

## **Institutional Framework for Multimodal Transport Coordination Development to Support Logistics System in Tanjung Priok**

Nurullah Budisiswanto <sup>a</sup>, Miming Miharja <sup>b</sup>, B.Kombaitan <sup>c</sup>, Pradono Pradono <sup>d</sup>

<sup>a</sup> *PhD Candidate, School of Architecture, Planning, and Policy Development, Institute of Technology Bandung, Indonesia*  
E-mail : [budi87.siswanto@gmail.com](mailto:budi87.siswanto@gmail.com)

<sup>b</sup> *Associate Professor, School of Architecture, Planning, and Policy Development, Institute of Technology Bandung, Indonesia*  
E-mail : [mimingm@pusat.itb.ac.id](mailto:mimingm@pusat.itb.ac.id)

<sup>c</sup> *Professor, School of Architecture, Planning, and Policy Development, Institute of Technology Bandung, Indonesia*  
E-mail : [benk@pl.itb.ac.id](mailto:benk@pl.itb.ac.id)

<sup>d</sup> *Professor, School of Architecture, Planning, and Policy Development, Institute of Technology Bandung, Indonesia*  
E-mail ; [pradono@pl.itb.ac.id](mailto:pradono@pl.itb.ac.id)

**Abstract:** The institutional model of multimodal transport in the context of the national logistics system, in an effort to realize the concept of institutional coordination of multimodal transport that can actually support the achievement of the vision of developing a Tanjung Priok Port logistic system. An institutional development of multimodal transportation and logistics used to reveal the development of multimodal transport coordination. The scope of the research covers the implementation of the concept of multimodal transport institutional in order to support logistics system in Tanjung Priok Port. The analysis shows that Multimodal transport model to compete effectively and can hit a lower cost with a higher flexibility, if the measures taken more emphasis on the use of each mode separately. There are implications of such needs less time and cost less due to the implementation of multimodal.

*Keywords: Logistics Transport, Multimodal Transport, Institutional Transport, Coordination, Logistics System*

### **1. INTRODUCTION**

Freight transport is a crucial element of the distribution and supply chain to determine timeliness and efficient movement of raw materials and also finished products (Crainic, 2003). Empirical evidence from many developed countries, one of the transportation system development strategy to enhance the efficiency of the port logistics system is multimodal transport system development, especially at the vertices of the port of export-import (UNCTAD, 2003). Multimodal transport is the transport of goods by using at least two different modes of transport (UNCTAD, 2003; UNECE, 2009). Multimodal transportation of goods, that most of its functions related to the containerization development, which aims to increase cargo security, standardization, lowering handling costs, and connectivity to several transportation modes (Crainic and Kim, 2007) and also associated with sustainability (Woodburn *et al*, 2007).

Multimodal transport of goods is a multi-actor chain management, where the player has different market forces in logistics transportation system (Taylor and Jackson 2000). Multimodal transportation is at the heart of trade in which goods move efficiently and cost effectively in a sea and land: port terminals, rail and road. Economic growth of trade cannot

be maintained properly without using such methods multimodal transportation (OECD, 2001). Schijndel (2000) proves there is a strong perception on the part of the sender that a multimodal transport logistics solutions congestion movement.

Efforts to build a multimodal transportation system in support of national logistics system has been implemented by Indonesia government, among others, issuing a series of regulations related to the national logistics system (Presidential Decree 26/2012) and multimodal transportation system (Government Regulation No. 8/2011 and Minister Regulation in 2012), but the performance of logistics system is still not optimal. Indonesia's national logistics performance is still lagging behind compared to neighboring countries at the level of ASEAN (ESCAP, 2015).

This paper discusses the institutional dimension in multimodal transport system related logistics systems in ports. Institutional dimension that will be examined include, among others, the involvement of organizations / actors, regulatory requirements, mechanisms and operational procedures, functions and authority, and activity such as coordination, collaboration and coordination. The discussion is limited to the institutional aspects of the institutional scope of multimodal transportation system is based on the concept of multimodal benchmark used as a reference. More specifically this research will focus on the discussion of institutional aspects to support the institutional embodiment of multimodal lead to the institutional development of the single trait carriers as well as single document.

