



# DOCKS THE FUTURE

defining the concept of "Port of the Future"

## Analysis of macro-trends and perspectives in the maritime sector

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## 1 Introduction

Task 1.4 provides a survey on the most essential macro-trends on a global level and hence, not focussing on the maritime sector but which are assumed to have probably impacts also on ports and shipping. Therefore, Task 1.4 is complementing Task 1.3 which refers to foreseeable developments in the ports and shipping sector.

Shipping and thus port operations depend as diverted demand from international trade and its need for transport and handling facilities. Therefore, the further development of global macro-trends having impacts on international trade are supposed to affect also the future development of ports and shipping. These trends occur of course from different thematic areas, like e.g. changes in economic patterns, environmental framework conditions or disruptive technologies. In order to gather those relevant macro-trends, the main thematic areas have been identified, i.e.

- economic trends
- environmental trends (incl. energy)
- society trends
- technological trends
- governmental/political trends

For each of the thematic areas the most essential trends will be identified and described in order to gain a survey about what is expected to happen until 2030. It is assumed that thematic overlaps of macro-trends will likely occur as trends interrelate and moreover reinforce each other with regard to their impacts. Macro-trends are supposed to refer to a global level but the influence on regional levels are of course different depending on factors like economic developments, societal frameworks or governmental structures.

## 2. Macro-trends

## 2 Macro-trends

### 2.1 Macro-economic trends

Macro-economic trends will furthermore base on an ongoing globalisation in terms of international trade and international capital movements. Expected developments are an increase in trade by about 4 to 5% p.a. and investments and more complex trade and investment relationships. However, these processes will be accompanied by uncertainties or counter acting developments like the implementation of new trade barriers or reduced trade liberalisation following certain national policies (e.g. introduction or raising of import tariffs by the U.S government and follow-ups by other countries, like China or trade blocks, like the EU) or by cascading economic problems from a national or a sectoral level to an international level, like the crisis in 2008. However, these uncertainties will not affect the overall framework of globalisation and reduce volume of trade but might influence expected growth rates.

The global GDP is expected to grow by factor three from 2010 to 2030 with impacts on the global demand and supply for raw materials, semi-finished and manufactured goods and services. Based on a the OECD Economic Outlook (2014), OECD countries will have a share of about 56% in the global GDP while non-OECD economies will show for 44% in 2030 – compared to 67% for OECD countries and 33% for non-OECD countries in 2010.<sup>1</sup> Reason for this significant change are strong economic developments in these non-OECD countries particularly in China and India as both here are assumed to strongly increase their GDP leading to a 31% share in the global GDP and showing moreover a 35% share in global population. These strong economic developments will take place also in Brazil, Russia, South Africa, Mexico or Indonesia – and also driven by population growth and interlinked areas like technology developments or societal changes. In 2030, China, India and Brazil are expected to be ranked top-five in the national GDP listing.

In addition to the trend in the GDP development, the GDP per capita will develop stronger until 2030 compared to 2010 than in the periods before. Even if the high-developed countries still will show the highest GDP per capita, a strong increase will derive from medium and low-income countries like China, India, Vietnam and Indonesia – with consequences on consumption, infrastructures, trade and transport developments.

With regard to trade developments, intra-regional trade will gain higher importance. Already nowadays, intra-regional trade is bigger than on an inter-regional level. Currently, intra-EU trade has a share of about 70% in total EU trade, while intra-Asia trade has about 53% and intra North America trade about 49% of total trade volumes. Until 2030 it is expected that these intra-regional trades will double. On a global level, exports from Asia will double to 39% compared to 2013.<sup>2</sup>

In this respect, the trend towards an increase of regional trade blocks is assumed to be pursued having impacts on the above-mentioned trend in the development on intra-regional trades. Most essential reason for an ongoing development towards regional trade blocks is the aim to lower or abolish trade barriers on a regional level. However, the degree of strength in the development and role of regional trade blocks will depend on the situation on a global trade field and whether national protection strategies (like the 'America First' or national protection policy) will get followers or if global trade will develop around or despite these protectionism policies.

From an economic view, the growing significance of cities will continue. From the beginning of the industrialisation, cities were a cradle for trade, financial flows, consumption, infrastructure and technology developments. Comparable to the changes in the GDP ranking, also here cities in current high-industrialised countries will drop behind cities in emerging countries. It is expected

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<sup>1</sup> OECD Economic Outlook, Volume 2014/1, OECD, Paris.

