

Mapping Actors in the Modeling of Logistics Sea Shipping Network Structures

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Abstract

Logistics sector increasingly important role in supporting economic development and prosperity of a country. The purpose of the blueprint for structuring and development of Indonesia's logistics sector is to improve the competitiveness of national businesses in the global market. Pendulum Nusantara concept, or better known as the Toll of the Sea, is a sea transportation service concept that aims to reduce the national logistics costs and lower the price disparity between regions in Indonesia. In line with the Indonesian government's priorities lie in strengthening the infrastructure, the research for mapping the actors of logistics, especially in the field of maritime transport service along the sea transportation networks that are served, it is important to do as a first step before designing a network pendulum archipelago. The purpose of this study are to identify the perpetrators of logistics in the field of marine transportation services. The method used was the descriptive method, which involved collected of secondary data and observational studies of people in a sea shipping environment. They were surveyed and interviewed to collect the necessary information, in addition to analyzing the existing records of liner companies. The results identified logistic actors that classified into five groups of perpetrators and their role in sea shipping network activities. Coordination in logistics management is a complex processes, covering many activities and stages, and involves many parties. To ensure the smooth flow of goods shipped, it takes an intensive coordination, information and communication technologies that can support these logistics activities. Results of this study is becoming the initial data in the analysis and design of structural model of sea shipping network.

Keywords: logistics, actors, sea shipping networks, Indonesia

1. Introduction

Stable and predictable environment was replaced with uncertainty and rapid change. Each organization is required to adjust to the challenges of a volatile external conditions. There are two challenges facing the organization, which is a global challenge and stakeholder challenge. Global challenge characterized by globalization, deregulation of markets in many countries, cooperation among countries in various regions, changes in technology, as well as tariff exemptions. While stakeholder challenge tinged with consumer demand for improved quality of goods and services produced and the quality of service, social responsibility organizations in the neighborhood. Such challenges require organizations improve the ability to compete in domestic and international markets.

Logistics Management, which later evolved into Supply Chain Management, is the process of planning, implementing and controlling the level of efficiency and effectiveness of current storage of goods, services and related information, from the upstream-to-downstream and vice versa, in order to meet the requirements and demands of the customer (Council of Supply Chain Management Professional - CSCMP). Meanwhile, according to the definition issued by the Council of Logistics Management (Ballou, 2004), logistics are the process of planning, implementation, and controlling efficiency, cost-effective flow and storage of raw branches, semi-finished materials, finished goods and related information from the origin to point of consumption in order to meet the needs of consumers. In the world economic order, logistics or logistics management has an important role in supporting economic development and prosperity of a country. Better logistics management will help businesses in a country to be superior to the competition comparison of the costs and will therefore generate more value for the products or services produced. Competitiveness improvement will help improve people's welfare. Efficient logistics also will directly participate sustain the environment and save energy. In this regard, the World Bank has a special view of the logistics sector, namely: to reduce costs and improve the quality of logistics systems and transport would improve access to international markets, which will bedampak directly to

increased trade, and through this, it will increase revenue and means to reduce poverty significantly.

World Bank periodically surveying the logistics performance of various countries in the world, known as the Logistics Performance Index (LPI). In 2007, LPI index showed Indonesia ranks 43 (out of 150 countries in the survey), under Singapore, Malaysia and Thailand. Three years later, the condition of Indonesia, according to the LPI index, fell to 75th out of 150 countries surveyed. While in the research and survey the Global Competitiveness Index (GCI) conducted by the World Economic Forum in 2007-2008 put Indonesia on the order to 54 of 131 countries surveyed, under Thailand (28), Malaysia (21), and Singapore (7). Indonesia's global competitiveness index had climbed to 44 in 2010. However, Indonesia's ranking back down to rank 46 in 2011 and ranked 50 in 2012, to then go back up to rank 38 in 2013, then rose again to rank 34 in 2014. The two surveys show that the Indonesian government has a huge homework to improve competitiveness. Both of these international survey also shows that the logistics sector is seen more and more important in supporting the development of trade and industry competitiveness of a country.

Goods or services would be useful for customers if they fit the needs of the customer, in the right quantity, at the right time and at an affordable price if countries have a system that is effective and efficient logistics. This condition will be successful if the country has an effective and efficient logistics system. In Indonesia, effective and efficient logistics system is not working well. Problems of distribution of goods become a strategic issue at the national level, which shows the weakness of the national logistics sector support. Goods distribution problem becomes a severe problem for Indonesia, for example, the distribution of fertilizer, fuel, rice, sugar, and election logistics. At the world level, the global distribution experience significant changes. These changes occur because of trade between countries are intertwined. Inter-regional economic cooperation is growing, such as AFTA, NAFTA, ASEAN Economic Community, Trans-Pacific Partnership. This cooperation leads to the free market and expand the market. Market expectations are also changing because customers want quality products and services, and a variety of options.