The substance of other studies that will be discussed in addition to the institutional aspects and the system is related substance transportation multimodal logistics systems in Tanjung Priok Port and its hinterland. Some aspects of logistics systems in ports to be discussed among other mechanisms of distribution and transportation of goods from upstream to downstream and chain transport linkages that support it.

## **2. INSTITUTIONAL CONCEPT OF MULTIMODAL TRANSPORTATION**

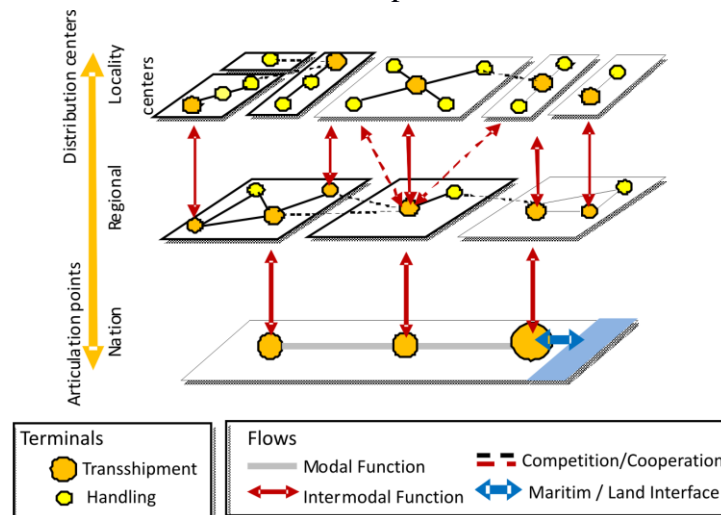
Research related to the field of multimodal transport institutional collaboration is still quite rare. Thus, review of available shows that few studies have been done on a multimodal transportation system in the context of developing countries, especially Indonesia. Relevant studies specifically in the context of Indonesia has never been done in the level of detail. None of certain of the above research work is focused on problem identification and development dimension of multimodal freight transport from the institutional side. This study tries to contribute to fill this gap. Patterns following institutional and governance policies multimodal transport logistics are not yet a comprehensive discussion of the material in the academic literature.

The study, there is more scrutinized at each aspect of multimodal transportation (Hanssen and Mathisen, 2011; Woodburn *et al*, 2007; Macharis *et al*, 2011; Taylor and Jackson, 2000; Bontekoning *et al*, 2004, Tsamboulas and Kapros, 2000) and the institutional logistics (Lemoine and Dagnaes, 2003; Gupta *et al*, 2011; Hicks, 2009; Ng and Pallis, 2010; Chang, 2009; Motraghi, 2013; Chaudhury, 2008). Research Monios (2014) although it has combined these two major aspects, namely multimodal transportation / intermodal and logistic institutions but within a framework of regionalization harbor more specific, not in the form of institutional development itself.

Multimodal Transport Definition according to Government Regulation No. 8 of 2011 on Multimodal Transport was "*Transport Multimodal is the transport of goods by using at least two (2) different transport modes on the basis of one (1) contract as a document of multimodal transport from place of receipt of goods by business entities multimodal transport*

to a place designated for delivery of the goods to the consignee transport multimodal "

Kazakova (2006) argues that multimodal goods transport uses many modes of transport with one sender or carrier responsible for the whole process of transporting goods from supplier to consumer in one transport documents. Here is a picture of a multimodal concept of Rodrigue, et all (2009) where the transport of goods is passed through some terminals, point and modes in the context of competition and coordination.

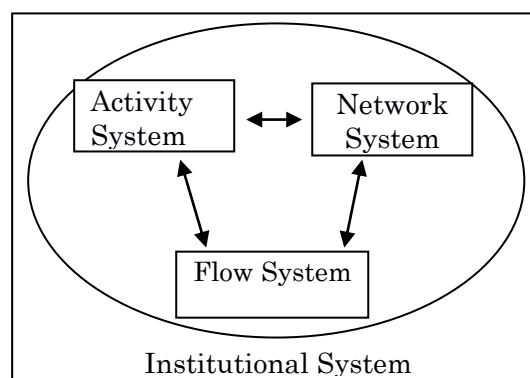


**Figure 1. Multimodal Transport Concept**

Source: Rodrigue, et all (2009)

In general it can be said that the transport system as a whole (macro) is the interaction that influence each other and intertwined, as shown in the figure below, between the various transport systems that are smaller (micro), namely:

- a. system activity
- b. Transport infrastructure network system
- c. System traffic movement
- d. institutional system



**Figure 2. Macro Transportation Systems**

Source: Tamin (1997)

Lemoine and Dagnaes (2003) stated that in the new millennium, the institutional role of logistics is vital in determining the organizational model as well as the basic competencies that will be used to adapt to the environment of globalization. (Gupta *et al*, 2011) confirmed that several obstacles in logistics services requires institutional role of government in making

policies. (Monios, 2014) explains that the facts show that the failure of the development of intermodal transport occurs because of the urgency of the institutional aspects of development are not well understood.