<sup>2</sup> Global Marine Trends 2030, Lloyd's Register, a.o., London, 2015

that New York and Tokyo will still lead the GDP ranking but other big cities from the U.S, Japan and Europe will fall behind rising cities from China, India and cities from Latin America until 2030. The development until today has led to the fact that more than 50% of the richest cities are port cities and this trend will further intensify towards 2030.

## 2.2 Macro-environmental trends (incl. energy)

Macro-trends from an environmental perspective are dominated by climate change and resource stress covering availability and use of natural resources. The climate change, which has taken place due to greenhouse gas emissions, will be a further essential issue towards 2030 and in the decades afterwards – and hence required appropriate activities to cope with this challenge. Looking at the sources for GHG, the production and consumption of energy based on fossil energy sources provides the biggest share of GHG (78% in 2015). The Paris agreement in 2015 reconfirmed the aim of limiting global temperature rise well below 2 degrees Celsius, while pushing efforts to limit the rise to 1.5 degrees. Under this Paris Agreement, the EU confirmed the goal to reduce GHG by at least 40% below 1990 levels until 2030. This global challenge requires efforts in improving energy efficiency, strengthening the use of renewable energy and developing international and national strategies and policies that facilitate market-based mechanisms and financial instruments to accelerate investments in sustainable clean energies.

The second significant environmental macro-trend is the future demand for natural resources until 2030 and the diverted stress on these resources, i.e. on water, nutriment, land and energy that will derive from pressures from ongoing economic growth, urbanisation, demographic development and requirements from climate change.<sup>3</sup> Major changes in worldwide productions and consumption will cause further strain on limited natural resources. With regard to demand for nutriments, an increase in world population from 6,9 bn in 2010 to about 8,6 bn until 2030 will require a step-up of about 50% in production of nutriment. Looking at future water demand and supply, there will be a discrepancy of 40% in 2030 leading to a worsening of the situation today of worldwide access of people to water resources. Energy demand is expected to grow by 40% compared to 2010 whereby the growth in OECD countries is likely to be marginally, while in contrast about 75% in developing countries.

Fossil fuels will still play a key role in in energy production in 2030 and beyond as adapting the world energy system to alternative sources requires time and moreover, fossil fuels still provide large reserves that can be economically exploited. Crude oil is expected to support easily the matching with the increasing energy demand and its supply will grow by 38-63% until 2030. The same is valid for coal where reserves currently are about 140 times the annual production in 2011 and a forecast growth in production by more than 100% until 2030 with China as the leading coal producer.

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<sup>3</sup> Future State 2030: The global megatrends shaping governments, KPMG, Zurich, 2016



## 2.3 Macro-societal trends

From a societal view, demographic development presents an essential macro-trend with strong impacts on the future.<sup>4</sup> It is expected that on a world-wide level by 2030 about 1 billion people will be 65 years old or older that means about 19% of the total population compared to 8% in 2016. The ageing of the global population by increased live spans and a decline in birth rates will pose big challenges on global societies, particularly on their fiscal and social welfare systems and also employment markets.

In 2030, the total world population will be around 8,6 billion people with India as the country with the biggest population (18%) followed by China (17%). The European Union will have a share of about 6% in the total population and among other individual countries with single-digit shares around 2-3% are Pakistan, Indonesia, Nigeria, Russia and Bangladesh.

On a global level, 5,2 billion people will live in cities representing a share of about 60% of the total population (55% in 2018) – a trend that is expected in all countries, but the highest increase rates for urbanisation will be in Asia and Africa. Main reason is that cities provide better economic and social prospects (e.g. job opportunities) which in turn will require that an increased demand for infrastructures, energy and water will have to be met by an adequate supply. The number of megacities with inhabitants above 10 million will increase from 20 in 2016 to 37 or higher in 2030. Many of the mega and also major cities are in Asia, Latin America and Africa with locations in or close distance to sea or inland ports allowing a good access to maritime transport services.

Another trend having impacts on global societies is the so-called 'rise of the individual' which is caused by better access to education for a much larger part of the global population than today. The advance in information and communication technologies will play a vital role here. As consequence from better education, higher salaries accompanied by higher lifestyle expectations are estimated and moreover the ongoing of the process towards equal treatment of women in most countries.

Around 60% of the global population will belong to the so-called middle class compared to merely 27% in 2009 whereby 80% of the middle class will live in developing countries against 58% in 2010.

