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WORLD ECONOMY, SEABORNE TRADE AND POSTURE OF MARITIME SECTOR IN THE NEXT DECADE

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ABSTRACT

The maritime transportation which is directly related to improvements in the World economy and Trade seriously affected from the economic and financial crises in the last two decades. The posture of the maritime sector stayed in apposition to make changes in a drastic manner to protect itself from global crises. The sector needs to see the future of the world economy to shape its structure and expectations. The aim of this study is to define new posture of the maritime sector by reviewing significant changes in the World economy, trade and seaborne trade to define some proposals for the countries developing their maritime industries. The study starts with the review of related literature which is mainly based on broad range of empirical researches made by internationally recognized organizations. After summarizing new improvements in the maritime industry, it is intended to make an evaluation on the impacts of the World changing economic, trade and transportation requirements which will directly create an impact on shipping. As result of this evaluation some proposal are produced to adopt these improvements to improve maritime industry in the developing and emerging economies. The result of this study will assist the maritime sector to imagine the new posture of the World to enable them to define a correct vision on maritime affairs. This study may help the researcher to understand the new posture of the future of maritime sector and use it as a reference to make research on different elements of shipping such as shipbuilding, freight rates and port development.

Keywords: Maritime Sector, Maritime Transportation, Seaborne Trade, World Economy, World Trade

1. INTRODUCTION

a. Maritime Transportation

The evolution of sea transport is a well-travelled road which we can even plot on a map. Over 5,000 years, whether by chance or some deeply hidden economic force, the commercial centre of maritime trade has moved west along the line shown by the arrows in Figure 1. This 'Westline' started in Mesopotamia in 3000 BC, and progressed to Tyre in the eastern Mediterranean then to Rhodes, the Greek mainland and Rome. A thousand years ago Venice (and soon after Genoa) became the crossroads for trade between the Mediterranean and the emerging north-western European centres of Cologne, Bruges, Antwerp and Amsterdam. Meanwhile the Hanseatic towns were opening up trading links with the Baltic and Russia. The two streams merged in Amsterdam in the seventeenth century and London in the eighteenth. By the nineteenth century steamships carried the Westline across the Atlantic, and North America became a leading centre of sea trade. Finally, in the twentieth century commerce took another giant step west across the Pacific as Japan, South Korea, China and India picked up the baton of growth. This evolution of maritime trade was led successively by Babylon, Tyre, Corinth, Rhodes, Athens, Rome, Venice, Antwerp, Amsterdam, London, New York, Tokyo, Hong Kong, Singapore and Shanghai. At each step along the Westline there was an economic struggle between adjacent shipping super-centres as the old centre gave way to the new challenger, leaving a trail like the wake of a ship that has circumnavigated the world. (Stopford, 2009).



Figure-1: The Westline: 5,000 years of maritime trading centres (Source: Stopford, 1998)

Approximately 90% of international trade is made by maritime transportation today. The capacity of maritime transportation measured by tonne-miles not as tonne. By 1990s four-fifths (81%) of ship traffic is conducted in the northern hemisphere and today more than 60% of the traffic is in the Indian and Pacific Oceans pending upon the importance of Asian in global trade.

b. World Economy

Global growth is projected at 3.7 percent for 2018-2019 which is -0.2 percentage point lower for previous year. The downward revision reflects surprises that suppressed activity in early 2018 in some major advanced economies, the negative effects of the trade measures implemented or approved between A weaker outlook for some key emerging market and developing economies arising from country-specific factors, tighter financial conditions, geopolitical tensions, and higher oil import bills (WTO, 2018).

The change of World GDP was over 5% between 2004 and 2008 related to the high rate of GDP change in the Emerging economies. But a sudden drop is observed in the Economic (Financial) Crises at 2008. The negative effects of this crises started to change after 2008 and Change of GDP is stabilized at over 3%. Since 2008 this GDP change is 3.8 % and it is expected that figure will not be changed by 2023 (Figure 2).



