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The Future of World's Shipping Routes: an Analytical Comparative Prediction

Yasamin Hasani Asyabdareh [1], Mohammad Moonesun [2*], Mehdi Adjami [3]

[1] *MSc in Coasts, Ports and Marine structures Engineering, Dept. of Civil Engineering, Shahrood University of Technology Email: yhasyabdareh@shahroodut.ac.ir*
[2] *Assist. Prof., Marine Architecture Engineering, Faculty of Civil Engineering, Shahrood University of Technology, Shahrood, Iran, Email: m.moonesun@shahroodut.ac.ir*
[3] *Assist. Prof., Coasts, Ports and Marine structures Engineering, Faculty of Civil Engineering, Shahrood University of Technology, Shahrood, Iran. Email: adjami@shahroodut.ac.ir*

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ABSTRACT

Countries that produce products and consumers are the determining factors in important commercial shipping routes in the world. In the 20th century, Europe and America produced as agents and Asia as consumers, but this is not the case since the new beginning. The increase in population, the growth of the GDP index, and the wealth and technology of Asian societies can be seen. Also, due to the increase in population, Western companies have turned to Asia for more profit and to benefit from cheap skilled labor. In this paper First, the important and influencing factors on the transit routes are stated, and then the important chokepoints in the world, one of the influencing factors, are introduced. Then factors such as population, gross domestic product, industry and technology, and wealth distribution, each one is examined separately and its current position and future status are predicted. Finally, according to the evidence, it is concluded that the transit route in the future will be from Asia to Asia and from Asia to other continents.

1. Introduction

The analysts of the transit routes and the thinning of the shipping lines in the world at the present time and the analysis of the world trade situation in the near and far future are in such a way that they prepare their countries to deal with new conditions. Global shipping operations are dependent on three key factors: predictability, punctuality, and economy of scale [1] . in the definition of transit routes, there are two main factors: 1- the origin of the production of commercial goods (which are often industrial and advanced countries) and 2- the destination of receiving commercial goods (which are often the countries with a large population of consumers, which may be developed or backward countries). In the last century AD (from 1900 to 2000), the important transit routes of the world were defined between the West, that is, Europe and North America (as the major producers of the world's trade products) and Asia (as the world's most populated consumers). In the last century, Asia has been the main source of commercial goods for two main reasons: 1- The most populous countries in the world were in Asia, which often did not produce and meet their commercial needs, such as China, India, Indonesia, and Iran. These were imported from different countries. 2- The richest oil-rich countries in the world, such as Saudi Arabia and the countries on the edge of the Persian Gulf (including Iran), were unproductive and consuming countries that met their major commercial and even vital needs by relying on raw materials and oil and gas. They used to enter. Then, for 100 years, Asia was the most attractive import destination and at the end of the goods transit routes in the world. Of course, this issue is related to the origin of oil and gas and raw minerals in Western countries. But this situation has been changing at an indescribable speed since about a quarter of a century ago, i.e. the beginning of the century AD (since 2000), which economic and transportation analysts believe that the world's commercial future and the busiest transit routes in the world have come from Asia. It will be Asia, not from the West to Asia. According to the World Shipping Council and based on the 2017 behavior, the top trade routes are:

1. Asia – North America: 26.57 million TEU shipped.
2. Asia – North Europe: 15.06 million TEU shipped.

3. Asia – Mediterranean: 7.91 million TEU shipped.
4. Asia – Middle East: 4.74 million TEU shipped.
5. North Europe – North America: 5.40 million TEU shipped.
6. Asia – East Coast South America: 2.07 million TEU shipped.
7. North Europe / Mediterranean – East Coast South America: 1.68 million TEU shipped.
8. North America – East Coast South America: 1.27 million TEU shipped.

It isn't surprising to see the Asian continent leading the main trade routes since 70% of the world's top ports are located in China. This only highlights the relevance of this country to international trade and logistics. It has experienced significant growth that has changed the market for good and it is now the major provider of the whole world. It is truly an example for the industry to learn what innovation and determination can accomplish [2].

According to January 2018 statistics, the first five countries with the largest tonnage of the shipping fleet had more than 50% of the world's capacity, which are Greece, Japan, China, Germany, and South Korea. In January 2019, the countries of Singapore and Hong Kong reached the fourth and fifth positions after leaving behind Germany and South Korea. Most flag registrations were also done in the countries of Panama, the Marshall Islands, and Liberia. In terms of shipbuilding, three countries, China, South Korea, and Japan, make up more than 90% of the world's ships. Also, more than 80% of the ships in the world are scrapped in Bangladesh, India, and Pakistan. With 236 vessels and a capacity of 17.9 million tons, Iran owns 0.91% of the world's trade and ranks 24th in the world after the Netherlands, UAE, and Saudi Arabia [3].

There are two main reasons for this wonderful phenomenon: 1- The densest population in the world will be in Asia. 2- In the last 2-3 decades, Asian countries have gone through the path of industrialization at an amazing speed and have presented themselves as prominent commercial and industrial producers in the world. Some of these Asian countries, which happen to be the most populous countries, include China, India, South Korea, Japan, Indonesia, and Malaysia.

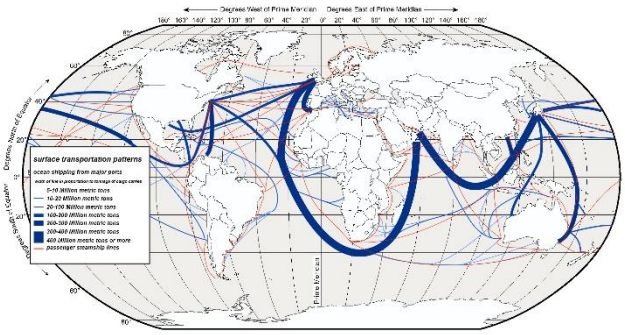

Figure 1: Important commercial shipping routes of the world [4]

In this article, an attempt has been made to consider the factors affecting important transit routes in the world, such as chokepoints, population distribution, industry and technology, gross domestic product, and wealth distribution in different regions of the world. Important transits routes are expected in the future.

2. Definition of transit chokepoint

In military strategy, a choke point (or chokepoint) is a geographical feature on land such as a valley, defile or bridge, or maritime passage through a critical waterway such as a strait, which an armed force is forced to pass through in order to reach its objective, sometimes on a substantially narrowed front and therefore greatly decreasing its combat effectiveness by making it harder to bring superior numbers to bear. A choke point can allow a numerically inferior defending force to use the terrain as a force multiplier to thwart or ambush a much larger opponent, as the attacker cannot advance any further without first securing passage through the choke point [5]. on the other hand, a chokepoint refers to locations that limit the capacity of throughput and cannot be easily bypassed, if at all [6].

In the meantime, crude oil routes are more important in the world because energy security and the continuity of the world's factories depend on them.

