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Product Innovation Design of Freight Shipping Website Application on Maritime Transportation Using The Design Thinking Method

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ABSTRACT

Indonesia is a maritime country, and most logistics activities are by sea. Digitization is needed as a form of differentiation and competitive advantage in logistics services. The current condition of shipping through maritime transportation has several problems such as uncertainty of ship departure and arrival schedules, inability to monitor shipments, too long broker chains, unable to provide integrated multimodal transportation shipments between islands in Indonesia, and lack of public knowledge about available ship routes and schedules and selection of the most appropriate type of ship. An innovation is needed in this case that can become a platform to facilitate and visualize the delivery of goods using digital maritime transportation based on web applications. This research uses the three stages of the design thinking model proposed by IDEO: inspiration, ideation, and implementation. In developing a system, a prototype is needed, or it can be called a minimum viable product. At the implementation stage, there is a usability testing process that uses a feedback capture matrix and a system usability scale. The results of the research are in the form of a product with the hope of pioneering the use of comprehensive digitization and making it easier for customers to ship goods via maritime transportation.

KEYWORDS: Freight Forwarding, Maritime Transportation, Product Innovation, Web Application, Design Thinking

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1. INTRODUCTION

According to (Chow et al., 2008) Supply Chain Management is a holistic and strategic approach in terms of demand management, operations, purchasing, and logistics processes. Indonesia as the largest maritime and archipelagic country, carries out the majority of its shipping activities by sea. On the other hand, the expectations of shippers, in this case the customers of liner or shipping companies and forwards, are increasingly complex due to increased global competition and advanced consumer demands (Marino et al., 2018). Container shipping is a non-technological industry that plays an important role on economic globalization and supply chain realization, thanks to reliable and efficient transport services at lower costs (Bernhofen et al., 2016). Service digitization is considered a vital source of differentiation and competitive advantage in logistics services (Gunasekaran et al., 2017).

PT Linus Trans Indonesia is a company engaged in total and integrated freight forwarding. PT Linus Trans Indonesia is engaged in first-mile and mid-mile services in logistics. The service products of Linustrans are shipping via sea, land, air freight, project scale shipping, loading and unloading equipment rental, and warehousing rental and management. The current condition of shipping via maritime transportation has several problems such as uncertainty of ship departure and arrival schedules, inability to monitor shipments, too long broker chains, unable to provide integrated multimodal transportation shipments between islands in Indonesia, and lack of public knowledge about available ship routes and schedules and selection of the most appropriate type or type of ship. Based on this, an innovation is needed which is the purpose of this research, namely, to be able to design a system that becomes a platform to facilitate and visualize the delivery of goods using maritime transportation. This research uses the design thinking method proposed by IDEP, namely inspiration, ideation and implementation. The final result is a prototype which can be called a minimum viable product (MVP). Design thinking is used because it is a procedure that can be used to develop better results from products, services, or strategies. It serves as an analysis process for ambiguous problems (Mahmoud-Jouini et al., 2016). One of the characteristics of design thinking is to pay attention to user needs. Therefore, design thinking has been described as a human-centered method that combines observation and understanding of user needs (Brown, 2009).

2. LITERATURE REVIEW

Maritime Transportation

Maritime transportation has a significant role in global supply chains as it can transport large loads efficiently. Several studies and experts have highlighted several aspects and benefits of maritime transportation in logistics, including cost efficiency according to research by, (Song & Panayides, 2015), maritime transportation is generally considered a more cost-efficient mode of transportation for shipments of large quantities and long distances. Economies of scale, according to (Notteboom, 2006), maritime

transportation takes advantage of economies of scale as large ships can transport significant cargo. Global network, according to (Haralambides et al., 2011), maritime transportation plays a key role in connecting ports around the world.