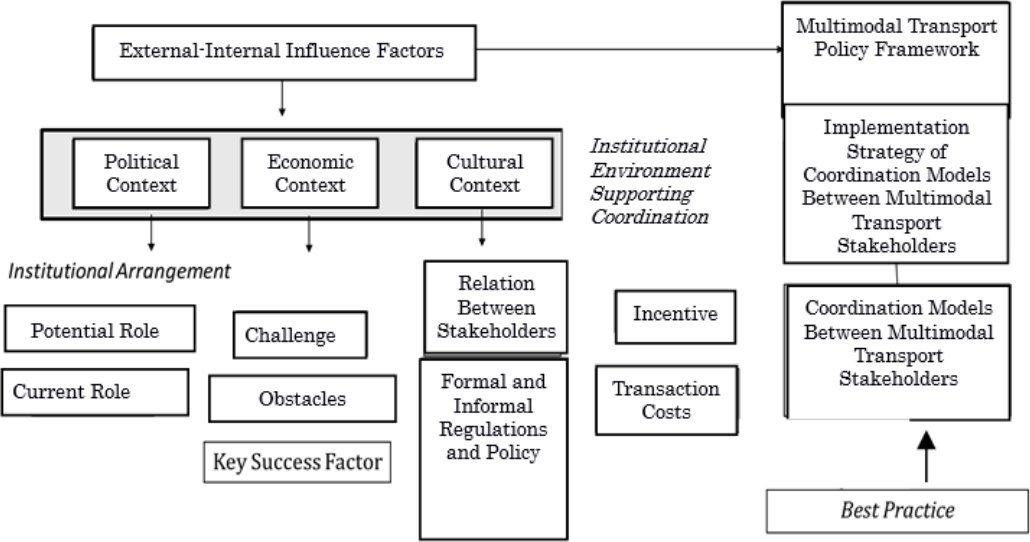
In relation with aspects of legislation (Taylor and Schweitzer, 2005) examines the assessment of the application of transportation planning jurisdiction in the United States. As for (Miharja and Woltjer, 2010) to discuss the inter-local government and the perception of transaction costs in the metropolitan transportation planning in Indonesia., (Stank, Keller and Daugherty, 2001) to discuss the performance in the supply chain and logistics services. Lack of institutional support, inappropriate incentives, lack of coordination in decision making. and lack of information (Whipple and Frankel, 2000; Cruijssen *et al.* 2007; Simatupang and Sridharan, 2005; Fawcett *et al.*, 2008; Richey *et al.*, 2010)

This institutional model addresses the challenges of institutional multimodal transportation and logistics, which divert the multimodal transport development model of the spatial focus to focus on the institution. Multimodal logistics integration strategy and institutional processes and coordination in solving the problem of collective action will be a concern in this study. Multimodal transport cannot be fully understood without a larger analysis of the key issues arising from in-depth analysis of spatial and institutional characteristics of multimodal transport and logistics. Traditional spatial analysis on the transportation of goods has been expanded to include institutional relationships that govern the complexity of transport connections.

It recognizes that the development of modern transport actors operating in the environment, transportation and logistics are more complex and sophisticated, embedded in a multi-scale planning regime. The idea of transport is the result of a reformed request as an integrated query (Hesse and Rodrigue, 2004). Thus, the relationship between goods flow and spatial development is complicated and complex due to network nodes and corridors that may not perform the primary function adequately, potentially limited by physical infrastructure deficits and lack of connectivity or inability to access a wider network.