2.1. The most important transit chokepoints in the world

According to Figure 2, we can name 9 important transit chokepoints in the world, if any of them are blocked, the world economy will suffer. These points are:

2.1.1. Strait of Hormuz

The Strait of Hormuz is the world's most important chokepoint, with an oil flow of 17 million b/d in 2015, about 30% of all seaborne-traded crude oil and other liquids during the year. In 2016, total flows through the Strait of Hormuz increased to a record high of 18.5 million b/d [7].

Figure 3 shows the volume of oil passing through the world's important chokepoints by oil tankers in 2016

(in millions of barrels per day). In this way, the Strait of Hormuz with 19 million barrels of oil per day is of the highest importance, and if this strait is blocked, it would be pointless for 16 million barrels of oil to pass through the Strait of Malacca, as no oil will reach there, and this means be The collapse of the global economy and industry will be. It is for this reason that the Strait of Hormuz and the Persian Gulf have always been a place of conflict between superpower countries and extra-regional forces in the past decades and have witnessed the occurrence of several wars in the past four decades. In other words, guaranteeing the security of the Strait of Hormuz and the Persian Gulf means guaranteeing energy security in the world.

2.1.2. Bab al-Mandab Strait

The Bab al-Mandab Strait is the narrow waterway that separates the Arabian Peninsula from the Horn of Africa and links the Red Sea to the Gulf of Aden and the Indian Ocean [8]. The strait is 20 miles (32 km) wide and is divided into two channels by Perim Island; the western channel is 16 miles (26 km) across, and the eastern is 2 miles (3 km) wide. With the building of the Suez Canal, the strait assumed great strategic and economic importance, forming a portion of the link between the Mediterranean Sea and East Asia. The flow through this strait provides for circulation between the Red Sea and the Gulf of Aden since no flow takes place through the Suez Canal. The strait's Arabic name means "the gate of tears," so called from the dangers that formerly attended its navigation [9].

This strait is important in two ways: 1- A part of Saudi oil is exported from the shores of the Red Sea, and this strait is the passage route for about 5 million barrels of oil per day (energy chokepoint). 2- It is the access route to the Suez Canal, and if this strait is blocked, the Suez Canal is practically blocked as well.

2.1.3. Suez Canal

This Canal is the communication route between the Red Sea and the Mediterranean Sea. According to Figure 4, it is clear that if this canal is closed, to reach Europe from Asia, the continent of Africa must be bypassed, which is a longer route. This Canal was blocked for 7 days in 2021 due to the accident of a container ship deviating and getting stuck in the bottom of the Canal [10]. During these 7 days, the world economy suffered and Egypt itself paid 900 million dollars. Passing through this Canal in 2022 earned $7.9 million [11]. The Asia to Europe trade is today dependent on the shipping route via Suez [12].

Ship companies can realize the greatest advantage because present travels of more than 20000 km from the Far East to Northwest Europe via the Suez Canal can be reduced to about 10,000 km and the average sailing times can be shortened from 20 days in the 1990s to 11 days on average in 2012–2013 if either the Northern Sea Route (NSR) via north of the Russian Federation through the Arctic or the Northwest Passage (NWP) via the Canadian Arctic Archipelago are used [13,14].

2.1.4. Strait of Malacca

The factor that was explained in the previous parts, the economic, political, and military future of the world will be in the hands of Asia and especially East Asia (China, Japan, and Korea) and the transit route of goods will be from this country. These industrialized countries have high energy consumption and the main goal will be oil and gas production. The route of all commercial and oil goods to East Asia is through the Strait of Malacca, and whoever controls this strait practically controls the trade chokepoint of East Asia. It is for this reason that there have been intense conflicts between China and the United States for the control of the Strait of Malacca. On the 9th of August, 1965, Singapore was expelled from the Malaysian Federation and became a sovereign country [15].

This action was done by the Westerners to dominate the Strait of Malacca, and now Singapore is a big regional transit hub for goods and energy. With the increasing growth of China's military power against the United States, this strait will definitely be the source of future conflicts in the world, because the security and control of the Strait of Malacca mean direct security, and for this reason, the United States has secrets about its direct military presence in this region. Currently, about 16 million barrels of oil pass through this strait and it experiences high-density vessel traffic [16,17].

2.1.5. Panama Canal

According to Figure 5, this Canal is a communication route between the Pacific Ocean and the Atlantic Ocean and a communication route between the East and West of the American continent, so that with the opening of this Canal, for example, the sea route from New York to San Francisco will be from about 21000 km to 8000 km. It decreased, which means that the sea route became shorter by 13000 km. Generated by this Canal in 2020 was 2.7 billion dollars [18].

2.1.6. Strait of Gibraltar

The Strait of Gibraltar, also known as the Straits of Gibraltar, is a narrow strait that connects the Atlantic Ocean to the Mediterranean Sea and separates Europe from Africa [19].

2.1.7. Bosphorus Strait

The Bosporus Strait or Bosphorus Strait is a natural strait and an internationally significant

waterway located in Istanbul in northwestern Turkey that connects the Black Sea to the Sea of Marmara. It forms part of the continental boundary between Asia and Europe and divides Turkey by separating Anatolia from Thrace. It is the world's narrowest strait used for international navigation [20].
it has always been of special military and economic importance during the First and Second World Wars because the countries bordering the Black Sea have no other way to get out of the maritime deadlock than passing through this strait.

2.1.8. The Cape of Good Hop

The Cape of Good Hope is a rocky promontory on the Atlantic coast of South Africa, at the end of the peninsula du Cap located south of the city of Cape Town and close the False Bay to the west. This rocky promontory ends at Cape Point, 2 km from the Cape of Good Hope proper. It is a nature reserve traversed by coastal paths [21].

2.1.9. Strait of Magella

The Strait of Magellan is a maritime passage located in the extreme south of Chile,2 between Patagonia, the Big Island of Tierra del Fuego, and several islands located to the west of it towards the Pacific Ocean. It is the main natural passage between the Pacific and Atlantic oceans. The strait is named after the navigator Ferdinand Magellan, who discovered it in 1520 during the Spanish expedition to the Moluccas [22].