Design Thinking

According to (Kelley & Brown, 2018) the design thinking approach is a human-centered approach to innovation that is taken to integrate the needs of people as users, technological possibilities, and requirements for business success. The design thinking approach combines three elements, namely business (viability), people (desirability) and technology (feasibility) as a consideration in creating ideas. Initially, the design thinking method was popularized by IDEO founders David Kelley and Tim Brown in 2008. The purpose of creating design thinking by David Kelley and Tim Brown is to solve problems by focusing on user needs. The design thinking process proposed by Tim Brown through IDEO puts forward human centered design (HCD).

Web Application

Basically, a web application is a collection of web pages that are interlinked and interact with each other to provide a more dynamic experience. Users can interact with interactive elements within the web application, such as filling out forms, submitting data, performing searches, communicating with other users, and many more. According to research from O'Brien, Web Service is a software component based on web frameworks and object-oriented standards and technologies for web usage that electronically connects different user applications and different platforms. Web services can connect business functions for real-time data exchange in web-based applications (O'Brien & Marakas, 2010).

System Usabilility Scale

One of the tools that is often used in assessing the usability of a system is to use the System Usability Scale (SUS). The SUS method was developed by John Brooke in 1986 in response to the lack of cost-effective or practical solutions for analyzing usability. (Brooke, 1996) The purpose of SUS is to provide a measurement of users' subjective perceptions of system usability and help evaluators to conduct research briefly during evaluation sessions (Brooke, 2013)).

3. METHODS

This research uses a qualitative research design to produce descriptive data in the form of words or spoken from journals, users, and observable behavior. In qualitative research, the data collected comes from interviews and direct observation. This research uses a design thinking method based on IDEO, namely: inspiration, ideation, and implementation. With the research subject is the internal management of Linustrans and external users who have used Linustrans services and general users who have not used Linustrans services. External user sources are divided based on the Pareto principle, namely The 80-20 rule, The Law of The Vital Few or The Principle of Factory Sparsity. The Pareto principle states that of many events, about 80% of the effect is caused by 20% of

the cause (Koch, 1998)). A detailed explanation of what was done in each stage of design thinking is as follows: Inspiration stage. Inspiration with inputs based on observations and interviews from internal and external users produces initial ideas, which can be explained through business model canvas, segmentation targeting and company positioning, user persona, empathy map, user journey and point of view analysis. Ideation stage. Based on the output of the inspiration stage, it is used as input from the ideation stage which produces the output of the ideas used, information architecture and prototype. Implementation stage. The implementation stage is carried out, namely conducting user testing using interview to users based on the feedback capture matrix and then collecting data based on the system usability scale method. The results of the feedback obtained from the implementation process are iterated to the prototyping process to produce maximum results or called the most viable product.

4. RESULTS

Inspiration

At this stage, an initial analysis of Linustrans internal aspects is carried out, this is obtained from interviews and internal data owned by the company. To get problems or inspiration about this research, various methods are carried out, namely the business model canvas, segmentation targeting and positioning of the company, and interviews with stakeholders in the company.

Based on the segmentation of Linustrans are companies and individuals domiciled in Java Island with a delivery area coverage of 70% in eastern Indonesia. Companies with manufacturing, construction, heavy equipment, energy and logistics and individuals. The majority of 60% of Linustrans' new customers make transactions through the website, and customers need safe and transparent delivery services in terms of cost, cargo location and delivery time. In Linustrans' position compared to existing competitors, Linustrans can provide multimodal transportation services, engage in first mile and mid mile logistics and specialize in eastern Indonesia.

Based on the results of the interview, concluded that the current condition at Linustrans is that there is already a website that functions as a showcase of the portfolio and services provided, and must contact customer service to place orders, including schedules, prices and updates on the delivery process. So that an innovation opportunity arises, namely an online booking platform that can simplify and visualize the delivery process, a platform that provides transparency regarding the type of delivery, price, schedule, and ship route with a live track system that applies in real time.