The concept of coordination among stakeholders will be used to see the extent to which the role of the stakeholders so far in encouraging the formation of multimodal transportation to logistics, and the concept of coordination will be used to look at the possible collaboration opportunities between actors who had been engaged to transform multimodal transportation to logistics. Formulation of the institutional model built upon the context of politics, economy and culture. Later it was used to see how they affect the institutional arrangement in the form of division of roles between actors, obstacles, challenges, key factors, relationships between stakeholders regulations and policies, incentives and transaction costs that can be used as an analysis of how to build models of coordination among stakeholders transport logistic multimodal, strategy implementation and the necessary policy framework. The points above are also compared with the institutional understanding of existing multimodal transportation abroad as a best practice to make comparisons and lessons for the institutional development of multimodal transportation in Indonesia.

Here is the institutional framework that was adopted from some institutional theory into the research context:



**Figure 3. Institutional Framework in the Context of Research**  
Adapted from Otgaar, et all (2008)

In discussing and formulating institutional multimodal transportation to logistics, to be built on the concept of coordination, institutional concept, and the concept of multimodal transportation. Some of these concepts are used in discussing and formulating institutional multimodal transportation, with a focus on studies surrounding the case study of Tanjung Priok port as a hub with Cikarang Spoke dry port in Indonesia as being an outflow of incoming cargo from and to the hinterland. The concept of coordination is used to look at the relationship and the type of coordination that has been established in the institutional development of transport logistics.

**3. COMMON PROBLEM OF COORDINATION OF MULTIMODAL TRANSPORT**

Common coordination problem in the relevant inland transport between rail and truck transport is the following issues: Information exchanges and inadequate coordination between Container Shipping Line, Terminal Operating Company, railroad transportation company. Therefore, the lack of commitment from the cargo company to use the newly developed inland services, so that the volume is not achieved so that the new channel cannot be sold beyond the minimum volume limit. Coordination between Terminal Operating Company, dryport terminal operator, and Container Shipping Line can reduce empty containers. Movement of unproductive empty containers certainly adds higher operational costs. The coordination issues described above are relevant at the port. Therefore, initiatives are needed to improve coordination among stakeholders. The issues and the actors involved is described in the table below:

Table 1. Coordination Issues and Actors Involved

<b>Coordination Problems</b>	<b>Actors Involved</b>
Inadequate container data information makes poor planning	Container shipping line, terminal operating company, forwarder, rail operator, truck company,
Investment in hinterland terminal is not optimal	Forwarder, rail terminal operator hinterland
The new hinterland service requires basic volumes but, logistic actors are not committed to using the new service	Forwarder, shipper, container shipping line
Bad planning on empty container transport and storage	Terminal operating company, rail terminal operator in hinterland, container shipping line
Customs in administrative and physical checks that are less effective cause delays	Forwarder, Customs, truck company, rail operator
Inadequate information about customs clearance from customs	Forwarder, Customs, shipper

Source: de Langen, 2010

#### **4. INSTITUTIONAL ISSUES OF MULTIMODAL TRANSPORT IN TANJUNG PRIOK PORT**

##### **4.1 Current Tanjung Priok Multimodal Transport System Issues Preliminary Survey Result)**

Indonesian government seeks to develop port capacity and development of interconnection with hinterland by developing a railway network for freight transport as the development of multimodal transport network that will reduce cost, time and road haulage.

Use of trains to Cikarang Dry Port so far has not been optimal which was operated earlier this year but still not effective, this is because the truck mode is still competing with the train mode. Besides, there is still Interest interest that is motivated by economic motivation, resulting in the end of container shipments through the train is still quiet. In the end, the use of the train is being reviewed by the maritime minister (Luhut Panjaitan) and looking for for its development strategy. Related efforts to reduce costs, a product can be suppressed if in the delivery process is supported by a system of multimodal transport and logistics that have been good. While this has not been applied properly in Indonesia, so our products are less competitive with countries that already have a good system.

Use of railways makes it more efficient, because for a certain distance in the process of moving the container, but the condition occurring in Tanjung Priok Port is the number of "unemployed" trucks, despite investing so much, and many items carried by truck, Trucks are "idle", consequently would cause harm.

There used to be a Short Sea Shipping Program, a program undertaken as one of the measures to reduce the burden of land transportation on the highway and lower the cost of logistics production, in the implementation has not run optimally and then stalled. This is because the party who owns the goods is the party who has a truck as well. So this side controls until downstream, then there is a monopoly.



