Study application of the domestic freight logistics system in Indonesia

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Abstract. With the geographic conditions of Indonesia, the availability and need for commodities in each province are different, the fluctuations and disparities in the prices of basic goods between regions are quite high, those are driving factors for inter-island trade. Inter-island trade has an important role in the economic sectors of society. The geographic condition of Indonesia with 62.89% sea area, means that the modes of transportation that can be selected in inter-island trade are sea transportation and air transportation. The choice of transportation mode is closely related to the 9R of logistics principles, namely: Right Way, Right Product, Right Quantity, Right Quality, Right Place, Right Time, Right Customer, Right Cost. The development of the digital era that has penetrated all aspects of human life has also influenced the patterns of world trade which have begun to change since the presence of e-commerce. This study will try to portray how the current inter-island trade logistics system in Indonesia is conduct and how electronic commerce (e-commerce) affect the logistics business. This research aim to provide the right input for business actors in choosing the mode of inter-island trade transportation.

1. Introduction

Indonesia is the largest archipelagic country in the world which has 17,508 islands, with a land area of 1,922,570 km² and an area of body water 3,257,483 km². The geographic conditions of Indonesia cause each region in Indonesia has the diversity of the face of the earth, this diversity makes each region have its own main product which gives rise to product specialties from each region. Referring to the 2018 data released in 2019 by Badan Pusat Statistik (BPS), of the ten cities with the largest economies of scale according to total GRDP, six of them are cities in Java [1]. So that it can be concluded that Java Island is still the center of the national economy, where many companies both in the production and trade sectors operate.

With the geographic conditions of Indonesia, the availability and need for commodities in each province are different, the fluctuations and disparities in the prices of basic goods between regions are quite high, those are driving factors for inter-island trade.

Inter-island trade is the activity of trading and/or distributing goods from one island to another within a province or between provinces, which is carried out by inter-island trading business actors by means of crossing the goods using sea or river transportation. Thus, trade between regions can be interpreted as the trade and distribution of goods from one province to another which is different within the same country [2].

The development of the digital era that has penetrated all aspects of human life has also influenced the patterns of world trade which have begun to change since the presence of e-
commerce. Online transactions are an option for residents in areas where the availability of goods is limited and not diverse. This phenomenon is expected to continue to grow in Indonesia. Based on data released by Asosiasi Penyelenggara Jasa Internet Indonesia [3] the number of internet service users in Indonesia continues to increase from year to year as shown in figure 1. The blue graph representing the survey results shows that in the last ten years the number of internet users in Indonesia has increased by 86%. In the early 2000 the number of internet users looks stagnant, then it increased gradually. The highest increase in the number of Indonesian internet users occurred in 2015 and 2016, where the number of users in each year increased by 22 million people from the previous year. There were 143.26 million internet users in Indonesia in 2017, or around 54.68% of Indonesia's total population. The number increased by more than 10 million people compared to the previous year which was 132.7 million. It is estimated that the numbers of internet users in Indonesia will continue to rise, the green graph which represent the projection of users illustrates that by 2023 the number of internet service users in Indonesia will increase by 32%, breaking the 212.6 million user [4].

![Figure 1. Development of Internet Users in Indonesia](image)

This study will try to portray how the current inter-island trade logistics system in Indonesia is conducted and how electronic commerce (e-commerce) affect the logistics business. This research aims to provide the right input for business actors in choosing the mode of inter-island trade transportation.

2. Literature Review

2.1 Value Chain

A value chain is a business model that describes the full range of activities needed to create a product or service. For companies that produce goods, a value chain comprises the steps that involve bringing a product from conception to distribution, and everything in between—such as procuring raw materials, manufacturing functions, and marketing activities [5].

Value Chain Porter (discovered by Michael Porter) is a model used to help analyze specific activities that can create value and competitive advantage for the organization [6]. These activities are divided into 2 types, namely:

- Primary Activities which includes Inbound Logistics, Operations, Outbound Logistics, Marketing and Sales, and Service.
- Support Activities which includes Procurement, Technology Development, Human Resource Management, Firm Infrastructure.