Figure 2: Change of the World GDP

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If the GDP growth of the past 40 years is considered (Figure 2) the growth is approximately 3.8 percent except the significant increase between 2000 and 2008 related to the inclusion of China and India in the World economic system. A significant change of GDP growth is not expected for the near future unless an unexpected political and/or economic crises is raised.

World merchandise trade volume is expected to grow 4.4% in 2018, accompanied by GDP growth of 3.2% at market exchange rates. Faster trade expansion is being driven by stronger economic growth across regions, led by increased investment and fiscal expansion. Trade growth in 2018 is likely to fall within a range from 3.1% to 5.5% if current GDP forecasts come to pass, although a continued escalation of trade restrictive policies could lead to a significantly lower figure. Trade growth should moderate to 4.0% in 2019 even as global GDP growth slows slightly to 3.1%. WTO economists publicized that "World merchandise trade growth is expected to remain strong in 2018 and 2019 after posting its largest increase in six years in 2017, but continued expansion depends on robust global economic growth and governments pursuing appropriate monetary, fiscal and especially trade policies (WTO, 2018a).



Figure 3: Real GDP Growth, by Country Group Source (IMF, 2018)

c. World Seaborne Trade

Global seaborne trade is doing well, supports by the 2017 upswing in world economy. Expanding at 4 percent, the fastest growth in five years, global maritime trade gathered momentum and raised sentiment in the shipping industry. Total volumes reached 10.7 billion tons, reflecting an additional 411 million tons, nearly half of which were made of dry bulk commodities (UNCTAD, 2018).

A significant increase is observed in containerized trade (6.4 percent) and dry bulk cargo (4 per cent), as crude oil is decelerated to 2.4 per cent. Prospects for seaborne trade are positive; UNCTAD (2018) projects volume increases of 4 percent in 2018, a rate equivalent to that of 2017. Contingent or continued favourable trends in global economy, UNCTAD is forecasting a 3.8 per cent compound annual growth rate between 2018 and 2023. Some negative impacts are concerned due to trade tensions between China and United States. This tension will also effects European Union and country in close cooperation with United States (Figure 3).





The capacity of World fleet was decelerating since last five year. In 2017 42 million gross tons were added to the world fleet that means 3.3 per cent growth rate. The Marshall Islands emerged as the second-largest registry, after Panama and ahead of Liberia. China, japan and South Korea are the key countries in the shipbuilding as having the 90 percent of World capacity.

Having an increasing global demand, a stable supply and demand condition is established and this increase freight rates. Considering Industrial Production and World Trade since 2005, there is a slight increase in World trade and it will be a positive sign for the future of seaborne trade.



Figure 5: World Trade and Industrial Production (IMF, 2018)

As global demand improved and merchandise flows expanded, freight shipping rates continued to rise. World maritime transport exports consequently recovered, rising by around 5 percent in 2017, following a decline of 11 per cent in 2016, while transport services via all other transport modes, such as rail and road, grew by12 per cent (WTO, 2018).

2. RESEARCH METHOD

The aim of this study is to define new posture of the maritime sector by reviewing significant changes in the World economy and trade and, to define some proposals for the countries developing their maritime industries.

Meta synthesis is applied for this study. Reciprocal Translation method of meta-synthesis which is "Concepts in one study can incorporate those of another" is applied. Different approaches, considerations and predictions from versified sources are reviewed, evaluated and discussed to interpret the future of maritime management.

The study starts with the review of related literature which is mainly based on broad range of empirical researches made by internationally recognized organization. After summarizing new improvements in the maritime industry, it is intended to make an evaluation on the impacts of the World changing economic, trade and transportation requirements which will directly create an impact on shipping. As result of this evaluation some proposal are produced to adopt these improvements to improve maritime industry in the emerging economies.

The result of this study will assist the emerging countries to imagine the new posture of the World to enable them to define a correct vision on maritime affairs. This study may help the researcher to understand the new posture of the future of maritime sector and use it as a reference to make research on different elements of shipping.