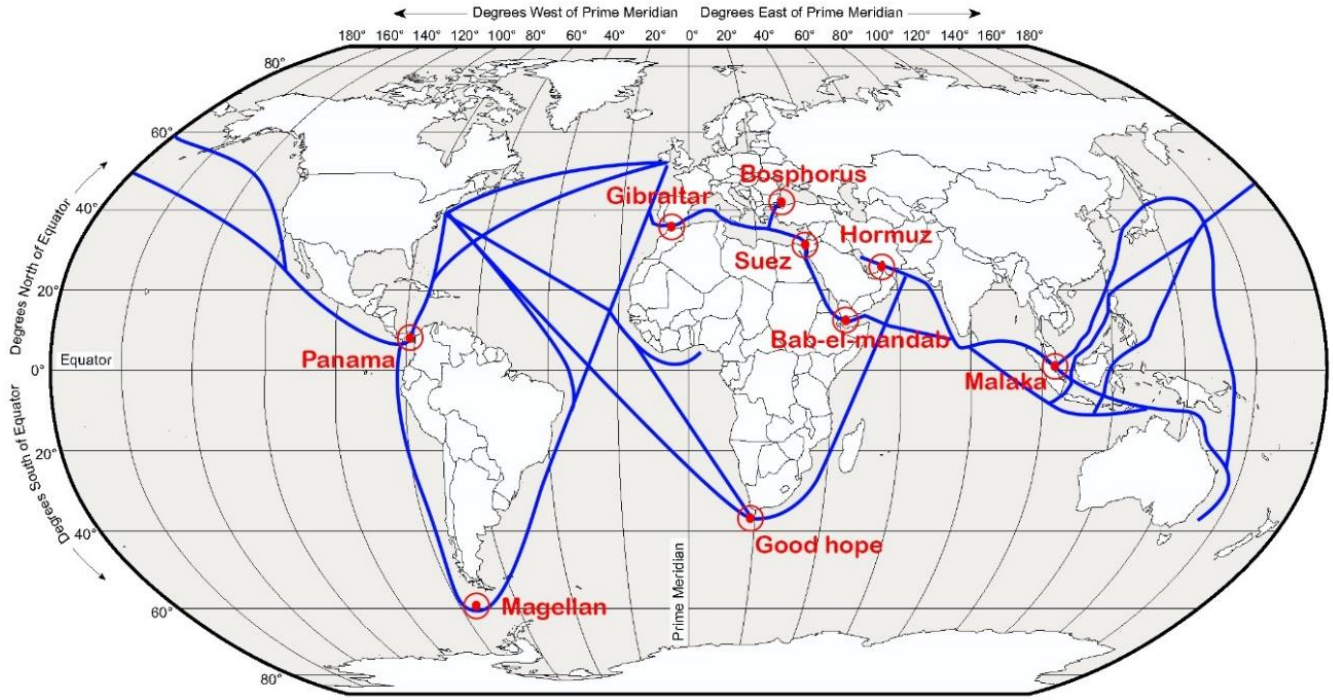

Figure 2: Location of 9 important transit bottlenecks in the world

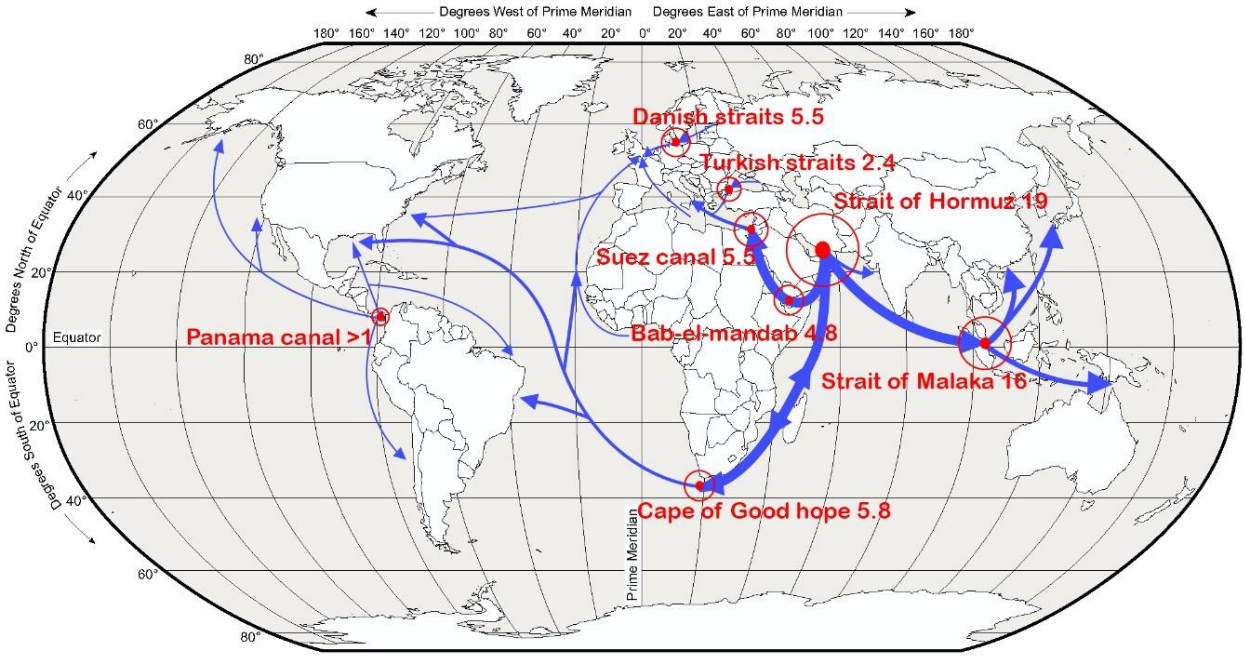

Figure 3: The volume of oil passing through the world's important bottlenecks by oil tankers in 2016 (in millions of barrels per day)

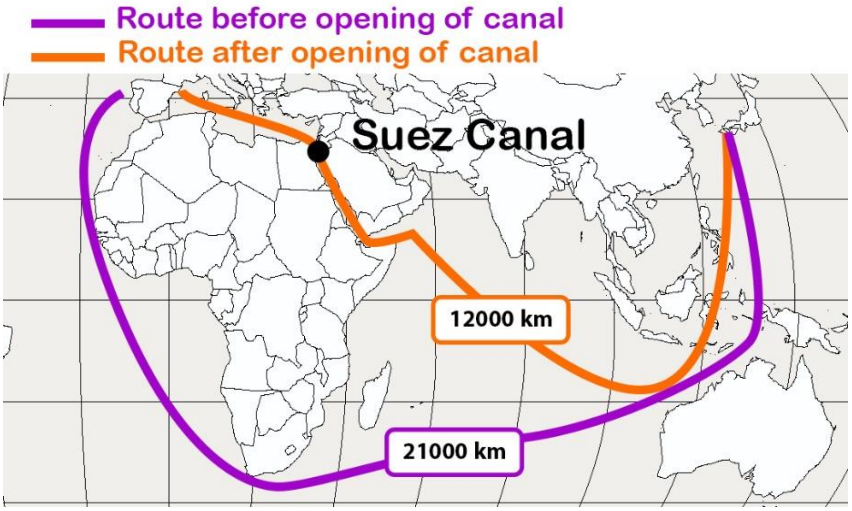

Figure 4: The effect of the Suez Canal in reducing world trade routes

Figure 5: Panama Canal's impact on reducing shipping routes in the Americas

3. Changing the population balance of the world toward Asia

In the last century, an approximate population balance was maintained between Asia and the West, so that according to the graphs in Figure 6, in 1950, out of the 2.5 billion people of the entire world, the population of Asia was 1.5 billion people (60%). and population West (Europe and North America) had 0.6 billion people (24%). While in 2023, out of the 7.5 billion people on Earth, 4.5 billion people (60%) are in Asia and 1.1 billion (15%) are in the West (of course, 20% of this population). In the West, they are immigrants from other countries). This division in 2050 will be such that out of the 9.7 billion people on Earth, 5.3

