Initiation of Modernize Development in Database Application of Traditional Shipping

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Abstract: Traditional shipping which is known as *pelra* is one type that has an essential role in the logistics and distribution of items on isolated islands. The advantages of traditional shipping do not need a significant investment, such as the development of a dock—however, traditional shipping is down, not only from the amount of dock but also crew and cargo. The government had promoted traditional shipping because of the indirect impact on economic viability in isolated islands. This study aims to produce a blueprint of a traditional shipping database and implement a traditional shipping database application. This study uses a qualitative method that explains traditional shipping database applications—the government efforts such as; the policy of gasoline subsidy and the subsidy of harbor fees. The policies are not effective because of a lack of accurate data that shows traditional shipping conditions. Traditional shipping characterization still traditionally and conventionally is the cause of the absence of data. Therefore, needed information technologies in collecting and processing the data. The development of this database application can be the initiation of the traditional shipping industry modernization process.

Keywords: Application, Database, Technological information, Traditional shipping.

1. Introduction

This Traditional shipping is one of the logistic activity cantilevers in Indonesia, especially on routes impassible for conventional shipping. Indonesia has 227 harbors connected with traditional shipping. In this situation, the connectivity from that island depends on traditional shipping services. Increasing regional prosperity is more effectively carried out by connectivity [1].

This study uses traditional shipping theory effectively to service isolated islands because it needs a significant investment in infrastructure. Not only can traditional shipping reach out to the isolated island, but it also hopes to reduce the area price disparity serviced by Indonesia's major economies. Commodities price disparity in different areas, especially in isolated areas, requires cohesiveness of the cargo route network [2]. Traditional shipping business people are owners and providers. The general connectivity of traditional shipping includes entire harbors, types of cargo such as cartons, and cargo processes handled by the ship crew.

The amount of cargo transported by traditional shipping was around 16% to 24% of the total cargo transported by national ship docks from 1989 to 1997 [3]. Nevertheless, from 1999 to 2004, the

cargo volume was transported by 11% [4]. Moreover, in big traditional shipping harbors such as Kalimas, the volume of traditional shipping cargo is around 11%. In contrast, 89% of cargo is transported by locally used ships. Many factors that caused this condition such as loss of the competition of conventional ships, technology development, the risk of cargo damage, and there is no insurance guarantee. The type of shipping strived by traditional shipping is tramper (unscheduled). From the harbor side, according to the data from the Ministry of Transportation, the amount of traditional shipping experienced a drastic decrease from 50% in 1997 to 2014. The condition will influence network distribution, especially in islands that cannot be accessed by conventional ships. The government made policies and programs to support traditional shipping revitalization, for example, motor gasoline or fee subsidies [5]. However, there are hurdles to the unavailability of accurate data from traditional shipping organizations. Policy and decisions taken do not have a significant impact. Traditional shipping organizations stated the importance of data collection in real-time as the basis of decision-making and giving an opinion to the government because currently, the data used was old.

Application in traditional shipping has been studied by Arizal [6] which examines performance-enhancing focused on item service. The result of this study mentions that the shearing process of transferring information can reduce the damage caused by risk. The differences in this study focused on database application of traditional shipping while the previous study focused on items service.

Therefore, we need an application with information technology to collect and process data required in policy-making. That stuff/application has high flexibility and can develop according to requirements late on. Based on the background of issues explained, this study aims to produce the blueprint for traditional shipping

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database applications. The study's results hoped to support traditional shipping in initiating the modernization process in the traditional shipping industry and are helpful for institutions, especially in the traditional shipping industry.

2. Theoretical Review

2.1. Traditional Shipping

Article 15 Constitution of the Republic of Indonesia, number 17 of 2008, concerned shipping and mentioned that cargo activity, traditional shipping, was community efforts and part of cargo efforts in water that has an important role and own character [7]. Subsequently, that article comes down again in government regulations number 20 of 2010 about cargo in water and decree of the Minister of Communication number PM 93 of 2013 about Operation of Cargo, till the decree of the Minister of Communication, in traditional shipping to ship material not to mention the material types.

