



Strategies to Improve Logistics Cost Efficiency in Indonesia

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ABSTRACTS

Logistics is one of the important indicators to achieve social justice for all Indonesian people. With an effective, efficient, and competitive logistics process, Indonesia will certainly become a country that can not only fully protect its people but will also certainly be able to spread the impact of world economic growth like Singapore. Therefore, this article aims to help all logistics actors, the government, and all Indonesians to be able to jointly create social justice for all Indonesians by involving vocational training as an engine for forming qualified human resources in the technical field of logistics management process implementation. By exploring using the systematic literature review method and synthetic matrix of various secondary data, it can be found that there are some similarities in the problems and appropriate solutions in increasing the efficiency of logistics costs by maximizing in 4 things, namely, infrastructure, multimodal transportation, dwelling time, and application of application technology.

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1. INTRODUCTION

Logistics costs are a factor that greatly affects the competitiveness of companies and countries (Sumaardiyasa & Pohan, 2019). For companies, logistics costs affect the selling price of the final product. For countries, total logistics costs affect export and import markets. Reducing logistics costs has always been a concern for business leaders and regulators. Logistics costs increase material and production costs. In inbound logistics, it costs logistics to store and transport materials from suppliers to manufacturers. At the same time, the logistics costs for storage, transportation, and distribution from the factory warehouse to the trader to the end consumer are consumed in outbound logistics. Logistics costs include all cost components of goods movement activities in several supply chain processes (Kennedy, 2019) The more efficient the logistics costs in the supply chain process, the more competitive the final product price. The logistics costs of a company, industry or country are always an interesting discussion. Not only the results of logistics cost calculations, comparison of logistics costs of companies, sectors, countries, logistics cost calculation methods, but also the comparison of a country's logistics costs to the gross national product or gross domestic product (GDP) of the country.

One way to find problems in Indonesia's logistics system is to compare Indonesia's logistics performance with that of other countries. by comparing Indonesia's logistics performance with that of other countries, by using the Logistics Performance Index. In 2018, Indonesia ranked 46th out of 160 countries surveyed by the World Bank, and was below several ASEAN countries, namely Singapore World Bank, and is below several ASEAN countries, namely Singapore (7), Thailand (32), Vietnam (39), Malaysia (41), but higher than Laos (82), Cambodia (98), Philippines (60) and Myanmar (137). From this data, it can be seen that logistics performance in Indonesia is still low, which certainly affects logistics costs. For this reason efforts are needed to reduce logistics costs, which are expected to increase Indonesia's competitiveness in the market. Indonesia's competitiveness in the global competition arena as a result of an increasingly open market. Low logistics costs will provide added value to national products, both in terms of cost and quality. One of the efforts to reduce logistics costs is by improving the efficiency of the national transportation system, which includes modes of transportation such as road, rail, sea, and air transportation modes (Dwiatmoko, 2018)

The disruptive phenomenon is known as the Industrial Revolution 4.0, where companies that are unable to keep up with the speed of technological change and resources will experience bankruptcy (Bantacut, 2018). This must be anticipated together. Logistics activities are closely related to the increasing industry in the digital era 4.0. Every good/product produced requires logistics activities in it, starting from the factory to the final buyer. Logistics costs that are too high actually make Indonesia unable to face rapid movement and dimensional changes, now and in the future. The long and convoluted chain makes logistics inefficient and ineffective. So a new breakthrough is needed with an integrated logistics system to reduce logistics costs in Indonesia, so as to ensure timeliness, reduce costs, maintain the quality of goods and services and increase transaction speed.

2. METHODS

In this research, the method used is Systematic Literature review. Systematic literature review is a research method carried out by identifying, interpreting and evaluating various other studies related to certain topics of concern. (Murniarti et al., 2018).