Based on domestic issues and global trends, the Government of Indonesia has formulated a blueprint for managing and developing the logistics sector in Indonesia. This blueprint put the logistics sector into one of the pre-means to build national competitiveness. This policy is expected to improve the performance of the logistics sector in order to prepare the Indonesian economy facing the free world trade significantly already embodied in the agreement of the World Trade Organization (WTO), the Asia-Pacific Economic Cooperation (APEC) and the ASEAN Free Trade Area (AFTA). Blueprint for the National Logistics System explained that Indonesia urgently needs an integrated national distribution system in order to ensure the availability of basic goods fairly and equitably. Currently, the performance of the logistics system in Indonesia is not optimal as indicated by the absence of effective regulation, the cost of distribution and transport are so high, infrastructure is inadequate in terms of both quantity and quality as well, the role of hub ports that are not managed effectively, efficiently, and yet integrated, as well as the ineffectiveness of intermodal transport and interconnection between port infrastructure, warehousing, transportation and hinterland. (Blueprint Sislognas, 2010). The development of transportation in Indonesia based on the National Transportation System (Sistranas) established by the Minister of Transport Regulation of the Minister of Transportation No. KM. 49/2005. In Sistranas, marine transport network consists of two components: (1) network of marine transportation services such as routes, differentiated according to the nature of the activities and services; and (2) marine transportation infrastructure network that consists of sea ports and shipping lanes.

In Indonesia, the transportation system is the driving force of development and the adhesive between the provinces, where the absence of administrative boundaries makes transportation unobstructed. Due to its strategic geographical position, Indonesia needs to develop transportation infrastructure that can support the connectivity of local and national logistics system. The Indonesian Government makes an integrated economic development plan called The Master Plan for the Acceleration and Expansion of Indonesia's Economic Development (abbreviated MP3EI). MP3EI is a comprehensive concept that combines the potential of Indonesia from Sabang to Merauke. There are six economic corridors are expected to be sustaining economic growth. One Content MP3EI is to solve the bottleneck problem through the development of regional economic potential corridors 6; conduct national connectivity through national action plans related to infrastructure and regulation; and partnerships through public private partnership. Focus on strengthening national connectivity to support the acceleration and expansions of Indonesia's economic development related to marine transportation system are: a) intra economic corridor, b) connectivity between economic corridors, and c) international connectivity. There are seven components to build connectivity posture as in the following table:

Table 1. Forming components of Indonesia connectivity posture

SISLOGNAS	SISTRANAS	Spatial Development	ICT
1. Determination of Key Commodities	Transportation safety	Increased Local Economy	Migration Towards Convergence
2. Strengthening Logistics Services	Exertion Transportation	Capacity Building Human Resources	Equitable Access and Services
3. Network Infrastructure	Transportation Network	Infrastructure Development	Development of Broadband Networks
4. Capacity Building Human Resources	Human resource development, science and technology	Institutional capacity	Network Security and Information Systems
5. ICT Improvement	Environmental Quality	Access Working	Infrastructure integration
6. Regulatory harmonization	Development fund	Basic social facility	e-literacy improvement
7. Board of National logisticiel	State administration		Industrial independence

(Source: Mappangara, 2013)

Indonesia is a country that consists of 13 466 islands, stretching from Sabang to Merauke, which is arranged in thousands of large and small islands, which are connected by various straits and sea. Currently, there are 13 466 islands and has the coordinates listed. Indonesian vast stretches 3977 miles between the Indian Ocean and the Pacific Ocean with a land area of 1.922.570 km² and vast oceans 3,257,483 km². Under these conditions, using sea transportation to distribute goods is an advantage because the cost is cheaper than land and air transportation. The main problem in the distribution of goods in Indonesia is that there are different prices for the same goods in every region of Indonesia. The price disparity between the eastern and western Indonesia is one of the problems in Indonesia's logistics system.

Logistics sector increasingly important role in supporting economic development and prosperity of a country becomes the starting point of this study. The purpose of the blueprint for structuring and development of Indonesia's logistics sector is to improve the competitiveness of national businesses in the global market. Because Indonesia has a strategic location, the transportation infrastructure, particularly sea transportation, must be met to support the logistics system connectivity both locally and nationally in line with the MP3EI. Pendulum Nusantara concept, or better known as the Toll of the Sea, is a sea transportation service concept that aims to reduce the national logistics costs and lower the price disparity between regions in Indonesia. In line with the Indonesian government's priorities lie in strengthening the infrastructure, the research for mapping the actors of logistics, especially in service in the field of maritime transport along the sea transportation networks that are served, it is important to do as a first step before designing a network pendulum archipelago. The purpose of this study are to identify the perpetrators of logistics in the field of marine transportation services.