3. THE WORLD SEABORN TRADE

3.1. Importance of Maritime Transportation

The maritime Transportation is important for both national and international economy concerning the following aspects;

- Provide Freight and other earnings
- Provide employment
- > Ensure political and military independence
- Assure Prestige
- Maintain other social and public benefits

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Over the last 50 years seaborne trade has seen a remarkable development. Shipping carries the vast majority of international trade with its share ranging between 80 and 90 per cent of trade. This predominance is particularly pronounced in developing countries where trade structures including the low volumes of intraregional trade leave limited space for land transport and air transport. In terms of trade value, of course, the shipping share is considerably lower with various estimates hovering around 60 to 70 per cent of trade (UNCTAD, 2018b)..

3.2. Improvement in seaborne trade

The long-term trends in seaborne trade since 1970 in the Table 1. As far as concerning cargo types liquid and dry bulk cargoes as the main part of global se trade. Depending upon the large amount of energy requirement gas and oil products were bigger than the major bulk carriage. But after 2003 the amount of the oil and gas and bulk cargo carried reached approximately the same figures. This change is directly related to the speedy development in manufactures trade. Figure 6 shows the change of the amounts of the cargo by the types of the cargo. A significant improvement is in the container cargo is evident as there is an equalization in the amount of dry bulk and oil products.

Fable 1: International seaborne trade development between 1970 and 2017 (Millions of tons loade)	ed)
(Source: UNCTAD 2018a)	

(Millions	of tons loaded)		, ,	
Year	Crude oil, Petroleum products & Gas	Main bulksª	Dry cargo other than main bulksª	Total (all cargoes)
1970	1 440	448	717	2 605
1980	1 871	608	1 225	3 704
1990	1 755	988	1 265	4 008
2000	2 163	1 295	2 526	5 984
2005	2 422	1 7 1 1	2 976	7 109
2006	2 698	1 713	3 289	7 701
2007	2 747	1 840	3 447	8 034
2008	2 742	1 946	3 541	8 229
2009	2 642	2 022	3 194	7 858
2010	2 772	2 259	3 378	8 409
2011	2 794	2 392	3 599	8 785
2012	2 841	2 594	3 762	9 197
2013	2 829	2 761	3 924	9 514
2014	2 825	2 988	4 030	9 843
2015	2 932	2 961	4 131	10 024
2016	3 055	3 041	4 193	10 289
2017	3 146	3 196	4 360	10 702

Note: a: figures for "Main bulks" include iron ore, grain, coal, bauxite/alumina and phosphate. Starting in 2006, "Main bulks" include iron ore, grain and coal only. Data relating to bauxite/alumina and phosphate are included under "Dry cargo other than main bulks".

Change of the international seaborne trade between 1980 and 2017 by cargo types is shown in the Figure 6. Technological developments in the technology and economy reshaped the fleet structure and type and size of the ships. The size of the ships and capacity is increased, new types of ships are appeared in particular in dry bulk and tanker shipping. The use of automation on board and ports become widespread. VLCC and ULCC become major element of crude and bulk carriage.

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Figure 6: International seaborne trade, selected years (Millions of tons loaded) (Source:Clarksons Research, 2018)

The improvement of the technology facilitated containerization which played a significant role to emerge multimodal transportation. This change integrated shipping and other mode of transportation. Figure 7 shows the increase of the container carriers versus general cargo ships. The enhancement of the number and capacity of container ships is expected. This also has increased number and capacity of the container ports. The capacity of container ports in 1970 was 225,294,000 TEU and it is reached to 752,714,000 TEU in 2017.



Figure 7: Ratio of container to general cargo fleet (tonnage), 1970–2018

3.3. Seaborne Trade in Figures

The seaborne trade capacity reached to 10.7 billion tons with a 4 per cent annual growth in 2017. The increase rate of cargo types in 2017; +6.7% containerized cargo, 5.4% major bulk, +2.4 % crude oil and 3.9% petroleum products comparing with 2016.