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<sup>4</sup> A growing and ageing population - Global societal trends to 2030: Thematic report 1, RAND Corporation, Santa Monica, California/Cambridge, UK, 2015

## 2.4 Macro-technology trends

The development of technologies has played an essential role for the global societies in the past and will do so in the future until 2030 and beyond, inter alia in sectors like science, engineering, health, manufacturing and transport. Technology aims at solving specific problems of modern societies as well as creating the future global framework drive technology development.<sup>5</sup>

An essential macro-trend here is the ongoing development of information and communications technologies, inter alia through blockchains, digitalisation, autonomous machines, sensible sensor systems, Big Data applications, Internet of Things (IoT) and artificial intelligence systems. These technologies will have impacts on processes and products, e.g. utilisation and management of energy and natural resources, development of new markets and new value chains, shifts in worldwide trade patterns and international competitiveness.

Global impacts from a significant technology trend derive also from the development of additive manufacturing. Here, 3D printing is the most known trend that is expected to have impacts on digital transports, warehousing, manufacturing of products, use of manufacturing materials, waste handling and logistic processes. However, a final time horizon for market maturity is still not fully clear as a number of problems are to overcome like suitable materials for the processing, standards or industrial ownership rights.

Blockchains is a disruptive technology assumed as having fundamental impacts on the electronic business communication. Decentralised stored blockchain technology is considered as fail-proofed and offering a higher availability compared to conventional centralised systems. The integrity of blockchains like any potential subsequent manipulation of data, is ensured through an applied cryptographic interlinking which leads to an improved and simplified transaction security in non-centralised systems. Blockchains are based on the operational applications of the electronic currency Bitcoin and have been used also in a closed environment in the banking sector. Meanwhile, a number of pilot projects have been launched like in the energy, trade and transport sectors. Based on blockchain technology cost savings of up to 20% in the overall logistic costs of supply chains are estimated by substituting conventional creations of trade documents and their physical transportation. However, blockchain has still not achieved market maturity and the current ongoing pilot projects are expected to provide rather no strategic results on the transferability of benefits from blockchain technology for a larger share of companies and sectors. Hence, market penetration of blockchains in the different industries will depend on a number of factors like standards, regulations, technology maturity, type of assets and the degree of cooperations among companies (being often also competitors).

Trends in biotechnology are also assumed as having a macro-character with high impacts. Important areas in such a framework are genetics and genomics, biology informatics or molecular biology. Impacts are expected in a number of different areas tackling nowadays important issues like global warming and cutbacks in nature, sustainability in many sectors like energy, transport, economics and agriculture and also global health.

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<sup>5</sup> The Ocean Economy in 2030, OECD, Paris, 2015

Trends in nanotechnology will have significant impacts on economical processes in many areas but also on environmental and social challenges as they will change characteristics of materials and products, i.e. being stronger, cheaper, faster, lighter or more energy efficient.

## 2.5 Macro-governmental / political trends

Governmental- or political-related macro-trends are not clearly separated from other macro-trends. Hence, some trends have been described already like e.g. the increasing significance of emerging and developing countries and the changes in economic and consequently political power. Another example for these overlaps are environmental related trends and challenges where governments and policy need to act accordingly like on climate change or a sustainable use of natural resources.

An additional macro-trend on a governmental level is the development towards a further increase in public debts – mainly caused by the 2008 crisis - as these have in turn significant impacts on policy and fiscal options with regard to other areas with governmental responsibility like responding to environmental and societal challenges, guiding economic developments or supporting new technologies.<sup>6</sup> The ageing of the population will require about 4,4% of governmental spending for health and pensions in developed countries from their GDP and 3,2% of the GDP in developing countries. With regard to infrastructure costs caused by an increasing urbanisation, it is expected that around 41 trillion US\$ are required in the period between 2005 and 2030. Further public financial risks are expected by natural disasters, like increased floodings, droughts, extreme weather events and polar melting causing large financial burdens for all waterborne sectors. A projection until 2050 forecasts that these costs due to natural disasters could run up to 1% of the global GDP per annum.

Public debts in developed countries have raised from about 46% in 2007 to roughly 78% in 2013 and will further increase to about 95% or above of the global GDP under the assumption that current trends will continue.

