

**Digitalization and logistics service quality: Evidence from Indonesia national shipping companies**

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The research aimed to know the impact of electronic delivery orders and logistics digitalization on the import document activities mediated by logistics service quality in the national shipping lines, especially the members of Regional Container Lines. Several logistics companies in Indonesia have now begun to utilize digital technology supported by the national logistics ecosystem platform to advance logistics activities, to assist logistics processes in all sectors, including the industrial sector. Shipping, especially by sea shipping. One of the research problems, among others, is that the TSJ/T3 terminal still uses manual delivery orders. The research used the path analysis method and Sobel test with a random sample of 102 PT Bhum Mulia Prima customers. The result of the study showed that electronic delivery orders and logistics digitalization partially contribute to the import document activities through logistics service quality. Furthermore, logistics service quality as the intervening variable strengthened the contribution of an electronic delivery order to the import document activities. Testing is also needed by comparing digital systems between the shipping companies that still do not use manual documents and those that have used online processes in import activities.

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**1. Introduction**

In the modern industrial revolution 4.0, technology has transformed to digitalization, especially in the logistics industry (Setiawati et al., 2022). Nowadays, some logistics companies in Indonesia have started to utilize digital technology in implementing their logistics activities to help the logistics process in all sectors, including the shipping sector, through sea delivery. The Indonesian shipping industry also follows the advancement of technology. As a result, the government policy in implementing manual Delivery orders has changed. It has started to implement Electric Delivery Orders (E-DO) in the form of digital innovation to facilitate the process of goods handling in the port and to make efficient time for logistics activities. The process of document proposal using E-DO is carried out online, with the benefits of especially time efficiency and cost efficiency, reducing counter queues, avoiding traffic jams, and ensuring transaction security. One of the shipping agents that has implemented the E-DO program until now is Regional Container Lines (RCL). The implementation of E-DO by RCL has been standardized and fully authorized by its principal to process the data. To retrieve E-DO, people must fulfill the requirements and rules prevailing in the shipment and in the process of import services in RCL, and the D.O. documents must be taken directly from the RCL office.

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Regional Container Lines in the port of Tanjung Priok now use four terminals: Mustika Alam Lestari Terminal, KOJA Terminal, JICT (UTC1), and TSJ/Ter3. Three of the four terminals in the Tanjung Priok port have implemented the delivery using E-DO directly to the port terminal. In contrast, TSJ/T3 terminal still needs to implement the E-DO delivery process. The delivery of E-DO to the TSJ/T3 terminal still uses manual D/O because TSJ/T3 terminal has not fully supported the E-DO program. Behind the poor implementation of E-DO, there still have been problems, such as the inhibited smoothness of the delivery process. There is also a problem of uncertain ship schedules, so they must make repeat schedules with the management of the terminal port of Tanjung Priok using a digital system (Barata et al., 2022).

The implementation of E-DO in logistics business in nationwide shipping is intended to facilitate the logistics activities, especially in the shipping companies, to be effective and efficient (Ricardianto et al., 2023). It is also intended for time efficiency so that time can be minimized, but the problem is that the service time at the port and the counter is different. Service time in the port is 24 hours a day, whereas the service time in the office of shipping companies cannot be 24 hours every day, having no standard procedure to access directly and freely without time restriction. The implementation of E-DO also aims to facilitate the performance of import document activities in the logistics services, especially in shipping companies, to be more effective and efficient. However, with the digital innovation of E-DO to facilitate the process of goods handling in the port, the E-DO program via system still must be improved.

Based on those problems, the researchers identify the problems; (1) Limited time at the shipping line office having impacts on time efficiency; (2) Incomplete documents as required for import needs; (3) Uncertain ship schedule having impacts on import activities; (4) Limited understanding of the human resources about logistics digitalization in the implementation of E-DO; (5) Digital technology experiencing down the system, errors in connection that inhibits import activities. This research aims to know both the direct and indirect impacts of electronic delivery orders on import document activities with the mediation of electronic service quality.

