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بحوث الشرق الأوسط

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(مُعتمدة) شهريـًا

العدد مائة وواحد
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الرؤيـــة

السعي لتحقيق الريادة في النشر العلمي المتميز في المحتوى والمضمون والتأثير والمرجعية في مجالات منطقة الشرق الأوسط وأقطاره .

الرسالـــة

نشر البحوث العلمية الأصيلة والرصينة والمبتكرة في مجالات الشرق الأوسط وأقطاره في مجالات اختصاص المجلة وفق المعايير والقواعد المهنية العالمية المعمول بها في المجلات المُحَكَّمَة دوليًّا.

الأهـــداف

- نشر البحوث العلمية الأصيلة والرصينة والمبتكرة .
- إتاحة المجال أمام العلماء والباحثين في مجالات اختصاص المجلة في التاريخ والجغرافيا والسياسة والاقتصاد والاجتماع والقانون وعلم النفس واللغة العربية وآدابها واللغة الانجليزية وآدابها ، على المستوى المحلى والإقليمي والعالمي لنشر بحوثهم وإنتاجهم العلمي .
- نشر أبحاث كبار الأساتذة وأبحاث الترقية للسادة الأساتذة المساعدين والسادة المدرسين بمختلف الجامعات المصرية والعربية والأجنبية ٠
- تشجيع ونشر مختلف البحوث المتعلقة بالدراسات المستقبلية والشرق الأوسط وأقطاره ٠
- الإسهام في تنمية مجتمع المعرفة في مجالات اختصاص المجلة من خلال نشر البحوث العلمية الرصينة والمتميزة .

مجلة بحوث الشرق الأوسط

شروط النشر بالمجلة

- تُعنى المجلة بنشر البحوث المهتمة بمجالات العلوم الإنسانية والأدبية ؛
- يعتمد النشر على رأي اثنين من المحكمين المتخصصين ويتم التحكيم إلكترونيًّا ؛
- تقبل البحوث باللغة العربية أو بإحدى اللغات الأجنبية، **وترسل إلى موقع المجلة على بنك المعرفة المصري ويرفق مع البحث ملف بيانات الباحث يحتوي على عنوان البحث باللغتين العربية والإنجليزية واسم الباحث والتايتل والانتماء المؤسسي باللغتين العربية والإنجليزية، ورقم واتساب، وإيميل الباحث الذي تم التسجيل به على موقع المجلة ؛**
- يشار إلى أن **الهوامش والمراجع في نهاية البحث وليست أسفل الصفحة ؛**
- يكتب الباحث **ملخص باللغة العربية واللغة الإنجليزية** للبحث **صفحة واحدة فقط** لكل ملخص ؛
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محتويات العدد 101

افتتاحية العدد 101

يسر مركز بحوث الشرق الأوسط والدراسات المستقبلية صدور العدد **(101 – يوليو 2024)** من مجلة المركز «**مجلة بحوث الشرق الأوسط**». هذه المجلة العريقة التي مر على صدورها حوالي 50 عامًا في خدمة البحث العلمي، ويصدر هذا العدد وهو يحمل بين دافتيه عدة دراسات متخصصة: (دراسات علم الاجتماع، الدراسات التاريخية، دراسات جغرافية ، دراسات مكتبات ومعلومات، دراسات إعلامية ، دراسات أثرية، دراسات لغوية) ويعد البحث العلمي **Scientific Research** حجر الزاوية والركيزة الأساسية في الارتقاء بالمجتمعات لكي تكون في مصاف الدول المتقدمة.

ولذا تَعتَبر الجامعات أن البحث العلمي من أهم أولوياتها لكي تقود مسيرة التطوير والتحديث عن طريق البحث العلمي في المجالات كافة.

ولذا تهدف مجلة بحوث الشرق الأوسط إلى نشر البحوث العلمية الرصينة والمبتكرة في مختلف مجالات الآداب والعلوم الإنسانية واللغات التي تخدم المعرفة الإنسانية.

والمجلة تطبق معايير النشر العلمي المعتمدة من بنك المعرفة المصري وأكاديمية البحث العلمي، مما جعل الباحثين يتسابقون من كافة الجامعات المصرية ومن الجامعات العربية للنشر في المجلة.

وتحرص المجلة على انتقاء الأبحاث العلمية الجادة والرصينة والمبتكرة للنشر في المجلة كإضافة للمكتبة العلمية وتكون دائمًا في مقدمة المجلات العلمية المماثلة. ولذا نعد بالاستمرارية من أجل مزيد من الإبداع والتميز العلمي.

والله من وراء القصد

رئيس التحرير

د. حاتم العبد

الدراسات اللغوية

LINGUISTIC STUDIES

The Effect of Developing A Suez Canal logistics hub on International Maritime Network

تأثير تطوير المحور اللوجستي لقناة السويس على الشبكة البحرية الدولية

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Abstract

Suez Canal, which is 193 kilometers, was established in November 1869, as this establishment remains the quickest and its remarkably effective direct sea route between two continents Europe and Asia. Suez Canal is one of the major canals worldwide. Additionally, it is a man-made canal that links the Mediterranean Sea to the Red Sea. It is the longest waterway without locks in the entire world. In reality, it serves as a crucial global choke point. In transportation geography, the term "choke" is widely used to describe areas with limited circulation space that cannot be avoided.

This indicates that any other alternative to a choke point requires the usage of a different route, both of which involve considerable expenses and delays. The canal, which permits ship travel in both directions, is drawing more shipping companies and shippers. Alternative trade routes do, however, exist, including the Cape of Goods Hope, Panama Canal, and the Northern Sea Route (NSR). As a result, the Egyptian government established a master plan to develop the Suez Canal into one of the top logistics hubs in the world. The purpose of this research is to provide evidence that the development of A Suez Canal Logistics Hub will have a major effect on the international maritime network.

The researcher highlighted the strategic importance of the Suez Canal as it saves more expenses and time than using the Cape of Goods Hope route. In addition, a comparative analysis has been conducted between Suez Canal and Panama Canal.

ملخص

تم افتتاح قناة السويس، التي يبلغ طولها ١٩٣ كيلومتراً، في نوفمبر ١٨٦٩، حيث تظل هذه المنشأة هي الطريق البحري المباشر الأسرع والأكثر فاعلية بشكل ملحوظ بين قارتي أوروبا وآسيا. قناة السويس هي واحدة من القنوات الرئيسة في جميع أنحاء المتوسط بالبحر العالم. بالإضافة إلى ذلك، فهي قناة من صنع الإنسان تربط البحر الأحمر. إنه أطول ممر مائي بدون أقفال في العالم بأكمله. في الواقع، إنها بمثابة نقطة اختناق عالمية حاسمة. في جغرافيا النقل، يستخدم مصطلح " اختناق " على نطاق واسع لوصف المناطق ذات مساحة الدوران المحدودة التي لا يمكن تجنبها.

يشير هذا إلى أن أي بديل آخر لنقطة الاختناق يتطلب استخدام طريق مختلف، وكلاهما ينطوي على نفقات وتأخيرات كبيرة. القناة التي تسمح بالسفر للسفن في كلا الاتجاهين، تجتذب المزيد من شركات الشحن والشاحنين. ومع ذلك، توجد طرق تجارية بديلة، بما في ذلك رأس الرجاء الصالح وقناة بنما وطريق البحر الشمالي. ونتيجة لذلك، وضعت الحكومة المصرية خطة رئيسه لتطوير قناة السويس لتصبح واحدة من أفضل المراكز اللوجستية في العالم. الغرض من هذا البحث هو تقديم دليل على أن تطوير محور لوجستي لقناة السويس سيكون له تأثير كبير على الشبكة البحرية الدولية.

وسلط الباحث الضوء على الأهمية الاستراتيجية لقناة السويس؛ لأنها توفر المزيد من المصاريف والوقت مقارنة باستخدام طريق رأس الرجاء الصالح. بالإضافة إلى ذلك، تم عقد مقارنه بين قناة السويس وقناة بنما.