Public debts are also an issue for China with regard to its 'Belt & Road Initiative' (BRI). China issued long-term loans to mostly underdeveloped or developing countries which dispose of natural resources or other properties functioning as kind of guarantees or incentives for China to act as lender. Among the countries benefiting from China as lender for most investments in infrastructures and public services, there are a number of countries which show the risk to get debt distress, e.g. due to potential economical setbacks caused by natural disasters. This in turn leads to a mutual vulnerability between China and the borrowing countries. This would bring economical risks to China and its economy and hence to the global economy reflecting the current and future role of the Chinese economy.

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<sup>6</sup> Future State 2030: The global megatrends shaping governments, KPMG, Zurich, 2016

# 3. Potential impacts from global macro- trends on the maritime sector

### 3. Potential impacts from global macro-trends on the maritime sector

Direct potential impacts on ports until 2030 deriving from these macro-trends are hardly to assess as port developments depend on ports of call strategies decided by ship operators and on volumes handled in ports based on vessel calling. However, some of the macro-trends will indirectly impact shipping and port via a reduced growth of international exchanges of goods. Hence, in the following part assumptions with regard to impacts of macro-trends on ports are made where maintainable.

The current and future economical growth in especially developing countries will still have positive impacts on the development of international trade – among regional trade blocks but also on a global level. The increasing demand for consumer as well as for investment goods for a longer period will be covered by supply from the currently developed and emerging economies. On the other hand, the developed economies are expected to experience a further slowdown in consumer demand, economics growth and consequently demand for imported goods. Reasons for this trend can be seen in the saturation of larger parts of the population with respect to container volumes and other sea transports related consumer goods, the over-ageing of population leading to reduced shares of income spending for consumption and the ongoing trend towards service-oriented economies. These assumptions, if compared to past experiences, could lead to an under-proportionate growth of world trade and consequently seaborne cargo transport. This has of course impacts at least on the speed of demand growth for international shipping and hence ports services as derived demand. While during the last decades the relation between growth rates of global GDP and global trade showed a ratio of about 1:1.6 it is expected that this ratio will be smaller in the period until 2030. Demand for container shipping and port handling services in the past decades grew even faster, i.e. the ratio between GDP and container handling growth rates was 1:3. This over-proportionate growth will become also significantly slower as a result of the reduced growth rates of international trade on the one and the limited potentials for a further containerization of current general cargo trade flows on the other hand.

In general, the macro-trend with regard to changes in populations and population structures will also influence the structures of global trades. In China the one-child-policy resulted in a reduced growth of population, increases in average ages and finally in shortage of workforce with the effect of rising salaries and labour cost. Of course, this on the one hand fosters rising demand for imported consumer goods and on the other hand makes outsourcing of production for developed economies less attractive. Consequence will be a change in global trade structures with impacts on the demand for ports services. Shipping and thus ports might be affected also by trade restrictions imposed by the U.S. as there may be a shift of trade relations from the transpacific trade towards the Asia-Europe trade.

A counter-acting trend on a global level might be the further growing of the middle class with better education, higher salaries and accordingly changing lifestyle expectations and consumption, which will lead to increasing seaborne transports of raw materials, semi-manufacture and manufactured commodities, including related logistic services. Here, shipping and hence ports as interfaces between shipping and land-based transport flows to industry sites, trading firms or final consumers will further benefit from these trends leading to a rising demand for maritime logistics but less significant compared to the past. Here, in the past a 1% growth in world trade lead to a 1% growth in maritime transport and to about 3% growth in container transport. However, these correlations

are not expected to continue meaning that the impact on growth rates in global trade will have less impacts on maritime trade and container trades. Here, particularly container trades have been subject to saturation effects (e.g. due to already high degrees in containerization) which will continue also in the future.

With regard to the expected growth in the global population, the growing demand for nutriment, clean water and related technological products will also benefit ports and shipping as the cost advantage of shipping transports is here of particular significance for transports and logistics of clean water, nutriment and fish farming.

As with regard to environmental trends, the global economic and societal development will lead to an overall upwarding demand for energy. In order to meet the demand within the time horizon until 2030, it is expected that fossil sources will play further on an essential role for the production of energy, even if alternative energy sources will gain an increased importance over the years to come. However, main sources here are at sea which is why exploitation will move furthermore to offshore production sites facilitated by higher oil prices and technological developments coping with environmental challenges. In addition, also alternative energy sources will continue to enhance market shares like offshore wind farms and other sea-related energy sources like technologies using the energy of waves and tidal currents, e.g. in combination with additional approaches like aquaculture to solve food related issues. Positive impacts are expected for ports from production and handling sites for offshore platforms and other equipments and bases for related logistic services like maintenance and supply. Expected world wide growing volumes in alternative fuels like LNG or methanol for transport and production will cause also a demand for handling and bunker capacities in ports.