UNCTAD (2018) World Seaborne trade growth forecast for 2018–2023 is 3.8 percent. A fastest growth is expected in the containerized and dry bulk and slower pace in crude oil transportation

The percentage of the loaded and unloaded cargo in 2017 by the type of the economies is shown in the Figure 8. There is a balance between export and import in developed and developing economies, but it is unbalanced in the transition economies.

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Figure 8: Percentage of the Loaded and Unloaded Cargo in 2017 by the type of the economies (Source: UNCTAD, 2018)

3.4. Fleet development

The total world fleet in 2017 stood at 93,100 ships with 1.86 billion dwt. This compares to a fleet of 1.28 billion dwt in 2010, 800 million dwt in 2000, 680 million dwt in 1980 and 320 million dwt in 1970. Hence the 1970s and the two decades of the new millennium were decades with the highest fleet growth. These decades were also characterized by overcapacity in the shipping markets and consequent downward pressure on freight rates.

Figure 9 shows the development of the world merchant fleet by main vessel types from 1980 to 2018. The fleet development confirms the structural changes that took place in global trade. The share of tankers in the world fleet declined from nearly 50 per cent to less than 30. At the same time the share of dry bulk carriers increased from 27 to 42 per cent primarily reflecting the development of demand for ore and coal. The share of container tonnage is nearly 10 times what it was in 1980. At the same time and as expected, advances in transport technology resulted in a general cargo tonnage decline, from 17 to 4 per cent. Further reductions can be expected but at a slower pace as the process of containerization of conventional general cargo trades is more or less accomplished (UNCTAD, 2018).



Figure 9: World fleet by principal vessel types (1980–2018) (Source: UNCTAD, 2018)

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Global supply of container ship-carrying capacity

The global container demand at 6.4 per cent in 2017 with a estimated total volume of 148 million TEU Figure 10). Although supply growth was relatively moderate, the container market continued to grow across all trade lanes. The freight rates are also grown in 2017.

Average trans-Pacific spot freight rates increase by 16.7 per cent with the Shanghai–United States West Coast routes averaging \$1,485 per 40-foot equivalent unit (FEU). Rates on the Shanghai–United States East Coast route increase by 17.3 percent and averaged USD 2.457 per FEU, On the Shanghai–Northern Europe route, average rates stood at \$876 per TEU up by 27 per cent whereas Shanghai-Northern Europe averaged USD 876 per TEU, an increase of 19.4 per cent over the previous year.



Figure10: Container Freight New ConTex Index, 2010–2018 (Source: UNCTAD, 2018)

Dry Bulk Freight Rates

The dry bulk market underwent a remarkable recovery in 2017. Growth in demand for seaborne dry bulk surpasses the fleet growth, as demand for commodities went up while the surplus of vessels gradually continued to diminish. The seaborne dry cargo carriage 4.4 per cent in 2017, up from 2.0 in 2016.

Consequently, the Baltic Exchange Dry Index rebounded, especially after having experienced one of the weakest years in 2016 since the financial crises in 2008. As shown in the Figure 11, 1,153 points, reaching a peak of 1,619 points in December 2017, the highest level since 2013, the index averaged about 1,153 points, reaching a 1,619 points in December 2017, the level since 2013, when it had reached 2,178 points.



As a result, average earnings in all fleet segments, averaging \$10,986 per day in 2017, up to by 77 percent from depressed levels of 2016 (Clarksons Research, 2018b). The sector experienced a strong rebound in charter rates as growth in demand for commodities (see Figure 12).



Figure 12: Daily earnings of bulk carriers, 2009–2018 (Dollars per day)

4. RESEARCH

A New Approach in Forecasting and Planning Related to Marine Trade

Today, the freight rate used as main criterion for the companies operating in the maritime transport sector in their forecasting and planning. Freight price is tried to be determined by using classical supply demand function on a scale which have the number of ships supplied and demand of cargo to be transported. This freight price is still the main determinant for new shipbuilding, 2nd hand shipbuilding, ship sales and scrap sales.