3. RESULT AND DISCUSSION

By exploring the systematic literature review method and synthetic matrix of various secondary data, it can be found that there are some similarities in the problems and appropriate solutions in improving logistics cost efficiency by maximizing four things, namely, infrastructure, multimodal transportation, dwelling time, and application of application technology.

3.1 Element & Infrastructure Logistics

In discussing the logistics system, it should be noted that the object of logistics is not limited to the logistics of goods, but includes passenger logistics, disasters logistics and military logistics (defense and security) carried out by every business and industry, both in the primary sector and the industrial sector, both in the primary sector, secondary sector, and tertiary sector in order to support their operational activities. Furthermore, in the Blueprint for the Development of National Logistics System (Sislognas) outlines that logistics activities also involve various stakeholders, which can be categorized as follows

various stakeholders, which can be categorized into five groups, namely:

- a. Consumers; logistics users who need goods for use in the production process or for consumption. Consumers are authorized to determine for themselves type and quantity of goods to be purchased, from whom, and where the goods are to be purchased and to which destination the goods are delivered purchased and to which destination the goods are delivered.
- b. Logistics Actors (PL); namely as owners and providers of goods needed by consumers. consumers. Logistics actors are divided into two, namely:
 - (1) producers, namely logistics actors logistics actors who act as producers or makers of goods; and
 - (2) distributors (intermediaries), who act as intermediaries in the transfer of ownership of goods. which acts as an intermediary for the transfer of ownership of goods from producers to consumers through distribution channels (distribution channels). producers to consumers through distribution channels (wholesalers, distributors, agents, markets, retailers, and stalls) in a trading mechanism.
- c. Logistics Service Provider; is a service provider institution in charge of delivering goods (transporter, distributor, agent, market, and stall). Expedition of Sea Cargo (EMKL) from the location of origin of goods (shippers), such as manufacturers, suppliers, or distributors, to their destination (consignee), fumigation).
- d. Logistics Supporters; i.e. institutions that support the effectiveness and efficiency of logistics activities, and contribute to the resolution if the logistics activities, and contribute to solving problems during logistics activities logistics activities take place. Actors that fall into this category include include associations, consultants, education and training institutions, and research institutions.
- e. Government; the government's role in logistics activities is as a regulator that regulators who prepare laws and policies, facilitators who provide and build the logistics infrastructure needed for the implementation and integrator that coordinates and synchronizes logistics activities, in accordance with the vision to be achieved, and empowerment both for logistics actors, logistics service providers, and logistics supporters (Pramuja & Tobing, 2020).

Whereas, logistics Infrastructure includes essential facilities and structures such as roads, bridges, airports, ports, railways, energy distribution networks, water supply systems, and more. Logistics, in this context, involves the organization, movement, and coordination of resources, materials, equipment, and personnel required for the development and functioning of these infrastructure (Skorobogatofa & Kuzmina, 2017) . Poor logistics infrastructure is one of the factors for high logistics costs in Indonesia (Dwiatmoko, 2018). With the development of logistics infrastructure, it will support the implementation of an effective transportation system as the government's goal to reduce logistics operational costs (Nurkhamid & Rahayu, 2020).

An explanation of the components of logistics infrastructure are as follows: (Dwiatmoko, 2018)