1. Introduction

Suez Canal handled goods annually worth more than $1 trillion, or close to 8% of all global trade. This path was used by nearly 19,000 vessels within 2020. This is equivalent to 50 vessels daily sailing between Port Said and Suez, carrying between $3 and $9 billion in cargo. The volume of goods transferred via the Suez Canal in 2019 was over 1 billion tons, which is four times greater than what was transported through the Panama Canal. Energy, commodities, and consumer goods are transported all the way from the Middle East and Asia to Europe through the Suez Canal.

Conflicts between major nations of the world over the Middle East's dominance have increased because of the Suez Canal's strategic importance (AbdoMobashir, 2005, pp. 282). The most significant national initiatives Egypt has now been implementing include the expansion of the current Suez Canal and the region around it. Such area is intended to become a hub for manufacturing and logistics on a global scale, as well as a global trade service, which will work as a crucial axis for Egypt's economic development. Due to the advantages and qualities of its unique location, it is in a perfect position to serve as a global center for industrial economic zones, transit trade distribution, and logistical services for vessels and commerce crossing the Suez Canal (Mostafa Kamal Al-Hegazy, 2013, pp. 282).

On March 23, 2021, the vessel “EverGiven” was grounded, due to low visibility, challenging navigation, and a sandstorm, near the southern end of the Suez Canal. Vessels transiting the Suez Canal at the time of the event were directed back to neighboring anchorages, and transit through the canal was temporarily halted. The Suez Canal blockage disrupted global trade for six days, attracting worldwide attention (Lockton, 2019; Boulougouris, 2021; Allianz, 2019; and Hayden, 2015, pp. 33). The Ever-Given incident caused hundreds of vessels to be delayed in transit through the canal, leading to a disruption in worldwide trade as well as increasing the shortages of shipping containers, causing congestion in several ports and a rise in the freight rates of the containers (Hellenic Shipping News, 2021). Due to this

incident, 422 cargo ships carrying oil and consumer goods were left stranded, resulting in the blocking of maritime commerce, and preventing an estimated $9.6 billion from moving daily. Furthermore, it has forced numerous operators to take the only alternative remaining for them, which is passing around Cape of Goods Hope, increasing their voyage by 6,000 miles adding up approximately 3 weeks of navigation. Many merchants lost money due to the blockade of important shipments, as well as international trade, were delayed. The closure of the canal during the COVID-19 outbreak resulted in a global shortage of essential goods including surgical equipment and medicines. Due to the Suez Canal blockage, the supply of medical and pharmaceutical supplies to several countries that are presently experiencing a global public health emergency was severely delayed. The Suez Canal blockage incident has drawn attention to how crucial shipping is to the global economy. The major finding is that the Suez Canal Logistics Hub will attract many businesses resulting in a change in the pattern of world trade. The research motivation is to realize the effect of developing a Suez Canal logistics hub and how it will influence the national and the international network and economies.

The research structure shows the plan which has been undertaken to test the hypothesis, answer the research question, and achieve the objectives as well. Throughout the rest of the paper, in the second section, it includes the literature review about developing a logistics hub in Suez Canal and how it will affect the international maritime network. In the third section, it discusses the appropriate aspects of the research methodology, approach and methods used in my research. In the fourth section, a comparative analysis is being made with the other alternatives for Suez Canal to prove that developing a logistics hub in Suez Canal will have an impact on the international maritime network. Finally, it provides a conclusion about the significance of developing such a logistics hub in Suez Canal, recommendations, and further work in the fifth section of the research.

2. Literature Review

2.1 Suez Canal Strategic Importance

The Suez Canal is seen as a direct route between the east and the west because of its special position. The canal is strategically located among three continents that contains several industrial global zones and marketplaces. This significance remains growing in conjunction as well as the expansion of maritime transportation of global trade, which is the cost effective as well as a valuable transportation mode, along with waterways moving more than 80% of international trade volume. The Suez Canal geographical location resulted in shortening the distance for the vessels and fuel consumption as well as reducing the operational costs for the goods.

It is critical to establish and implement a long-term development strategy to improve such areas and capture the potential benefits that could enable the country's development. Egypt threats missing important development opportunities if the Suez Canal area is not well-managed. As a result, the Egyptian government announced its "Egypt's Vision 2030" sustainable development strategy in 2014, and the Suez Canal region was identified as a special economic zone in 2015. Such plans presented new guidelines for the country's sustainable and inclusive growth, which could be achieved through the long-term use of the Suez Canal zone. Boosting economic progress and also conserving the environment are linked concerns in a developing country like Egypt, and neither can be achieved without the other.

Year	Total goods	Crude oil	Other tanker trade	Dry cargo
1975	3 072	1 364	280	1 428
1980	3 704	1 527	344	1 833
1985	3 330	1 049	410	1 895
1990	4 008	1 287	468	2 253
1995	4 651	1 532	518	2 601
2000	5 984	1 605	558	3 821
2005	7 109	1 857	565	4 687
2010	8 401	1 785	968	5 649
2015	10 013	1 761	1 178	7 074
2020	10 648	1 716	1 202	7 730

Figure 1. Increases in goods loaded globally by kind of cargo (Millions of

tons).

Source: UNCTAD, 2021

The new Suez Canal area will be capable of competing with the world's major logistical hubs, particularly with Northern European ports like Rotterdam and Hamburg. Since the Suez Canal is the world's longest waterway without locks. In comparison to other waterways, there are almost no incidents. Navigation is also available all day long, not restricted to a specific time. The Canal was widened and deepened as necessary to keep up with the increase in vessels sizes and tonnages. Vessels may be monitored and followed on every place of the Canal through using the Vessel Traffic Management System (VTMS) and emergency action can be taken.

The Suez Canal was enlarged by developing the New Suez Canal, which has increased its total length to 37 km and its maximum draft to 66 ft. Thus, it affected the overall outcome of Suez Canal by increasing the foreign currency earnings for the national economy. In addition, an expansion in the double parts of Suez Canal occurred resulting in reducing the transit time for the vessels heading towards the southbound from 18 hours to 11 hours. Furthermore, it reduced the vessels' waiting time as the vessel waiting time averaged from 8-11 hours leading to a shorten to 3 hours overall. However, it is attracting the ship owners as the management is expecting an increase in transit vessels from 49 vessels to 97 vessels by 2023. The development of such a logistics hub will have significant influences on the local and the international network as well.

2.2 Importance of the logistics hub and its elements

The logistics hub is the focal point of a certain location where numerous operators execute several activities related to logistics, transportation, and products distribution. The owners or renters of the buildings or facilities could be the operators. In order to comply with free market laws, all firms engaged in the activities described above must have access to a logistics hub. In addition, public facilities need to be available in a Logistics hub to carry out the functions listed above as well as including public services for employees and equipment for

users. To support the multimodal mobility for goods handling, a variety of transportation modes should be available for use in the logistics hub. When the various logistics service providers cooperate to provide some value-added services, such service can be defined as a logistics hub as it directly affects the movement of goods, thus having an impact on the efficiency of the transportation systems as well.

One of the most successful Logistics hubs worldwide is Rotterdam Port as this port connects several continents which encouraged them to develop its hinterland which resulted in enhancing their economy as it has many neighboring developed countries such as: United Kingdom, Germany, France, Switzerland, and Belgium. Such countries are very advanced in several industries; thus, they need the raw material and fuel to be imported so they can produce the product then export it as a final product. Rotterdam Port plays a very strategic role as it acts as a transit center for their bulk goods. The inland locations in Netherlands are incredibly special as they have a good physical infrastructure for the rail, road, and waterway. Since Germany is having a very technological country in the production of the high-tech industry which have an extremely high demand in the Central and Eastern Europe. The logistics hub consists of the following elements:

2.2.1 Territorial Planning

The logistics hub is a designated area where several operators perform all activities associated with transportation, logistics, and commodities distribution.

2.2.2 Transportation Quality

A high service quality standard is one of the most significant factors in ensuring a high degree of competitiveness, especially given that competing nowadays requires surviving the effects of globalization. Increased freight movement and intense rivalry across all local production regions have compelled enterprises to demand more efficient transportation and logistics solutions, which include minimizing bottlenecks and waste. Logistics hubs can provide optimal logistics, transportation, and storage solutions to the local

manufacturing sector. This includes regulating both transportation cost increases and the competitiveness of industrial productivity.