Using digital technology in the logistics business can solve many problems, and the technology industry can efficiently replace some obsolete business models (Helmke, 2022). Based on the studies by Sudrajat et al. (2020) and Moldabekova et al. (2021), government agencies or companies developed several information systems related to logistics digitalization. The studies by Ahmed and Rios (2022) and Iman et al. (2022) concern some case studies of logistics digitalization. These studies mention the new empirical evidence of the potential implication of digitalization for the whole shipping industry. Other research concerning some variables studied logistics digitalization, among others, by Del Giudice et al. (2022). This study discusses the main topic in the literature about digitalization and new technology in the ship and port industry. It analyzes the key variables that will take part in achieving Sustainable Development Goals (SDGs). Another finding by Jović et al. (2022) explains that with the impacts of digitalization, there are changes in the business model, such as organizations in the maritime sector with the additional revenue from new sources, channels, and sales services. The finding by Plomaritou and Jeropoulos, (2022), explains that although digital technology offers many advantages in the charter business of maritime transportation, many legal obstacles still exist.

The results of research by Sultra et al. (2020) show that the implementation of electronic delivery orders (Online D.O.) contributes positively to the service users in accelerating the flow of documents and import goods to the port and that it also faces some obstacles in the shipping companies. Based on the study by Bae and Lee (2016), delivery order (D/O) in the cargo delivery process plays an essential role in international container transportation. Another research by Prastyorini and Syaputra (2020) mentions that container import activities are affected by the electronic delivery order (E-DO) and the e-container equipment interchange receipt. In line with the growth of trade volume and the recent tighter regulation, Digital Transformation is very important for container lines to follow the new trend in the container shipping industry (Yuen et al., 2022). As a result of another research, Tavares and Castañeda-Ayarza (2022) show that international trade has become shorter, more centralized, and more transparent with the simplified import process. Research by Pangaribuan et al. (2021) finds several things related to Delivery Orders, namely online D.O. systems with good quality, not many companies switch to electronic delivery orders, and the announcement of Delivery Orders by the port operator has positive impacts. Aprilia et al. (2022) state that there needs to be synergy between the choice of incoterms documents and the involvement of 3PL, which can support the performance of logistics import activities that can reduce the risk and cost as well as increase the efficiency of import activities.

Today, the measurement of logistics service quality through their customers' feedback and the relation between logistics service quality and performance measurement, in fact, still need to be paid adequate attention to (Singh et al., 2022). The result of a study by Jamkhaneh et al. (2022) provides essential guidance for companies to improve their logistics service quality to cope with traditional supply chain and logistics challenges. Some dimensions of logistics service quality, according to the studies by Gupta et al. (2022), Gupta et al. (2022), Susanto et al. (2020), Akil and Urgan (2022), and Yen et al. (2022) have an indirect correlation with customer loyalty, which is mediated by customer satisfaction. Most customers perform good jobs in terms of quality, accuracy, and punctuality and have a high level of logistics services (Ma et al., 2022; Indrasari et al., 2022). However, companies consider the environment's uncertainty when determining the strategy to improve their logistics service quality (Ercan & Çelik, 2022).

## 2. Literature Review

### 2.1 Logistics Digitalization

Digitalization explains working by utilizing information and communication-based tools and practices (Berger, 2016). According to Kayikci (2018), the concept of logistics digitalization allows transparency along the time from supplier to customer, or in other words, there must be transparency along the supply chain. In general, Istomin et al. (2021) state that using an online digital platform can be done by using web technology in a distributed network and wide cloud application. Many companies make strategic changes, such as business consolidation, integration processes, and investment in digitalization to solve their problems (Jensen, 2017). Digitalization using internet technology in Indonesia has affected some business sectors and orders for online shopping to increase the use of transportation for cargo delivery (Rusminingsih, 2022). Especially for logistics digitalization, technology as a process of increasing added value uses or produces a product, where the product is inseparable from the other existing products. Shipping companies can submit the electronic delivery order (E-DO) by uploading it to the website. Logistics digitalization can be synthesized as a series of logistics activities ranging from planning, implementing, and controlling the effective and efficient flow of goods or services. The information also concerns the starting point until the point of use to fulfill customers' needs which is transformed into a digital format.