Multimodal transport regulations have been provided (Government Regulation No. 08 of 2011 on Multimodal Transportation), but none of the operators are willing and able to implement multimodality in one document. Basically, the Government tries to improve the integration of infrastructure network according to private and public demand, one of them is through port railway, but the quality and service from private parties (Multimodal Transport Agency) is most importantly improved so that existing facilities and infrastructure can be used and maximized. The IT system for multimodal transport licenses has been provided by the government through Indonesia National Single Window (INSW), but its use by logistic actors is still minimal.

#### **4.2 The Role of Actors at the Port of Tanjung Priok (Preliminary Survey Result)**

Here are the pre-research results that the author did in the port of Tanjung Priok, Port is a logistic node that has a very dynamic nature in which many actors and relationships affect each other. Pelindo (IPC), Syahbandar, Port Authority (OP) are the three actors managing at the Port. Syahbandar covers the safety and security affairs of the voyage. Meanwhile, the Port Authority covers business regulation and supervision. Strengthening the function, role and allocation of revenue The port management actor changes as the ruler changes. For example In the time of jonan minister, non-tax state revenue (PNBP) port is directed to the state-owned treasury, but at the time of the minister of works, directed to the cash of state-owned operators (pelindo). This means that institutional strengthening depends on policy trends. The following in figures 4 and 5 is a description of the actors involved in each of the truck and train modes

The government (OP) has made and facilitated the regulation, enhance efficiency and effectiveness of sea freight but the implementation of the regulation still has not brought the maximum significance. Tanjung Priok Port Land is owned by Pelindo. Pelindo is the operator and developer of the port business, can be considered as the main actor of the port business. The character of the business structure in tj priok is still to Master the main actors of the port business from upstream to downstream.

Around the 1970s, the entire port was managed by the Directorate General of Sea Transportation, but as it grew, it was then divided. Finally at that time, all of the assets and port land were given to Pelindo. Pelindo directly certifies land and port assets. Surely this complicates the competition in this port because all the land is owned by Pelindo, not state land.

This should be a state land that is competed to be processed in accordance with its port activities by competitors. When traced to the action of certification by the Pelindo, many parties lost due to lack of assets. Finally until now, Tanjung Priok Port is still in Monopoly by the Pelindo.