The main purpose of a Logistics hub is maintaining an important level of quality, which has the following consequences on the transportation system:

1. Development of the logistics chain
2. Maximizing the use of trucks
3. A reduction in labor costs
4. Warehouse Utilization
5. A reduction in total transportation expenses
6. A reduction in overall industrial expenses
7. An increase in the total turnover of the transport operators.

2.2.3 Intermodality Development

The usage of a minimum of two different modes of transportation during a single door-to-door journey is referred to as intermodal transportation. Intermodality is influenced by the degree of integration in terms of ownership, operation, and usage. The establishment of smooth integrated transport chains is required to improve intermodal transportation.

Main objectives of a logistics hub:

1. Managing the freight movement which is handled by logistics and transportation firms.
2. Offering very efficient transportation and coordinated solutions (rail/road/short-sea-shipping) on long-distance journeys, utilizing block shuttle trains.

For all transport operators transferring freight from one location to another using various modes of transportation is their main activity, the location is extremely critical. The warehouses and the intermodal terminal are the most essential infrastructures within a Logistics hub. The warehouse is the facility in which the transport operator conducts the majority of his operations. Depending on the activities and freights handled by the transport operator, many types of warehouses exist such as: general storage warehouses, rail-road interchange warehouses,

warehouses with air conditioned, Intermodal Terminals, Warehouses with raised docking bays, and large warehouses (for logistics activities). The hub is created to satisfy the region's needs. The recommended components are as follows:

1. Railways
2. Warehousing & Storages
3. Truck Terminal
4. Auto Workshops & Showrooms
5. Recreational Zone
6. Green Open Areas
7. Business Center & Office Space for various Service Providers & Agents
8. Hotels, Dormitories & Restaurants for the Drivers
9. Fuel Station

2.3 Suez Canal Logistics Hub

It is possible to convert the Suez Canal from a cargo gateway to a logistical hub. In order to become a global hub, operations must be optimized, complex transportation must be integrated, performance must be improved, customer lead times must be shortened, costs must be reduced, a wide range of logistics services must be provided, the supply chain must be integrated, and waste must be eliminated. Several types of logistics hubs exist (Nam and Song, 2011, pp. 272). From the logistics perspective, a logistics hub might be a distribution facility. From the perspective of freight transportation, it might be a freight village. In terms of facility location, it might be a logistics zone (free trade zone). It is frequently described as a method of organizing and controlling the movement of information and cargo among ocean carriers concerned with maritime logistics. It is a systematic entity of the logistics integration system, the maritime logistics hub is concerned with specific activities related to maritime transportation as well as an efficient logistics flow (Notteboom 2002, pp. 275).

There are three players in maritime transportation: shipping firms, port operators (including value-added services), and freight (Nam and Song 2011, pp. 262). Enhancing the 6 pillars including the

transportation sector, trade sector, tourism sector, renewable energy sector, human development sector, and industrial complexes sectors, is the framework for transforming the Suez Canal region into a worldwide logistics hub. Suez, Ismailia, and Port Said governorates are all located along the Canal and can assist in the development of these pillars. Innovative technology should be used at the Suez Canal Container Terminal in Suez to offer all transiting vessels with modern handling and operation systems.. Thus, developing a logistics hub in Suez Canal will change the world trade pattern as many vessel operators select the Suez Canal Route to reduce the lead time taken to deliver goods. Suez Canal could be a chokepoint of goods and the most attractive point for distributors and manufacturers (SCA, 2022).

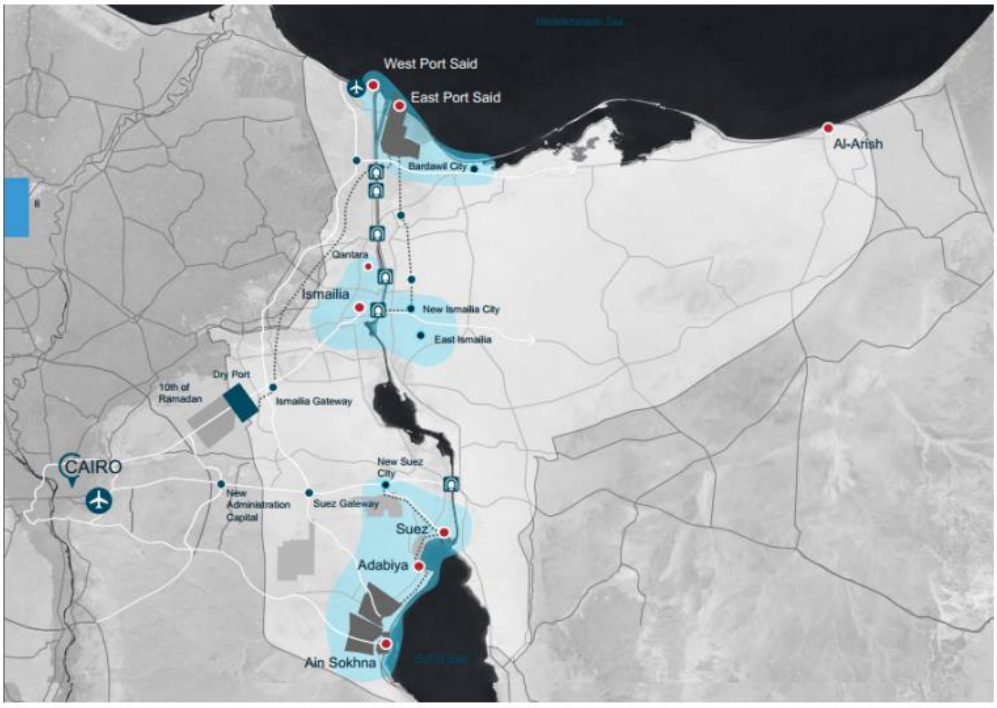


Figure 2. Suez Canal and its link to the Suez Canal Economic Zone and the distribution of ports, Industrial zones, and investment zones.

Source: UNCTAD, 2021

Figure 2 illustrates the importance of Suez Canal and its link to

the Suez Canal Economic Zone and the industrial zones, and investment zones.

2.3.1 Suez Canal Region

These are the areas: Port Said Region, Suez Region, and Ismailia Region. By establishing a growth plan for logistical and industrial zones that includes the three previously existing cities and ports.

2.3.1.1 Development of Port Said Region

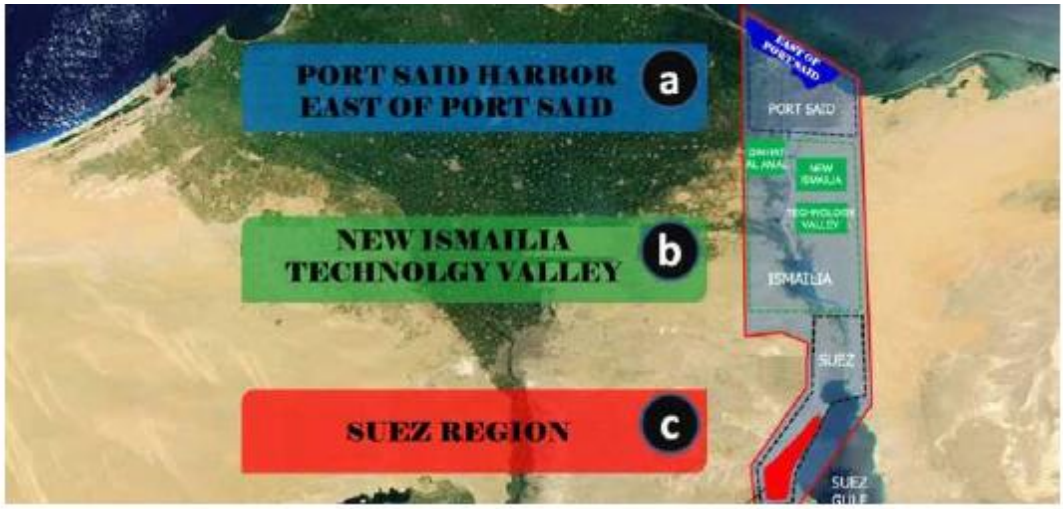


Figure 3. The Development Zones
Source: The Suez Canal Corridor Development Technical Secretariat - SCC

The current Port Said's west port is deemed to be the world's largest central port because it is situated on the Suez Canal and its 35 km2 size with 37 quays for various uses. The port is adjacent to Egypt's largest industrial free zone, which has a surface area of 99 km2 and a 50,000-acre agricultural area. The current port is categorized into four primary zones, as shown in the figure below:

1. Tourist Zone
2. East Zone
3. South Zone

4. North Zone

In addition, two tunnels in the Mediterranean city of Port Said were completed by November 2019. Instead of waiting days for a ferry, they reduce the time required to cross the Suez Canal to 10-20 minutes. The Port Said tunnels are four kilometers long and have a diameter of 11.4 meters. They are connected by emergency corridors. The tunnels can accommodate up to 2,000 vehicles per hour.

