PROJECT REPORT

FACTORS FOR THE LINER SHIPPING BILATERAL CONNECTIVITY INDEX (LSBCI)

Submitted for partial fulfilment of the requirement for the degree of

MASTERS OF BUSINESS ADMINISTRATION

By

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-Kiran Mishra

DECLARATION

I, **Kiran Mishra** (Reg. No 2003305018), hereby declare that the project report on **"**IDENTIFYING FACTORS FOR THE LINER SHIPPING BILATERAL CONNECTIVITY INDEX**"** submitted to **Indian Maritime University, School of Maritime Management, Chennai** in partial fulfilment of the requirements for the award of degree **Master of Business Administration** in International Transportation and Logistics Management, under the supervision of **Dr. Emil Mathew**, Assistant Professor, School of Maritime Management, Indian Maritime University, Chennai.

This submission represents idea of mind in my own words and where ideas or words of other have been included. I have adequately and accurately cited and referred the original sources.

Place: Chennai **Kiran Mishra**

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CERTIFICATE

SCHOOL OF MARITIME MANAGEMENT

INDIAN MARITIME UNIVERSITY, CHENNAI.

This is to certify that the project report entitled "IDENTIFYING FACTORS FOR THE LINER SHIPPING BILATERAL CONNECTIVITY INDEX**"**, submitted to the School of Maritime Management, Indian Maritime University, Chennai Campus., in partial fulfillment for the award of the degree of Master of Business Administration in International Transportation and Logistics Management, is a record of work carried out entirely by Kiran Mishra Reg. No.2003305018.

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ABBREVIATIONS

ABBREVIATION	EXPANSION
ASEAN	Association of Southeast Asian Nations
BRU	Brunei
EoDB	Ease Of Doing Business
IND	Indonesia
KHM	Cambodia
LAO	Laos
LSBCI	Liner Shipping Bilateral Connectivity Index
LSCI	Liner Shipping Connectivity Index
MYA	Myanmar
MYS	Malaysia
NM	Nautical Miles
PHL	Philippines
SIN	Singapore
TEU	Twenty-foot Equivalent Unit
THA	Thailand
UNCTAD	United Nations Conference on Trade and Development
VNM	Vietnam

CHAPTER –1
INTRODUCTION

1.1- BACKGROUND:

The network is the main part of the worldwide exchange. The Director-General of the WTO, Pascal Lamy referenced in a discourse: "By connecting the least connected countries to global value chains, these countries should be able to join the global exchange network. " We want to make a clear distinction between What it means to be related and how availability might be accomplished. Because our exchange framework is increasingly based on exchange errands rather than conclusive merchandise, a nation can join the global framework by accomplishing one task at a time and then continually increasing to it. Because peripheral regions may have enormous unmet exchange-related prospects to establish monetary agglomerations, combining local and international economic sectors is crucial. that could disrupt professional career limits. Being associated requires a decent working window to have the option to approach a framework. In the event that your traditions or other boundary administrations are wasteful, the simplicity of getting to the worldwide organization is diminished, prompting a lower connectedness. One of the principal motivations for approaching the worldwide exchange. The notion is that by making an organisation or structure more accessible, more businesses and individuals will be incentivized to utilise it because the barriers to entry will be reduced, cutting expenses.

In any case, to know how to work with the admittance to a framework, it must be known exactly what variables decide to have or not to approach the framework. All together have the option to find these elements, the actual framework, and its design must thus be examined and portrayed.

For example: Lower (sea) transportation costs, owing in part to the massive overcapacity of the world trader fleet, make delivering things internationally much more financially appealing these days.

As a result, remarkable situations have arisen in which specific components of a finished item can be manufactured anywhere on the planet (and thus at the lowest cost) before being shipped to the final destination.

one of the most important facilitators of the spread of fabricated product trade and transportationAs a result, enterprises that create lower-cost products require fewer workers and smaller capital investments continue to migrate to low-wage countries.

As a result, more developed countries tend to climb the value chain, opening the door for emerging countries to join the global value chain.

It is important for a nation to approach the worldwide transportation and exchange connectivity, to make the issue of network significant. Because of the portability of products and businesses, the need for manufactured goods transportation has grown dramatically over the last ten years, accounting for a significant share of all global seaborne trade.

One of the most important enablers of the growth of manufactured product trade and transportation has been the container. The shipping costs were reduced by placing the products in a container and then transferring the container rather than the individual items. One could argue that containers have had a greater impact on globalization than regulation.

1.2- LINER SERVICE-

The structure of containerized marine transport was designed to be compared to a typical transport plan in which vessels depart and arrive from and at ports at regular intervals. As a result, oceanic container and manufactured goods transportation is depicted as a liner service. A liner shipping network can be used to describe how much access to these global delivery services there is. The main issue emerging from this idea of connectivity is:

What causes differences in country connectivity when it comes to liner shipping services?

Once they've been located and assessed, they can be combined to form a connectivity index that can be used to assess the connection of various locations and to assist policymakers in determining access to the global liner services network.

1.3- THE INITIAL LINER SHIPPING CONNECTIVITY INDEX (LSCI)-

An index called Liner Shipping Connectivity Index (LSCI) is made yearly by UNCTAD starting around 2004 for the nation level. A point to be noted here is that it is a little different from Liner Shipping Bilateral Connectivity Index (LSBCI). The higher a country is on the list, the easier it is for that country to participate in international sea containerized trade. Past studies have indicated a strong and significant correlation between the costs and the components of this record.

1.4- PROBLEM STATEMENT-

The main problem statement that must be addressed by an analysis of the current data is-

What are the other components that can be included in the current LSCBI (Liner Shipping Bilateral Connectivity Index) published by UNCTAD annually?

1.5- OBJECTIVES:

The aim of this undertaking is to understand the factors that can be taken into consideration while preparing the Liner Shipping Bilateral Connectivity Index (LSBCI) by looking at the bilateral relations among ASEAN nations, that either influence, or possibly have a connection with, the liner connectivity among them.

This will bring about the accompanying principal question:

How is bilateral liner network linked to these indicators?

1.6- SCOPE-

The extent of this undertaking is as per the following: It is centered on the possible factors affecting the liner network between any two countries-

- This means that the components of liner shipping availability for groups of nations (or courses between two nations) must be identified, and related subquestions and difficulties must be addressed.
- To figure out what characterizes approaching an index, an investigation must be carried out for it.
- Availability should be concentrated to distinguish factors that could act and fill in as its presumptions and can accordingly be utilized as its indicators.

This project effort will aid in determining how access to global liner shipping services can be improved, as well as working on existing logical knowledge on the drivers of global exchange. Accordingly, this can assist nations with working on their admittance to the worldwide market, which will be particularly useful for emerging nations like India.

1.7- METHODOLOGY-

The present literature has been studies and acknowledged on the factors taken into consideration by UNCTAD to prepare the LSCI and LSCBI. Then, based on the secondary data, other important factors have been analyzed and their relative impact with respect to the liner connectivity among ASEAN nations is brought out from the analysis. Then conclusions have been drawn from the analysis, and recommendations are put forward.

1.8- STRUCTURE-

The design of this proposal is as per the following:

Chapter Two: It introduces a theoretical framework for analysing contemporary logical writing on major themes. This structure can be used to infer the basics of exchange and the predicted determinants of bilateral networks.

Chapter Three: The approach is looked into in Chapter Three. The data is displayed with its sources, and the models that were utilised are described and discussed. This part also discusses the examination's legality, sincerity, and limitations.