billion (55%) will live in Asia and 1.2 billion people (13%) will live in the West (which is, of course, 50% of this population). In the West, they are immigrants from other countries). Figure 7 shows the changes in world population very well. It is clear that the native population of Western countries is disappearing and a major part of their population can be other immigrants who may be very different in terms of the quality of human resources and the level of efficiency. Therefore, even in the most optimistic forecasts, we cannot expect that the old countries with native populations that are currently dying out will have the future of the world in their hands again. In Figures 6 to 9, you can clearly see the state of population changes in the world. From the strategist's point of view, in the future, the countries that have more population (but the world has a younger population) will have a greater role in the world, and the Western world, which ruled the world for 150 years, is rapidly disappearing. These issues caused China to abolish the one-child law 15 years ago. If Iran has suitable population growth, in the future, it will have a suitable share of economic power.

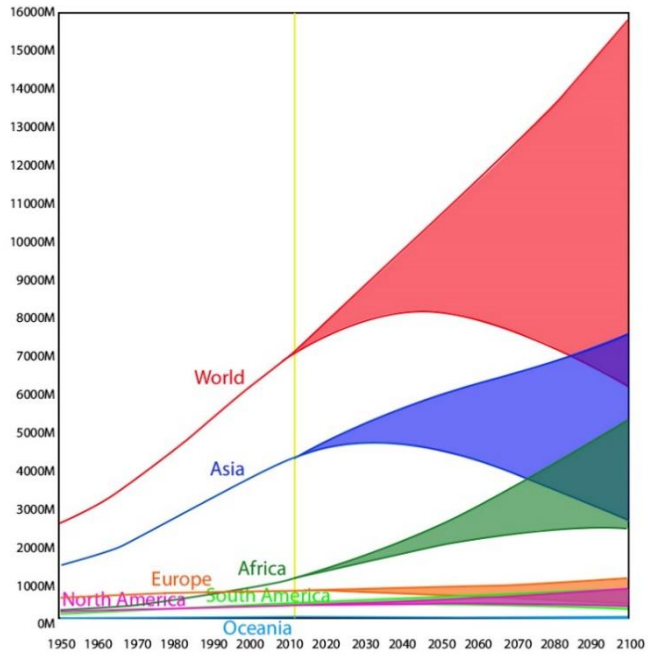

Figure 6: Prediction of world population changes in different continents until the year 2100

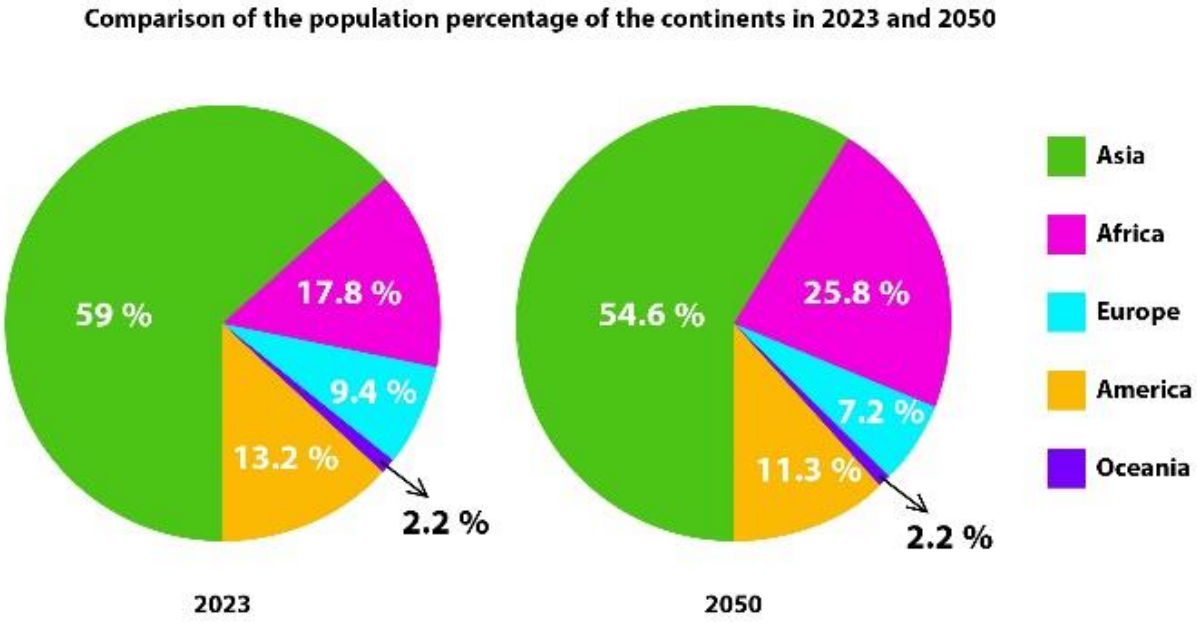

Figure 7: comparison of the population percentage of the continents in 2023 and 2023