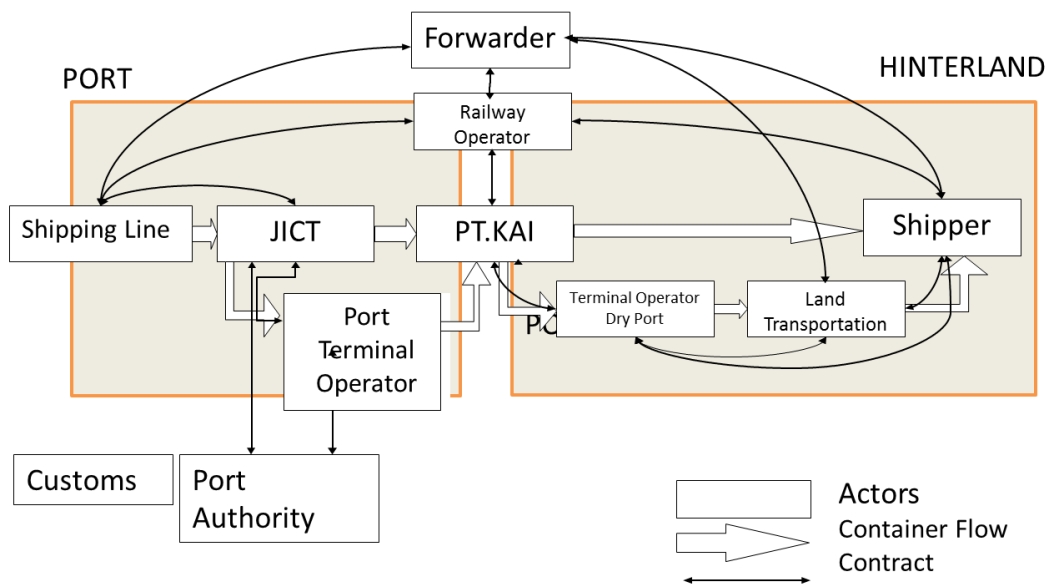


Figure 4. Actor In Railway Mode at Tanjung Priok Port

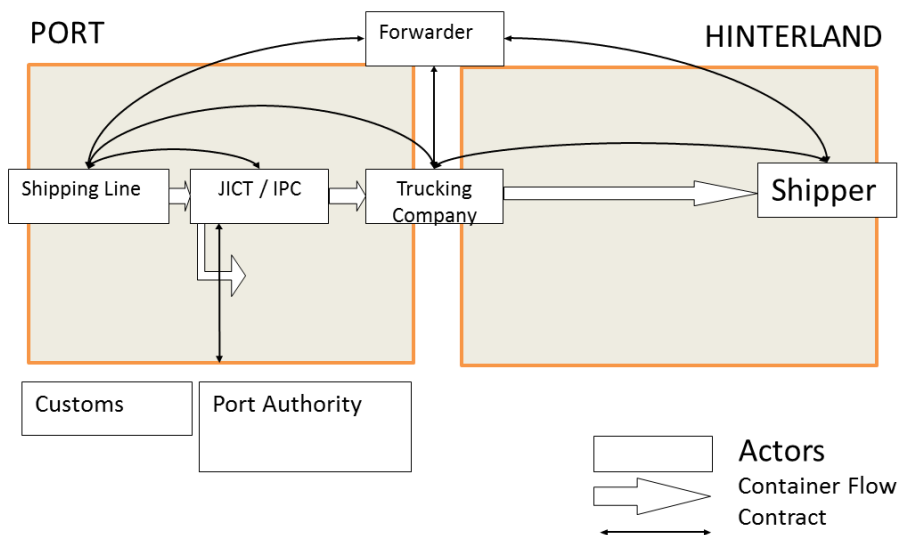


Figure 5. Actors In Truck Models at Tanjung Priok Port

### 4.3 Coordination Constraints of Hinterland Accessibility to the Hub

Port to hinterland accessibility issues can be approached from the perspective of infrastructure and markets. If seen from an infrastructure perspective, it can be argued that a reliable road, rail, and water network, combined with an efficient and integrated interconnection system, is the first viability condition for multimodal inland access operations accessibility. From a market perspective, it can be said that it should be efficient and effective company that provides various services to the customers of hinterland transport. In considering how the hinterland accessibility offered to customers, emphasis needs to be an organizational perspective to analyze the performance and the factors underlying them. Hinterland accessibility is the result of joint action of the various stakeholders of the company private and public actors,



It can be described as a hinterland accessibility organizational challenge with a practical example, in the chain of export-import, carrying containers leave the containers at marine terminals. Terminal Operator Company (hub) moves the container to the terminal area, storage area or transferred directly to the land transport modal. Container carrier has a contract with the port terminal operator and pays the entire operation at the terminal. Inland transport operators, for example, rail operators have contracts with freight forwarders to pick up containers at terminals and transport to inland terminals. The railway company in hinterland ensure that there is a slot in the terminal handling at the time of arrival, and that has a slot to use the infrastructure managed by the infrastructure manager.

Upon arriving at the container terminal hinterland, there are other requirements for terminal handling slot. This example shows that a lot of actors involved in the operational coordination to handle one container, and sometimes coordination should take place among more than two actors simultaneously. These actors have different business models and different interests in designing the transport chain or network that they are part of it (de Langen and Chouly, 2004).

Multimodal of transport ships goods to the location is still very limited in terms of its availability. Apart from the numbers, the condition of the ship is still limited in terms of availability loading facilities such as crane equipment to move cargo (containers) from and to the transports. In addition, the transport of commodity occasionally experience delays due to the need to compete with other commodities, such as basic food commodities. This is because no clear schedule for the arrival of ships carrying cargo from the shipper.

On the other hand, in terms of infrastructure, many ports of loading and unloading commodity that is not equipped with a crane. This forces the industry using transports that have been equipped with a loading tool. Moreover, on the road, some areas have poor road infrastructure conditions support the process of distribution / delivery of goods from port to distributor or to a retail location.

In terms of transportation using more than one type of means of transport, double handling is expected to occur as a result of the transfer of goods, such as from truck to rail or ship, or vice versa. When these conditions are valid then the implication is the need for the delivery time is longer and there is an additional charge of loading and unloading services as a result of the transfer of goods. Besides bringing in additional implication, of course, will have implications on the additional costs the owner of the goods (producer). This then affects the final price of the product received by the consumer where the price of the end product has undergone additions for their extra transportation costs.