Chapter Four- Liner shipping and its forecasting features are used to address the main research question. In the case of ASEAN states, existing bilateral trading streams are evaluated, which when combined form a picture of global liner shipping connectivity.

Chapter Five- The notion of connectivity, as well as the LSCI and its components and proposals, are addressed in further depth here. This section ends with a description of the LSBCI and an illustration of what the record should cover in the index parts that are currently proposed. Moreover, by exhibiting and explaining the index and its relationship to seaborne exchange manufactured merchandise, the results of the list employing these recommended elements are provided. The recognised cornerstones of global seaborne containerized commodities exchange are investigated and compared to bilateral network exchange volumes and proportions. These are the four support pillars:

1) Setting and Institutions,

2) Policies,

3) The connectivity structure,

4) Infrastructure and ports.

The ends, where the fundamental exploration question is addressed and the subsequent suggestions are given and examined. Following this, the proposal closes with the bibliography and indices.

CHAPTER –2

LITERATURE REVIEW

2.1- TRADE COSTS-

A decrease in sea transport costs emphatically affects exchange and especially on the serious edge of exchange through an increment of the average cost of exchanged products. Subsequently, exchange volume grows for diminishing transportation costs. Many writers have examined and contended that the distance to the vitally global liner shipping networks highly affects sea transport costs than the real geological distance. Moreover, it has been shown that factors connected with port framework, quality of service and LSCI together make sense of around a little over half of cargo rate difference. In relation to these variables, various authors have demonstrated that the number of carriers effects cargo rates in the same way that it influences competition on a certain route.

Distance is another characteristic that is usually utilised to understand exchange costs. As the distance between two business sectors widens, shipping charges are projected to climb. However, it is usually only used when direct connectivity is the only mode of maritime travel between two countries. As the liner transporting connectivity is developed so that for a larger part of courses somewhere around one trans-shipment is required, it suggests that the quantity of trans-shipments ought to likewise be considered in oceanic exchange models as this influences the successful sea distance between the beginning and terminus.

Close to this, the costs of transportation likewise will more often than not change per vessel as their feature additionally impacts their fuel use. Along these lines, vessels that are utilized on the significant routes will enjoy a benefit as far as expenses because they are normally the largest and freshest vessels, while the more established vessels are flowed down to other less vigorously utilized delivery routes. Notwithstanding, actual limitations on specific shipping lanes at ports or canals which will restrict the chance of utilizing bigger vessels is there. These actual limitations can't be taken out in the short run, and that implies that the fountain impact is essentially restricted. In this way, almost certainly, exchange costs will likewise rely upon the utilization of every specific transportation path:

The greater the need for a passage, the more likely new and productive vessels will emerge.

The quality of the courses in terms of cost of fuel, measure of trans-shipment, exchange volume, association, and port infrastructure of port cause changes in cargo rates across distinct

passages. Without a doubt, the cargo prices applied on major routes will be cheaper than those on secondary routes. Examinations show a few port qualities that can go about as determinants of worldwide costs of transportation. It was found that efficiency and infrastructure of port, private area investment and association between ports essentially affect sea transport costs. Prior research has shown areas of strength for a huge effect of port proficiency on bilateral exchange streamsIt was also tracked down that political activities to protect sea ocean lines to increase competition in the sea transport industry, developments aiding the expansion of merchant ships' sizes, and restrictions on the use of fills by ships all affect the volume and structure of global exchange, which is more unequivocally linked with transport cost than approximations based on countries' topographical distance.

2.2 PILLARS-

It turns out to be obvious from inspecting the writing on both seaborne and general global exchange that the focal point of the examination on the connection among exchange and its true capacity and potential determinants is separated in a few primary themes. Those that are applicable for this paper are: the structure of transportation network, strategy, infrastructure and ports lastly a point of support named establishments that incorporates a huge number of elements like culture, topographical area and organizations. Underneath, the writing is examined for every one of these FOUR points of support:

2.2.1- NETWORK-

Because the worldwide liner carrying network is not uniformly distributed, organisational centrality exists in distinct geological locations. Because of the organization's unbalanced dispersion, a duplication of service connectivity kinds is likely to arise, since this will give the best benefit credits in managing worldwide providing chains.

Because of changes in the global climate, such as rising oil prices and the increased risk of looting in specific parts of the world, as well as changes in the design of global monetary arrangements, businesses have altered their supply chains and transportation operations. The rise of China and India as major modern centres, as well as Europe's modern power, can be considered. The market structure is not reliable with perfect type of competition on most routes

due to the high convergence of the transportation sector. As a result, transportation alliances are becoming more powerful, increasing the relevance and effect of the decisions taken by these groups.

The issue of big fixation also has an impact on the development of the global liner network, whose primary forecasters are ship owners, who are the primary administrators of port sea associations, transporting course development, and connectivity designs. Nonetheless, power might be gained by seeking better execution levels, reduced costs, and higher quality support from ports. The vessel's owner is mainly concerned with choosing a route that minimises their most variable transportation costs between their origin and destination. Transporters, on the other hand, cover not just transportation costs but also all landed costs, or the entire charges experienced by an item in carrying it from its origin to its final destination. As a result, charges such as inventory costs, dealing costs, and value of recurrence are just as important for carriers as they are for vessel operators when it comes to cargo pricing and direct transportation costs.

The portrayal of slow steaming, in which the vessels sail at lesser speeds to manage the increased fuel expenses, is one example of this. Slow steaming has a number of distinct repercussions, one of which is that the boats' rotation time is extended, resulting in a reduction in the regular amount of miles travelled per year and a reduction in port calls.

They also believe that Singapore's current position could be jeopardized by the growth of two neighboring ports that are aiming to use trans-shipments to attract significant supply lines and alliances.

Exchange freight prices are also affected by differences in exchange rates across areas. In any event, the impact of exchange lopsidedness is difficult to assess, and it is frequently underestimated.

As a result, it's worth considering if the import-to-trade ratio is the most effective technique to measure irregular traits. The increase in the complexity of the framework as a result of difficulties such as exchange imbalanced features, rising oil costs, and security issues would also increase supply chain risks and weaken the organization's dependability.

The framework's subsequent sections will encourage delivery lines to consider a wide range of business and functional factors when deciding which ports to call.

Ports that can adapt to the path of combination with the liner transportation industry and boost the value of the business, functional and crucial quests for delivery lines will be regarded as more serious and enticing as a port of call.

They also understand numerous factors that influence transporter port decisions, such as distance to market, port charges, freight volume, level of port proficiency, infrastructure, plan reliability, and availability, among others. A few common characteristics can be seen in all primary delivery facilities.

2.2.2- POLICY-

There are also numerous authors who discuss the effects of policy and trade facilitation on exchange volumes and exchange costs. While many researchers have focused on the effects of transportation frameworks on related costs and advanced and developing countries, the number of studies that focus on trade facilitation is limited.

The aspects that trade focuses ought to zero in on difference per definition. Some just incorporate port proficiency or for example trading methods, while others center on a wide assortment of measures. Generally speaking, trade facilitation will focus on lowering trade obstacles. According to research, trade facilitation considerations are more important than charges in terms of relative importance. As a result, increasing the ease of doing business would result in an increase in global commerce. Because of provincial institutional differences, the magnitude of this influence will most likely vary by location and nation. Extended commodity and import strategies reduce the chance of companies entering time-sensitive business areas. As a result, in order to attract exchange, the quantity of systems expected for import and product should be reduced.

The influence of port fees on trade flows has been studied by academics. They discovered that at peak hours, ports with higher port fees attract fewer people, but ports with more worldwide traditional lines earn more per tonne. They also discovered that when there are a lot of nearby ports, earnings per port tonne drop, implying that having more options reduces market power.