2. Literature Review

Logistics system in general is handling all the activities associated with the delivery of goods or products from the point of origin to point of destination. Point of origin plays a role as a manufacturer because it serves as a supplier of goods, both as a producer (producing goods) or distributor, and a destination point plays the role of acting as a consumer, whether used directly or indirectly.

All logistics activities arranged in a form of management that is called logistics management, which is part of the design and set up a system for controlling the flow of material, semi-finished goods and finished goods to support strategic business unit (Bowersox and Closs, 2002). In this case defined that the material is raw material (raw material) to be processed further, semi-finished goods are goods produced from raw materials but has not yet become the finished product and must be further processed into finished goods and finished goods are goods that already ready to be used or consumed. The supply chain is a network of organizations that have the same goal, which is organizing the procurement or distribution of goods. According to Chopra and Meindl (2001), the supply chain can be defined as the integration of all parties involved, directly or indirectly, to meet consumer demand, including manufacturers, suppliers, warehouses, retailers, to consumers.

2.1 Mission and logistic performance

Mission logistics activity is to provide the right goods at the right time (when needed) and in the right place to

provide the greatest contribution to the achievement of corporate goals. The mission encourages each company to conduct a series of activities were integrated logistics (integrated), both starting from procurement, production activities, to physical distribution, because the consumer always wants the availability of a product to meet their needs at any time when needed. Logistics activities have a certain level of performance to be achieved. The desired level of performance is to create a balance between the quality of service expected by the customer and the costs incurred so that the company's goals can be achieved. There are two factors related to performance, namely first, service factor regarding the level of service provided to consumers, secondly, the cost factor related to the costs incurred by the company in connection with the level of service provided to customers. (Bowersox and Closs, 2002). Logistics performance can be measured by three criteria:

1. Availability : Concerning the capacity of the system that consistently satisfactory fulfilment of materials or products (concerning the inventory level). Stock out small frequency will increase investment for inventory purposes.
2. Capability : Capability is the time of entry of the request (order transmittal) until the delivery of the product (customer delivery), which is determined by the speed of the delivery and the time required consistency. In general, the faster the delivery, the program will be better.
3. Quality : Quality relates to how well the logistics activities can be completed (in relation to the damage, the precision of these types of items, and solving problems which is not expected). Performance standards to be set based on the appropriate bases. Some products are more critical than others because of differences in the level of importance both buyers and gains.

2.2 Logistic supporting factors

Some supporting factors are very important in logistics requires coordination and integration to achieve a good level of competence. These factors should be mutually supportive with each other to form a logistics process. Factors supporting the logistics can be described as follows (Bowersox and Closs, 2002):

1. Network Design

Network design aimed to determine the type and number of facilities needed in logistics activities, which includes determining the amount of inventory of products supplied each facility, and the place of delivery of the product concerned.

2. Information

Represents all the information flow that supports the entire logistics process. Accuracy of information becomes very important, because the lower the level of accuracy of the information, the higher the decision-making errors, and vice versa. Some software is often used by companies to support activities include: TDSP (Transaction Data Processing System), MIS (Management Information System), DSS (Decision Support System).

3. Transportation

Variety means of transport used is transporting private (private), the transport contract (contract), and public transportation (common carriage). Meanwhile, the main aspects that must be considered in the cost of transportation activities, transportation speed, and consistency.

4. Inventory

Inventory must be set in order to meet customer needs while maintaining the lowest cost. Often, an item has a number of inventory with the lowest percentage but has contributed to higher incomes among the supplies. It's important to know the contribution gains by each inventory so it can be determined the composition of the inventory of each item.

5. Warehousing

Under the arrangement, the company can carry out two possibilities that do warehousing arrangements themselves or outsource the warehousing arrangements. It is usually distinguished by the scope of activity and the level of coverage problems. Some activities related to warehousing is the product selection, sorting products, order selection and consolidation of transportation.

6. Transfer of Material

The transfer of material serves to receive, move, sort and assemble products to meet consumer needs. The most important thing in the removal of material is minimizing the transfer time so that will reduce the risk of damage to the goods.

7. Packaging

Packaging serves to protect the quality of products during the logistics process, and simplify and streamline the transport.