The goal for Port Said's growth is to make a significant contribution to trade and economic activities in Egypt's northwestern region and the Mediterranean. Port Said is expected to transform into a significant economic hub, focusing on industry, logistics, and port-related activities. East Port Said's development, as it will be regarded as an economic hub, will be a top priority. This phase of development is scheduled to be completed by 2030. Following that, the majority of new developments are expected to take place in the city region. Once the construction is finished, the area surrounding East Port Said will need to be completely served.

Moreover, the current development in West Port Said is expected to shift gradually to East Port Said. In order to meet the anticipated urban density, the city of Bardwail will be developed. Bardwail city and East Port Said will have a major impact in the city region after 2030 by growing residential capacity and diversifying economic sectors. The majority of the land in this area will be utilized for manufacturing (medium to light enterprises), ports and logistics, and residential purposes, resulting in a 494,600 increase in employment in the Port Said city area in 2030 and more than 1,150,000 in 2050. The expansion will attempt to transform the port into a logistic hub, with the number of quays reaching 22 by the year 2030. To link mainland Egypt with the peninsula and the Suez Canal Economic Zone, five tunnels were built beneath the Suez Canal. Passengers and goods will be capable of moving more quickly than ever due to the network of tunnels and bridges, attracting more investors to this potential area.

2.3.1.2 Ismailia City Region Development

The area surrounding Ismailia, one of Egypt's most popular cities, was chosen as the second zone in the expansion plan. The development plan is mostly focused on the "AlQantra Shareq" zone, which is part of the Ismailia governorate and is bounded on the north by Port Said city, on the south by Suez city, and on the east by Sinai city. Qantara Shareq covers approximately 2400 km2 and accounts for nearly 49% of the total area of the Ismailia city. Qantra Shareq is the largest area in Ismailia, although it is also the least populated. Qantara Shareq's development plan intends to enhance the sector in two dimensions. The first is to develop technology industry, while the second is to create miscellaneous industries such as pharmaceuticals and petrochemicals.

The technological valley project will serve as a backbone for expanding this area and bringing residents from congested governorates to the new development zone. The following are the goals of the technological valley in terms of technical development:

1. Sector of Electronics
2. Sector of Biomedical
3. Sector of Software
4. Sector of Renewable Energy
5. Sector of Materials and polymers
6. Sector of Communications

2.3.1.3 Suez City Region Development

Suez City is divided into 3 parts: Suez City, Adabiya Port, and Ain Sokhna Port. The third zone is located beneath Ain El Sokhna Port and extends behind the existing touristic zone in Ain El Sokhna. The targeted zone has 13 phases, as well as a variety of heavy industry areas to the south and west. This area is aimed at the following industries:

1. Automobiles

2. Petrochemicals
3. Fabrics
4. Building materials
5. Packing
6. Household
7. Medications
8. Food Industry

Table 1. Traffic through Suez Canal (2015-2021)

Year	No (Vessel)	Net Ton (Ton)
2015	17,483	998.7 M
2016	16,833	974.2 M
2017	17,550	1,041.6 M
2018	18,174	1,139.6 M
2019	18,880	1,207.1 M
2020	18,830	1,170 M
2021	20,694	1,270 M

Source: Suez Canal Authority, 2022

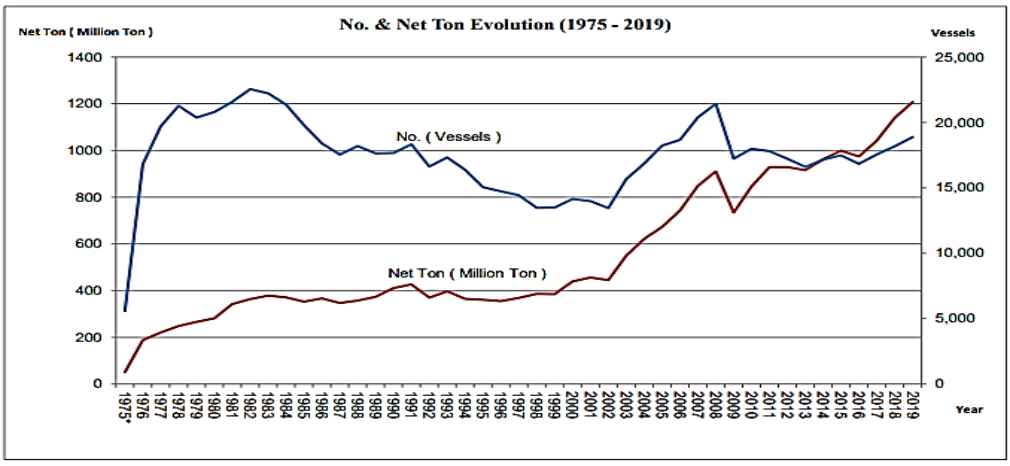
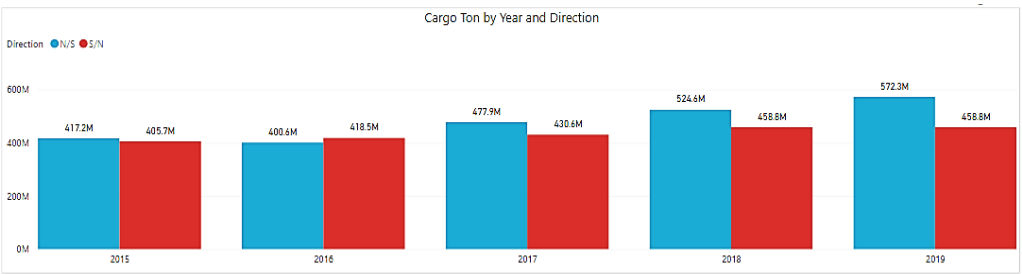


Figure 4. Number and Net Ton Evolution

Source: SCA, 2019

Table 1 shows the growth in the number of ships that use the Suez Canal as well as the volume of cargo moved. In addition, Figure 4 illustrates how modifications to the canal have made it possible for larger ships to pass through as well as how the number of ships using the Suez Canal and the net tonnage of goods transported have gradually increased.



Direction	2015	2016	2017	2018	2019
N/S	417.2M	400.6M	477.9M	524.6M	572.3M
S/N	405.7M	418.5M	430.6M	458.8M	458.8M
Total	**822.9M**	**819.2M**	**908.6M**	**983.4M**	**1,031.2M**

Figure 5. Cargo Ton by Year and Direction (2015-2019).

Source: Suez Canal Authority, 2019

Figure 5 shows the amount of cargo transported in tons in each year from 2015 till 2019 and it shows the flow of trade from North to South and vice versa. These numbers highlight the importance of the Suez Canal, and how developing a logistics hub will have a huge impact on the maritime network.