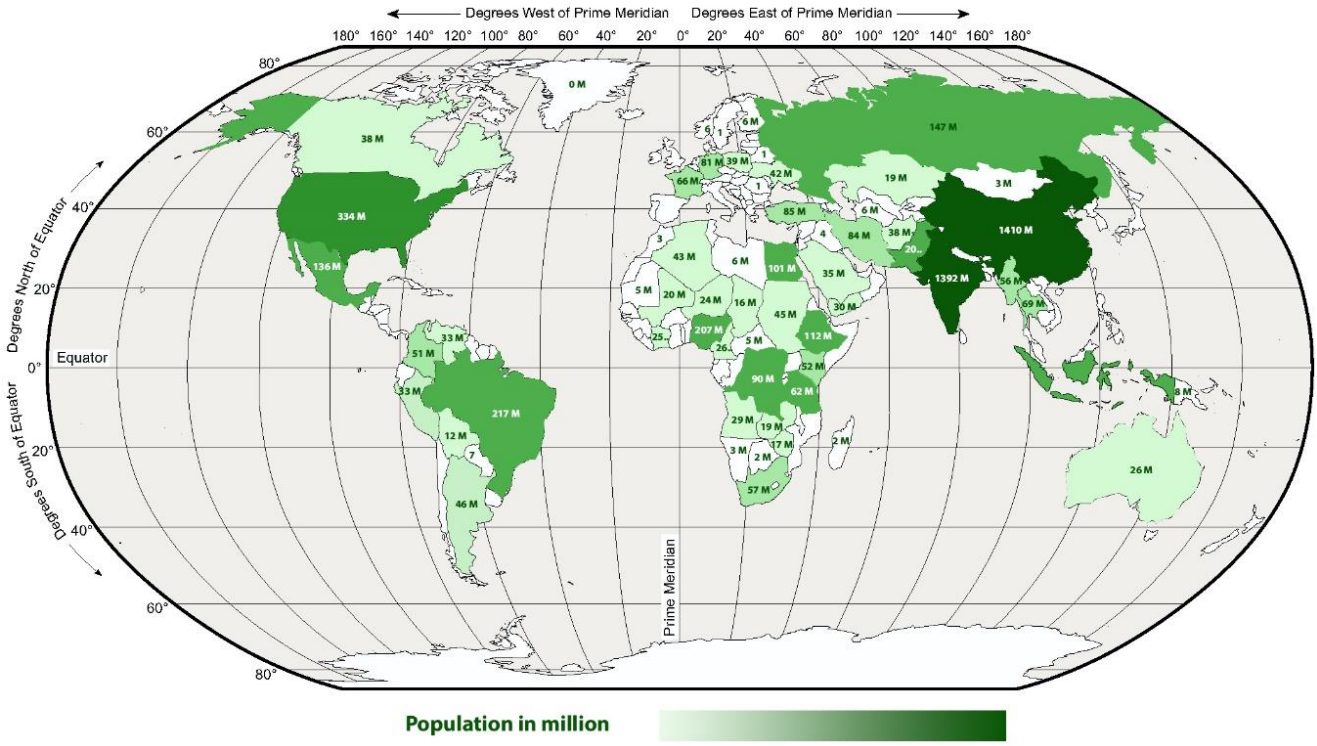

Figure 8: World population distribution in 2050

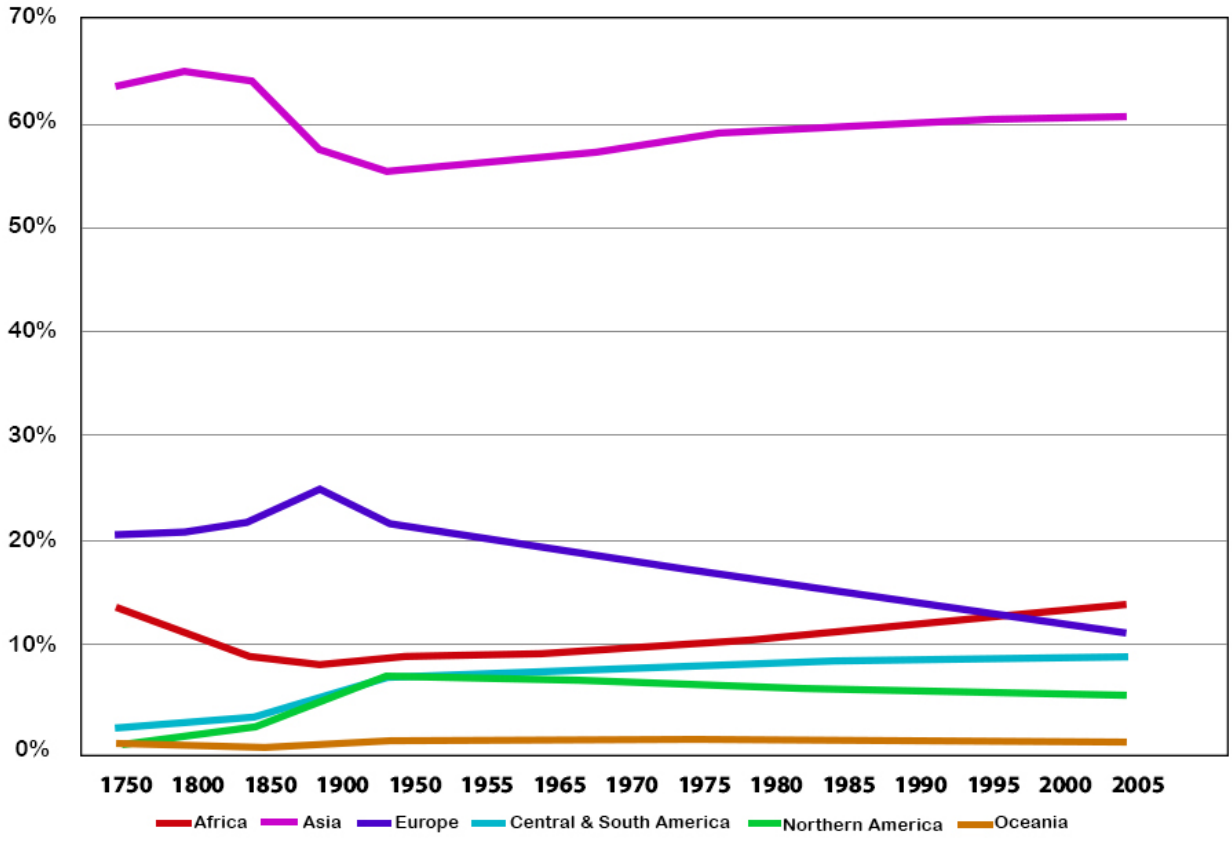

Figure 9: World population changes in different continents from 1750 to 2005

According to the forecast of the United Nations, the world population will reach 9.7 billion people in 2050, with a growth of 60% from 6.1 people in 2000. More than half of this population is Asian [23].

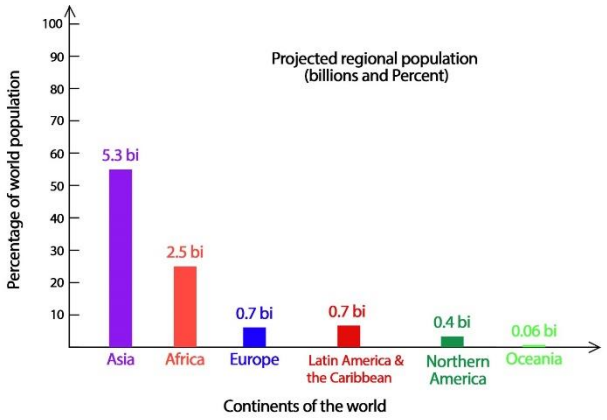

Figure 10: World population forecast in 2050

In 2019, most international migrants (around 74%) were of working age (20 to 64 years of age), with a slight decrease in migrants younger than 20 years old from 2000 to 2019 (from 16.4% to 14%), and a constant share (around 12%) of international migrants 65 years of age and older since 2000. In 2019, Asia hosted about 84 million international migrants, respectively. Including 30.1 % of the total global reserve of international migrants in the total global international migrant stock combined [24].