### 2.2 Electronic Delivery Order

Electronic Delivery Order (E-DO) is a warrant for the delivery of goods or cargo (Jin-Hong, 2006). Online DO is the redeemer of delivery orders from shipping lines made by an expedition company in an electronic form (Sultra et al., 2020). It needs to increase the speed and smoothness of outflow cargo services from the port by implementing electronic orders for import cargo. According to some researchers like In-Hyeon, (2011), Jung-Won, (2013), and Seok-Wan, (2008), E-DO is an electronic document stating that a shipping company orders the warehouse operator to deliver the cargo to the cargo owner. In their study, Bae and Lee (2016) state that E-DO is a transportation document used by a shipping company to order or instruct the warehouse operator who manages the transported cargo to deliver or hand over the cargo to the cargo owner. Theoretically, the implementation of E-DO sends an electronic message as proof of cargo delivery issued by the shipping company to the shipper.

### 2.3 Import Document Activity

Theoretically, according to the Law of the Republic of Indonesia, import activity brings goods from other countries' ports/customs areas into Indonesian customs areas. The customs area is the territory of Indonesia which includes land, water, and the air above it, as specific places in the Exclusive Economic Zones and continental land. The document in activity of document digitalization is the main factor of added value in sea transportation, and the Covid-19 pandemic era can accelerate document delivery (Pu & Lam, 2021). Therefore, import documents can be synthesized as an international trade activity by bringing goods into Indonesian customs areas carried out by individuals or companies running export-import businesses subject to import duties in compliance with the prevailing rules and regulations.

### 2.4 Logistics Service Quality

Logistics service quality using the SERVQUAL model, according to Mentzer et al. (2001), becomes one of the most effective measurement models to examine and assess the quality of logistics services. According to Mentzer et al. (2001), the dimensions of logistics service quality measure physical attributes and more qualitative dimensions. According to Thai (2014), the quality of service, especially logistics service, is a series of interactions among the suppliers of logistics services. Electronic service quality can theoretically be synthesized to establish efficient regulations and excellent standard services, to collaborate government services with the platform of business players in logistics, and to create an appropriate logistics space arrangement supported by an information technology system. Therefore, logistics service quality is much related to information technology and logistics innovation (Akoğlu et al., 2022; Ricardianto et al., 2021).

This research aimed to know the impacts of E-DO and logistics digitalization on the activity of import documents mediated by logistics service quality in the national shipping companies, especially as a member of Regional Container Lines. The research was conducted on the import customers of PT Bhum Mulia Prima. The process reviewed was the implementation of electronic delivery order shipping, logistics digitalization, the activation process of import documents, and program I of the National Logistics Ecosystem concerning the ease of service (logistics service quality). This research consists of two independent variables, namely E-DO ( $X_1$ ) and logistics digitalization ( $X_2$ ), a dependent variable of import document activity ( $Z$ ), and an intervening variable, namely logistics service quality ( $Y$ ). With the combination of these four variables in the discussion about logistics services in the national shipping agents, especially the Regional Container Lines (RCL) group in Jakarta, this research is a novelty. Furthermore, this research uses a quantitative approach, and the correlation among the variables can be described hypothetically as a conceptual framework (Fig. 1).

2.5 Hypotheses

- H<sub>1</sub>: Electronic delivery order has a direct impact on logistics service quality.
- H<sub>2</sub>: Logistics digitalization has a direct impact on logistics service quality.
- H<sub>3</sub>: Electronic delivery order has a direct impact on import document activities.
- H<sub>4</sub>: Logistics digitalization has a direct impact on import document activities.
- H<sub>5</sub>: Logistics service quality has a direct impact on import document activities.
- H<sub>6</sub>: Electronic delivery orders indirectly impact import document activities mediated by logistics service quality.
- H<sub>7</sub>: Logistics digitalization indirectly impacts import document activities mediated by logistics service quality.