The concept of establishing an international logistics hub necessarily involves a strategic integration of regional and national legal, economic, administrative, and planning frameworks. The following are part of the expansion plan:

1. Expanding foreign trade and increasing exports.
2. Develop sectors such as global maritime services, logistics, industrial development, and urban development.
3. Diversification and development of the area's current operations.
4. Offering enhanced economic growth through integrating the mentioned activities and encouraging foreign investments.
5. Taking advantage of this opportunity to apply sustainable development best practices.
6. Investment and employment opportunities.
7. Raising cargo transport volumes and Suez Canal revenues.
8. Emphasize the importance of multimodal transportation
9. Expanding the Sinai Peninsula.
10. Improve the Egyptian labor force's efficiency to meet the global standards

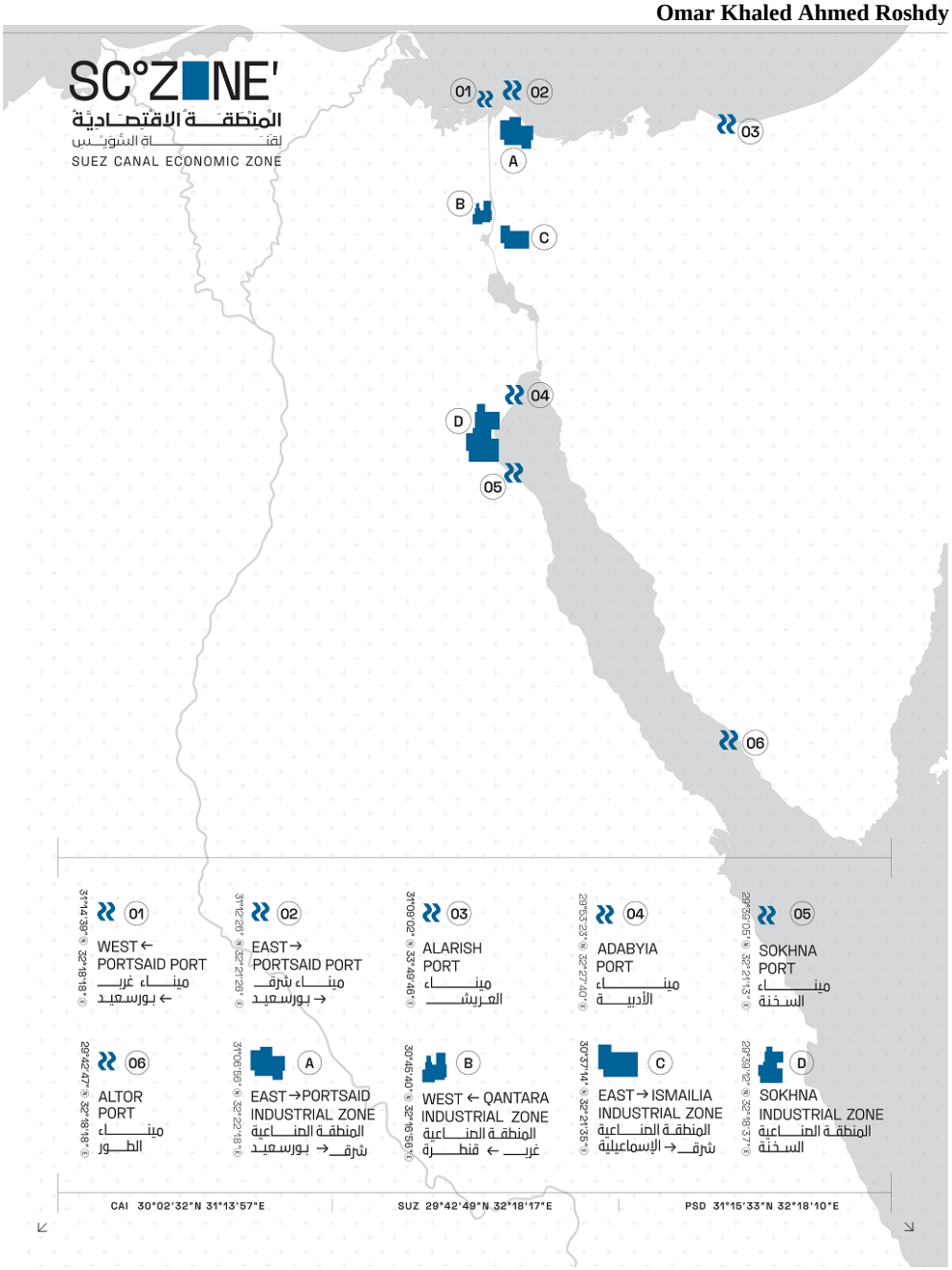


Figure 6. Integrated Route between Industrial Ports and Industrial Zones

Source: Suez Canal Economic Zone

Figure 6 highlights the integration between Industrial Ports and Industrial Zones.

2.4 Maritime Network

2.4.1 Geography of Maritime Transport

Maritime transportation geography is distinct because it addresses commercial, strategic, and physical needs. Physical problems are clearly stable throughout time, but due to the ups and downs of globalization, strategic, and particularly commercial, factors are always shifting. Even though oceans make up 71% of the earth's surface, the majority of maritime transportation occurs along predetermined paths that are frequently used in trade routes. Mandatory points of passing, which are crucial points, as well as physical restrictions and political boundaries all influence these pathways.

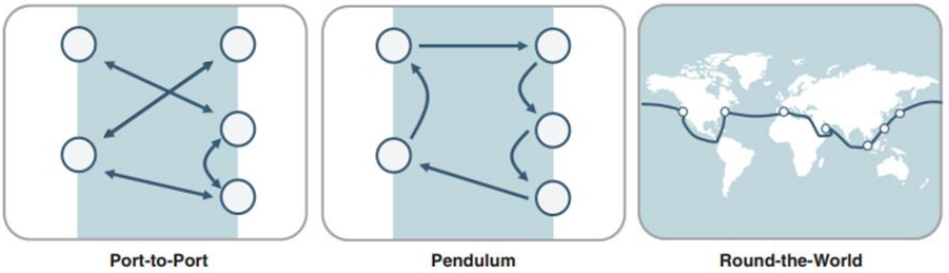
The world's marine network is established by the Panama Canal, the Suez Canal, and the Malacca Strait, which connect North America, Europe, and Pacific Asia. Only a small amount of the Atlantic Ocean's northern, southern, Indian, and Pacific oceans is used due to hazardous conditions. Due to hazardous navigational conditions and their remoteness from economic hubs, the northern and southernmost regions of the Atlantic, Indian, and Pacific oceans, as well as the Atlantic, are only used on rare occasions. Navigation in the Indian Ocean and South China Sea may be more hazardous during the summer (April to October). Shorter shipping routes in the Arctic may also be made possible by climate change, but these possibilities are still far off.

Since the transatlantic and transpacific routes are set up the way they are, it is obvious that marine routes tend to follow the great circle path for various reasons. Because they serve important markets, core routes are the ones that are most frequently used, whereas secondary routes primarily serve as connectors between secondary and major markets. The significant longitudinal (east-west) interconnections continue to dominate maritime transportation. The advantages of maritime transportation are consistency and the ability to carry large

loads of freight, not speed. Simply said, such a volume and intensity of traffic cannot be supported by the current rail and road transportation infrastructures.

2.4.2 Maritime Transport Networks

Maritime transportation networks are built to cover the shortest distance while still reaching major markets. As a result, trade-offs exist between the number of ports visited and the number of vessels dedicated to certain commodities. Loading and unloading a vessel was a costly and high process prior to containerization; a cargo vessel would frequently spend more time docked than at sea. This had a significant impact on how maritime routes were configured. Containerships are constantly moving between ports of call, spending more time at sea than in port, although this trend has recently reversed. As a result, the



network structure that was mostly port-to-port has changed due to containerships, becoming a more complicated structure that spans numerous markets. The commercial services they support determine how the maritime routes are organized. Three broad categories can be made from these services:

Figure 5. Types of maritime routes.

Cited n: Maritime Transport.

1. The typical service structure, **port-to-port** involves regular calls between two ports. Vessels frequently swap between carrying a full load and an empty backhaul. The network structure of basic materials such as cereals, minerals, and oil often have minimal connection. Typically, chartered vessels will load at one port and

discharge their cargo in one to three ports to serve these markets.