The next process is an interview with external users. The number of respondents in this study amounted to 5 people who were adjusted based on the segmentation of respondents and the distribution of percentages based on the Pareto principle, namely 4 non-users of Linustrans and 1 Linustrans user. The number of users was determined based on the opinion of (Knapp, 2016) who states that 85% of problems are observed after five interviews. More than that, the answer pattern tends to repeat.

Furthermore, it can be known that the user persona in this study aims to describe a fictitious character of each potential customer as a basis or description for designing a website for shipping goods via maritime transportation. This study is divided into two categories of user personas, namely for customers and non-customers. After the process of doing user personas, the next findings the empathy map which aims to further explore the needs and desires of customers. Next is the user journey map stage, which aims to compile a customer scenario when choosing a product.

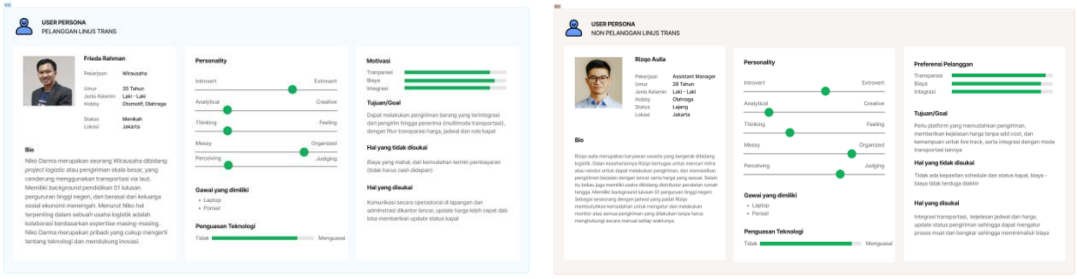

FIGURE 1. User Persona (a) Non-Linustrans Customers; (b) Linustrans Customers

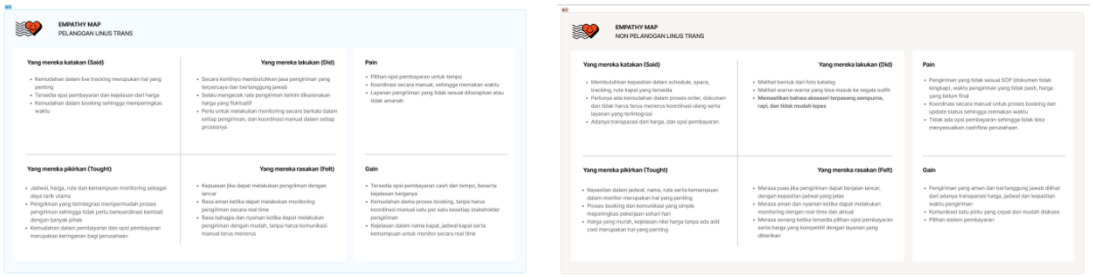

FIGURE 2. Emphaty Map (a) Non-Linustrans Customers; (b) Linustrans Customers

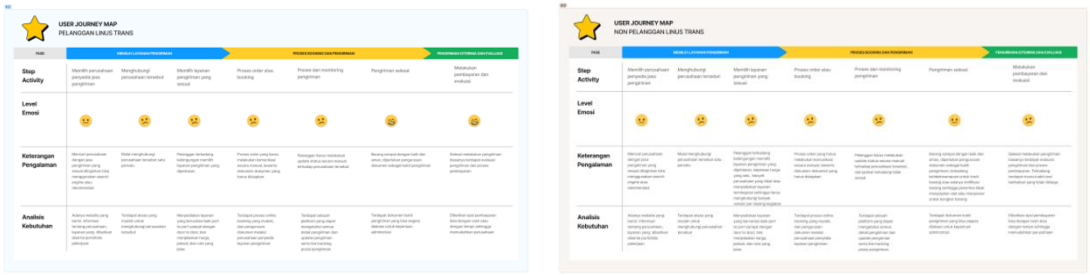

FIGURE 3. User Journey Map (a) Non-Linustrans Customers; (b) Linustrans Customers