It was arrived at the resolution that nations with lesser policy instigated boundaries to worldwide trade have a more quickly developing economy by utilizing cross-country development relapses. The explanation they found for this quicker financial development is that lower obstructions imply more exchange and along these lines' admittance to a greater market.

2.2.3- PORTS AND INFRASTRUCTURE-

There is intense competition among transportation lines to attain global inclusion of destinations and to expand their link beyond the oceans to the land. As a result, port selection is critical and has an impact on service quality and level.

As a result, shipping lines' port selection is becoming increasingly important, as it determines whether the company can comprehend its functional, service, and execution goals. The operators of the vessel, as previously said, have the most influence on port selections.

Be that as it may, the main part of the existing writing on port decision models is devoted to port decisions by transporters. Transport administrators' port decision conduct has been perceived by a couple of scholars.

In a study, a few scholars found that transporters and delivery organizations have comparable port determination standards, a similitude that could be made sense of because of the way that numerous transporters apply transporter haulage framework contracts, which lead them to have similar views as transportation organizations.

Another determinant in port selection has been discovered by researchers. They said that the port's actual closeness to clients is less significant than obtaining scale economies and minimising the time necessary to conduct business-to-business services in luring traffic to a certain port.

As a result, as previously said, topographical distance is seen as less important than monetary distance. Some ports are more strongly tied to their hinterlands than others, according to comparable study.

According to them, port development is typically related to the critical role of ports in organisations: it is dependent on the harmony between the parts of the port hinterland and their difficulty of consideration in shipping lines.

Any container port's availability is basically and inextricably linked to its port traffic. They go on to suggest that this openness might be regarded one of the key indicators of port expertise. Container port crowding is an issue that emerges as a result of increased container traffic.

As a result, the port requires a strong and reliable connection with the major land transportation companies, as well as a high-quality infrastructure in its immediate vicinity. Furthermore, due

to high oil prices and poor cargo rates, global shipping companies have increased their focus on the productivity of their ship operations. execution because it increases the amount of the port's uncontested market, allowing it to take advantage of a more prominent position.

Slow steaming, in which the vessels cruise at a slower speed to save fuel and reduce the lookout's overcapacity, is one of their strategies. In any event, to keep up with equivalent vessel efficiency levels, port stay times must be reduced, putting further pressure on ports to work faster and more effectively.

During their analysis of the evolution of commodity streams in Spanish ports and their hinterlands, some researchers revealed that the percentage of traffic that these ports find out how to collect is reliant on their portion in the disputed hinterlands.

The capture of this traffic is intricately tied to each port's specific qualities, including location, and is also heavily influenced by the state of the local economy. Regardless, the port's substantial multi-purpose port-train linkages have no connection to the components of port traffic that do not originate in the hinterland.

This suggests that the hinterland of a port is not entirely controlled by factors that directly impact or effect it, but rather by foreign forces, such as the amount of feeder trade of transshipment.

Finally, it was determined that a better framework for both ports and the country itself results in a cheaper freight rate. It may be concluded from this section that emphasis on current publications leads to many port selection measures.

We may conclude from current research that port offices, port efficacy, prices, administration, multi-purpose connections, value-added services, and data accessibility all impact port choice since they all determine the port component of overall marine transportation expenses.

2.2.4- INSTITUTIONS AND SETTING-

Exchange strategy impediments are only one part of the overall cost of trading. Institutional borders may be growing in relative importance as the influence of tax hindrances on exchange declines. The findings demonstrate that institutional exchange barriers have a greater impact on trade streams than tax borders. According to these findings, exchange strategy discussions should focus on working with exchange procedures and should be at the forefront of multilateral discussions.

Establishments are human-created or socially constructed systems of norms that force and promote human collaboration. These rules might be official, such as the law or special norms, or informal, such as personal preferences or constraints. The regulative, standardising, and social mental pillars of institutions are frequently identified in writing, each with its own logic, requisite components, and consistency and authenticity basis. These three pillars of support should not be viewed as separate entities; they can operate together to shape and influence others. Establishments are not static and change throughout time. Some argue that this will eventually lead to an ideal harmony in which no one benefits from change, while others argue that institutional change will be less startling. On the one hand, the institutional environment alludes to a wide range of informal traditions, practises, schedules, and standards, while on the other, it alludes to formal arrangements of legally adopted norms and guidelines. The institutional plans refer to certain authority structures (firms, state organisations, helpful organisations, or, more commonly: administrative frameworks) that evolve as a result of, and are reflected by, the institutional environment. Many scholars have throughout recent years investigated the effect of the foundation of international alliances between nations. Albeit these investigations have took into consideration the displaying of these impacts, they give no understanding on what arrangements, for example, these arrangements can mean for sea exchange. This is no different for the majority of possible indicators of exchange: despite the fact that relations can be demonstrated, this does not anyway imply that they really cause exchange.

A few researchers also explain how global financial connections affect bilateral exchange streams. Following China's admission to the WTO, changes in exchange streams have been identified. The impact of collusions and the confirmation of new individuals in current settlements on global exchange is another possible impact that has yet to be thoroughly investigated. The impact of violent acts against ships and their relationship to global maritime

trade has also been investigated. They discovered that only the most heinous form of savagery, hijackings, were reducing the amount of trade between countries.

A current examination into gravity models has also revealed that participation in a financial association predicts bilateral exchange (UNESCA). This investigation of gravity models also revealed that relative trade costs determine bilateral exchange. In any case, it's worth noting that bilateral levy obstacles are absent in almost all gravity models. Institutional characteristics of countries, such as language barriers, normal arrangement, and normal culture, should also be included in gravity models. The impact of these drivers on worldwide exchange volumes and costs has been studied by a large group of academics.

To begin, the researchers state that distance and public limits are important barriers to cross-line exchange development. They also ensure that oceans and seas can be considered a distinctive line, with countries sharing a common water boundary exchanging half as much as those that do not (under the situation that the two nations do not share a land boundary). This implies that the compelling, or financial, distance between two nations is determined not only by physical distance, but also by the characteristics of the nation’s borders. As a result, it's reasonable to assume that countries that share seas or oceans are better connected, and hence are more likely to have a close relationship in the liner transportation network. Similar worldwide situations and typical foundations will normally increase respective interaction as persons and locations that share these similarities assemble in both company and personal life. According to the researchers, poor administration increases the transaction costs that result as a result. They also demonstrate how the nature of formal principles influences informal standards and methods of working, increasing the likelihood that countries with similar levels of institutional quality will be familiar with one another's strategic approaches, lowering exchange costs and facilitating increased trade. On bilateral exchange streams, both administration and institutional quality have a substantial, positive, and important impact. As a result, countries with low-quality foundations may trade less with countries with high-quality foundations, but may trade more with other countries with low-quality foundations. The same may be said about the nature of administration. A large percentage of the publications shown above are either focused on a certain region of the world. Likewise, they may have grown obsolete as society evolves and, with it, global interactions and (both national and global) institutions, resulting in a shifting exchange design through time. This necessitates a continuous examination of the relationship between the aforementioned elements.

2.3- LINER SHIPPING CHARACTERISTICS-

As stated in the presentation, the primary component of Liner service is that corporations provide regular scheduled services and predetermined route transportation services.

Every three to four months, they make planning decisions to identify annual and rare requests. These judgments are often based on estimations about normal shipment demands, after which the decision maker prepares the container streams to ensure that everything is used to its full potential. Then, in order to satisfy the minimal criteria, container ships are assigned to the courses.