2. **Pendulum services** comprise a number of port calls that are serviced in container shipping. It is obvious that the order of these ports was chosen to achieve maximum vessels' load factor. A "pendulum" is a shipping service that rotates back and forth between two maritime distances. The most important pendulum routes connect the world's three primary economic poles: East Asia, North America, and Western Europe.
3. Container shipping also relates to **round-the-world** services, which include calling at a variety of ports in a particular order—often in both directions—so that the voyage is completed. Only a few ports on each continent are serviced, although they are either significant gateways or transshipment hubs. These services were created to enhance the connections between latitudinal and longitudinal trade movements.

2.5 Development of other modes of Transport in Suez Canal Logistics Hub

2.5.1 Introduction to Transportation

The optimal location of any logistics hub is one of the most critical elements of success. They must be as close to airports, seaports, effective road networks, and railway terminals as possible. Global hubs must be near high-quality transportation links. Transportation is critical in giving access to many regions for both freight and passengers for businesses and individuals (Yu et al, 2005, pp. 17). All supply chain entities are linked simultaneously in order to transform resources into valuable items for the final consumer. As a result, its process must be professionally managed in order to reduce overall costs while increasing the satisfaction of customers (Topolek et al, 2018, pp. 17). The most important logistical activity is transportation, as it accounts for one-third of an organization's total expenses (Helmy et al, 2018, pp. 17). Consciously, it affects the cost of the goods (Aleksandra, 2017, pp. 17). As a result of the rising dependence of society on transportation networks, developing transportation infrastructure is seen as a main aspect (Satish et al, 2009, pp. 17). Transportation developments have a

wide range of impacts, including saving time and costs by shortening travel distances, lowering operating costs, which includes fuel consumption, and enhancing network node accessibility. These developments might also aid in the removal of obstacles to a country's economic growth and the enhancement of logistics performance outcomes.

2.5.2 Transportation Network Investments

Transportation investments contribute to a variety of related economic processes which, in the long run, enhance a country's accessibility and productivity, since transportation networks allow individuals and businesses to expand their markets and improve their supplier accessibility. Increasing connectivity and accessibility also increases opportunities, which can result in long-term productivity benefits (Wood, 2016, pp. 17).

A large amount of money is needed, and investments to build a transportation network and also a well infrastructure that will help meet demand at the desired service level. Transportation infrastructure expenditures are divided into two categories: infrastructure development and infrastructure improvement. To begin, infrastructure development includes the traditional building of new roads, railway routes, or additional waterways, bus, or rail terminals. On the other side, infrastructure improvement provides additional services to the existing highway system, such as logistics centers, gas stations, emergency stations, or adopting a new technology. Investors should make decisions regarding their investments based on the needs of the country. (Eberts, 2017, pp. 18). Infrastructure is absolutely important to a country's logistical performance.

2.5.3 Road Transport

2.5.3.1 Introduction to Road Transport

Highways constitute an essential mode of transportation. They offer individuals and vehicles to commute to a variety of areas and assist them in arriving at their destination without delay. Road transport is the activity of using a road to transport goods or people from one

location to another. Compared to other forms of transportation, roads provide many benefits as they require less capital. However, the cost of building and using roads is much lower than that of air transport and railways. Road transport has the major advantage of providing door-to-door service. In comparison to other modes of transportation, road transportation requires less capital. Therefore, the cost of building, running, and maintaining roads is much lower than that of air transport and railways.

2.5.3.2 Development of Road Transport

As reported by the Minister of Planning, the Egyptian government has allocated LE 23 billion to the transport's projects, accounting for 30% growth rate, to finish significant road projects such as the expansion of the ring road by 106 kilometers. Additionally, the action plan provides funding allocations of LE 1.1 billion for the completion of 3 roads totaling 350 kilometers, which will complete the country's road development. The project is intended to develop substitute concrete bridges for ferries on waterways as it is directed to make 15 bridges on the Beheiri winds worth for a total cost of LE 1.5 billion. as a replacement for ferries on waterways. The project is to expand the Nile cross-axes, which is directed to complete as well as establish ten transverse axes worth a total of LE 3.1 billion. Central Agency for Reconstruction estimates that 2.9 billion pounds will be spent to complete three major road projects totaling 324 kilometers, including the King Salman Corridor Project, the Firdous Highway, and the Matrouh / Siwa Road duplication.

2.5.4 Railway Transport

2.5.4.1 Introduction to Railway Transport

It is least impacted by weather conditions like rain, fog, and other similar phenomena, railway transport has the biggest advantage over other forms of transportation in that it is the most consistent mode of transportation. It remains committed to predetermined schedules and routes. When compared to other forms of transportation, its service is more dependable and consistent. It offers the quickest long-distance

travel of any mode of transportation—aside from airways. Railway transportation is suitable for moving huge, bulky things over long distances and is both inexpensive and effective. When compared to other alternative modes, it is a cheap form of transportation. The majority of operational expenses for railroads are fixed. Every increase in rail transport results in a drop in the average price. Due to its ability to transport much more cargo than road transportation and the fact that only one driver and one guard are needed, rail transportation is also less expensive in terms of labor costs. The railway is the safest transportation mode because it has a low risk of collisions and malfunctions. Additionally, the load capacity of the rails is extremely high. Its capacity is also elastic, which usually means that it can be simply increased by adding more wagons.

2.5.4.2 Development of Railway Transport

According to a paper presented to the Egyptian Parliament, the ministry of transportation renovated 217 train stations and 480.6 kilometers of rail between 2014 and 2019. At a cost of LE2.5 billion, the project framework aims to modernize 1,102 railroads and the transformation of 1,120 railway control systems. 700 of the former and 439 of the latter have been completed here so far. Bashtil Station is also being developed by the Egyptian Railway Authority (ERA) for 4.7 billion LE. The Giza-based project aims to serve Upper Egypt by connecting various modes of transportation and performing vehicle maintenance, thereby reducing the load on Cairo and Giza's central stations. ERA is investing LE46.8 billion on soft loans to modernize 14 signaling systems throughout the country. The signaling systems for the Alexandria/Luxor Line, Banha/Zagazig/Ismailiyah/Port Said Line, and Zagazig/Abou kbir Line will shortly start to be worked on.

In order to better identify railroad problems, increase safety, and decrease collisions, the authority engaged into a deal with an Austrian company in 2019 for the provision of five rail test machines. ERA also authorized a contract totaling $466.3 million with PRL (Progress Rail Automotives). 50 train engines will be delivered by an American company over a 22-month period, 41 engines will also have a long-term

maintenance performed by June 30, and 50 additional engines will have improvements within 30 months of the contract's completion. They will also supply repair services and replacement parts for the 141 train engines over the following 15 years. According to the contract, Hungary will supply 650 railcars, Russia will deliver 500, and Egypt will produce 150 under the guidance of Transmash holding. In order to localize Egypt's locomotive industry, and train employees, technicians, and engineers in the field, a factory for Egyptian locomotives will be created. In addition to producing 150 railcars, the factory will also provide maintenance. General Electric and ERA have announced a $602.05 million agreement to provide 110 engines and spare components over a 15-year period and to repair 81 additional current fleet engines at Tebin Workshop in Cairo.

2.5.5 Airway Transport

2.5.5.1 Introduction to Airway Transport

Significant distances can be covered quickly by air freight. If a customer has to export a product urgently or if their freight needs special protection or reconditioning, this is seen as the best choice. It can travel long distances because it saves time. Due to its consistency, efficiency, reliability, and speed, air travel offers flexible, dependable, and quick service. In places where other forms of transportation are difficult to access, air travel is regarded as the only option. In addition, it has a low risk of robbery or injury and a high level of security. Air shipping has a high level of security due to the constant implementation of airport cargo safety regulations. Reduced cargo theft and loss is also made possible by efficient airport operations. There are no natural barriers or obstructions that prevent an aircraft from flying anywhere. The formalities associated with customs are quite easy to follow. Humanitarian aid is delivered by air during emergencies including earthquakes, floods, accidents, and famines.