2.3 Transportation model

Transportation problems related to the transfer of goods from various sources to a specific location, with the constraints of supply and demand remains, as well as lower costs. Hillier and Lieberman (2005) state that transport model are one particular form or variation of linear programming was developed to solve the problems of transportation and distribution of products from a variety of sources (central procurement) to various destinations (point request). According to Russell and Taylor (2003), a method of transportation is a quantitative technique that is used to determine how to organize transport at minimum cost.

Transportation is an important component in the design and management of logistics systems. Logistics system would work well if there is an effective transport system so that the product delivered will remain good. A logistics expert should have a good understanding of the problem of transportation. In this chapter will discuss the important things that need to be an expert in achieving managerial logistics transport system. Transportation system focuses on the facilities and services. Both will establish the price and performance from a variety of transportation services. Specifically, it is used to check the characteristics of many alternative transportation system optimally.

Currently, delivery of goods using more than one intermodal transportation has increased. The main features of intermodal transportation services is the free exchange of equipment between modes. For example, part of the container truck trailers carried out in an airplane, train or transported by water operators. Coordinated service usually compromise amid the individual services offered by the parties to work together. There are ten possible combinations intermodal services include; truck lanes, waterways, air track, pipeline, air truck, water truck, truck pipes, water pipes, air water, air pipe.

2.4 National connectivity in Indonesia

National Connectivity is an integration of four elements of Indonesia' national policy composed of the National Logistics System (Sislognas), the National Transportation System (Sistranas), regional development (RPJMN / RTRWN), Information and Communication Technology (ICT). This effort needs to be done to realize the national connectivity that is effective, efficient, and integrated (MP3EI, 2011). Strengthening national connectivity is one of the strategies pursued in the acceleration and expansion of national economic development (Bappenas, 2011). Therefore, there are three principle concepts of connectivity, first, to maximize growth through regional unity, not uniformity (inclusive development) by connecting the growth centers; second, expanding growth through connectivity with the region inter-modal supply chain system that connects the hinterland with growth centers; and third, achieving inclusive growth by linking remote areas with infrastructure and basic services for the benefit of development.

Weak national connectivity not only cause high economic costs, but will also weaken the competitiveness. The consequence is a slowing of economic growth in all parts of Indonesia. Besides improving connectivity, acceleration and expansion of Indonesia's economic development organized by developing centers of economic growth, both existing as well as new ones. It is planned that, in each region will be developed superior products. It aims to maximize the agglomeration, to explore the potential and advantages of the region, as well as improve the spatial inequality of economic development of Indonesia. The development of economic growth centers are run by way of the development of industrial clusters and special economic zones (SEZ). Development of growth centers conducted simultaneously with strengthening connectivity between economic growth centers with the location of economic activities, and the development of supporting infrastructure.

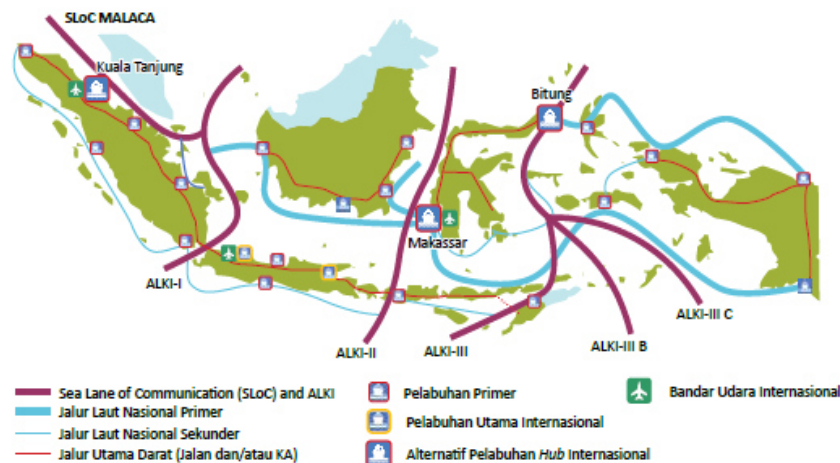


Figure 1. Concept of Gate Port and International Airport in the Future Position
 (Source: MP3EI, 2011)

As an archipelagic country, Indonesia has some of the strategic sea lanes that impact both economically and militarily. Sea lanes are Strait of Malacca (which is the Sea Lines of Communication / SLOC), Sunda Strait (Indonesian archipelagic sea lanes 1), the Lombok Strait and the Strait of Makassar (Indonesian archipelagic sea lanes 2), and Strait Ombai Wetar (Indonesian archipelagic sea lanes 3). Most of the world's major shipping passes and take advantage of the sea lanes as the track. MP3EI prioritize efforts to maximize the utilization of SLOC and ALKI (Indonesian archipelagic sea lanes) above. Indonesia can reach the many advantages of this maritime modalities to accelerate growth in various regions in Indonesia (especially Eastern Indonesia), establishing maritime competitiveness, and to improve the security and sovereignty of the national economy. To benefit from the strategic position of the national effort for the Acceleration and Expansion of Indonesian Economic Development needs to take advantage of the presence of SLOC and ALKI as waterways for international shipping.