Asian transportation lines' trans-shipment and tubing choices impacted the outcome of the container port decision battle the most. With regard to containerized freight movements between East Asia, Southeast Asia, Australia, the Middle East, and Europe, they view this as the emphasis of a number of their ports. They also claim that the growth of two neighbouring ports looking to collaborate with trans-shipments in order to attract significant transportation lines and partnerships would jeopardise Singapore's dominance. The Panama Canal, which limits vessel size, lies close by, and the bulk of vessels headed for the US East Coast market sail through it. The Panama Canal's enlargement, in any event, will allow ships with up to 12,500 TEUs to pass through. This will enable transportation businesses to deploy larger boats and cut unit prices through economies of scale. It implies that, with the opening of the new Panama Canal, the entire structure and framework would most likely undergo considerable alterations. If the now (again) projected Nicaragua Trench is built, these progressions might become considerably more dramatic in the future.

The researchers also claim that the infrastructure at South Atlantic ports is now insufficiently developed to adapt effectively to the South Atlantic interconnectivity, causing trade barriers in the area. Nonetheless, in order to draw in these freight streams, ports and governments have resorted to general market growth and components in container transportation with large interests in their basis. These hypotheses have focused on every aspect of the maritime transportation chain. Working on the availability of ports for growing vessel sizes is an example of this type of conjecture. As a result, it is reasonable to expect that the building of liner carrying structures will vary in the future as a result of variations in global financial creation and utilisation focuses, as well as changes in course prospects. Furthermore, the changing financial situation has an impact on the architecture of the liner transportation network. One question

that arises from this is whether global exchange examples will change as a result of changing global networks in response to changes in the global monetary climate, or if changes in the delivery network are more influenced by global exchange changes. As previously said, liner transportation companies normally prepare strategic choice plans every 3 to 4 months to deal with demand fluctuations. This implies that the organisation is more reliant on global exchange models than vice versa. Nonetheless, the final objective of this investigation is not as critical as deciding probable proxies of bilateral liner shipping networks: all that is necessary is a relationship between commerce and the dummy: causation is not required.

2.4- THE LINER SHIPPING NETWORK STRUCTURE-

The worldwide liner transportation network is like to a complex web. Significant level dispersions (many links or edges between hubs), high grouping, and progressive designs are only a few of the factors that go into determining the network structure. Analyzing the numerous levelled designs of a building helps reveal the centrality of each hub within a network.

The network hypothesis has been utilised and implemented in the social sciences for a long time, thanks to his persuasive study on the theoretical explanation of centrality in networks. These may be used to describe each network hub's overall centrality. The network theory is not applied for marine connections in any situation. Only a few papers have been released since 2010 that apply a few elements of organisation theory to this problem.

The majority of marine transportation network research concentrates on basic architectures with only one sort of connectivity between hubs. While this is partly due to the lack of a good numerical definition of multi-graphs, sociologists began to emphasise the importance of at least two types of links in the 1960s. Multi-edge relations are often investigated as simple graphs with a variety of connections using standard methods.

The preceding applies to any bilateral representation or result in a network, and thus to a bilateral index that should address a network proportion between two nations in the global liner transportation network. As a result, the portions of the LSBCI do not have to come from bilateral ties; they can also come from outside of country or region-specific factors, as they will influence the bilateral relationship for any nation pair.

The construction of the liner shipping network can be investigated using data from Lloyds List Intelligence. As previously said, this dataset displays all of the direct links for shoreline countries. Nonetheless, not all waterfront nations are examined for this paper's study; the illustration of the liner shipping structure only considers the 158 nations previously mentioned. There are 2169 direct associations between these 158 nations, out of a total of 12,562 nation pairs. This implies that a large proportion of all nation pairs expect at least one trans-shipment to transport goods between them. Table 2.1 demonstrates this.

The base measure of trans-shipments predicted to interface any nation pair is outlined here. The consequences are solely determined by bilateral relationships: If a nation pair has a direct relationship, no transshipments are necessary. If this is not the case, it has been decided if an association can be formed with only one trans-shipment, as opposed to two or three trans-shipments. With less than four trans-shipments, all connections between each nation pair are possible.

	0 trans-shipments	**1 trans-shipment**	**2 trans-shipments**	**3 trans-shipments**
%age of all possible connections	17.26	63.61	19.03	0.10

Table 2.1- Portion of least number of trans-shipments necessary for all nation pairs.

(Source: Lloyd's List Intelligence)

As shown in Table 2.1, approximately 17 percent of all courses are directly related, approximately 64 percent anticipates somewhere around one trans-shipment, 19 percent expects no less than two trans-shipments, and 0.1 percent of all prospective courses expects three trans-shipments.

As a consequence, whereas some countries have many direct ties, others have few, meaning that at least one, two, or possibly three trans-shipments will arrive in other countries. The United States (with 98 direct connections, frequently requiring only one trans-shipment, and occasionally requiring two trans-shipments) and Greenland are two clear instances of the two limitations (with just 1 direct association, 28 potential associations with one trans-shipment,

116 potential associations with two trans-shipments and 13 associations where no less than three trans-shipments are required). In any case, keep in mind that these data are based solely on actual direct ties, with no weight assigned to these associations. As a result, the direct relationship between China and Hong Kong has the same 'worth' as the relationship between the United Governments and all of the small Caribbean island states.

Table 2.2 shows an overview of the largest and average of each of the seven sections in Lloyds List's dataset on current direct nation-pair relationships. With the exception of the biggest vessel size, which may be utilised on a range of nation match courses, the greatest attributes for each of the courses are all in Asia, with four of the seven being on the Hong Kong-China route, signifying a strong affinity and relationship between the two countries. It's worth noting that this informational index begins in May 2013, when the Emma Maersk was the world's largest container ship.

	Total number of ships sailing on route	Total transportation capacity on route in TEU	Largest capacity vessel on route in TEU	Number of Operators active on the route	Nu Operators providing services	Number of services on route	Number of non unique Services on route
Average	27.585	134780.4	4446.774	4.64667	6.8671	4.8381	6.5953
Max	997	5730013	16020	52	67	173	292
Route with the max value	China Hong-Kong	China Hong-Kong	Multiple routes	Malaysia Singapore	China South Korea	China Hong Kong	China Hong Kong

Table 2.2: Overview data on direct routes (Source: Lloyds List Intelligence)

2.5 CONNECTIVITY-

This section provides a basic overview of the concept of availability. Following that, both the LSCI and the LSBCI are discussed. A few definitions of transportation availability are offered in the current collection of works. I

The following is a brief summary of these concepts: "The writing contains only a few definitions of transportation availability. Transport availability is an organisational attribute that refers to the quality and costs of moving freight between two points in space. The network of specific container ports represents the possibility for the expansion of containerized cargoes to and from other container ports via the organisation, as well as the degree of competition in the assistance supply."

The concept of oceanic accessibility has recently gained a lot of popularity. This should be evident in the growing number of studies that dissect the relationship between the sea network and other oceanic views, such as transportation costs, port intensity, operations network, and sea security. As it stands, only a small number of studies have linked availability to the liner conveying network using network theory, and they have mostly focused on a limited number of organisation variables and on port level organisation.

In studies on exchange seriousness and transportation costs, various amounts of nation-level liner shipping availability have been used as illustrative elements. Relationships between the liner shipping network and exchange costs have been identified as areas of strength in these new analyses.

Prior study has shown that the liner shipping network has a higher influence on the global distribution of marine transport costs than geographical distance, according to the researchers. Furthermore, shipping out nations LSCI has a greater relationship to exchange prices than bringing in nations LSCI, according to an ESCAP investigation. As a result, the exporting country's attitude to the international organisation is more essential than the importing countries.