- a. Infrastructure and distribution network; this component plays a role in supporting supporting the smooth transfer of ownership transactions between consumers, logistics actors, and logistics service providers. The entities of this component consist of providers (including producers, exporters, and importers), distributors (including wholesalers, distributors, wholesalers, agents, and retailers), and consumers.
- b. Transportation infrastructure and networks; this component acts as a link in the chain of linkages between transportation nodes and connectivity between nodes in the form of infrastructure and transportation links. (transportation link) in the form of transportation infrastructure and facilities. Which are included transportation nodes are seaports, air ports, stations terminals, and warehouses. While those included in the "transportation link" are public roads (including toll roads), railroad lines, river lines, shipping lanes, flight paths, and pipelines. These transportation nodes are very necessary to be integrated with the transportation network and services. integrated with transportation networks and intermodal transportation services to improve the efficiency and effectiveness of goods movement. to improve the efficiency and effectiveness of goods movement.
- c. Information infrastructure and networks; this component serves to facilitate information transactions among logistics stakeholders in a safe, secure, and reliable manner. This component is further divided into physical information networks (telecommunications networks), data transportation facilities (messaging hubs), applications (security, delivery channels, and specialized applications), and delivery channels, as well as specialized applications), and data in the form of documents.
- d. Financial infrastructure and network; this component serves to facilitate financial transactions among logistics stakeholders financial transactions among logistics stakeholders. Types of financial services logistics include customs, taxation, banking, and insurance services. What Included in the financial infrastructure and network component are financial service actors (banks, insurance, and financial institutions) and financial services facilities (ATMs, internet or sms banking, and cash counters).

Recommendation to address challenges and issues in logistics infrastructure :

- a. Integration with master plan connectivity development (infrastructure) of national logistics
- b. Preparation of infrastructure and facilities logistics handling based on products/commodities

3.2 Multimodal in Improving Logistics Cost Efficiency in Indonesia

Multimodal is the transportation of goods with more than 1 different modes in 1 contract document from the place of receipt of goods (point of origin) to a specified place (point of destination) coverage since the goods received (consignor) until the delivery of goods to the consignee (consignee) and carried out by multimodal transportation business entities (operators) (Agrista & Widodo, 2018).

Multimodal transportation has become a global concern in order to improve the welfare of people in all corners of the world, so it is deemed necessary to be regulated by the United Nations Convention on International Multimodal Transportation. United Nations in the United Nations Convention on International Multimodal Transport of Goods, and continued further regionally in the ASEAN Framework Agreement on Multimodal Transport (AFAMT). Role of multimodal transport is increasingly important with the integration agenda of the ASEAN logistics system towards the realization of the ASEAN single market. ASEAN single market. The integration of the ASEAN logistics system and the ASEAN Framework Agreement on Multimodal Transport implies the liberalization of multimodal transport services in the ASEAN region, which ultimately leads to the liberalization of services at the global level in accordance with the General Agreements on Tariffs and Trade (GATT's). Thus, it is necessary to create a conducive climate for the development of multimodal transportation business entities as part of Sislognas that grows sustainably and competitively (Sony & Sarinah, 2016)

The implementation of multimodal transportation has not gone well in developing countries including Indonesia. In the multimodal transportation process in Indonesia, the responsibility is still on each segment / part of the transportation activity, because the existing laws and regulations cannot cover all aspects of the responsibilities of the parties involved in the transportation chain, or if there are often not clear enough so that sometimes it causes conflict / differences in interpretation (Wibowo & Chairuddin, 2017).

In Indonesia, in terms of transportation documents, intermodal transportation has not used a single document. In general, each mode of transportation still uses its own transportation documents that have not been integrated with other transportation documents, so that the responsibility of the carrier is often unclear. In addition to this, because it is still done manually, the process of completing the document is relatively long, so it tends to hamper the smooth flow of goods (Wibowo & Chairuddin, 2017).

In its implementation, the limited capacity of the port of loading and unloading of large vessels optimally organizing multimodal transportation in the country is still constrained. Although the customs function carried out by the Customs and Excise Office in Indonesia can generally be said to be quite ready to support the implementation of STI. However, the existence of adequate/stable human resources with competitive capabilities in the implementation of multimodal transportation, both in terms of management and mastery of technology, is not yet apparent.

Related to the development of a multimodal transportation system, the national transportation system through the Decree of the Minister of Transportation Number KM.15 of 1997 stipulates that the National Transportation System is a systematically organized transportation order, consisting of land transportation modes, sea transportation modes, air transportation modes and pipeline transportation. The provisions regarding this Sistranas aim to be a guideline, both in the development and implementation as well as in planning and structuring the transportation network, in order to be able to realize the provision of transportation services in accordance with the level of need, orderly, smooth, and orderly.