With the irreversible force and trend to reduce emissions also from shipping there will be additional challenges for the ports on a global level – particularly with regard to port-city relations and the need for public acceptance of port operations and their consequences. Local emissions from ship operations have negative impacts not only on ports but also on populations living in port regions. According to the OECD about 230 million people who are living in the area of the top 100 ports in the world are directly affected by local emissions from shipping operations, like NO<sub>x</sub>, SO<sub>x</sub> and PM. Looking at the ten ports with the highest pollution from SO<sub>x</sub> emissions on a world-wide scale, approximately 40 million local residents are struck here – meaning that here about 22% of SO<sub>x</sub> emissions from global shipping operations are generated here. The SO<sub>x</sub> emissions can not be reduced by relying merely on low-sulphur HFO – inter alia due to potential constraints in the supply of low-sulphur HFO - which means that a higher share of vessels will have to be equipped with (dry) scrubbers. Here, ports will be affected as they have to provide the necessary infrastructures to supply calcium and to dispose the residual gypsum.

Hence, the role of ports in the reduction of emissions from shipping and ports operations will further increase. As done in the recent years, ports will have to initiate emissions reduction measures like infrastructure developments, incentives and regulations relevant for ship operators when calling a ports but also for terminal operators and logistic providers involved in port and hinterland processes (e.g. pre- and on-carriage by trucks). Provisions of infrastructures for alternative fuels (like LNG or Onshore Power Supply) and for efficient hinterland processes (e.g. pre-gate systems), development of port-emission-reduction-strategies (e.g. by aiming at 'zero-emission terminals') as well as introductions of incentives for vessel operators to enhance their environmental performances of vessels (e.g. rebate systems in port charges like ESI) will be ongoing challenges for ports to contribute to local and global environmental improvements of the maritime sector. An ongoing example with regard to port triggered CO<sub>2</sub> measures represents for

future ports activities here us the initiative of the port authorities of Antwerp, Barcelona, Hamburg, Los Angeles, Long Beach, Rotterdam and Vancouver who agreed in the framework of the Global Climate Action Summit to develop and perform joint 'climate protection' projects. The basic concept of the involved port authorities is that ports play a crucial role in reducing emissions from the maritime sector to achieve the climate goal from the Paris Agreement to keep global warming significantly below 2 °C. Hence, it has to be clearly expected that ports will become furthermore active in responding to ongoing emission-related problems and challenges.

According to the OECD environmental performances of European and Asian ports have been already relatively good considering that they show for about 70% of total port calls with being responsible for roughly 50-60% of ship-related emissions due to high port handling efficiencies (e.g. through efficient berth times) compared to ports on the American and African continents. However, even if further emission reductions measures in EU ports will have less impacts than in other parts of the world, it remains clearly important to further tackle these measures – moreover against the background that local emissions reductions are essential for port-city relations.

The ongoing climate change is expected to lead to more natural disasters in the future like extreme rain overflows, droughts and the ongoing melting of the polar ice caps. The port sector will be clearly affected by high floods, winds and a rising sea level which then clearly requires to adapt port infrastructures to cope with these developments. Ship-related impacts like the reduction of GHG emissions from shipping transports based on IMO decisions affects ports again as they need to provide relevant bunker facilities (cold-ironing or LNG bunkering) – and moreover, drive also ports to reduce emissions from port operations.

Societal trends with regard to the development of the global middle class, a more enlightened and ageing population, better global health conditions and better education will have impacts on a global attitude towards environmental challenges and also on the main actors here like the global maritime sector, particularly shipping operations. Impacts from environmental damages and existing labour conditions will enhance the public pressure on ports and shipping to comply with environmental and social requirements, standards and legal framework conditions, e.g. by implemented GRI standards<sup>7</sup>. Ports are assumed to continue their efforts to reduce emissions from port operations but also from ship operations, e.g. by setting incentives to ship operators to lower emissions from the shipping side – but also with regard to safety and security standards in port workers environment.

Technology trends, particularly in ICT will also have impacts on ports. Here, digitalization will influence and change port internal operational processes as well as along the whole logistic chain. The development towards autonomous ports which is significantly based on digitalization has been seen already nowadays and will continue as automation in port operations, but also autonomous vessels or trucks in hinterland transports is further emerging.