Indonesian transport development guided by the National Transportation System (Sistranas) established by the Ministry of Transportation. The legal basis used is the Regulation of the Minister of Transportation No. KM. 49/2005 which the national transportation system is also one of the components forming the posture of national connectivity. Sistranas has a function as a support element that provides transportation services, and promote national development. Sistranas also serves as an effective transportation service providers to connect isolated regions with areas that have developed.

2.5 Sea Transportation Network Model

Sea transportation network as one part of the network of water transport modes has different characteristics compared to other modes of transport that is capable of transporting passengers and goods in large quantities and long distances between islands and between countries. Marine transportation infrastructure network consists of two nodes that sea ports and shipping lanes. Sea ports distinguished by the role, function and classification as well as types. Based on the type ports distinguished by:

1. The common harbor; port is used to serve the public interest according to government statutes and have facilities quarantine, immigration and customs.
2. The special ports; port that used to serve the interests of his own to support specific activities.

Based on the roles and functions, the port can be divided into:

1. International ports hub is a major port which has the role and function of serving the activities of loading and unloading passengers and goods internationally in large volumes. This port is close to the market, international shipping lanes and Indonesian archipelagic sea lanes.
2. Port international is a major port which has the role and function of serving the activities of loading and unloading passengers and goods national level in relatively large volumes. This port is close to the shipping lanes of national, international, and has a certain distance to other international ports.

3. National Port is a major port which has the role and function of serving the activities of loading and unloading passengers and goods national level with moderate volume. This port needs to pay attention to the government's policy in the equitable distribution of national development and enhance the growth of the region, has a certain distance with a path / route cross-national and inter-island shipping and growth in the region close to the centre of the district capital, and national growth areas.
4. Regional Port is the port that serves feeders to serve the activities of loading and unloading of passengers and goods in small quantities and range of services between districts / cities as well as a feeder to the main port.
5. The local port is the port feeder that serves especially to serve the activities of loading and unloading of passengers and goods in small quantities and a range of services across sub-districts in the district / city as well as a feeder to the main port and regional ports.

Kjeldsen (2009) explains, there are some characteristics that need attention in the design of networking voyage, including the number of junction points, types of shipping operations, the request type of shipping, scheduling constraints at the port, the number of vessels, the composition of the vessel, the speed of the fleet, the satisfaction of service users. Shipping operations consist of three models named cruise liner, tramper shipping and cruise industry (Ronen 1982). The cruise liner often operate on routes covered by the schedule and a fixed landing ports, loading and unloading process is done at each port and are almost never shipping without charge. The tramper shipping, loading of goods is done at the ports of origin to one or two destination ports. While on the cruise industries, the cruise ship is controlled by the owner of the goods.

Problems in developing network planning service (route) sea transport can be classified in three things: issues of strategic, tactical and operational. (Mappangara, 2013). Planning system route network is one part of the strategic planning of the marine transportation system. Cruise network, according to Yang and Chen (2010), can be classified into a circular cruise lines, pendulum cruise lines and the hub - spoke cruise line.

2.6 Level Liner Shipping Connectivity Network

To assess the level of network connectivity cruise liner in a region, then UNCTAD since 2004 has issued an index value for the cruise liner connectivity to 162 countries surveyed. According to Hoffman (2012), the index of connectivity cruise liner is determined based on the components include a number of shipping companies serving the ports in the region, the size of the vessels that serve the cruise in a country where it is as an indicator of economies of scale and capacity of port infrastructure in the country the number of services that connect the region with other regions, the total number of vessels that serve the region, and the total capacity of containers transported by cruise liner in the region.

3. Research Method

In general, the methods used in this research is descriptive method. This study collected data from various sources and identified the perpetrators of logistics. The collecting data activity starts with collecting the secondary data by listing all the ministries and associations that has data about the transportation network and the logistics companies. The ministries and associations are:

- Minister of Transportation
- INSA (Indonesian National Shipowners Association)
- Coordinating Ministry for Maritime Affairs
- Indonesian Logistics Association
- ALFI/ILFA (Asosiasi Logistik dan Forwarder Indonesia / Indonesian Logistics & Forwarders Association).
- Indonesia Port Corporation

Furthermore, research will synthesize any problems faced by the actors in running the logistics services. Results of the study will be the basis for the design of marine transportation system in accordance with the government's plan contained in MP3EI.