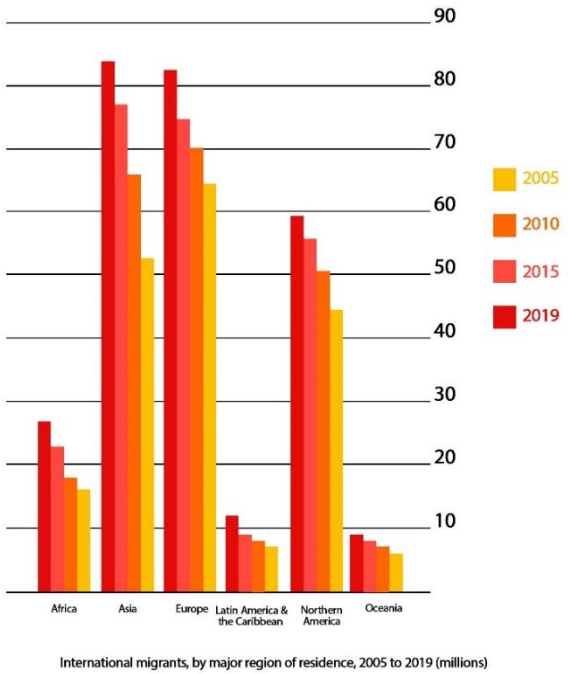

Figure 11: International migrants, by major region of residence, 2005 to 2019 (millions)

4. Changing the balance of world industry and technology toward Asia

It is one of the consequences of the population in the West that over time it loses its young strength and creative and energetic brains, and this issue makes the industry and technology that was completely in the West's favor in the last century, now achieve it. Asia's interests are changing rapidly. Currently, several research centers and post-graduate education chairs are active in the West with borrowed brains from other countries (especially from other Asian countries such as India, China, Iran, and Pakistan). And by paying minimal expenses in the form of educational scholarships, they have carried out the heaviest research projects, which have been a kind of exploitation of the geniuses of Asian countries. This ancient path of the West attracting elites to the right is fading.

According to the available statistics, in 1935, out of 100 types of industrial goods that are widely consumed in the world (including radio-electronic and telecommunication equipment, electrical equipment and generators, combustion engines, machines, and mechanical tools), only 15 types of goods had competitors in non-Western countries. 85 types of goods were exclusively produced in the West. This statistic alone shows that most of the world's industrial products (85% in all types of equipment) are produced exclusively in the past. In 2005 (i.e. 70 years later), this statistic is such that only 2% of the world's 100 types of high-consumer goods industries are produced exclusively in the West, which includes high-tech equipment such as commercial aviation industry equipment. space industries and emerging military technologies. In other words, in 2005, 98% of the world's most consumed industrial goods have serious competitors in non-Western countries, especially in Asia. It is clear that this monopoly will not only be zero within the next decade, but the monopoly of producing some goods (even high-tech goods) will also definitely be in the hands of Asia. For example, a sign of this is the powerful entry of China, along with some Asian countries, into the production of many airplanes, which were previously in large Western companies such as Boeing and Airbus. The loss of this monopoly and authority in the West clearly means two things: 1- the loss of many job opportunities, 2- the reduction of the gross domestic product and the reduction of wealth and the reduction of the profitability of the production of goods due to the competitiveness of prices. and the presence of numerous competitors.

5. Changing the balance of wealth and ending the hegemony of the dollar

There is a strong correlation between population and gross domestic product (GDP) growth on the one hand and maritime trade growth on the other [25].

In 2011 China surpassed the EU and the United States (US) to become the world's largest exporter [26]. Figure 12 shows the wealth of different countries in 2022 and Figure 13 shows the GDP of different countries in 2014 in terms of billion dollars. These graphs clearly show that the wealth and GDP in the West are getting weaker because the colors according to Figure 14 are clear, the Asian countries have stolen the lead in the GDP growth rate from the Western countries.