The Internet of Things could change global logistic chains as intelligent devices are increasingly organizing logistic flows independently. It has been an ongoing process that ports have tried to increase their influence on the logistic chain through extending their services also to hinterland operations (e.g. by building and operation of train services) or by offering dedicated terminals or owned-ship operator terminals to bind shipping services to the respective ports. Independent decision process may change here the structure of building business process and relations putting ports again back to their roles merely as interfaces in logistic chains but with less impact on the

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<sup>7</sup> GRI = Global Reporting Initiative

design of logistic chains. Therefore, efficient port systems including optimized hinterland transport infrastructures for all modes are expected to become even more vital than today in order to maintain or gain competitiveness in supply chains organized by autonomous intelligent devices.

The impact on ports deriving from blockchain technologies is depending on the degree of implementation of blockchains in the shipping sector – and so the corresponding time horizon. In the shipping sector the use of electronic data transactions is still very low and hence, most processings use paper documents. There are technical, operational and legislative reasons why the use of electronic documents in shipping is still underdeveloped – particularly compared to air transport. Expected benefits from the use of blockchain technologies are significant improvements of the efficiency of operational processes like an enhanced digitalisation and an end-to-end visibility of supply chains. Within the maritime sector, it is assumed that enhanced operational logistic processes will lead to significant cost savings – particularly in the container market - and in turn to an increase of up to 15% in global trade. To what extent blockchains can prevent cyber attacks, e.g. with regard to past cyber attacks against Maersk in 2017 by against ransomware attack, is still uncertain. Challenges do also exist with regard to legislative issues like issues on contracts (e.g. stakeholders-authentication by digital signatures), liabilities or data protection. In current available information on pilot projects in the maritime sector, the issue of migration of conventional systems to blockchain system is not covered and relevant aspects of IT security are only covered marginally. Moreover, sharing business data is still a sensible issue and reluctance by the relevant actors needs to be overcome. Hence, even with a medium or long-term market penetration of blockchain technology, relatively long transition periods are assumed to be required in which traditional EID-based port communications and new blockchain technologies do exist in parallel, e.g. with regard to mandatory notifications to authorities (e.g. customs) – and which will require migration strategies. Here, particularly operators of port community systems with services concerning centralised databases and communication systems will need to prepare for new structures communications along supply chains and for new business models.

Furthermore, the trend towards 3D Printing will have impacts on global logistics like on transport of raw materials and semi-manufactured and manufactured goods, production processes, warehousing provided that market maturity will be achieved, including certifications and liabilities of 3D printed parts and cyber security issues. These developments affect global logistic chains, including shipping and hinterland transport and ports as nodes in these global chains. It is expected that 3D Printing will increase transport of raw materials as material input while less semi-final and final products will be transported and production will move closer to final consumption sites. Hence, transported container volumes are supposed to decrease – with consequences for handling of container volumes in ports. Furthermore, 3D Printing could increase onshoring activities of the industry provided that benefits from 3D Printing (e.g. logistic costs, product quality, transaction costs) will outbalance potential rises in labour costs.

In this context, an essential issue is also the protection against cyber attacks following an ongoing digitalization. As recent examples have shown, e.g. cyber attacks on the container carrier Maersk and APM terminals in 2017, cyber security is and will be an essential issue also for ports until 2030 and beyond. Logistic chains and the related IT are so complex in the meantime that disturbances in the flow of information and in the operational systems of ports and shipping lines can lead to complete breakdowns with impacts not only within the ports and the lines themselves but on the downstream production processes. Therefore, cyber resilience will become an essential asset for ports in order to protect internal port operations, port as intermodal nodes and the concerned overall logistic chains.





The described development towards a further increase in public debts on a global level and the potential economic consequences bear also risks for the port and shipping sector. Here, clearly China inter alia with its 'Belt&Road Initiative' (BRI) poses a risk for the global economic development. While China supported its own economy as well as the world economy after 2008 through a debt-financed stimulus package, since then the increase of China's debt have been above its economic growth. This led to the second highest level of public debt globally and presents potential economic risks to China's economy as well as to the global economy. Due to China's current and growing significance for the global economy, particularly through its demand for raw materials, machineries and equipment and consumer goods, any economic downturn in China will have strong impacts on the development of the world economy and lead to subsequent consequences for the shipping and port sector that depend on global trade.

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