Inbound Logistics are activities associated with the receiving input, storage and distribution of inputs / raw materials. Operations are activities associated with converting inputs or raw materials
into final product forms. Outbound Logistics are activities associated with the collection, storage and distribution of products to buyers. Marketing and Sales are the activity of persuading or attracting buyers to buy, while Service are activities associated with providing services to increase and maintain product value.

Procurement, refers to the purchasing function, Technology Development, consists of various activities that can be grouped into efforts to improve products and processes. Technology development is essential for competitive advantage in all industries. Human Resource Management includes recruitment activities, training, human resource development. Lastly Firm Infrastructure are the company's infrastructure activities consist of a number of activities including general management, planning, finance, accounting and quality management.

2.2 Logistics Concepts
These are no correct terms or definitions regarding logistics due to differences in the goods produced, the companies that produce them, and the different systems applied. Although it has various definitions, one definition that is widely agreed upon around the world and which also touches the essence of logistics is that of Logistics = Material Management + Distribution [7]. Logistics focuses on the physical flow and information as well as storage (storage) from raw materials to the final distribution of finished products. Thus, material management represents storage and flow in the production process, which for distribution represents storage and flow from the point of the finished product to the end consumer or end user.

Logistics company is a company that provides transportation services for delivery of goods from the place of collection of goods to their destination. In addition, logistics companies also provide warehouse rental services for other companies to store their goods [7]. Logistics company can be divided into three categories:
- Logistics Service Provider: only provide one type of service.
- Third Party Logistics: provide goods delivery services and warehouse management.
- Lead Logistics Provider: the entire shipping process is handled by one company only.

In the Regulation of the Minister of Trade of the Republic of Indonesia, Number 29 / M-DAG / PER / 5/2017, it is stated that in inter-island trade the distribution of goods can be authorized to third parties, namely logistic service providers [2].

2.3 Supply Chain
Supply chain covers an even broader cope of the business area. This includes the supply of raw materials and components as well as the delivery of products to the final customer. Thus: Supply Chain = Suppliers + Logistics + Customers. In general, it can be said that: supply and materials management represents the storage and flows into and through the production process; while distribution represents the storage and flows from the final production point through to the customer or end user [7]. Supply Chain Management is an activity that involves coordinating the management of raw materials / materials, business information and financial flows in business relationships between participating organizations / companies with added value benefits, maximizing profitability through efficiency, and achieving customer satisfaction. Supply Chain Management is a cycle that runs continuously in line with a company's business processes which include [10]:
- Material flow: the physical flow of products from suppliers to customers, including product returns, services, recycling and disposal.
- Information flow: includes demand forecast, purchase transmission and delivery status reports
- Financial Flow: includes credit card information, credit terms, payment schedules.

The mode of transportation has an important role in the physical flow process of the product. Supply Chain Managers need to understand well the feasibility, advantages and disadvantages of each type of transportation in making product delivery / distribution decisions. In general, each mode of transportation has its advantages and disadvantages in terms of various considerations. The
following is shown in Figure 2 to see the differences in the advantages and disadvantages of each mode of transportation commonly used to ship goods:

Table 1. Advantages and Disadvantages of Each Transportation Mode [4].

| Modes of transportation | Truck | Train | Ship | Airplane |
|-------------------------|-------|-------|------|----------|
| Volume                  | Average | Very Large | Very Large | Large |
| Time Flexibility        | High | Low | Low | Low |
| Route Flexibility       | High | Very Low | Very Large | Very Large |
| Speed of Delivery       | Average | Average | Low | Very High |
| Cost                    | Average | Low | Low | High |
| Inventory (in-transit)  | Low | High | Very High | Low |

Like the table shown each modes of transportation have its advantage and disadvantage. There are some decision factor for both shipper and carrier to determine the best way to deliver their goods, for example, the use of expensive modes of transportation results in fast delivery and significant reductions in inventory.