4. Research Finding

Logistics activities involving the various stakeholders can be classified into five groups of perpetrators. The groups are:

1. Consumer, logistics users who need goods both for the production process as well as for consumption. Consumers can determine the type and quantity of goods to be purchased, from whom and where the goods are purchased and where the goods were delivered.
2. Actors Logistics are the owner and provider of the necessary consumer goods, consisting of:
 - a) Producers who act as producer (source) goods either through cultivation (agriculture, fisheries, livestock, agriculture, and forestry), mining, and processing production;
 - b) Distributor (intermediate) which acts as an intermediary transfer of ownership of the goods from the manufacturer to the consumer through Distribution channels (wholesalers, distributors, agents, markets, small retailers, stalls, and so on) in a trading system mechanism.
3. Logistics Service Provider; a provider institution freight forwarder (transporter, freight forwarders, shipping liner,) from the place of origin of goods (shipper) to its destination (consignee), storage of goods and services (warehousing, fumigation, and so on). The origin of the goods could have come from the manufacturer, supplier, while the destination to consumers, distributors, or manufacturers.
4. Supporting Logistics.
An institution that gives support to the effectiveness and efficiency of logistics activities, and provide contribution to solve the problems of logistics. Which are included in this category include associations, consultants, education and training institutions and research institutes.
5. The Government.
To improve logistics capabilities, the government has three roles: (a) as legislators whose role is to make the rules, regulations and policies; (b) as a facilitator whose role is to facilitate the availability of infrastructure, and (c) as integrator whose role to synchronizes logistics activities in accordance with the vision to be achieved, and empowering both to the perpetrators of logistics, logistics service providers and logistics support.

To perform the necessary logistics activities logistics infrastructure consisting of vertices logistics and the logistics chain that serves move goods from point of origin to the destination point. Logistics node can be a logistics players, and consumers, while the logistics link includes network distribution, transportation networks, network information, and financial networks, with some explanation as follows:

1. Infrastructure and distribution network is a chain of linkages between providers (manufacturers, exporters, and importers), distributors (wholesalers, distributors, wholesalers, agents, retailers) and consumers through infrastructure and means of distribution (Distribution Centre, Agricultural Terminal, Main Market, Traditional Market, Kiosk, Shops, Hypermarkets, Supermarkets and Mini Market). Function infrastructure and distribution network is to facilitate the transfer of ownership transactions between consumers, actors' logistics and logistics services provider.
2. Infrastructure and transport network is a chain of linkages between transport node (transportation node) and connectivity between nodes (transportation link) in the form of infrastructure and transportation. Transport node may include seaports, airports, stations, terminals, depots, and warehouses, while "transportation link" is roads, highways, railways, rivers lines, cruise lines, flight paths, and pipes. Transportation nodes should be integrated with the transport network and intermodal transportation services facilities connect efficiently and effectively.
3. Infrastructure and information network consisting of the physical network information (telecommunications network), data transport means (messaging hub), application (security, delivery channels, as well as special applications), and data (documents). Judging from the connectedness of infrastructure and information network consisting of the National Information Network connected through the National Gateway and the Global Information Network through the "International Gateways" which is a unit in the order of e-logistics system that serves to facilitate national transaction information among stakeholders' logistics are safe, secure and reliable.

4. Infrastructure and financial network consisting of actors financial services (Bank, Insurance, and non-bank financial institutions), and facilities of financial services (ATM, Internet banking, cash). Types of financial services logistics services include customs, taxation, banking, and insurance functions of the infrastructure and financial networks to facilitate financial transactions between stakeholders' logistics.

National Logistics system is not only related to micro aspects as described above, but also to the broader aspects (macro) housed in policies and regulations, as well as serve as a legal basis and reference in logistics activities among the stakeholders. The format can be laws, rules, regulations, policies, and mechanisms of interaction between stakeholders' logistics activities, which accommodates a macro and micro perspective in handling the issue of national logistics.

As an archipelago country, the role of logistics in the movement of the flow of goods in Indonesia plays an important role not only to meet the basic needs of society, but also as a vehicle to deliver agricultural production, mining and industry in order to be used and marketed, both domestically and abroad. The maritime sector has contributed directly to the final request at: marine fishing, crude petroleum and natural gas production; canning, preserving and processing of fish; petroleum refineries; manufacture of miscellaneous petrol and coal products; manufacture of marine engines; manufacture of fishing equipment and requisite; ship building and repairing; pipeline transport; ocean and coastal water transport; supporting services to water transport; marine insurance; marine administration; and maritime education.