Table 1. Recap of Questionnaire Data Tabulation on the Effect of Multimodal System on Logistics Cost Efficiency

Responden	Sistim Multimoda (Freight Forwarding)	Efisiensi Biaya Logitik
1	44	45
2	54	57
3	39	35
4	45	40
5	47	48
6	58	57
7	50	44
8	53	49
9	43	33
10	45	44
11	50	53
12	45	49
13	34	32
14	34	32
15	45	46
16	48	48
17	48	45
18	48	48
19	48	48
20	48	48

Table 2. From the SPSS calculation, the following results are obtained: Model Summary

Unstandardized Coefficients		Standardized Coefficients	t	Sig.
B	Std. Error	Beta		
-6.809	6.166		-1.104	.284
1.120	.132	.894	8.475	.000

The calculation means that the relationship (correlation coefficient r) is strong, which is 0.894 and the influence of the multimodal transportation system on the efficiency of logistics costs is (R Square x 100%) = 80%, while the influence of other factors is only 20%, assuming that these other factors are not included in the observation. (Hasan, 2005) for the regression model data from SPPS obtained the following results.

Table 3. Correlation Coefficient

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.894 ^a	.800	.788	3.401

$$\text{then : } Y = -0.809 + 1.12 X + e$$

If the Multimodal Transportation System implemented so far can be increased in performance by 1%, respondents will have logistics cost efficiency will increase by 1.12 times with an initial constant of -0.809. Meanwhile, for significance and hypothesis testing from Table 1, the criteria and calculations are as follows. Ho = There is no relationship between Logistics Cost Efficiency and Multimodal Transportation System. Ha = There is a positive relationship between Logistics Cost Efficiency and Multimodal Transportation System. Then obtained 0.000 (coefficient of significance) <0.05 which means there is a significant relationship between Multimodal Transportation System and Logistics Cost Efficiency.

Therefore, according to this study, there is a strong relationship (correlation coefficient r) between the multimodal transportation system in Indonesia and logistics cost efficiency of 0.894 and there is an influence of the multimodal transportation system on logistics cost efficiency of $(R \text{ Square} \times 100\%) = 80\%$.

MTO (Multimodal Transport Operator) supporting companies in Indonesia, such as railroad companies, freight forwarders, shipping, and trucking in general are still working as subsystems of MTO International Freight Forwarders. However, the existence of human resources capable of organizing multimodal transportation is not yet apparent, both in terms of mastery of technology and management. So it is necessary to improve the quality of human resources in mastering technology and managing logistics operations in Indonesia.

In addition, transportation service providers / organizers can also be carried out by the government through technical implementation units, the private sector, cooperatives, and BUMN. Faced with economic growth that will continue to grow, demanding adequate growth in the transportation sector, so that the participation of organizers needs to be improved.

Recommendation to address challenges and issues for logistics service providers :

- a. Increased understanding of products/commodities and their supply chains supply chain
- b. Capacity building product/commodity management (people, process, technology)
- c. Strengthening processes, facilities, and actors of product/commodity consolidation
- d. Efficiency (length reduction) product/commodity supply chains
- e. Standardization and integration of business processes between logistics service providers
- f. Adaptation to changes in business and trade patterns trade patterns
- g. Planning and implementation of Risk Management System

3.3 Port Dwelling Time

Ports have a very crucial role and function in the movement and growth of the economy and logistics in Indonesia (Nuyanto & Ngaijan, 2018). The port function itself means that it is a distribution area for products, standard materials, natural resources, and distribution of human resources using maritime routes. So far, the port infrastructure of ports in Indonesia does not have adequate facilities. Indonesian ports that are known as unsterile ports and do not have adequate facilities will damage both domestic and international trade (Kennedy, 2019). By increasing inter-island connectivity and improving port and logistics infrastructure in Indonesia, it can build low transportation costs and will contribute to product production costs and overall logistics costs.