The process of determining the problem is done by defining the problem based on the Point of View (PoV) Analysis obtained from the empathy map synthesis of each category. Based on the PoV Analysis that has been carried out from three categories, the results obtained are needs and insights, the need for a website that contains information about the company and services, requires easy access to contact, provides a variety of services with price, schedule, route and time transparency, online booking, and document processing, knowing travel details and live tracking, there is a proof of delivery document that is immediately accessible and cash or payment options with tempo. This PoV Analysis was then converted into a problem statement as outlined in the PoV and How Might We (HMW) Question, which then concluded the HMW Question from the three categories to be processed at the next stage, namely as follows.

1. How can users get access to the company and the services provided?
2. How can users do the booking process easily, quickly, and flexibly?
3. How can users find out details about the type of delivery, price, schedule, time, and delivery route transparently?
4. How can users monitor the delivery in real-time and be notified of every update of the process?
5. How can users be facilitated in paperwork and administration in every shipment?
6. How can users have the option to pay for their shipments?

Ideation

The next stage is ideation, which is a process for creating various design alternatives aimed at exploring a wide solution space and diverse ideas. From the results of the brainstorming, there are several recommendations for innovations that can be implemented in the Linus Trans website application innovation, this is translated into content requirements and functional specifications along with their function specifications based on table 1.

TABLE 1. Content Requirement and Functional Specification

Content Requirement	Functional Specification
• Digital platform that is easy to access	Users can find out information about the company, type of service, availability of routes and ship schedules, along with prices easily as needed
• Information about the company	
• Information on the types of services that can be provided	
• Ship availability information based on routes and schedules	
• Ship availability information based on routes and schedules	
• Price information based on service type	
• Transaction process for booking goods delivery	Users can make transactions or orders easily and flexibly, along with cash or tempo payment options based on needs
• Ease in the shipping booking process	
• Choice of payment options for cash and due date	
• There are several payment options such as QRIS, Fintech and Bank	
• Dashboard for users containing details of shipments made	Users get a dashboard containing shipment details, from Ship data, Trucking data, shipping documents
• The dashboard explains the details of the ship and also the details of the truck used (SIM, STNK, KIR)	
• Dashboard that contains details of the • required documents (invoice, road letter, handover minutes)	

Content Requirement	Functional Specification
• Dashboard for tracking shipments made (land and sea transportation modes) both in writing and visually	Users can get certainty of arrival time with real time tracking coupled with the delivery number to be traced through the dashboard and notification to the sender's email and contact person, as well as proof of delivery.
• There is a receipt number or delivery number that can be traced	
• Notifications that are connected to the • email and contact person of the user for every delivery update	
• There is evidence that the delivery has been completed and carried out	

Furthermore, after generating ideas and initial product designs, the next step is to realize them in the form of prototypes, with the concept of user flow or information architecture as shown in Figures 5 and 6.