Logistics actors in Indonesia acknowledges many problems facing the logistics industry in Indonesia that make the competitiveness of the sector is low, both regional and international levels. Some of them are problems of logistics infrastructure such as ports, airports and roads are not sufficient, a multimodal transportation system that is not integrated properly and long bureaucratic system. The perpetrators of logistics in Indonesia states that it required reforms in the field of logistics, especially by accelerating infrastructure projects, provision of fiscal policy, promote logistics education, eliminating the ego among agencies and sectoral ministries. Problems faced in the field of logistics must be carried out together by all the parties.

One concept to address challenges in the logistics system in Indonesia is the concept Pendulum Nusantara, or commonly known as the Toll of the Sea, as illustrated in the figure 2 below. Pendulum Nusantara is a system of transport of goods by ship large size (3000-4000 TEU capacity) which passes through a major sea lanes from west to east Indonesia on a regular basis. This concept is called Pendulum Nusantara because the movement pattern from west to east and then turned east to west (such as the movement of a pendulum when shaken). In the major sea lanes, there will be five major port that will be visited by ships large size, namely the Port of Belawan (Medan), Port of Tanjung Priok (Jakarta), Tanjung Perak (Surabaya), Makassar Port and Port Sorong (Papua). Five major port serves as a node or a regional hub for the surrounding region (called a loop). The goods will be sent to the port around using a smaller boat. The existence of a large ship, which regularly sail from west to east and vice versa, is expected to occur transport goods more cheaply and efficiently. Transportation costs do not just depend on one route (for example: Tanjung Perak-Sorong), but also the entire route to be taken by large ships and small boats. In this case, crowded stretch will subsidize deserted stretch. The program's goal is the occurrence of an efficiency of transporting goods thereby lowering the national logistics costs and ultimately encourage the growth of industry and the equal distribution of income, especially for eastern Indonesia.

In the implementation of Toll of the Sea in Indonesia, there are some major obstacles. First, there is an imbalance of cargo flows. The flow of cargo from Eastern Indonesia (KTI) to the west is very less as compared to the reverse charge current. Load current imbalance is associated with an imbalance of growth in each region. Second, the terms of use with sized vessels of 3000 TEU's, while national shipping companies do not have this kind of size vessels. Third, with regard to the funding needs for infrastructure development, particularly the port. As an agency assessment in logistics in Indonesia, Supply Chain Indonesia (SCI) have made the Architecture Design of Indonesia Toll of the Sea, that is expected to be an important input for Jokowi-JK government programs in decreasing the national logistics costs, as can be seen in Figure 3.

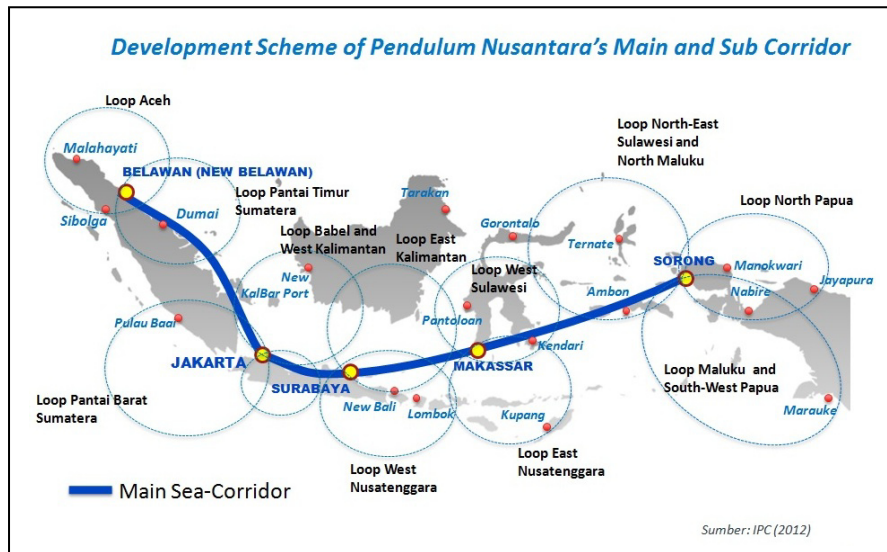
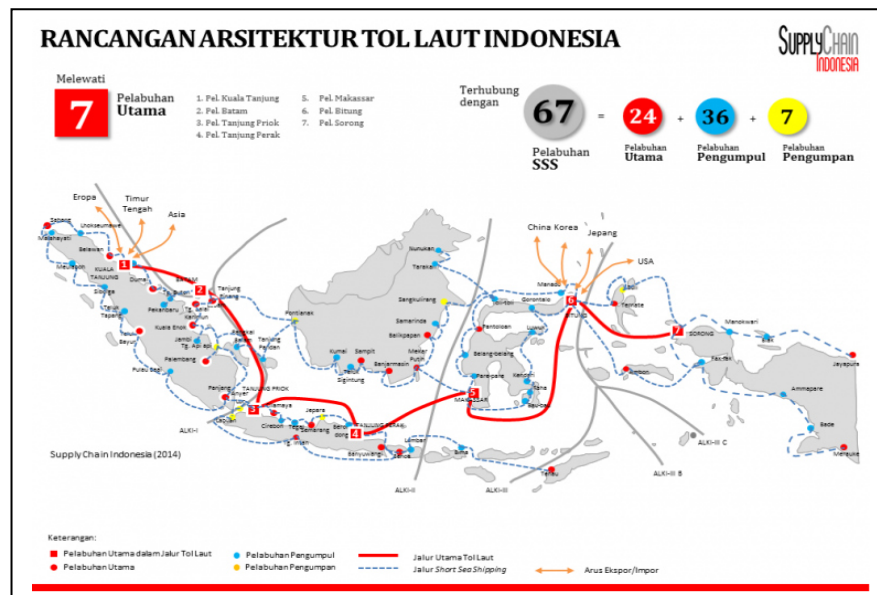