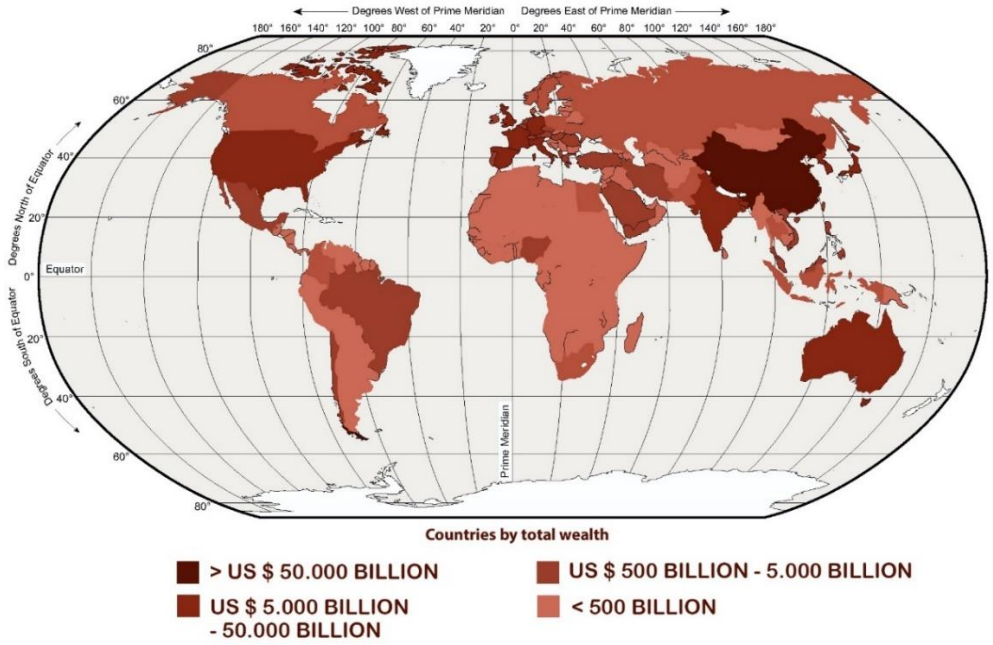

Figure 12: Wealth of different countries in 2022

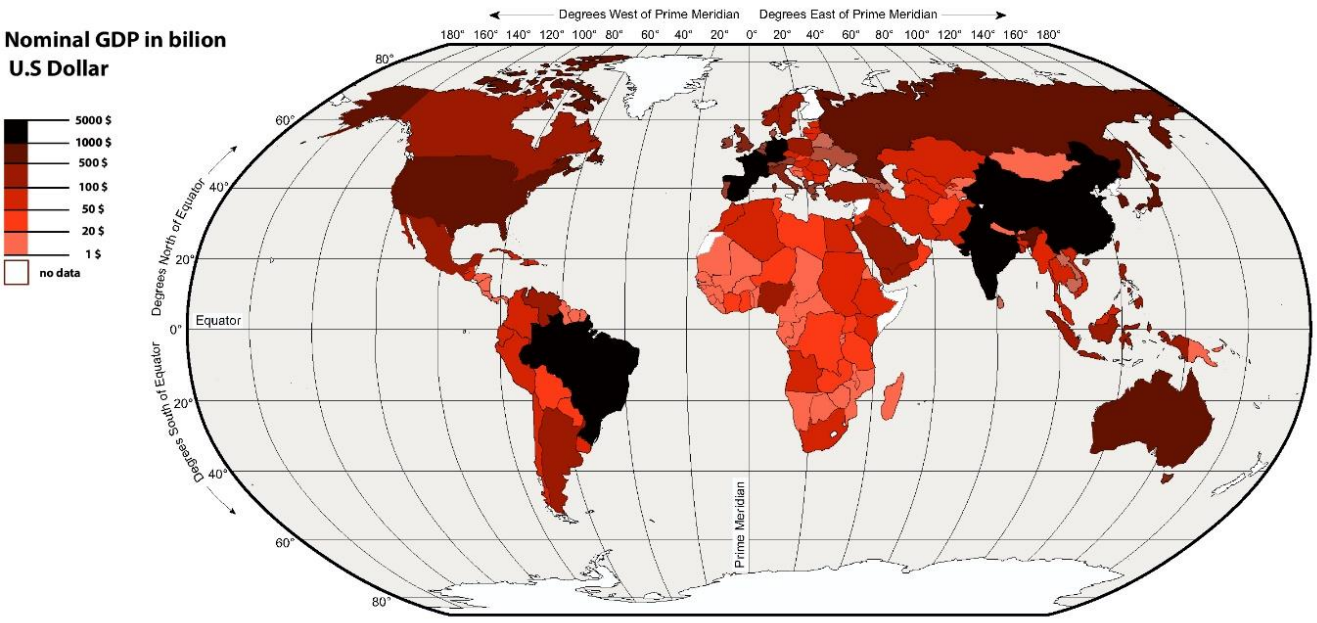

Figure 13: The amount of GDP of different countries in 2014 in billions of dollars

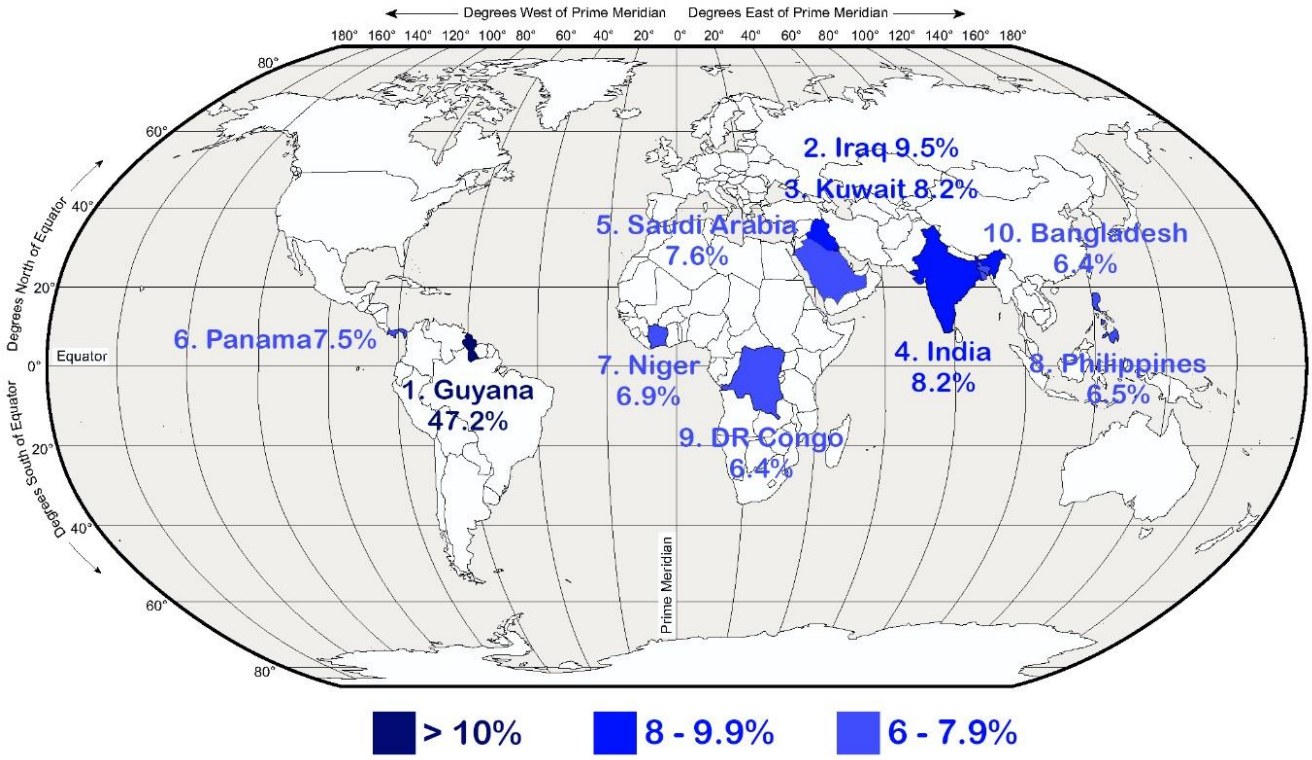

Figure 14: Countries with the highest GDP growth rates in different countries in 2022

Before its modernization, China's centrally-controlled and globally isolated economy made manufacturing inefficient. Since 1979, China has rapidly grown to become the world's most prolific manufacturer. Economic reforms like decentralized trade and trade liberalization, along with foreign investment spurred unprecedented growth. On average, China's GDP has grown 9.5% every year since 1979, according to the Federation of American Scientists. This growth prompted the World Bank to declare China "the fastest sustained expansion by a major economy in history." As the world's most populated country, China was able to activate a massive labor force. Currently, 13% of China's population works in manufacturing (182 million workers), compared to 13 million manufacturing workers in the U.S. (4% of the U.S. population).

Brands have been moving manufacturing out of China since the early 2000s, especially for high-labor products like footwear. As of 2006, Vietnam produced 29% of Nike's footwear, compared to 31% in China. In 2017, Vietnam accounted for nearly 50% of Nike's manufacturing. Brands are not abandoning Chinese manufacturing altogether, but diversifying their supply chains. The United States Fashion Industry Association reports this development reflects "a change in the sourcing trend, from 'China Plus Many' to 'China Plus Vietnam Plus Many.'" Different aspects of manufacturing and supply chains occur in different countries to take advantage of the diverse benefits of Southeast Asian countries. For example, high-labor manufacturing is the most cost-effective in low-wage countries, electronics manufacturing relies on technology-specific infrastructure and high-volume production benefits from countries with the capacity for mass production. Diversifying your supply chain may be the best way to maximize profits and efficiency for your organization [27].