In the decree of Directorate General of Marine Transportation number PY.66/1/2-02, mentioned in Article 1, the alphabet of a stated that the primary material from woof of asekotor ton up to GT 500 and has "Sailing boats motors known as KML was sailboat with driving force up to 535 horsepower particular to transported an items and/ animal not human."

2.2. Types of Traditional Shipping Cargo

Transported cargo by traditional shipping fleet consisted of various types, starting from cement, fertilizer, and rice. The structure of the physical packaging or cargo for traditional shipping was very diverse, including in the form of sacks, and cartons, from the various types of cargo transported by traditional shipping. Izza collected data at one of the traditional shipping companies in Kalimas [8].

The ship's crew carried out the arrangement of cargo positions in traditional shipping based on their experience [9]. Based on information from the ship's crew who handled the cargo laying, there are a few things to pay attention to in cargo position adjustment in traditional shipping, such as:

1. Weight and volume, a weight cargo is placed at the basic and a light cargo placed at the top,
2. Woven bags cargo usually placed at the basic,
3. The dangerous cargo, such as lighter, LPG or fragile stuff that can easily accessible placed by ship's crew,
4. Cargo with unique shapes such as wire rollers are placed on the ship's deck.

However, the implementation of laying traditional shipping cargo was difficult. The ship's crew experiences many obstacles because of the uncertainty of cargo arrival. The cargo that comes first is transported to the ship if the cargo has come placed at the deck and placed on the stern area deck so that it did not cover ship access if there is a weight cargo that must be entered in the ship [10].

2.3. Software Development Theory

The method of software process can explain a particular point of view process and give information concerning the process. The method used to develop software by writing is the waterfall method that is a sequential development model, systemic and sequentially in building software—that making-process from analysis sequentially, design, code, examination, and maintenance. The advantages of this method were easy to understand and applied in the software development process. Pressman said that the software

s instruction (if instruction executed will give a function), the data structure enabled the manipulation of a program, and a document that explained the program used [11].

2.4. The Technology Information of Water Transportation

The aim of implementing technology information was to increase the ship's service system and better items, so that easy for water transportation service users obtained a fast service, transparent, and measurable [12]. According to law number 11 of 2008 about information and electronics transactions, technology information has an essential role in trade and national economic growth to create social welfare.

According to Whitten, technology information explained the combination of computer information technology (software and hardware) with telecommunications technology such as figures, networks, and data [13]. In comparison, according to Sawyer, information technology was generally described as a technology to manipulate, generate, save, and spread information [14].

3. Research Method

This study used a qualitative method, which explains an achieved procedure in application development. Then, this study used a discussion approach with part of traditional shipping and other stakeholders, such as BP Migas, Pertamina, the Ministry of Transportation, and PT Pelindo III. The discussion focused on the investigation as the blueprint of application development. The research was around six months and began in September 2021 in Surabaya Kalimas port. The data analysis technique was to search and arrange the data systematically from note yields, discussion, documentation, and interview with explaining and organizing the data, arrange and choose which ones were important and will be studied, and then make conclusions so that others easily understood them.

The standard method in this study was an investigation of user needs with a discussion method and field observations. The discussion gave a figure about the data need and information as the base of decree/policy and an operational tool. The field observations gave information about the user's background. Then this tool can be used by the user. The results from this step were blueprint development applications.

a. Making architecture design in the form of organization architecture and functional are identification of actor, role, and fulfilment of user requirements, then technology architecture and communication to identify and investigate a technology.

b. The development of application under the architectural design that has been made. Applications were built using a web-base, then can be accessed from all device types. The programming languages planned to use HTML, PHP, and SQL as databases. This system will work in the network (online) to facilitate the exchange of data and information. The trials were done to make sure the application runs appropriately.

c. The application was installed on an online server to be tested to find loopholes or bugs so that mitigation can be done to minimize errors during real-time implementation.

d. Socialization and assistance to users so they can fill in their data. At this stage, it was discussed about future application development as the process of modernizing

traditional shipping.