2.6- THE LINER SHIPPING CONNECTIVITY INDEX (LSCI)-

The UNCTAD LSCI, which is based on the same data gathering from Lloyds List Intelligence that was used to generate the global liner shipping network in this study, is issued yearly for the 159 nations who rely on the research for this proposition.

Each of the five areas of the liner shipping availability record is considered as a representation or probable signal of a country's availability, as illustrated below:

1. The number of organisations that give various types of assistance from and to the nations' ports.

This is a measure of market competition: the more organisations that provide various sorts of assistance from and to a nation, the more contestable the market becomes, decreasing the barriers to utilising that country to interface with a global organisation.

2. The maximum size of the largest vessel delivering various types of assistance from and to the countries' ports.

Because ports require sufficient capacities to operate certain vessel sizes, this section exhibits infrastructure and economies of scale. As stated in the hypothetical structure, a solid foundation of ports is expected to draw more assistance from liner shipping companies, and will most likely be closely tied to exchange volumes. As a result, economies of scale and foundation are projected to lower the costs of joining the global liner transportation network.

3. The number of services connecting various nations' ports.

The greater the number of services passing through a port, the more probable it is to have a direct link to a destination without the need for trans-shipments. This indicates that this part serves as a connection between the various ports accessible from the studied nation.

4. The total number of ships deployed to and from each country's ports.

Because the length of each particular route from and to that nation, as well as the cruising speed of the vessels, this section cannot guarantee the degree of recurrence of services, meaning that a better is still reasonable availability ceteris paribus.

5. The maximum number of TEUs of containers that can be moved between ports in each nation.

Despite the fact that this section does not suggest that the limit is used or even may be used, it still exists, signalling that there is more room available for projected container conveying limit developments.

When the LSCI was first constructed in 2004, it began to reveal patterns. They noticed that Korea's LSCI was higher than Japan's, and that Russia's LSCI was significantly higher. The researchers offer a number of plausible explanations for these two oddities, including Russia's entry into the WTO, which will allow more foreign flag vessels to trade with Korea, as well as greater investment in Korea's infrastructure.

Another trend identified by the researchers is an increasing measure of fixation in the sea containerized area: between 2017 and 2021, the number of service providers per nation reduced by 20%.

2.7- THE LINER SHIPPING BILATERAL CONNECTIVITY INDEX (LSBCI)-

Although around 18% of all nation pairs are directly connected without the requirement for transshipment, the nation-level network data is insufficient to understand the notion of a bilateral global liner transportation network. Around 63 percent of the variability in bilateral interaction is recognised, requiring the need for a boundary that handles bilateral networks more precisely. As a result, UNCTAD created the Liner Shipping Bilateral Connectivity Index (LSBCI) to study global sea containerized trade and transportation. As previously said, the question is what should comprise this particular availability list.

As previously said, the LSBCI must determine how simple open exchange is between any two countries. In this regard, its components should act as a buffer between the number of bilateral

obstacles that exacerbate the financial difference between the two nations. Instead, if a complex structural theory is shown, the components should be powers that connect the two centres.

To do so, look for probable parts in the next section about gravity circumstances that could address (part of) bilateral liner shipping availability. Then, based on these likely sections, a few files must be produced to figure out what these records are about and whether they may be used.

2.8- LLOYD'S LIST INTELLIGENCE-

Lloyd's List Intelligence has been considered as the undisputed master of giving important information about the worldwide maritime sector for the past three centuries. It is the major vessel utilised to integrate human knowledge on the ground with land-based and satellite AIS to provide vessel locations for approximately 129,000 active boats. Lloyd's List Intelligence is the most complete source of delivery data accessible, with real-time information on administrators, vessel organisation, transport characteristics, possession, setback and detention records, ports, terminals, and more.

CHAPTER –3
METHODOLOGY

The technique of this proposition is addressed in this section. The pre-owned models, as well as a few various systems used throughout this proposition, are explained. The reasons for selecting them are also defended. After that, the previously possessed information is briefly presented, with all sources cited. In the third segment, a quick portrayal of the exploration's sincerity and legitimacy is offered and discussed, and the section concludes with the examination's fundamental obstructions.

3.1- WHAT IS THE NEED TO INCLUDE MORE FACTORS IN LSBCI?

In reality, these lists help with rankings. In any case, there are a few reasons to seek out different depictions. The LSCI evaluates a country's international associations. A country that is loosely related with some countries but closely associated with others will receive a standard score. This is the position of many African countries, which have solid relationships with Europe and are developing new ones with Asia, but are ineffectively connected to the rest of the globe. The following global ranking will be pretty powerless, regardless of how closely the countries are linked to their most important financial partners. The lack of direct availability is a barrier to trade with other countries, although these streams are also weak or non-existent.

As a result, a low LSCI score does not necessarily imply that a country is segregated: an ineffectively associated country may be closely linked to its collaborators. Alternatively, a high LSCI does not necessarily suggest that the country engages in extensive international trade. The LSBCI does not survey network with monetary partners, although being more functional from the perspective of emerging nations (mirroring the detail of links with different countries). Starting with one country, monetary partners shift to the next. To be complete and effective, the relationships with each of these countries must be examined, raising questions regarding the significance of minor differences in LSBCI scores.

What do minor variations mean in the LSCI or LSBCI rankings of nation network centrality? Both LSCI and LSBCI are the result of a combination of a few variables designed to reflect the possibility for organisational rivalry. While large variations or changes in patterns undoubtedly indicate true changes, little variations over time from one year to the next, or within the LSCI or LSBCI country rankings, should be interpreted with extreme caution. The two indices are calculated for 155 countries. For the chosen contextual analyses, not all nations are equally significant. There is no information on the relevance of the aspects that make up the top ten best associations ranking.

The pointers are often set at the national level. When a nation's largest port is examined, it is often assumed that the nation's score is similar to that of that port. For the specified contextual investigations, not all of these nations are equally important. The LSCI calculated at the port level allows different ports within a country to be recognised.

The two records rely on a few small pointers that have vanished. Similarly, differences in network scores do not account for the commitment of each component. LSBCI, for example, may detect both normal and abnormal connections. This qualification, which is particularly useful, is overlooked by the index. The interpretation of the records is occasionally far from evident. The absence of network that results from a lack of exchange, in the opinion of emerging countries, is more significant.

3.2- METHODOLOGY

The gauging technique is one of the most important parts of an index's creation. According to a study, the vast majority of the indices used in the sea transportation industry involve loads that are not subject to master evaluation. The following are the most frequently mentioned weight-generation strategies within that classification: Analysis of Secondary Data

However, the focus of this proposal is not on creating the actual index, but rather on identifying potential predictors and how they can be linked to an LSBCI.

One technique to come up with plausible constructions for a bilateral liner conveyance network index is to look at the heterogeneity in trade streams between two nations and how this variation can be made sense of. Because it follows from the hypothetical structure that exchange is generally energised after the removal of impediments that limit access to global exchange organisations, those respective predictors that make it then, at that point, accepted have a critical positive connection to exchange streams, they can be used as a proxy for network. In other words, lowering the monetary distance lowers the exchange costs of participating in the global liner exchange network, leading in enhanced availability of the organisation.

The predicted predictors for a bilateral liner transportation network are first recognised in this technique, which index the bilateral borders that address a sign of bilateral exchange hurdles and so raise the monetary distance between any two nations. After that, a cluster of probable

indices is generated utilising these boundaries, and it is attempted to establish whether the sections picked genuinely address the percentage of the relevant liner shipping network.