Suppliers choose to move manufacturing jobs into countries like China, Malaysia and Vietnam because they can produce consumer goods at a lower cost than other countries. How do these countries keep prices so low? Most economists agree that those countries' competitive pricing is a result of two factors: a lower standard of living which allows lower wages, and an exchange rate that is partially fixed to the US dollar. Most American companies can't compete with these low costs. Many people would rather pay as little as possible for computers, electronics and clothing, even if it means other Americans lose their jobs. So it's unlikely the trade deficit would change. In addition, it's hard in the US to find the skilled workers required. IHS Markit Technology's Outsourced Manufacturing Intelligence Service estimates that the Chinese workforce which makes the components and assembles the iPhone totals over 150,000. The infrastructure to develop these types of electronics

was never in the US to begin with, so the concept of bringing it back would actually involve replicating and building from scratch the entire manufacturing network that has grown and matured in Asia over the last few decades. The US imports consumer electronics, clothing and machinery from China. A lot of the imports are from US manufacturers that send raw materials to China for low-cost assembly. Once shipped back to the United States, they are considered imports [28]. The rise of Asia is not a new phenomenon; the rise of Japan and South Korea has been witnessed over the second half of the 20th century. The start of the new millennium saw another boom, with many Asian economies recording high growth rates that took their share of global GDP from 26% to 32% between 2000 and 2014. Our extended long-term forecasts suggest that Asia's rise will continue up to 2050 not quite at the same pace, but by 2050 it will account for 53% of global GDP [29].

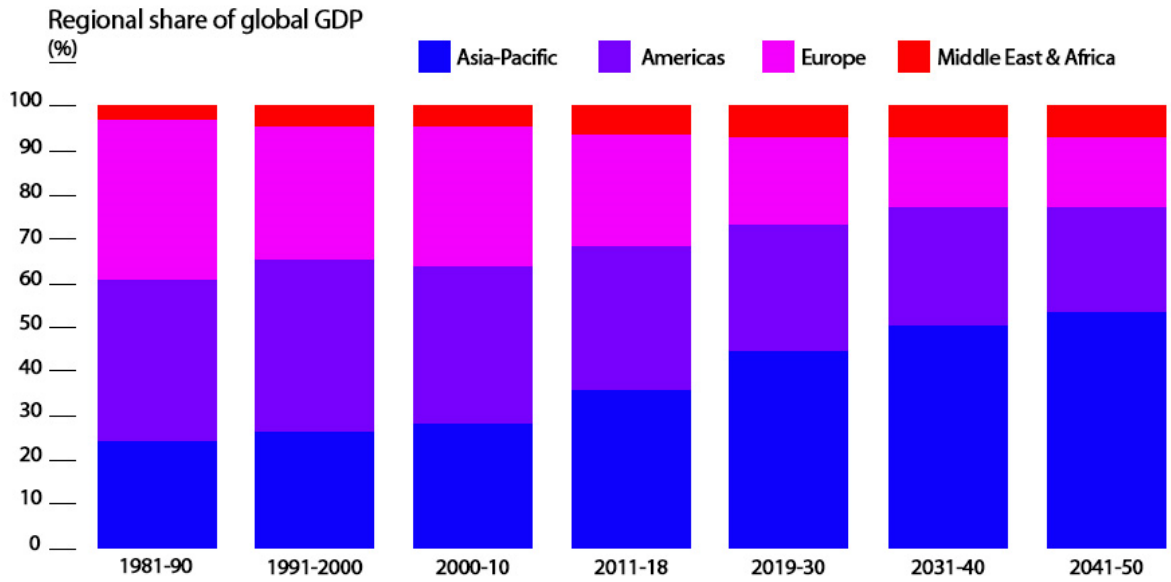

Figure 15: Regional share of global GDP

6. Conclusion

According to the evidence and information, with the reduction of the indigenous population of the West and the reduction of the GDP of the region, at the same time with the increase of the population and GDP of Asia, the routes of important shipping trade in the world will change. The important commercial shipping routes of the world will no longer be from the West and Europe to Asia, but from Asia to these regions and more, within Asia.

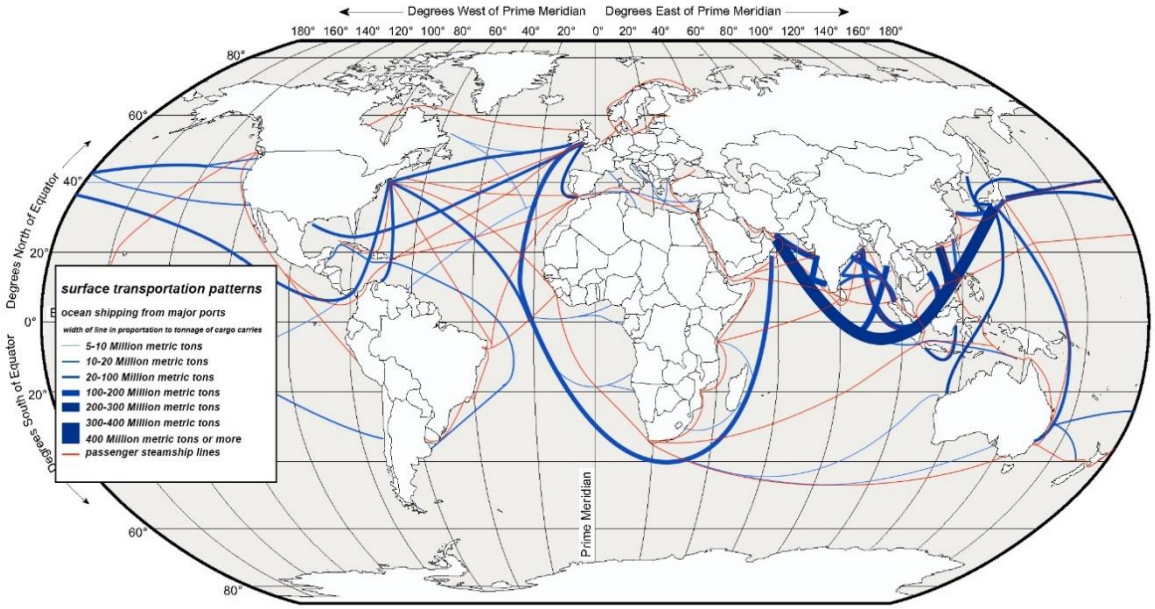

Figure 16: Forecast of important commercial shipping routes in the world in 2050

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