Martin Stopford has introduced a relation between freight rates and, ship construction and sales of which fright rates increase for 4 years and following 4 years decrease as and simultaneously the other two. And this trend has been valid for many years. However, related to the growth in the world economy since 1990s which increased from 2 to 4 percent changed this situation accordingly. The freight rates, which started to increase significantly in the beginning of 2000 and peaked till 2008 (See Figure 13 and 14 examples). As a result of this misleading situation, shipbuilding investments have increased, and second hand ship prices have risen, making it impossible to find a new shipbuilding shipyard. With the financial / economic crisis that started in 2008, freight rates suddenly fell to the bottom. This situation led to the collapse of many maritime companies. Stopford's trend has never been restored and the uncertainty and stability have been continuing for 10 years.

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Figure-13: Oil Tanker shipping market 1947-2005 1950–2006 (Source: Stopford. 2009)



Figure-14: Coal transport costs from Hampton Roads to Japan, 1950–2006 (Source: Stopford. 2009)

When we examine the long-term, reliable data obtained from such as UNCTAD, OECD, etc.; the economic growth in the world increased by 3 percent in the last decade, 3.5 percent in the. World Trade and 6 percent in the maritime transportation (trade). It is assumed that the increase in trade is mainly due to psychological reasons and the increase in the sea trade is due to the fact that the goods are bulk container type cargoes which generally contains subsidiary goods. There is not a significant increase in the amount of petroleum and raw material required for industrial goods.

This situation has prompted marine operators to seek new methods. It is required to conduct a scientific research on a new trend for maritime transportation to enable the people to create a new concept to forecast the improvements which enable them make their midterm plans.

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The suggestion is to establish a method to estimate the growth in the Maritime transportation based on the growth in the world trade and world economy based on reliable data. This application will better define the supply demand curve to estimate freight rate, future expectations on ship construction and ship sales.

h. Freight Rates described by Stopford

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Freight rates link supply and demand. When supply is tight freight rates rise, stimulating ship owners to provide more transport. When they fall, it has the opposite effect. We looked in detail at the dynamics of the mechanism by which freight rates are determined and found that time-scale is important in reaching an equilibrium price. Momentary equilibrium describes the day-to-day position as 'prompt' ships in a particular loading area compete for the available cargoes. Short-run equilibrium describes what happens when ships have time to move around the world, adjust their operating speed or spend time in lay-up. In shipping the long-term is set by the time taken to deliver new ships – say, 2–3 years. This characteristic certainly influences the 7–8 year duration of freight cycles. Our analysis of supply–demand charts showed that the short-term supply function has a characteristic J shape, and in the short term demand is inelastic. Freight cycle peaks and troughs are produced by the inelastic demand curve moving along the supply curve. When it arrives at the 'kink' of the supply curve, freight rates move above operating costs and become very volatile. Beyond this point economics can tell us little about the level of freight rates; it is entirely based on the auction between buyers and sellers for the available capacity. In the long term the volatile freight cycles ought to average out at a 'natural' freight rate which gives investors a fair return on capital. Although this is true in theory (Stopford, 2009).

c. A new approach based on "Relations between Worlds GDP and maritime Trade"

There is a close relationship between world trades and World real GDP growth. Figure 15 shows the Ratio of world merchandise trade volume growth to world real GDP growth.

Historically, *world merchandise trade volumes have grown around 1.5 times faster than world real GDP* at market exchange rates. The ratio of trade to GDP growth (referred to as the" elasticity of trade with respect to income") rose above 2.0 in the 1990s, but fell back to 1.0 in the five years following the financial crisis between 2011 and 2016. This elasticity measure rebounded from 0.8 in 2016 to 1.5 in 2017, which is close to the historical average. Stronger trade growth relative to GDP growth is expected to continue at least into 2018, barring major economic shocks. Growth in trade volume of 4.7 per cent in 2017 was close to the average rate of 4.8 per cent since 1990 and firmly above the post crisis average of 3.0 per cent. The increase in merchandise trade in volume terms last year is somewhat due to the weakness of trade over the preceding two years, which provided a lower base for the current expansion. The fact that trade growth in value terms was stronger than in volume terms reflects both increasing quantities and rising prices.