3.3- DATA DESCRIPTION

The lack of full data bases makes assessing the value and volume of containerized freight flows between nations difficult. Researchers used a value weight container translation factor based on the information they had to analyse maritime trading streams between ASEAN nations because no prior studies had looked into this fraction. The researchers developed a formula for translating the value of an oceanic trade into the number of containers transported between two nations. They used data from USA Trade, Containerization International, and Eurostat online to generate mean weight container change factors and value weight transformation factors for the exchange streams between four ASEAN countries.

The difficulty in acquiring the necessary transformation factors for each place is a challenge with applying this approach, even when looking at worldwide transaction streams rather than simply at a given site. Similarly, establishing the change reasons for each nation pair takes time, and given the time constraints and difficulties in getting the requisite data, it was chosen to employ bilateral exchange data from the trade data collection.

Only manufactured products are employed in this investigation because the focus is on liner transit. Although this study solely focuses at liner shipping, the ensuing connections will almost definitely be one-sided if non-containerized information on exchange is employed. The contrast between each order is sufficiently obvious to pick without polluting the trade information with non-containerized data while utilising this grouping.

All of the countries studied in this study are coastal nations. The reason for this is that include non-waterfront nations in the study will skew the results because the analysis and all of the models are based on sea linkages, and counting them requires noting land-based relationships to avoid one-sided conclusions. Only 159 of the 186 potential coastline nations were chosen to be recalled for this evaluation. The reasons for the absence of a few nations are either a lack of trustworthy information for these countries or their influence on the rest of the globe are minor.

Not all countries trade in all products, and not all countries trade in all methods. This is also stated in the bilateral exchange dataset that was utilised in this study. Only 47.33 % of the

conceivable country-to-country transit lines have any exchange produced items. Other exchange investigations have found similar rates, implying that the pre-owned data on bilateral exchange prices is trustworthy.

Another source of information is UNCTAD data sets, which have been utilised in the analysis of liners transportation networks and other ocean-related studies. This data collection contains variables like oceanic distance between states, a few institutional proxies like trade flows between countries, and whether or not a country is an island. More datasets were incorporated in the World Bank Performance Indicator knowledge base. This data store has provided pointers such as strategy execution and port framework. The Continuation of Work data collection from the World Bank was used. This data collection, for example, has provided the number of procedures necessary for bringing in or exchanging.

Lloyds List Intelligence provided the data for this study, which is based on the worldwide liner shipping network.

3.4- LIMITATIONS-

It's nearly hard to precisely assess real and genuine trade volumes and values, and it's also tough to draw any judgments about the quality of this information. It's intriguing to see how practically every exchange data set has colourful rates for clear courses, and nations report diverse exchange values and volumes.

CHAPTER –4
ANALYSIS

This section provides an overview and analysis of the global liner shipping network. This is followed by a discussion of the main characteristics of liner shipping and how they affect network design. The network's architecture in modern times is then discussed, and a few metrics that may be used to portray the situation in a network are then introduced and applied to it.

4.1- THE PROPOSED COMPONENTS OF A LSBCI: THE CASE OF ASEAN NATIONS-

The ensuing areas of bilateral relations between countries are studied grounded on the data collected from secondary sources. These aspects can be also considered by UNCTAD while preparing the LSCBI annually

4.1.1- TRADE FLOWS IN ASEAN COUNTRIES-

ASEAN, or the Association of Southeast Asian Nations, is a political and financial association of 10 states in Southeast Asia (Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam), which advances intergovernmental participation and works with monetary, political, security, military, instructive, and socio-cultural mix between its individuals and different nations in Asia. ASEAN's essential goal was to speed up financial development and through that social advancement and social change. An auxiliary goal was to advance local harmony and security in light of law and order and the guidelines of the United Nations contract. With the quickest developing economies on the planet, ASEAN has expanded its aim past the financial and social circles.

The relations between the ASEAN nations affect the bilateral liner shipping connectivity between them and this will be analyzed based on available data in further chapter in further chapter.

Figure 4.1 gives an outline of liners serving ASEAN countries. The breadth of the lines in the diagram mirrors the general recurrence of container delivering administrations working between the nations concerned.

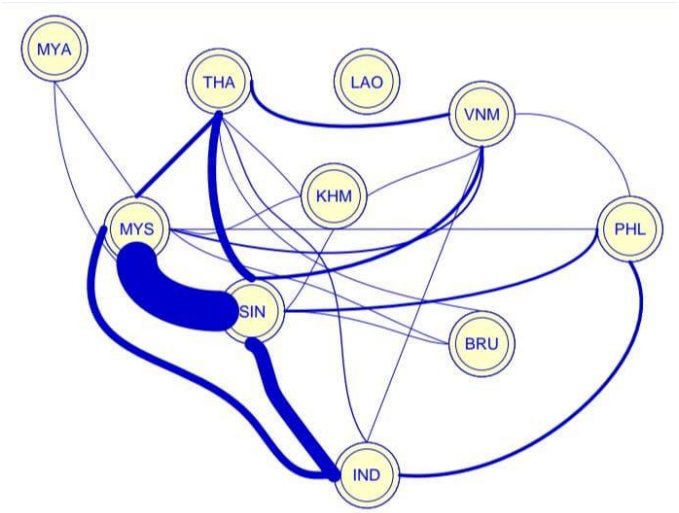

Figure 4.1: ASEAN countries' Liner Services offering.

(Source: file:///D:/Downloads/EIJR13069_FR_Main_vol1_01%20(1).pdf)

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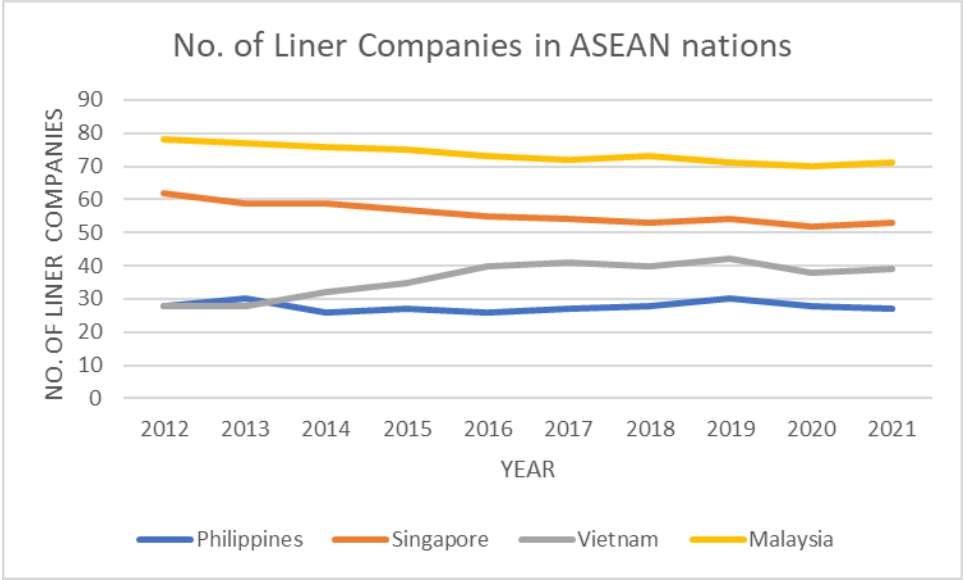