The conditions over the implications of the increased transportation costs are borne by the companies as a result of delays in the transportation and delays in unloading goods at the port of destination. In turn, the increased cost of transportation has incurred for the delivery of goods had an impact on the final price of goods in the market rate. Transportation costs accounted for 20% to 30% of the selling price of products at the consumer level. That is because the process of transporting the goods is still constrained in terms of facilities and infrastructure both on the ground (road) and the port side. High transportation costs mentioned above illustrate the fact that the national logistics conditions have not been effectively and efficiently reflected from the Indonesian national logistics costs by an estimated 27% of national income (GDP).

## **5. DISCUSSION**

Improving the performance of transportation services to support the commodity distribution process. The purpose of this is to support multimodal efforts to reduce the cost of

transportation resulting constrained distribution. The use of more efficient means of transport with a payload capacity / load mass is to create efficiency in product distribution. By the policy of accelerated infrastructure development in the region, will increase the level of domestic consumption. Under conditions where the industry has increased capacity, then of course the production will increase to distribute these productions efficiently,

Which is a multimodal transport of goods has been implemented throughout Indonesia, especially when it has done construction and development, improved accessibility and the optimization of the network infrastructure, network services, and transportation services such as the increased role of the dry port (among others Cikarang Dry Port and Gede Bage Bandung). Then, improvement of integrated network infrastructure between the ports by rail as at Tanjung Priok Port is being improved rail lines leading to the port. Until now, the institutional problems between the hinterland and the port have not been a focus, there has been no specific institutional governing multimodal transport and policy measures to strengthen institutional coordination among stakeholders.

Common Coordination problems in the inland mode is relevant to the problem of coordination terminal (port), railway transport, and trucks. Sufficient information exchange between container lines, TOC (terminal operating operators), and transport companies is a problem of coordination. In many cases, there is a lack of information about container destinations, delivery status of goods and cargo. This lack of information mainly occurs in container exports, almost all information is present on the import of container cargo ships manifest. Transport companies often have inadequate information about container exports to TOC and hampered shipping lane planning.

The second common problem is the lack of coordination of the companies commitment to ensure cargo volume to inland developed new services provided by TOC and inland transport company. Introducing inland areas that develop new services requires a volume base. However, Shippers, freight forwarders and shipping containers are often unwilling to commit to use this new service, due to competition with other moda issues.

Empty container planning is a third common coordination issue. Coordination between TOC, inland terminals and container shipping lines can reduce the movement of empty containers. Unproductive movements require high costs, coordination issues arise between inland transportation companies and stakeholders such as Customs.

Multimodal transport modes to compete effectively and can hit a lower cost with a higher flexibility, if the measures taken more emphasis on the use of each mode separately. There are implications of such needs less time and cost less due to the implementation of multimodal. This will have an impact on the product price received by consumers who increasingly competitive due to reduce the cost of transportation. Problems multimodal application is highly depend on the level of coordination and coordination among stakeholders in supporting the smooth operation of multimodal transport is the core of the application of multimodal transport.

## **6. CONCLUDING REMARKS**

The government seeks to develop port capacity and development of interconnection with hinterland by developing a railway network for freight transport as the development of multimodal transport network that will reduce cost, time and road load. Institutional patterns of transportation in Indonesia are lack of coordination and the necessary elements to execute the dynamic affairs of logistics. Coordination problems common in the inland mode is relevant to the problem of coordination terminal (port), railway transport, and trucks. Coordination problems common in the inland mode is relevant to the problem of coordination terminal (port), railway transport, and trucks. Adequate exchange of information between the

lines of containers, TOC (operator terminal port), and transport companies is a matter of coordination. The second common problem is the lack of coordination of the shippers commitment to ensure cargo volume to inland developed new services provided by TOC and inland transport company. Introducing inland areas that develop new services requires a volume base. Empty container planning is a third common coordination issue. Coordination between TOC, inland terminals and container shipping lines can reduce the movement of empty containers.

Multimodal transport modes to compete effectively and can hit a lower cost with a higher flexibility, if the measures taken more emphasis on the use of each mode separately. Improving the performance of transportation services to support the commodity distribution process. The purpose of this is to support multimodal efforts to reduce the cost of transportation resulting constrained distribution.

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