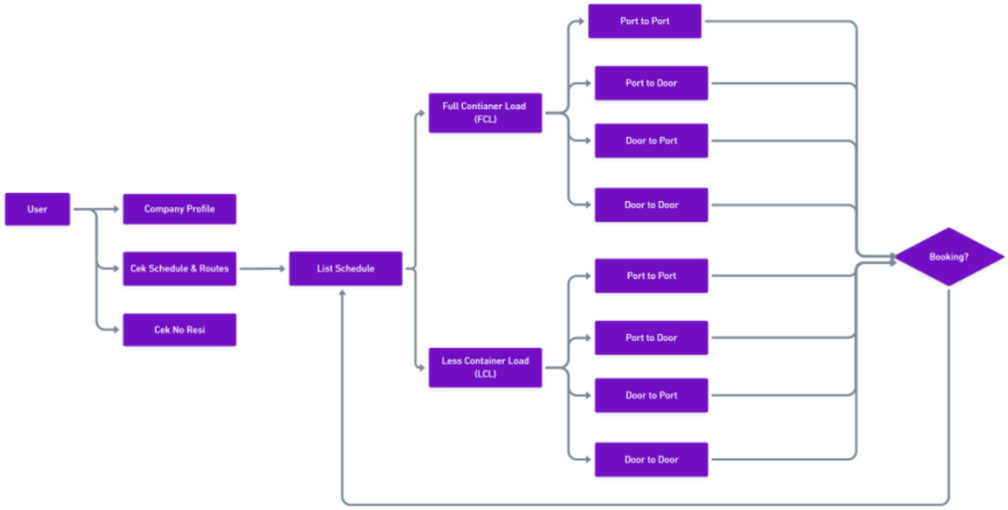

FIGURE 4. User Flow Website Application Linustrans (1)

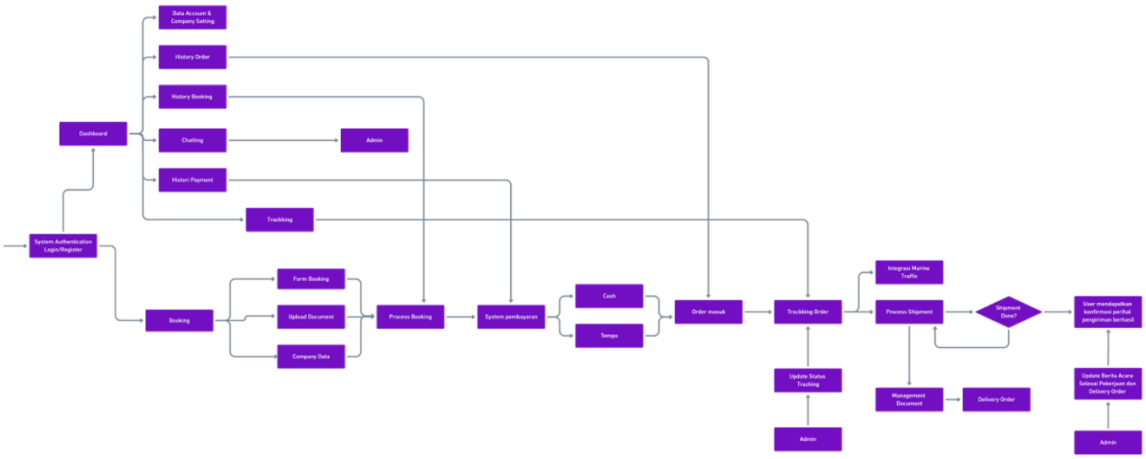

FIGURE 5. User Flow Website Application Linustrans (2)

After the user information flow is compiled, the next step is to start designing and making digital prototyping of the product called "Seaping". The brand selection "Seaping" means sea and ping means to give a sign or location. With the same pronunciation as when mentioning the word shipping which means shipping, but using the word sea which means sea so that it explains that this platform delivers goods via sea transportation. Descriptively "Seaping" is a digital platform for shipping using integrated sea transportation so that it can provide end to end service with coverage area throughout Indonesia. By considering using the Seaping digital platform, it is hoped that it can simplify and accelerate the commercialization process and make it easier for users to use it in their daily lives.