The following are solutions to improve the poor quality of infrastructure: (Juniati, 2017)

- a. Improvement of port infrastructure
- b. There is an increase in human resources on port operational performance.
- c. There is an increase in intermodal transportation integration.

Dwelling Time is the amount of time when goods are stored in containers in a temporary storage area (TPS), namely a port (Rafi & Purwanto, 2016). Here are 3 processes that occur in Dwelling Time: (Hendartono & Widilestari, 2020)

1. **Pre-clearance process:** the initial administrative process in the implementation of Custom Clearance. Pre-Clearance includes a matter in the import activity of logistics goods, namely legality and lartas. Here, logistics companies or customer service companies have an obligation to carry out customs registration.

2. **Customs clearance process:** is a process that you must do before exporting or importing. If not, then the goods you export or import will include illegal goods and you can be criminalized for violating the law.
3. **Post clearance process:** an activity which takes care of shipping or cargo to help export and import needs such as taxes, customs, and related documents so that the cargo or goods which are distributed in a country. This activity is required in international trade.

The problems that occur in dwelling time are as follows: (Anita & Asmadewa, 2017)

- a. Licensing issues from agencies/ministries.
- b. The existence of importers, exporters, and brokers who do not rule out the possibility of the perpetrators of dwelling time in the long run.
- c. The existence of service providers, who benefit from containers that are not effective in removing them from the port area.
- d. Infrastructure. In this case, infrastructure is not far from being a factor in dwelling time problems. For example, the Indonesian port is a non-sterile port.

The solution to overcome this dwelling time is:

- a. Make use of the prenotification facility for priority lanes.
- b. Coordination of the issuance of prohibitions and restrictions (lartas) in a planned manner.
- c. Changing the way containers are unloaded on import activities that accumulate.
- d. Adding a bandela loader unloading tool at the port.
- e. The use of web systems to streamline or shorten the supply chain, so that goods are delivered to an area in an efficient manner.
- f. Reducing the cost of guarantees in shipping.
- g. There is coordination in the logistics chain between ports, transportation agencies, customs and associations that work with the logistics process.

3.4 Information Technology and Computer Applications

The presence of Information and Computer Technology (ICT) in logistics management has certainly been introduced long enough in Indonesia. However, the role of ICT in the logistics process in general and specifically in the multimodal transportation system in Indonesia is still underestimated (Kristanto, 2015). So that it needs to be optimized again not only by logistics actors but also needs the ease of regulation from the government. The reference of ICT application program innovation in the field of logistics and multimodal transportation systems generally makes the European Union project application system as a reference, especially in the multimodal transportation integration system (Pane, 2016). These projects are used as references because the application of ICT applications in these projects is the most up-to-date source of information and can act as a reliable source of information.

Table 3. Barriers to ICT application based on three perspectives

Barriers		
Users	Technology	Rules and Policies
large company size	Compatibility and interoperability	Lack of related policies
economic & financial reasons	ICT integration and standardization	coordination and harmonization between regulations
Change of management	Information confidentiality	Lack of standardization supported by policy
Coordination and discussion among stakeholders	Infrastructure Readiness Internet and communication networks are not yet evenly distributed and stable	

The advantages and benefits of implementing Information and Communication Technology (ICT) act like a nervous system in a multimodal transportation chain network to connect and bring many benefits to the organization through real-time data reporting and efficient data exchange. However, the use of ICT without a deep understanding of the existing business processes in the field is actually a detrimental side effect for the efficiency of the company, because in general, workers will carry out past processes rather than using new applications because they have habitual patterns (Gunasekaran et al., 2017).