The latest figures, says the WTO (2017) states that "a disappointing development and underline a recent weakening in the relationship between trade and GDP growth". While trade has typically grown in recent decades at *1.5 times faster than GDP, the ratio has in recent years slipped towards 1:1.* The Relationship between GDP Growth and Seaborne Trade Growth is shown in the Figure 16.



Figure 16: The Relationship between GDP Growth and Seaborne Trade Growth (WTO, 2017)

d. Latest trends in world trade 2017-2018

Global trade recorded its highest growth rate in six years in 2017, both in volume and value terms. Merchandise trade volume, as measured by the average of exports and imports, grew by 4.7 per cent, marking the first annual increase in excess of 3.0 per cent since 2011. The dollar value of merchandise exports rose by 11 percent, to US\$ 17.73 trillion, while commercial services exports increased by 8 per cent to US\$5.2 trillion (Figure 17).

Merchandise trade growth in 2017 was up sharply from 2016, when trade volume grew by just 1.8 per cent, the smallest increase since the financial crisis of 2008. Strong growth in trade volume in 2017 was driven primarily by cyclical factors, as world growth in GDP at market exchange rates rose to 3.0 per cent from 2.3 per cent the previous year (WTO,2017).



Figure17: Overall Assessment of Economic Values in 2017 (Source. WTO, 2017)

e. The posture of the Seaborne Trade and merchant Fleet by 2050

GL DNV (2017) study forecasts that trade measured as tonne-miles will experience 2.2% annual growth over the period 2015–2030 and 0.6% per year thereafter, driven mostly by non-energy commodities, as illustrated in Figure 18. Trade in individual energy commodities will decline as their use declines: coal first, then crude oil, thereafter oil products. Despite projected growth in oil imports in some regions, global seaborne crude oil and oil products, trade will reach peak volumes before 2030. Natural gas – as liquefied natural gas (LNG) and liquid petroleum gas (LPG) – will experience sustained.

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The greatest increase comes in the container and gas segments where fleet tonnage rises almost 150% to mid-century, responding to increased trade. For other cargo vessels, we project a doubling of tonnage by 2050 (GL DNV, 2017).



Figure 18: The World Seaborne Trade by 2050 (in tonne-miles) (Source. GL DNV, 2017)

The global cargo fleet will track the changes in trade volumes, as illustrated in Figure 19, but digitalization and improved utilization mean that the fleet will grow somewhat more slowly than trade. Measured by deadweight tonnage (DWT), the crude oil fleet will decline by approximately 20% by 2050, with the decline beginning after 2030. The product tankers fleet remains stable. The bulk segment experiences a moderate growth of about 50%.

The greatest increase comes in the container and gas segments where fleet tonnage rises almost 150% to mid-century, responding to increased trade. For other cargo vessels, we project a doubling of tonnage by 2050 (GL DNV, 2017).



Figure 19: Posture of the Fleet by 2050 (Source. GL DNV, 2017)

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f. Relations among World GDP, Seaborne Trade and Fleet Growth

The Fleet Growth by type is shown in Figure 20. The fleet growth in the past two decade is approximately 80 percent.



Figure 20: Fleet Growth between by ship types1996 and 2017

There is obvious correlation between world GDP and size of the fleet (Figure 21).



Figure 21: Relations between World GDP and Fleet Growth (Source: Clarkson, 2018)

The following graphic shows Relations between World GDP and Seaborne Trade (Figure 21). Again there is almost a perfect correlation between them. But fleet growth is more than growth of seaborne trade capacity. The growth of Seaborne Trade is approximately 4 percent over the World GDP growth since 2010.