2.5.5.2 Development of Airway Transport

According to the Minister of Civil Aviation Mohamed Manar, he stated that some Saudi and Kuwaiti investors are interested in

competing for cargo village and logistic projects at Cairo International Airport (CAI) and Sphinx International Airport (SIA). The project to link CAI's "Terminal 2" to the multi-purpose carport, which is expected to open in June 2021 at a cost of EGP 170 million, is almost 35 percent complete, according to the minister, with new additions including a 310-meter-long electric walker, a 60-meter-long bridge, and a 1,200-square-meter commercial area. The newly introduced SAI airport in west Cairo is being extended to have a capacity of 900 passengers per hour instead of 300, to accommodate the predicted increase in traffic with the Grand Egyptian Museum's.

2.5.6 Waterways Transport

2.5.6.1 Introduction to Waterways Transport

Water transport allows the transportation of heavy and bulky commodities at minimal cost. When compared to rail and road transportation, this mode of transport is extremely affordable. Compared to rail and road transportation, the cost of maintenance for water transportation is less. Water transport is crucial in international trade as most of the goods are transported by the sea due to the minimal cost.

2.5.6.2 Development of Waterways Transport

Hala el-Said stated that the projects include improving river ports along the shipping route (Cairo/Aswan) and improving the effectiveness of the Halfa river port in Sudan. At the Egyptian Economic Development Conference, Egypt stated its goals and a variety of major developments in the Suez Canal area in order to encourage its sustainable improvement plan as well as the Egyptian Sustainable Development Goals (SDGs). Megaprojects include the following:

1. A major industrial region with a 176.5 square kilometer industrial park in the northwest Gulf of Suez that seeks out additional foreign investment
2. Port Said West Port, Sokhna Port, Adabiya Port, and Al-Tur Port all seem to have special ports for complementary activities.

Furthermore, maritime-related activities and logistics services could occur in East port.

3. Throughout In Ismailia, a technological valley will be Ismailia, a technological valley will be developed on an area of 16.5 thousand acres with the goal of developing high-tech projects like as software, renewable energy, electronics, complex materials and polymers, biomedical devices and information and communication technology.

3. Methodology Description

The Ontology applied in this research paper is Positivism as an existing theory has been selected, and the Hypothesis has been tested throughout the research. The Epistemology chosen in this research is Authoritarian Knowledge as it depended on the information obtained from research studies, and books. In addition, Empirical Knowledge has been used as it is based on the objective facts that have been established. The approach in this research is Deductive as I will start from general statements till I reach the conclusion. The Research Strategy depended on Articles, Governmental Resources, and Case Study. The choice applied is Mono Method as I will only use one data collection technique "qualitative". The time horizon is Cross-Sectional as I have studied many factors in the TLC at the same time. Primary and secondary data were used in the research's data collection. In addition to using numerous case studies in my study, I also used the primary data as I spoke over the phone with a representative of the shipping line to ask various questions regarding the shipments on the route that I had selected. The Secondary data as I have used governmental publications, books, journal articles, and websites. The data analysis applied in this research is Quantitative as I have collected the TLC from the shipping line to generate numerical data to help me prove that it's better to use Suez Canal than Cape of Goods Hope or any other alternatives in terms of nautical miles, saving miles and days.

4. Alternatives to Suez Canal

4.1 Comparative Analysis between Panama Canal and Suez Canal

The Panama Canal, one of the world's greatest technical accomplishments, links the Pacific and Atlantic oceans. The 48-mile (77-kilometer) Panama Canal runs through Central America's constricting Isthmus of Panama. It extends over both the Atlantic and Pacific oceans, from Limone Bay to Panama Bay. It is crucial to international trade as a shortcut to the hazardous trade routes through South America. With the canal, a trip from New York to San Francisco may be completed in less than 8,000 nautical miles. As trade between nations grew, there was a demand for mass movement of products, which different types of vessels could accommodate. It was always necessary to move this massive amount of cargo rapidly, which is why the canal construction was chosen. Before the Panama Canal was built, a route that went around "Cape Horn" was used (located in southernmost tip of South America). It takes around a month to complete this journey. However, once the Panama Canal, which connects the continents of North and South America, was built, a significant amount of time and money were saved. Thus, the building of the Panama Canal had a significant effect on shipping and global trade.

The development of the Panama Canal took place in two phases. The first phase, which took place between 1881 and 1888, was conducted out by the French business led by de Lessop, while the second phase, between 1904 and 1914, was carried out by Americans. The Atlantic and Pacific oceans are linked by the Panama Canal. Due to the landmass's modest elevation over mean sea level, the vessel must be raised up to 26 meters above mean sea level. To enable the vessel to continue its sea voyage, the vessel must be raised and then lowered to mean sea level after exiting the canal. Lock gates were provided to make lifting and lowering the vessel easier. From the canal's Atlantic entrance, a voyage along it would pass through a 7-mile constructed channel in Limón Bay. The remaining 11.5 miles of the canal lead to

the Gatun Locks. Vessels are raised 26 meters to Gatun Lake by this combination of three locks. It travels a further 32 miles to Gamboa, where the Culebra cut starts, through a channel in Gatun Lake. This 150-meter-wide, 8-mile-long waterway runs through the cut. The locks at Pedro Miguel are at the end of this cut. However, the following points can be concluded as a difference between Panama Canal and Suez Canal:

1. Panama Canal connects between the Pacific and Atlantic oceans across the Isthmus of Panama. Due to its exceptional geographical position, the Suez Canal is considered the quickest route between both the east and the west. The Suez Canal is a vital global shipping route that links the Red Sea in Suez to the Mediterranean Sea in Port Said.
2. Panama Canal's length is around 80 kilometers; however, Suez Canal length is around 193 kilometers.
3. Draft in Panama Canal is 15.24 meters; however, in Suez Canal, the draft is 24 meters.
4. Maximum Depth in Panama Canal is 15.09 meters; however, Suez Canal is 20.1 meters deep.
5. The Panama Canal seems to have 3 sets of locks totaling 12 locks: Miraflores Locks, Pedro Miguel Locks, and Gatun Locks.; however, Suez Canal has no locks since the Gulf of Suez in the Red Sea and Mediterranean Seas typically has the same water level.
6. The expansion cost in Panama Canal in 2006 was about 5.4 billion dollars; however, the expansion cost for Suez Canal in 2014 was about 8 billion dollars.
7. In 2021, 13,342 vessels used Panama Canal, with LNG and LPG carriers dominating with increases in both the number of transits and the total tonnage; However, the administrators of the Suez Canal in Egypt claim that challenges associated with supply chains, increasing shipping costs, and trade disputes between nations, the canal generated record-breaking yearly revenue of $6.3 billion in 2021. The Suez Canal Authority's Admiral Ossama Rabei announced that revenue increased by 12.8% compared to 2020. Rabei added that 20,649 vessels passed through the Suez Canal in

2021, an increase of 10% over the 18,830 vessels that did so in 2020.

4.2 Cape of Goods Hope

Depending on the vessel and cargo, moving through the Cape of Good Hope route requires a further 9,000 kilometers or 6-14 days of travel time. However, Suez Canal takes roughly 13-15 hours from beginning to end. Companies were forced to choose between waiting for the blockage of the Suez Canal or rerouting the vessels around Africa during the Ever-Given issue. The longer the shipping route, the higher the costs of resourcing and fuel, as well as the risk of time-sensitive freight (such as medical equipment) arriving late or damaged (such as food and therapeutics). The Cape of Good Hope has an additional security concern, such as the threat of piracy. So, if we compare between Suez Canal and Cape of Goods Hope, the Suez Canal would be the shortest distance among both East and West due to its geographical location, as shown below in Table 2.