2.4 E-commerce

According to Chaffey, define e-business as all information exchange and transactions through electronic media, both within an organization (for example ordering processing) and with external stakeholders who support various business processes. Meanwhile, what is meant by e-commerce is all transactions and exchanges of information through electronic media between organizations and external stakeholders [8]. Based on the subject, e-commerce divided into [9]:

- Business to Business (B2B) e-commerce: a form of buying and selling of products or services involving two or more companies and is carried out electronically.
- Retail (Business to Customer / B2C) e-commerce: B2C can be defined as a type of electronic commerce in which a company sells its goods directly to buyers.

Figure 2. Types of e-commerce based on the subject involve and example of the platform [11].
Customer to Business (C2B) e-commerce: is a form that is in contrast e-commerce in general, where consumers play an active role by informing the internet audience about their needs.

Customer to Customer (C2C) e-commerce: users can interact with each other and the content provided by the users themselves.

Business to Government (B2G) e-commerce: the government collaborates with businesses (private companies) in the form of provision of regulations or application media.

Government to Business (G2B) e-commerce: The intermediary for the relationship between the government and the private sector is through the website, which is done online and on mobile.

Government to Citizen (G2C) e-commerce: The general public in this case becomes the consumer and the government becomes the seller.

3. Method
This study was conducted in several industries (based in Surabaya, Gresik, Jogjakarta, and Bekasi) and Logistics Service Provider company (based in Surabaya). Data were collected by field observations and interviews to owners of industries to found out how the business process carried out, how the current logistics and shipment handled, current marketshare, supporting infrastructure owned, and their opinion about e-commerce. Meanwhile for the Logistics Service Provider company the interview will cover what is their current services, supporting infrastructure owned, how is business process of the services they offer, current marketshare, and their opinion about how the e-commerce will affect their business. The interview was required in order to capture an overview of the actual logistics process in the field, both from the industrial side and the logistics service provider. It would also be used in the analysis of how e-commerce will affect the future of the industries and Logistics Service Provider.

4. Discussion
To be able to find a real portrait of how the logistics process is carried out, a field review is being conduct on both the industry side as a service user and from the side of the logistics service provider company.

a. Overview of Industry - Fabric Business Field (UD. S)
UD. S is located in the Pengampon Square area, Surabaya. Operates in the textile sector, serving orders for various types of fabrics. Fabric is supplied by a textile industry in Jakarta. Suppliers send the latest fabric catalogs via Messenger Apps, orders are made via Messenger Apps or PO. Deliveries from Jakarta are made via expedition using trucks. Shipping costs are paid directly to the fabric supplier as the total bill paid.

Marketing is currently carried out with a sales system that makes offers to fabric stores. UD. S does not have a cloth display stand. Regarding e-commerce, UD.S does not have a plan to take part on online bussines. They reason that for fabrics, relying only on photos is considered less competitive in terms of price and quality. The average customer comes from Java, sometimes there are also orders from outside Java, for example Makassar.
Sequences process of how UD S performs packaging and delivery of orders to consumers.

For delivery to customer, the fabric is packed in plastic and then covered with 2 layers of sacks which are sewn so that it does not tear easily. The order will then delivered to the courier services that has been designated by the customer. The company has 1 truck fleet to support shipments to courier services. Shipping costs are borne by the buyer. The fee of shipping cost is a matter for the customer and the courier services, UD. S is only responsible for delivering goods to the courier services.

b. Overview of Industry - Fabric Business Field (QBB)
QBB is located in Bekasi. Operates in the textile sector, serving orders for various types of fabrics and woven products from all over Indonesia. Fabric is supplied by a textile industry in Bandung. Deliveries from Bandung are fully processed by fabric suppliers and made by trucks. Shipping costs are paid directly to the fabric supplier. Weaving products are obtained from the craftsmen all around Indonesia and usually sent via cargo services.

Marketing is currently carried out using offline (shop) and online systems (marketplace, social media, and web). Most customers come from Java, as well as several shops from Ternate and Kalimantan who regularly order fabrics. Shipping to customer usually uses courier services, while for bulk order are sent via cargo services. Shipping costs are borne by the buyer. The owner said that before the pandemic the offline store has the biggest sale, but after the pandemic most sale comes from marketplace.
c. **Overview of Industry - Convection and Screen Printing (TT)**

TT is located in Topaz, Gresik. Operates in the textile sector, Serving orders for making shirts, polo, jackets and others as well as screen printing. Production is carried out by customer order. Fabric supplier is a textile industry in Bandung. Suppliers send the latest fabric catalogs via Messenger Apps, orders are made via Messenger Apps. Deliveries from Bandung are made via courier services of choice by buyer using trucks. Shipping costs are paid directly to the courier services. Marketing is currently done offline (workshops) and online via social media.