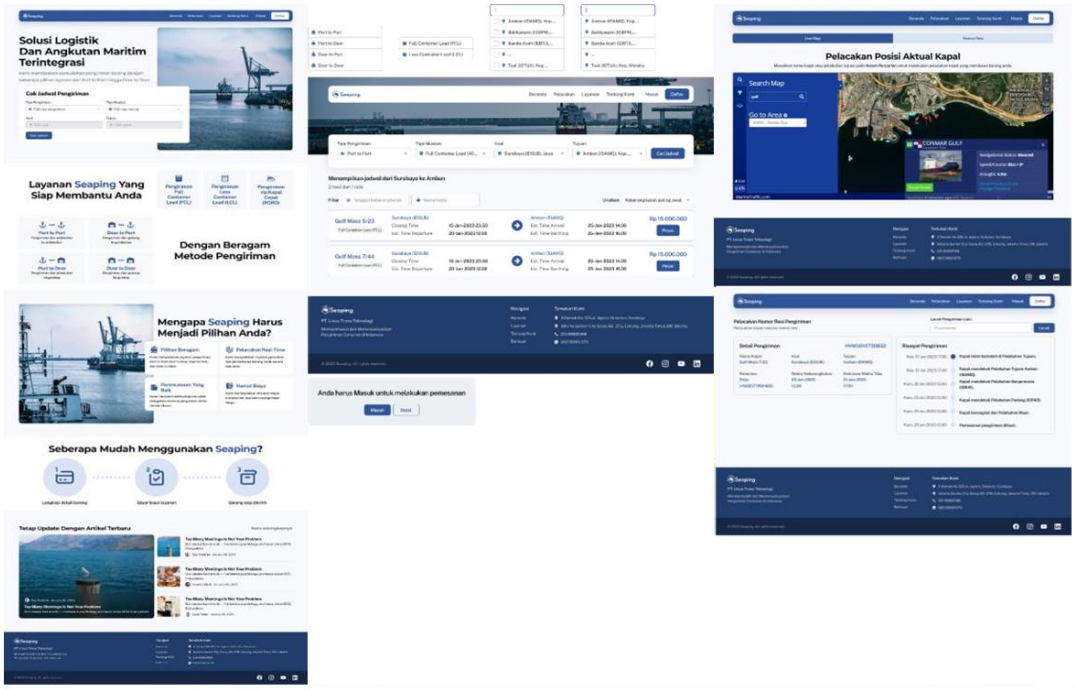

FIGURE 6. Company Profile View, Services, List Of Schedule And Tracking Menu Web Seaping

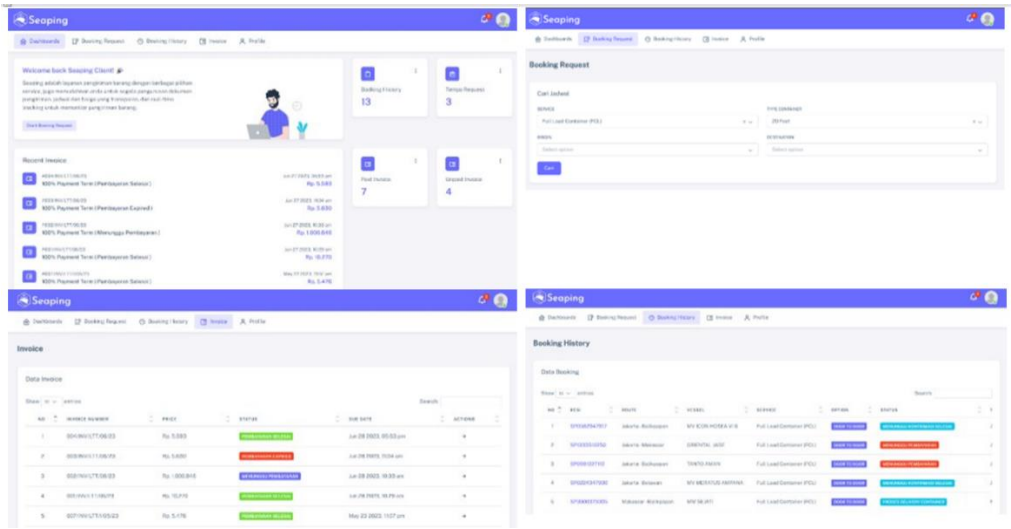

FIGURE 7. Customer's Dashboard Menu View in Seaping

Seaping being able to serve various types of shipments according to customer needs, namely port to port, port to door, door to port and door to door. In terms of shipping capacity, Seaping provides full container load and less container load services, for full container load itself Seaping provides services for 20ft containers and 40ft containers. In addition, other supporting features are a dashboard for customers to be able to carry out all their shipping activities and the documents needed, the admin dashboard is used by internal companies to manage existing shipments, online booking features that provide clarity regarding prices, ship names, ship schedules and ship routes, actual live tracking features for shipments via land and sea transportation, payment features in cash or tempo.. Seaping is expected to become a website platform that povides end-to-end services.