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Figure 22: Relations between World GDP and Seaborne Trade (Source: Clarkson, 2018)

There is also correlation between world GDP growth, World Seaborne Trade growth and Global Merchant Fleet growth (Figure 23). There is an abnormality just before and after the 2008 Financial Crises. There is a sudden increase in World GDP and Trade just before the economic crises as seen in 1974, 2001, 2008 crises. This rise ceases at the beginning of the crisis, but the high values continues for 2 years after the crisis. That is evaluated that the sudden rises in the World GDP and Trade is the messenger of a new economic crisis.



Figure 23: Relations between world GDP growth, World Seaborne Trade growth and Global Merchant Fleet growth (Source: WTO, 2017)

g. Seafarer Supply and Demand

BIMCO/ISF Manpower Report provide us the most detailed and reliable data on the supply and demand of the seafarers. The latest edition is the of the five-year study was published in 2016 (BIMCO/ISF, 2016). According to the report, the forecast growth in the world merchant fleet over the next ten years, and its anticipated demand for seafarers, will likely continue the trend of an overall shortage in the supply of officers. This is despite improved recruitment and training levels and reductions in officer wastage rates over the past five years.

A current shortfall of about 16,500 officers (2.1%), but there is a need for an additional 147,500 officers by 2025 to service the world merchant fleet which is more than 18% of the global demand for officers on ships (Figure 24). There is a current surplus of about 119,000 ratings (15.8%), with demand only having increased by about 1% since 2010.

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Figure 24: Seafarer Supply and Demand - Officers (Source: HBSA, 2018)

Although autonomous shipping was once regarded as fanciful science fiction, it is now being considered feasible in certain operations, requiring a more serious and realistic review from the industry (Crew Connect Global, 2018). If by 2025 very optimistically some 1000 ships will be fully autonomous and some further 2000 vessels semi-autonomous, this may possibly reduce demand for seafarers by 30.000 - 50.000. However, at the same time the need for highly skilled remote-operators, pilots of a new kind and riding gangs will be needed to keep ships operational (HSBA, 2018).

But we should also consider what Kevin Tester (2017) stated: "Autonomous ships are more likely to alter jobs rather than eliminate them and [...] this, combined with the creation of new types of jobs, will lead to greater prosperity in the long run". That means autonomous ships will not be end of the seafarer's job but will create new professions which will be closely related to the seafaring job.

h. Analysis of the relations between the growth of GDP and growth of World Trade

GDP versus World Trade

The data used for statistical analysis is provided from the Figure 15 (Ratio of world merchandise trade volume growth to world real GDP growth) between 1981 and 2017.

The correlation between the growth of the GDP and World Trade is found as 0.16746 that means there is no a strong correlation between them.

The highest deviation is observed as -12 for World Trade and -2.4 for GDP growth in the year 2009. When this extreme figures are removed from data, correlation became 0.366 which is more meaningful. The multiple regression statistics are as coefficient 0.5989 and R2 is 0.5989. That proves there is a strong relations between world merchandise trade volume growth and world real GDP growth.

The average of the World Trade growth is 5.29 percent and growth of World GDP is 2.14. That means the growth of World Trade is approximately **2.5** *times bigger* than growth of World GDP.

GDP versus Seaborne Trade

However, the commercial shipping markets – whether chartering or S&P – are very far from being *transparent*. Making the right choices and/or managing and containing the risks is difficult. This is because – although the shipping industry is regarded, more or less worldwide, as being one of the most open and genuine marketplaces – the shipping market is far from being wholly transparent. Hence, there is a degree of skill needed to interpret the market information that is available. Shipping is *not a transparent* industry (Drewry, 2006). For that reason the data for seaborne trade is not so much reliable.

Relationship between GDP Growth and Seaborne Trade Growth could be made using the data in the Figure 15 which contains more reliable data provided by WTO.