4. Results and Analysis

4.1. Traditional Shipping Database Application

User Interface (UI) design was the process used for design to make an appearance in software or computerized devices, focused on style. The UI designer aimed to make a design an easy interface for users.
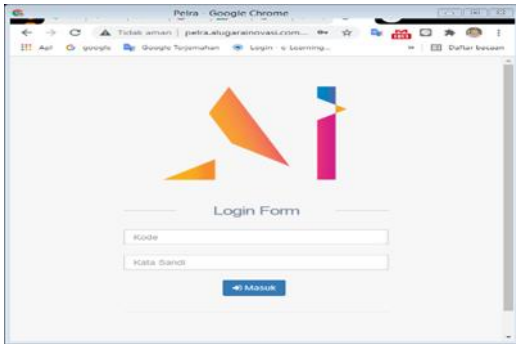
4.1.1. Login Menu Display

Fig. 1. The initial menu displays

The login menu initial was used to identify the application user. This application contained 4 (four) Main Menus, including Dashboard, the Data Master, Transactions, and Settings.

4.1.2. The Data Master Menu Display

This menu contained the data used as a reference to process data management in a system or application. Then, make it easier for users to use the data directly. There were nine submenus as follows:

1. Province

In the initer menu, people can find the province's name and the code. Data in this sub-menu cannot be added and cannot be edited.

2. Regency/City

Contained data in the form of the name of City, Province, and code, which later this data will be used in the owner (ship) sub-menu. It was possible to add the data Regencies/Cities that have not been listed by inputting the data as in the form. In the province, the column can be chosen according to the existing provincial master data.

3. Harbor

This data master was used on menu transactions>>journey to determine the port of origin and port of destination. The data contained in this sub-menu is the name of the port and province.

4. DPD

The data was inputted on The Regional Representative Council sub-menu in the form of DPD, address, telephone, email, and administrator data. Detail of the administrator data containing name, telephone/HP, and position can be added with a click "+". The master of DPD was used to input the DPC sub-menu.

5. DPC

The column detail inputted concerned the Branch Executive Board contained related DPD, DPC name, address, telephone, and email. DPC administrators can be added by inputting name, telephone, and position data.

6. Owner

This sub-menu contained the data related to the ship's owner that

was later used to input the data in the ship data sub-menu. Then, it can be filtered on the name of the ship owner. The input column detail involved the name of the company, Regency/City, DPC, owner name, owner address, administrator name, administrators, and email.

7. Crew

This sub-menu was about the ship's crew's data that will be inputted on the transaction menu>>journey. Then, the ship's crew can input only crew members registered in the master data. The data that needed to be inputted is crew name, position, address, telephone, KTP number, and BPJS number.

8. Ship

The ship data master contained information about the ships that can be used for various things, such as safety and security. This data was used to input on menu transactions>>journey only registered ships that can be chosen. The ship data inputted included the ship's name, registration number, year, owner, GT, length, weight, draft, fast, engine type, number of engines, engine power, engine brand, total main engine power, and auxiliary engine power.

9. The cargo types

The master of cargo types was used on menu transactions>>journey, so the group of the data-related cargo type was only according to the one in this master data. Details of the form fields in this sub-menu include the cargo code and the type of cargo.

4.1.3. Transaction Menu Displays

This menu was used to make the ship journey data and view the data related to the ship cargo. There were two sub-menus as follows:

a. Journey

The sub-menu used to register the ship journey contains adverbs of time, ship data, cargo, and crew. The inputted data needed was ship name, operator name, and departure schedule. Furthermore, related to the ship's journey, there was a data input column that had to fill in the cargo type transported, port of origin, port of destination, amount of cargo, unit, and owner stuff. In ship activity, this journey needed a crew to add the data related to the crew involved, fill in the crew tab, click "+" then choose the involved crew.
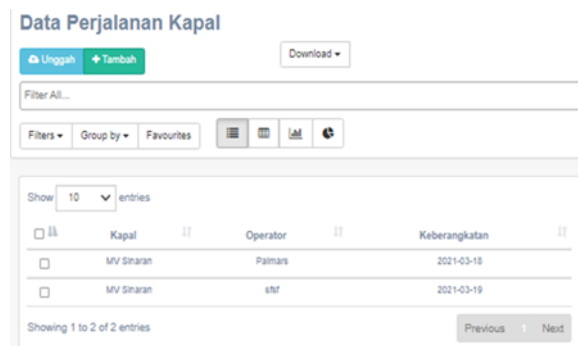