Logistics information systems enable the interconnection of all participants in the supply chain and creates opportunities for the efficient management of all logistics processes. These technologies include IMS (Inventory Management System), TMS (Transportation Management System), and WMS (Warehouse Management System) (Fekpe & Fiagbey, 2021). The main purpose of IMS is to augment the existing system by improving its efficiency and effectiveness. The software improves work method by replacing manual systems with computer-based systems. IMS automates every activity of the manual system and increases its throughput. Thus the response time of the system very little and it works very fast (Kumar, 2015). TMS application is a tool that can perform planning, optimization and implementation of transportation activities. Application TMS applications usually include cargo bidding, routing, scheduling, tracking, freight payment, and audit systems. WMS is devoted to improving efficiency of warehousing operations. The main purpose of a WMS is to track the movement, storage, and handling of goods in the within the warehousing system. With implementation of WMS, better stock management can be achieved along with better utility of warehouse capacity as well as more efficient realization of warehousing operations.

Real-time data exchange is capable of improve overall productivity of a supply chain where companies can receive and process accurate and timely accurate and timely information related to every shipment, warehousing, SKU, and etc. The EDI framework covers all actors in a supply chain, ranging from raw material suppliers, intermediate semi-finished material producers, finished goods producers, and the end consumer. The Internet is a key aspect to maintain the EDI system because participants in the supply chain in the supply chain must communicate with each other on a constant and timely basis (Saragih et al., 2020).

Table 4. Advantages and Reasons for the Need for ICT Implementation in Indonesia

No.	Appllication	Profit/Cost Reduction	Why it needs to be implemented in Indonesia
1	eFeight	<ol style="list-style-type: none"> 1. Increase the operational efficiency of transporting goods 2. Increase the utilization of existing transportation infrastructure 3. Increase user satisfaction of freight transport services 4. Reduces the possibility of no cargo when the transport returns 5. Overall it will reduce costs due to optimizing the use of transportation 	As an integrated goods transportation application platform, this application will help many parties involved in the transportation of goods in reducing the logistics and transportation costs incurred, so that with this application the performance of logistics in Indonesia can be better and cumulatively it will increase the nation's competitiveness.
2	VTMIS	<ol style="list-style-type: none"> 1. Reducing the occurrence of traffic congestion As a traffic in waters and ports this application pe VTMIS for scope by monitoring water traffic 2. Reducing the risk of transportation accidents in sea transportation, with up to date information on sea conditions 	As a country with many waters, this application needs to be implemented, not only for the scope of transporting goods by sea, but also for human transportation whose impact will minimize the occurrence of accidents in the waters
3	ITS	<ol style="list-style-type: none"> 1. Reduce delivery time and mileage with route optimization ITS 2. Facilitate the journey of goods transportation 3. Maximize all available routes and road infrastructure 4. Reduce the risk of land transportation accidents 	The implementation in Jakarta and Surabaya is still not optimal for reducing congestion on the roads, but if you want to maximize it, of course you can apply various ITS technology services accompanied by repairs and renewal of road infrastructure. Not only in big cities, other cities are also starting to need to organize city traffic with the help of this application
4	RIS	<ol style="list-style-type: none"> 1. Reduce traffic congestion on some of the river crossings 2. Reduce the risk of accidents in river 	In some cities in Indonesia where rivers are the main transportation route, RIS needs to be implemented to ensure the safety of passengers and the security of goods sent using transportation via rivers
5	TAF/TIS	<ol style="list-style-type: none"> 1 Reduce the risk of loss of goods 2. Speed up processing time when changing modes of transportation 	Railway service provider operators in Indonesia are still dominated by BUMN, so that interoperability between operators with this application is still not needed at this time in Indonesia

Therefore, here are the things that need to be done to improve logistics cost efficiency in Indonesia through the means of applications:

- a. Make the process very simple (less human intervention, immediate approval, automated process steps).
- b. Make object exclusion services faster (minimize the number of handlers, and Automation for excluded handlers).
- c. Minimize complex application/system processes (simplified use of user layouts, reduced intermediary applications, and systematic structuring of application flows).

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