Graph 4.1: No. of Liner Companies offering services between ASEAN nations

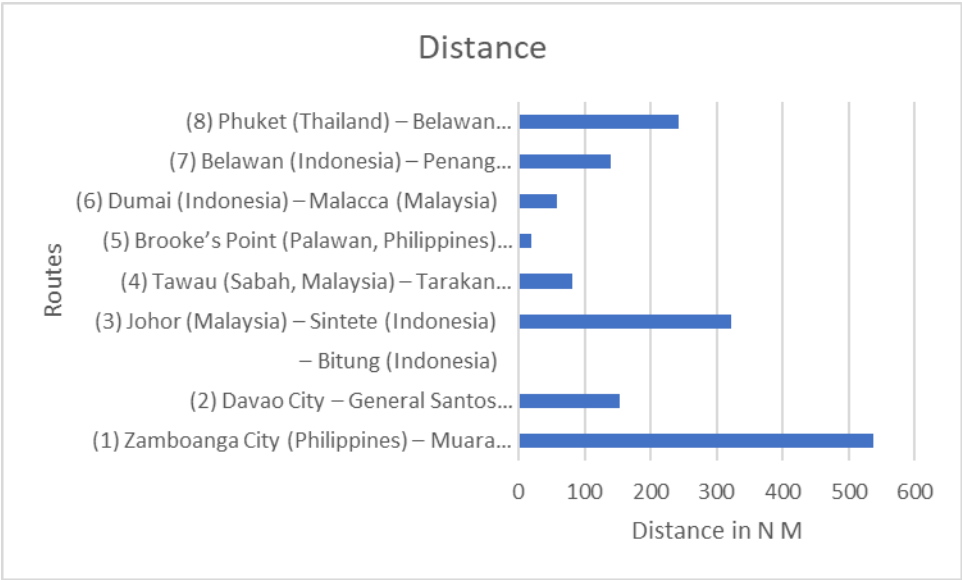
4.1.2- MARITIME DISTANCE BETWEEN COUNTRIES-

The maritime distance between a nation pair directly determines the liner connectivity between them. Larger the distance, lower is the liner connectivity, as liner services run on fixed schedules at fixed port of calls. By analyzing the distance in relation to the liner connectivity of the countries, we can include it as a basis for LSBCI. The figure below shows the middle to long distance liner service routes in a country like Japan.

Figure 4.2: Example of Japan: middle to long distance liner service routes

(Source: file:///D:/Downloads/EIJR13069_FR_Main_vol1_01%20(1).pdf)

This illustration of JAPAN shows that liner services are frequently concentrated in the areas where direct distance is shorter, and the long- distance routes show lower liner routes alongside presence of trans- payload areas.



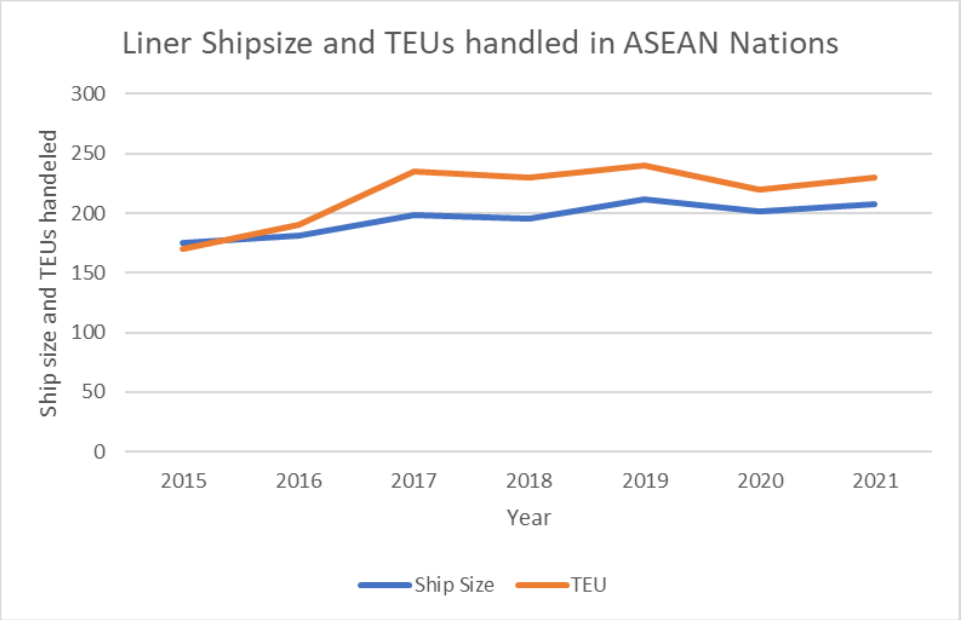
Graph 4.2- Distance between various ports of ASEAN nations (Source: UNCTAD)

Depending upon the distance among ASEAN ports from the above graph, the number of liner shipping services are as follows-

- No liner shipping service is observed between Zamboanga City (Philippines) and Muara (Brunei Darussalam); between Davao City – General Santos (Philippines) and Bitung (Indonesia); between Johor (Malaysia) and Sintete (Indonesia); and between Phuket (Thailand) and Belawan (Sumatra, Indonesia)
- Passenger shipping service is observed between Tawau (Sabah, Malaysia) – Tarakan (Kalimantan, Indonesia) and Pantoloan (Sulawesi, Indonesia).
- One small RO-RO ship started its service between Muara and Labuan having 1 return trip per day.
- Fast craft provides frequent passenger shipping service between Dumai and Malacca.
- Only rustic- housing vessels give this strait crossing service between Belawan and Penang.

4.1.3- PORT PERFORMANCE AND PORT INFRASTRUCTURE

Ports serve as the focal point and organisational centre for a wide range of aquatic transportation, linking nations with the rest of the globe, and so enhance transportation and conveyance at the lowest feasible cost. Ports are more than simply infrastructure for international trade; they also help firms get access to worldwide markets by determining cargo transit prices. As a consequence, the LSBCI may be calculated using a study of the influence of port performance and infrastructure.



Graph 4.3: Ship size and TEUs handled at ASEAN ports. (Source: UNCTAD and Lloyd's List Intelligence)

The issues incorporate oversupply of weight limit, abrupt drop in demand, hence causes the declining cargo volumes. The figure portrays the improvement of the 2 parts of the LSCI.

For ASEAN nations, the vessel size part expanded by 115%. Albeit the biggest new ships worked beginning around 2014 were not greater than those worked in 2015 (for example Maersk's Triple E class), the vessels are confirmed and answered to convey more TEU than the vessels in the earlier years.

4.1.4- ISLAND COUNTRIES-

The number of distant islands, where no prefectural capitals are found, is 314. To serve these islands, neighborhood liner delivering administrations are given by 252 operators with 579 vessels (353 GRT by and large). The vessel types are superfast craft, common traveler vessels and little scale RO-RO traveler ships.

The distant island traffic interest in 2008 is 47 million travelers or 1,170 million people per km, accordingly, the normal outing length is basically as short as 25 km. Since the interest is steady or marginally declining because of distant islanders' profile, overall revenue is low or negative. Thus, one third of the administrators are owned publicly or to some degree put resources into by the neighborhood states transport administrators of distant island. There are a few circumstances to get functional endowment/subsidy, for example, foundation of a transporting course partners' chamber and accommodation of a transportation service improvement plan including income increment and cost decrease measures. Useful measures incorporate

promotion of tourism in distant island, rebuilding of transportation course and activity body, task of more modest vessel and boundary free related transport alteration for the matured and the debilitated.

4.1.5- EASE OF DOING BUSINESS-

Ease of Doing Business (EoDB) is an index distributed by the World Bank. A total figure incorporates various boundaries which characterize the simplicity of doing business in a nation. Through this index, 'higher rankings' (a lower mathematical worth) show better, normally more straightforward policies for business firms and more guarded property rights.