Fig. 2. The form of journey sub menu

b. Cargo

The sub-menu showed the details of the cargo list brought by the ship so that it was easy for data processing. The sub-menu included the name of the ship's transportation, type of cargo, port of origin, port of destination, amount of cargo, unit, and owner of goods.

Fig. 3. Displays of cargo sub menu

4.2. The Feature of Business Intelligent

The specific functions of the application or software as follows:

1. Filter data

The filter data was used to search or show the data based on a specific search variable. The steps as follows:

    a. Start menu and search,

    b. Click filter; a search option will appear below it,

    c. Select the search variable.

    d. Select the search operator to use, for example, *mengandung,*

    e. Fill in the word to be searched,

    f. Then click [Q]

2. Grouping data

Grouping data was used to show the data based on specific groups/columns. The step as follows:

    a. Start menu and search,

    b. Click Group by; a search option will appear below it,

    c. Select the search operator, for example, status

    d. Then click [Q Cari]

3. Pivoting data

Pivoting data was used to present pivoting data by grouping data based on specific columns and displaying values for these grouping data. The steps were as follows:

    a. Open the menu to be pivoted,
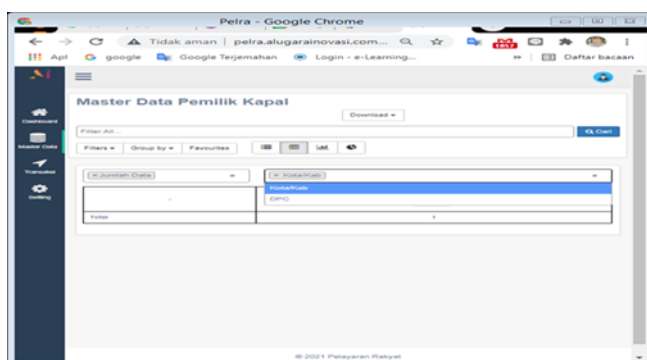
    b. Click a Pivot, [≡] [⊞]

Fig. 4. Displays of data pivoting defaults

    c. Select the pivot row for the data grouping,

    d. Then select Measurement to display the desired value,
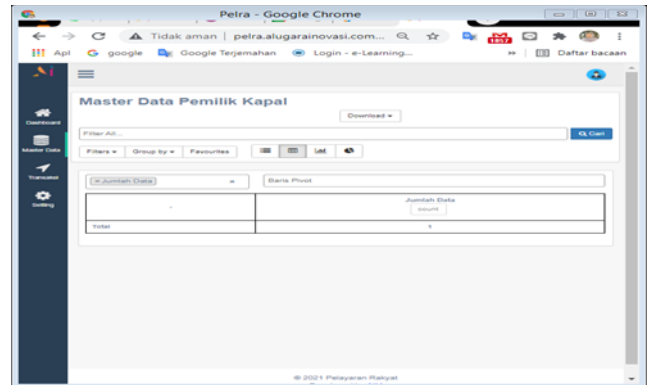

Fig. 5. Location based on pivoting

    e. The values shown by pivot were the value of the sum. If needed, the average can be done by clicking the sum button in the desired column,

    f. The pivot was completed with facility save to excel, allowing the user to perform further data processing.
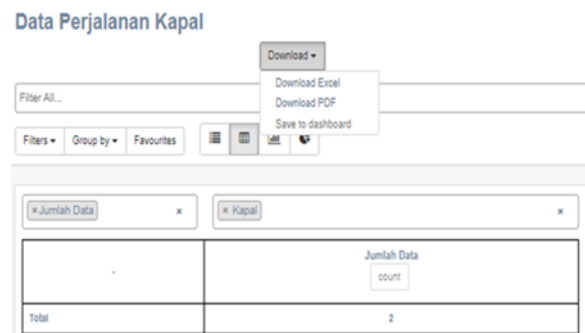