Implementation

The final stage of the design thinking method is testing the prototype products that have been made previously to potential users so that appropriate input and solutions are known. The testing process was conducted online, according to the time availability of the users involved in this process. The testing process was carried out on the same five users who were asked for information at the beginning. Testing is done by interviewing respondents using a feedback capture matrix to be able to see the things contained in the queries in the feedback capture matrix. Furthermore, data collection is based on the system usability scale (SUS). Based on the results obtained from the feedback capture matrix users like an easy and simple user interface, besides that, it is added with real-time tracking features from trucks and ships to make it easier to plan shipments. In terms of documents, there is also not much paperwork, and it is also easier to find out the price of shipping containers throughout Indonesia. Although there are some minor problems that must be resolved such as detailed units of measurement that are still not available for several aspects so that it can facilitate users who are unfamiliar with this industry, summarize the filling formula, there is no user guide and there is a need for price differences between cash and tempo. Furthermore, feedback was also obtained for future product development ideas, such as using search enginge optimization so that it can be known by the public, a reward point system, and other service improvements such as insurance, shipping via airplane, train, and warehousing.

Next, users will be asked to fill out a questionnaire form to provide an assessment using the System Usability Scale instrument. SUS is a questionnaire consisting of 10 questions where 5 questions are positive sentences and 5 negative sentences with a 5-point Likert scale that asks users to choose a value of strongly disagree (1) to strongly agree (5). The scores from each question point are summed up to get the SUS score. The score contribution of each statement point will range from 0 to 4. For points number 1, 3, 5, 7, 9, the score is the Likert scale position minus 1, and for points number 2, 4, 6, 8, 19, the score is 5 minus the Likert scale position. Then the total of all question points is multiplied by 2.5 to get the overall SUS score. The SUS value has a value range of 0 to 100.

TABLE 2. Overall and Subscale Scores Of SUS

No	Statement	Grade Conversion		Grade (Scale 0 to 4)
1	I think I will use this feature often	4,2	-1	3,2
2	I feel this feature is too complicated even though it can be made simpler	5-	1,6	3,4
3	I think this feature is easy to use	4,4	-1	3,4
4	I think I need help from a technical person to be able to use this feature	5-	1,6	3,4
5	I found that there are a variety of features that are well integrated in the system	4,4	-1	3,4
6	I think there are many inconsistent things in this feature	5-	1,8	3,2
7	I think the majority of users will be able to learn this feature quickly	4,4	-1	3,4
8	I found this feature to be very cumbersome to use	5-	1,4	3,6
9	I am very confident that I can use this feature	4,6	-1	3,6
10	I have to learn a lot of things first before I can use this feature	5-	2,6	2,4

Overall, it gets a score of 82.5 which indicates user satisfaction in using this website with a grade B or excellent assessment. In addition, when viewed from the usability side, it has a higher value of 85 with a grade B or excellent assessment, while for learnability it has a value of 72.5 with a grade C or good. In general, these values are above average and are functionally feasible for launching to the public.

5. CONCLUSIONS

This research produces an innovative web-based application for shipping using maritime transportation. Based on the results of the analysis and discussion that has been carried out, the following conclusions are obtained:

1. Based on external user preferences both as customers and non-customers of Linus Trans requires the development of shipping goods via maritime transportation, with consideration of three aspects namely transparency, integration, and payment methods.
2. The collaboration of the design thinking method combined with the business model canvas can produce products that are in accordance with customer needs and company conditions so that they can generate the most viable product.
3. Based on the results of both qualitative and quantitative testing using the system usability scale, the website application service for shipping goods on maritime transportation called Seaping gets a good response and is said to be suitable for commercialization.

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