Regarding e-commerce, TT does not have a plan to take part on marketplace. They reason that for fabrics, relying only on photos is considered less competitive in terms of price and quality.

The average customer comes from Java, there are also some orders from outside Java, for example Medan and Sintang. Orders are packed in plastic and then covered with a plastic bag with their brand logo. The order will then be delivered to the courier services that has been designated by the customer. For shipments outside Java, the average customer chooses Indonesia’s government owned couriers service because the price is cheap and can reach remote areas such as Sintang. Shipping costs are borne by the buyer.

d. **Overview of Industry - Convection and Screen Printing (VS)**

VS is located in Benjeng, Gresik. Operates in the textile sector, Serving orders for making shirts, polo, jackets and others as well as screen printing. Production is carried out by customer order. Fabric supplier is a textile industry in Kapasan, Bandung and Jogja. Orders are made via Messenger Apps or PO. Delivery of raw materials is adjusted to the urgency of the order, for urgent matters fabric will be sent via train courier, if it is not urgent they use cargo services. But, the downside of cargo services is that we can’t trace and track our shipment. Shipping costs are paid directly to the courier services.

Marketing is currently done offline (workshops) and online via social media. There are plans to explore and join marketplace of e-commerce, but they will only sell and offer a finished product, not a design and screen printing consulting service. They reason that the consulting service are very flexible and need a lot of communication, so offering services via marketplace is not a good idea. The plan to set up a marketplace store still has to be adjusted, there are many things to be considered like the additional employee who will take care of the marketplace business side, so as not to affect offline store performance.

The average customer comes from Java, sometimes there are also orders from outside Java. VS also won an order for the procurement of 6000 uniforms for the Papua region. Orders are packed in plastic and then covered with 2 layers of sacks which are sewn so that they do not tear easily.

The order will then be delivered to the courier services that has been designated by the customer. For outsides Java shipments in bulk, the average customer chooses to send by using containers LCL. Shipping costs are borne by the buyer.

e. **Overview of Industry – Sugar Factory (SF)**

SF is located in Jogjakarta. Nira suppliers are cooperatives in Kulonprogo, Cilacap and Cilongkok plantations. Delivery of raw materials to the production site uses pickups or 3-wheeled vehicles. 1kg of sugar requires 6000 liters of Nira which is carried out in 5 transportation times.

Marketing is currently carried out offline to companies that have entered into contracts, business actors, and trademark holders. They centered on serving export but also serve local shipments. For export shipments the costs are borne by the exporter, while for local shipments the costs are borne by the manufacturer. Local shipments use
private transport from the manufacturer. Local consumers are still centered in the Java area, especially Central Java and the Special Region of Jogjakarta.

e. Overview of Logistics Service Provider – 3PL (CKL)
CKL’s area of expertise is more focused on energy and manufacturing. However, CKL also provides services for other types of industries. Services offered by CKL: Transportation Management; Project Logistics; Warehousing Management; Bonded Logistics Center; Remote Site / Supply Base Services; Port Management; Cargo Shipping; Coal Barging; Loading and unloading for mining products. CKL has more than 40 network coverage throughout Indonesia.

They offered an end to end solution service, from inventory management (warehouses) to shipping services. Shipment can be conduct by Air Freight Services, Land/Road/Rail Freight Services, Ocean Freight Services. To support their businesses they have various infrastructure like truck fleets, vessel, warehouses. Currently they owned 130 truck fleets in various capacity and type. The fleets also empowered with GPS so customer can trace and tracks the update of their shipments. CKL own and operated several LCT and lease a few other type of vessel to accommodate their customer needs. Ten warehouses are being operated across Indonesia, six of them also certified as Bonded Logistics Center. As warehouse services they offer crossdocking, kitting, and distribution centre. The crossdocking is their top service, which shortening the warehouse process such as put away, refill dan picking. CKL also offering value added service like packing and repacking. These service take place for a shipment with a packaging that doesn’t meet CKL standard or when the order from the distributor comes in a pieces not as a whole package.