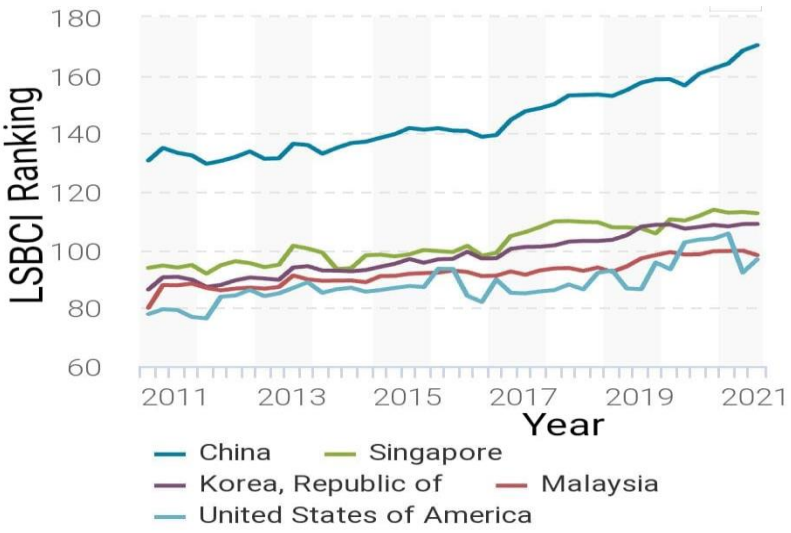
It is obvious that the better ranking nations in EoDB also have better liner connectivity. The results of EoDB index of ASEAN countries in the contemporary times is given in table 4.1:

Economy	Ease of Doing Business Ranking
Brunei Darussalam	84
Cambodia	127
Indonesia	109
Lao PDR	134
Malaysia	18
Myanmar	167
Philippines	103
Singapore	1
Thailand	49
Viet Nam	90

Table 4.1: Ease of Doing Business index ranking of ASEAN nations

(Source: Doing Business, World Bank)

From the above ranking list, it is clear why the world's top-ranking economies in LSBCI include Singapore and Malaysia.



Graph 4.4- Top 5 world economies in LSBCI, 2021 (Source: UNCTAD)

4.1.6- THE GEOLOGICAL ASPECTS-

To assess the degree of availability of selected ports, a geological technique is proposed. It revolves around four questions:

Which countries does the port have a direct relationship with? The countries have been grouped into regions for ease of use, but you can also look at the associations by country or by port. The number of weekly liner services has been determined at this time. Without direct ties, how might the nations be reached? Trans-shipments are significant because they provide access to many ports by serving central areas that are easily accessible.

What is the level of competition inside a port?

What is a port's maximum capacity?

In this case, we offer the following indicators to assess the maritime network: The number of weekly associations with Europe, Africa, and Asia, as well as the number of weekly associations with each of these continents. The number of centre point districts served directly, Number of collusions, largest vessel calling at the port, number of vessels calling at the port in seven days.

The idea is to concentrate on direct services, using the timetables provided by liner companies. This allows for the separation of relationships with a few specific locations (Asia, Africa, and Europe), as many services are shared by several areas. This distinction is useful in recognising

the importance of port topographical specialty. UNCTAD also monitors direct administrations at the country level, regardless of their frequency.

Four central locations have been identified for the evaluation of erroneous associations. Mediterranean, Middle East, Asia, and Southern Africa have all been identified as "central regions." This appeared to be a more rational and less dangerous strategy than registering all possible port connections, as was the case with LSBCI.

These choices are incorrect. The investigation of marine associations for genuine exchange partners, for example, has not been adopted, despite the fact that it is possible. Because the potential outcomes of true relationships have not been examined, associations with centres remain suspect. Furthermore, the suggested districts are disproportionately large. These perspectives can be broadened by fine-tuning the geological interweaving.

CHAPTER –5
CONCLUSION

Finally, this paper's main research question will result in a few recommendations for creating a liner transportation availability list. There are a few additional ideas for further research on the topic of this study at the conclusion of this section.

5.1- CONCLUSIONS-

How to characterize the availability between any two nations in the global liner transportation network was one of the first problems highlighted in this concept. I believe there are various different interpretations of this notion, ranging from a property that relates to cargo quality and prices to conventional and later transportation administrations along with the degree of competition. This study combined the complex organization theory with the features of liner shipping to portray the idea of availability.

The liner shipping network's main feature is that it delivers a consistent set of administrations at regular intervals over defined routes. However, not every nation on the planet has a direct link with another: just around 17% of all nations have a direct relationship with each other. As a result, a perplexing array of multiple direct and backhanded country duo mixes arises. Despite the fact that the network's architecture is always altering owing to shifting financial restrictions and alterations in global manufacturing and consumption centres, the hidden imaginary requirements stay the same in general.

Assuming that the harmony condition of the multitude of powers that follow up on each of the hubs determines the organization's construction at some random time, the overall powers that demonstrate between them determine the connection between each hub: the amount of all drawing in and anti-agents' powers between any two nations determines their relationship and how "close they are to each other." Following that, if the important powers that decide the organization's structure have a direction that pushes the two countries together, it may be said that they have a solid and stable connection. As a result, the fraction of the network might grow.

To find a representative or intermediary for this network, it must first be established what the bilateral and national powers are that shape the global liner transportation network's architecture. A set of components was discovered in the writing that might constitute either these powers or a conduit for them. The results demonstrated that there are areas of strength for a between the actual design of the organisation and the quantity transmitted. In particular,

the betweenness centrality, cluster coefficient, and degree centrality identified areas of strength for a bilateral trade. As a consequence, it appears that assessments of organisational structure are an appropriate intermediate for monetary distance across nations, and hence may be beneficial.

Other potential characteristics that might operate as a connection between the network's powers include measures of monetary and social integration across nations: assuming that nations have numerous commonalities, they almost likely have comparable strategic approaches that lessen financial distance. This was also demonstrated in research, which established a positive association between oceanic exchange streams and elements like normal language and normal money.

As a result, it is often thought that the key relationship between a liner shipping network and its potential determinants is that the determinants should function as a conduit for the attractive powers that operate between the organization's hubs. As a result, factors that define the organization's architecture should be significant components of a bilateral liner transportation availability index, in addition to the generally used LSCI. With these sections, an LSBCI manages not only the outcome of all the organization's drawing in and repelling forces functioning on each nation, but also the nation level network to the entire organisation.

Considering this, a few LSBCIs were created and tested against bilateral exchange streams utilising these components. The results indicated astounding parallels that were independent of the components and were comparable to utilising the LSCI alone to understand changes in respective exchange. As a result, the final LSBCI should include more than just a collection of measures that define the organization's structure and the LSCI.

5.2 RECOMMENDATIONS-

In this method, new feasible sections that can handle bilateral networks near the existing LSCI and the network properties defined in this research should be found in order to design an LSBCI later. Additional possible components might focus on course opposition or the impact of network restrictions, such as the existence of rivers on routes between two countries. There are also a few suggestions for additional research. Because the nature of the data is so crucial, it would help this inquiry if a few distinct sets of data on trade volumes and values were

accessible and compared to one another utilising factual procedures to generate a more trustworthy informative index against which to evaluate the free factors. Levies, while having a known influence on trading volumes, were not included in this analysis. Since a result, the connection of levies on bilateral availability may be mandated for future examination, as this would have twisted the outcomes and examination. Last but not least, a decision on how to weight the data is still expected.

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