Fig. 6. The step to download pivoting

5. Discussions

5.1. Information System Characteristics of Traditional Shipping Efforts in Indonesia

Traditional shipping efforts used by business people include the owner of goods that is an actor needs traditional shipping of cargo in the delivery of goods. It means the owner of goods was divided into two; consignee and shipper. A freight forwarder was an agency that aimed to provide services or management of all activities to carry out the delivery, receipt, and transportation of goods by sea, air, or land [15].

The providers of traditional shipping cargo service (ship company) were a party that gave the transportation to the owner of goods. In this case, service providers are divided into some parts: ship owners, ship agents/EMKL, and Stevedoring companies known as PBM. There are three conditions in a traditional shipping company as ships owner, ships agent/EMKL, and PBM; The traditional shipping company is the company that acts as the ship's agent (the shipping company does not own the ownership); and the traditional shipping companies as ship owners, PBM, and ship agents/EMKL (agents of own ships and ships of other parties).

The ship fleet route of traditional shipping is not fixed and is unscheduled operationally. Generally, the traditional shipping network involves all docks, especially in eastern Indonesia. There are 75% of 484 total docks in Indonesia serviced by traditional shipping, where 47% of docks were serviced by traditional shipping, and 28% of the port is a wedge between traditional

shipping, container ship, and the ferry ship [16]. Traditional shipping networks are not fixed to make the pattern of traditional shipping networks very dynamic. The traditional shipping, container, and ferry ship is a company where the company will coordinate the course of the ship until the delivery of goods reaches the destination.

The organization has access rights to view all of the company's data and vice versa. The other users are outside users who only receive data that has been processed through the management. The data needed two types: master data and transaction data. The master data was data that did not change in a short period/almost fixed. At the same time, the transaction data was data that changed whenever there were events that changed the data. The master data contain province data, dock, DPD, DPC, company, ship, and crew. At the same time, data transactions were ship voyage data that followed ship journey transactions. The application has to facilitate management to monitoring and evaluation, and consideration in making decisions. The application runs on a network using web-based technology, which can be accessed anywhere and anytime using any device. Factors of flexibility and compatibility become a consideration for the selection of technology.

This study identified some of the findings, including the condition of traditional shipping, which has not been touched by technological advances, because of the need for contribution and attention from the institution in the basic form. In comparison, traditional shipping significantly impacts logistics, economy, and society in isolated islands. One of the roles was that a modernized concept of traditional shipping activity could support the activity of traditional shipping operations, then increase competitiveness in the shipping industry physically or through policy.

6. Conclusion

The application blueprint began with users' identification, then that user knew the data needed. This stakeholder's application was users that grouped into organizational users and company users. Each agency has two types of users: the administrator type with access rights to create, read, modify, and delete data (CRUD – create, read, update, delete), and the management type with access rights to view and download that has been processed.

Implementation is carried out due to the nature of the shipping industry, particularly in traditional shipping, which is still conventionally and not open. It is because almost all traditional shipping companies are family companies. The first trial was carried out in the organization with pretty good results and no obstacles, then already available the information needed. The second trial was carried out with the target of business actors (companies). However, due to the constraints of pandemic conditions still, it cannot be implemented.

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Author contributions

Sereati Hasugian: Conceptualization, Methodology, Software, Field study **M. Imam Firdaus:** Data curation, Writing-Original draft preparation, Software, Validation., Field study **Anak Agung Istri Sri Wahyuni** and **Dian Wahdiana:** Visualization, Investigation, Writing-Reviewing and Editing.

Conflicts of interest

The authors declare no conflicts of interest.

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