Table 2. Comparison of different routes between Suez Canal and Cape of Goods Hope

F rom	To	Distance (Nautical Miles)		Saving	
		SC	Cape	Miles	%
Ras Tanura	Constanza	4144	12094	7950	66
	Lavera	4684	10783	6099	57
	Rotterdam	6436	11169	4733	42
	New York	8281	11794	3513	30
Jeddah	Piraeus	1316	11207	9891	88
	Rotterdam	3997	10797	6800	63
Tokyo	Rotterdam	11192	14507	3315	23
Singapore	Rotterdam	8288	11755	3467	29

Source: Suez Canal Authority, 2022

I have assumed that the type of product which will be transported is Stainless steel and its HS code is 7218. In addition, it will be transported in a 20Ft container. The first destination will be from Port of Tokyo, Japan and it will be transported to Port of Rotterdam, Netherlands. In addition, I will use two alternatives in this destination

(Suez Canal and Cape of Goods Hope). I will compare the following in this route:

1. Nautical Miles
2. Number of Days
3. Saved Miles

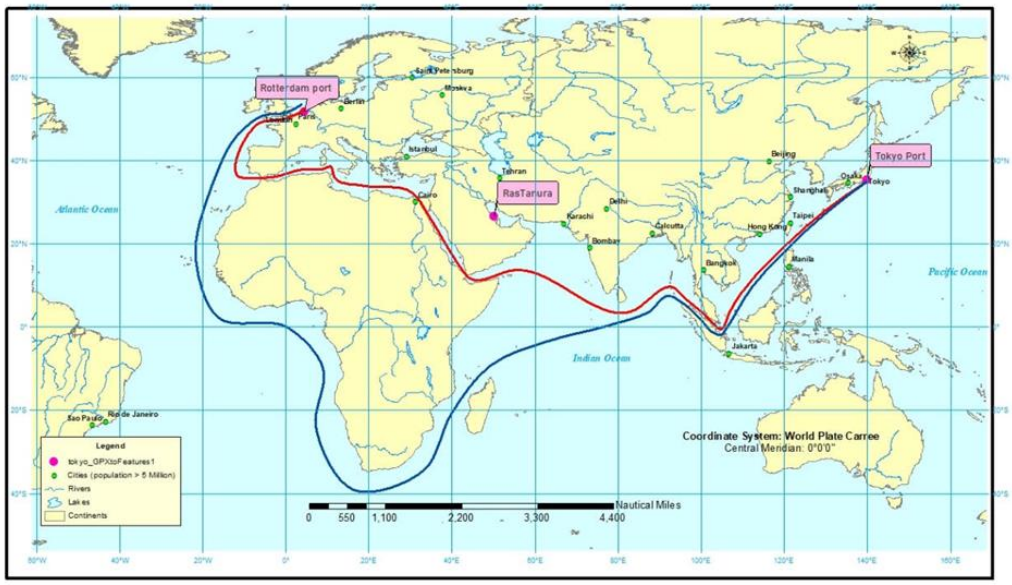


Figure 6. Destination from Tokyo Port, Japan to Rotterdam Port, Netherlands.

Source: Developed by the author

Voyage from Port of Tokyo in Japan to Port of Rotterdam in Netherlands is 11,192 nautical miles when passing through the Suez Canal. However, the destination from Port of Tokyo in Japan to Port of Rotterdam in Netherlands is 14,507 nautical miles when passing through Cape of Goods Hope. Keeping in mind that the economical speed for vessels is 13 knots, the voyage will take around 35 days 21 hours when passing through Suez Canal while the voyage will take around 46 days 12 hours when passing through Cape of Goods Hope which means that passing through Suez Canal will save 3,315 nautical

miles which account for 23%.

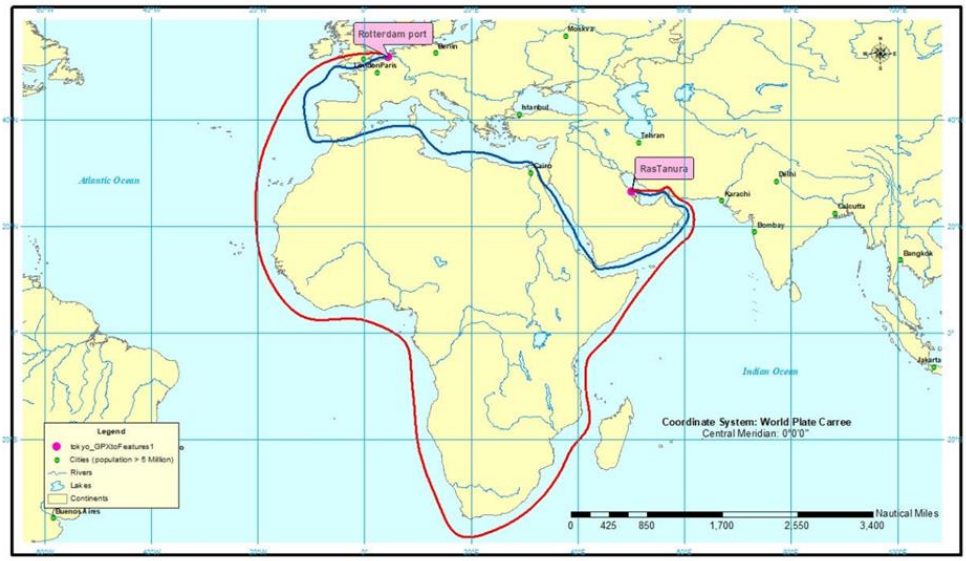


Figure 7. Destination from Tokyo Port, Japan to Rotterdam Port, Netherlands.
Source: Developed by the author

As the previous figure illustrated, the voyage from Port of Ras Tanura in Saudia Arabia to Port of Rotterdam in Netherlands is 6,436 nautical miles when passing through the Suez Canal. However, the destination from Ras Tanura in Saudia Arabia to Port of Rotterdam in Netherlands is 11,169 nautical miles when passing through Cape of Goods Hope. Keeping in mind that the economical speed for vessels is 13 knots, the voyage will take around 20 days 15 hours when passing through Suez Canal while the voyage will take around 35 days 19 hours when passing through Cape of Goods Hope which means that passing through Suez Canal will save 4,733 nautical miles which account for 42%.

4.3 Northern Sea Route (NSR)

Due to the melting ice and lengthening of the navigation season

brought on by global warming, experts have been increasingly interested in this shipping route. Since there is no ice throughout the summer, NSR can serve as a direct link between Asia and Europe (Tseng and Cullinane, 2018). For this type of trade, the Northern Sea Route is currently around 40% shorter than the Suez Canal Route. As it is located along the arctic coast of Russia. This maritime route has the biggest potential for commerce because it is most likely to be free of ice. It would cut the distance of a vessel travelling through the Suez Canal from 21,000 kilometers to 12,800 kilometers, conserving 10 to 15 days of transit time. Although in theory the NSR can cut down on fuel prices and sailing distance, its poor environmental conditions, such as poor visibility and temperatures, are more likely to cause ships to sail slower and use more fuel.

4.4 New Silk Road

One of the world's largest infrastructure developments is China's Belt and Road Initiative (BRI), also known as the New Silk Road. It is a significant infrastructure development that would extend all the way from East Asia to Europe, as they intend to build 2 new trade routes linking China to the rest of the world. Such a project aims to the establishment and strengthening of partnerships between the nations along the Belt and Road, the establishment of multi-tiered, multi-dimensional, and composite connectivity networks, and the achievement of diverse, and sustainable development in these countries. As it is the only maritime link between Europe, Asia, and Africa, the Suez Canal is expected to be absolutely essential to the Belt and Road Initiative (BRI). As a result of the Suez Canal logistics hub's development, it will serve as a logistical center for upcoming vessels and goods.

4.5 Nicaragua Canal

The main objective of building the Nicaragua canal as a shipping route is to provide a marine route that connects the Atlantic and Pacific oceans. In terms of implementing a direct rival to the Panama Canal, new desires to build such a canal emerged in the twenty-first century. The canal's likelihood of ever being built is quite poor.

However, if the Nicaragua Canal is built, it will not affect Suez Canal since it connects the Red Sea with the Mediterranean Sea, so it is far away from such a canal.

5. Conclusion

This research examines the impact of developing the Suez Canal on the international maritime network. Discussing the importance of Suez Canal as route and reviewing statistical data and comparing this route to other competitive routes and choke points. Thus, creating a logistics hub in Suez Canal will lead to reducing the total landed cost regarding the transportation, lead time and the production cost as the factors of production have competitive cost comparing other well-developed countries. Also, the logistics hub will increase the business cycles as Suez Canal has a high potential to be the most effective point of distribution worldwide and affect the global economic growth positively and it requires high investments to be able to cope with the potential high demand and provide space for manufacturing and distribution channels.

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