The correlation between the growth of the GDP and World Trade is found as 0,419297 that means there is a strong correlation between them.

The average of the Seaborne Trade growth is 4,154545455 percent and growth of World GDP is 4.652. That means the growth of World GDP is approximately 1.12 times bigger than growth of Seaborne Trade.

i. Routes of the Maritime Trade

DNV GL (2017) made a study on the Shipping Traffic at 2016 tracked by fuel use for all types of ships. DNV GL has also made a calculation as based on AIS-use that values of this assumption is introduced in the Table 2. Seaborne Trade Routes has changed between 2000 and 2016 depending upon the rise of the Chinese and Indian economies. As the Indian and Pacific Ocean trades grown a significant relative reduction in intercontinental traffic in the North Atlantic is happened. More than 60% of 2016 traffic is in Indian and Pacific waters, highlighting the importance of Asian trade. UNCTAD (2017) reports that Asia is the main importing and exporting region, accounting for 61% of unloaded cargo and 40% of loaded cargo in 2016. Developing economies are key players in supply of raw materials, but also growing sources of consumption import demand. In 2016, developing economies accounted for 6% of unloaded cargo and 59% of loaded cargo.

It is not expected a significant trade routes change unless an important change occurs in the emerging countries which may affect world economy.



Figure 25: Shipping Traffic 2016 tracked by fuel use for all types of ships (DNV GL, 2017)

Variable	Bulk vessels	Oil tankers	Container vessels	Other cargo vessels*	TOTAL
Number of vessels	11 844	6 5 3 2	5 383	19 824	43 583
Sailed distance (million nm)	529	211	372	726	1 838
Share of maritime fuel consumption	23%	16%	26%	24%	89%
Source: DNV GL *Chemical/product tankers, gas tankers, general cargo vessels, RoRo and refrigerated cargo vessels - in descending order ranked by amount of fuel consumed					

j. Future Expectations for the World Economy

If we make a resume of the approaches of some futurists;

- Change is now not gradually but suddenly;
- Change will be exponential and interdependent,
- Collaboration between different sectors will increase highly,
- > Digitalization will be most significant factor for the changes.

Now the shipping sector confronts a rapid and big change in relation with the improvement of technology. A futurist, Gerd Leonhard (2015) states that "Humanity will change more in the next 20 years than in the previous 300 years".

More data is available and it requires formulation of new methods to make forecast for the future.

5. CONCLUSION

a. The average of the World Trade growth is 5.29 percent and growth of World GDP is 2.14. That means the growth of World Trade is approximately 2.5 times bigger than growth of World GDP. The average of the Seaborne Trade growth is 4,154 percent and growth of World GDP is 4.652. That means the growth of World GDP is approximately 1.12 times bigger than growth of Seaborne Trade. It is clear that the ratio of world GDP growth and Seaborne Trade are approximately very close. So, the growth of the World GDP can be used to predict the growth of the Seaborne Trade.

b. Sudden and prolonged increases in World GDP and Trade may herald a new economic crisis.

c. The shipping is not a transparent industry and for that reason the data for seaborne trade is not so much reliable. But the figures for World GDP and World Trade can be used as a tool to forecast Seaborne Trade capacity. This data is also can be used to predict fleet growth and subsequently requirement for seafarers.

d. It is not easy to formulate the requirements of the ships by type. But the trend introduced in the Figure 18 and 19 can be used to formulate the requirements for the future.

e. For route planning; it is not expected a significant trade routes change in the next decade unless an important change occurs in the emerging countries which may affect world economy.

f. Fright rate mechanism should be considered by type of the cargo ships. The container freight rates have more stable growth comparing with bulk and tanker freights.

g. The shipping provides all advantageous of economies of scale but it is should keep in mind that it may also show character of the diseconomies of scale which may create surprizes for ship owners.

h. Shipping is risk-laden and complex business. In all stages of the business planning, high priority should be given to the risk assessment.

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