Their business process are as follows: receive inquiry, create operating plan, create project cost estimation, execution, reporting. For the example of cost component, here are the sea freight cost components: Freight Cost, Handling, Documentation, Trucking, LOLO, OPT/OPP, Stuffing/Unstuffing. The price for each cost component is different in each management area. The exact same service may have a different rate based on the site it carried out. For example trucking service to warehouse cost are different between these three city area as shown in table 2.

CKL priorities shipment based on urgent matters.

For now, CKL does not intend to expand its business by cooperating with e-business players. Especially looking at the areas of expertise of their customers who are mostly involved in energy and manufacture, it’s a special commodities which requires special handling. Their marketshare is customer-oriented with special care.

Table 2. CKL Rates.

| City | LCL (IDR) | 20" (IDR) | 40" (IDR) |
|------|-----------|-----------|-----------|
| SUB  | 72,000.00 | 780,000.00| 936,000.00|
| JKT  | 84,000.00 | 1,872,000.00| 2,196,000.00|
| BPP  | 96,000.00 | 3,792,000.00| 5,676,000.00|

f. Overview of Logistics Service Provider – 3PL (PLL)
PLL’s area of expertise is more focused on retail, consumer goods, and automotive, industrial. They offers custom brokerage, distribution, custom and distribution. Currently PLL Indonesia is doing a trial run for their track and trace application which already use in their China and Vietnam branch for over two years.
Different from CKL, PLL doesn’t have any assets. They rented all of their warehouses and fleets. Currently they operated eight warehouses across the country. Another differentiation with CKL, PLL open consolidation services. They offer a multi picks, multi drop, and multi customer consolidation. But the risk are higher for the LCL services, the source said that sometimes they need to process the shipment not in full container because the there aren’t any goods to process, the waiting time for the LCL service can add to one month. PLL also offer multi modal and warehouses services too. Crossdocking and value added include. The value added services conduct when there are an order from distributor which comes in a pieces not as a whole package.

Their bussines process are as follows: receive inquiry, create operating plan, create project cost estimation, execution, reporting. As in the LCL services, the goods will store at the PLL hub in container while waiting for another goods in the same destination. When the container arrive at the destination there are two choices, delivering goods based on how they place nearer the container door or the container unpack according to customer and delivered using a smaller fleet.

PLL priorities shipment based on the value of the goods, they have a list which cargo should be process first.

In line with CKL, PLL does not intend to expand its business by cooperating with e-business players. However, because PLL’s marketshare is mostly engaged in FMCG, they think the presence of digital-based companies engaged in logistics services can be considered as their competitors in the future. They have the same market share, and digital-based companies able to offer user-oriented concepts as well as digitization that from customers point of view are added value in the services provided.

5. Conclusion
Based on the explanation that has been delivered, the following conclusions are obtained:
- The key factor for shipper to determine the best way to deliver their goods are the urgency of the matters (time), value of the goods, their destination, and shipping cost. So the decision factor are volume of the goods, speed of delivery, and cost.
- Logistics Service Provider priorities their order on the urgency of the matters (time) and value of the goods. So the decision factor are volume of the goods, time flexibility, route flexibility, cost, and inventory.
- Each logistics service provider has a different operating system depending on the type of customer served and company policy.
- Digital business is something big nowadays, but not all industry players are interested in getting into it. Especially competition in a marketplace where buyers are pegged on pictures and prices, without being able to directly evaluate goods.
- For industry to get into the marketplace requires a lot of preparation, for example from the human resources side.
- For logistics service providers with FMCG customers, the presence of digital-based companies in the field of logistics services have a possibility to become their competitors in the future.

6. Suggestion
For future works/study regarding these matter, we would like to suggest more comprehensive study regarding how the digital base business logistics affect the current logistics bussines, how is the future picture of the conventional logistics business competition with digital-based logistics and IT businesses.

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