Figure 2. Pendulum Nusantara Scheme
 Source: Indonesia Port Corporation, 2012



source: Supply Chain Indonesia Agency, 2014

Setijadi, Chairman of SCI, explained that in the draft, there are seven major Ports are skipped Line Toll of the Sea, namely the Port of Kuala Tanjung, the Port of Batam, Tanjung Priok, Tanjung Perak Port, Port of Makassar, Bitung Port, and the Port of Sorong. Seventh Major Ports are connected to 67 Ports Short Sea Shipping (SSS). SSS ports consist of several ports at this time is still different class, the main port, the port Gatherer and feeder ports. This design has been considering some of the obstacles or problems of implementation of Toll of the sea.

Cargo flows related to the imbalance between the west and east, balancing the flow of cargo carried by the determination / separation doors exports / imports by country of destination / origin. The port of Kuala Tanjung, as the door in the western region, intended for European countries, Middle East, Asia, and so on. Bitung Port, as the doors in the eastern region, especially for the countries of China, Korea, Japan, USA, and so on. The size of the vessels used in the Marine Line Toll can be adjusted by taking into account the availability of ships, for example by measuring vessel of 1,700 TEU's owned by the National Shipping. Use the size of these ships can be done gradually by taking into account the volume of cargo. Funding for the development of infrastructure, especially ports, pursued through the synergy of the various parties because of limited funding budget of government. Governments need to encourage a synergy of funding from state enterprises, national private companies, foreign companies, and local governments. Public Private Partnership scheme (PPP) should be developed to support the existence and Infrastructure Development Bank initiated by current government. It is

precisely the implementation of this concept will be the driver of growth in the region through the opening of access to the delivery of goods, both into and out of KTI. Furthermore, with the growth of KTI, the freight volume will increase and encourage the implementation of the concept behind the Toll of the Sea. Implementation of this concept should be done wisely by involving national shipping that have contributed to build and run a marine transportation system in Indonesia. Every logistics actors, such as national shipping company, third party logistics people, should be involved in accordance with their respective roles.

5. Conclusion

Logistics is a series of activities taking and placement of goods from the place and time that has been planned. The importance of transport for the continuation of logistics is that the availability of transport will enable the availability of goods for people who come from other regions at a cheaper cost, which in turn creates stability of prices. In the supply chain, a company can not move on their own. As described in the theory of collaboration in logistics, to get the maximum benefit of the actors or stakeholders in the logistics must work together to achieve mutual benefit nature. The role of 3PL (third party logistics) in the modern global supply chain at this point, is because of the many companies that can not provide transportation or distribution logistics management for his own company. Therefore, there are many companies that act as a 3PL that provides logistic services and have a role as an outsourcing companies, where this role have proven successful in reducing the cost of logistics transport . There are various kinds of services provided by 3PL company is, and the scope of services provided depends on infrastructure owned. Not all of the logistics company has its own ship, so that the company is acting as freight forwarder in collaboration with the company owning the ship. Coordination in logistics management is a complex processes, covering many activities and stages, and involves many parties. Therefore, to ensure the smooth flow of goods shipped, it takes an intensive coordination and communication technologies that can support these logistics activities. Results of this study is the identification of the perpetrators of logistics, especially in service in the field of maritime transport is becoming the initial data in the analysis and design of structural model of the sea transportation network which includes models of network infrastructure (port) and the network model of service (route) sea transport, special for transport of goods.

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