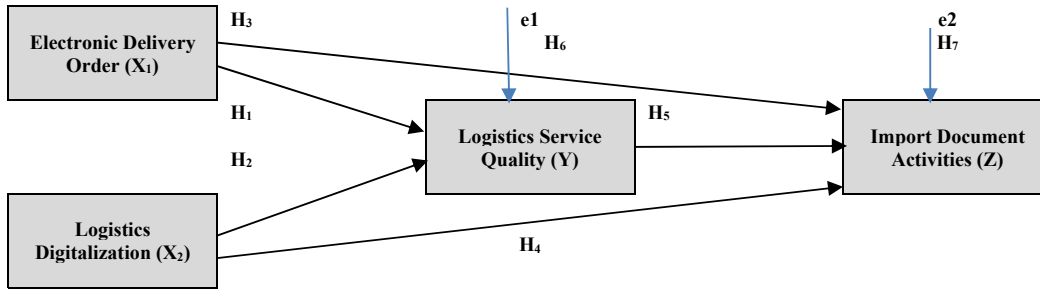


Fig. 1. Conceptual Model

3. Research Method

In this research, the samples are the employees of PT Bhum Mulia Prima, a member and agent of the Regional Container Lines (RCL) Group, with as many as 102 respondents. The respondents come from the export and import documentation division, finance and accounting division, logistics operation division, sales and customer services division, project procurement division, and forwarding companies or direct shippers that use the shipment from PT Bhum Mulia Prima. The method used in this research is Path Analysis supported by several steps through an analysis of the sub-structural I equation. Calculating the coefficient of determination followed by an analysis of the sub-structural II equation, with which each equation calculated the coefficient of determination and partial effect test or t-test. In the next step, the mediation test was conducted using the Sobel test.

4. Results and Discussion

4.1 Path Analysis

Analysis of Sub-Structural I Equation

Table 1

Results of Test on the Coefficient of Determination of Sub-Structural I Equation

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.829	0.688	0.682	3.551

The value of R square (R<sup>2</sup>) is 0.688 or 68.8% which means that the ability of E-DO (X<sub>1</sub>) and logistics digitalization (X<sub>2</sub>) variables in explaining the variable of logistics service quality (Y) is 68.8%, and the value of error terms is 0.558 (Table 1). This analysis of sub-structural I is used to know the influence of independent variables X<sub>1</sub> and X<sub>2</sub> on the intervening variable Y.

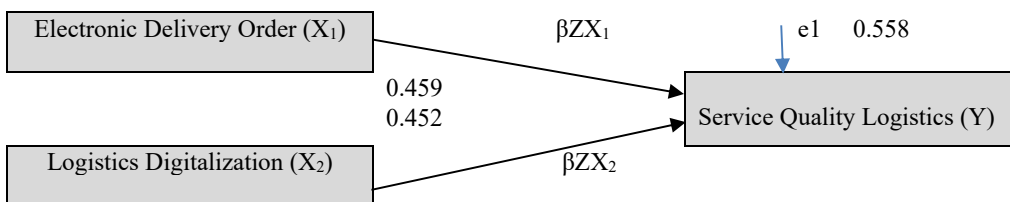


Fig. 2. Sub-Structural Correlation of X<sub>1</sub>, X<sub>2</sub> to Y

**T Test: Partial Testing of E-DO (X<sub>1</sub>) toward Logistics Service Quality (Y)**

Based on the results of the  $t_{test}$ , the  $t_{statistics}$  of E-DO (X<sub>1</sub>) toward logistics service quality (Y) is 6.162 at a significance of 0.000. E-DO (X<sub>1</sub>) has a significance value of 0.000, less than  $\alpha$  (0.05); thus, E-DO (X<sub>1</sub>) has a significant influence on logistics service quality (Y).

**T Test: Partial Test of Logistics digitalization (X<sub>2</sub>) toward Logistics Service Quality (Y)**

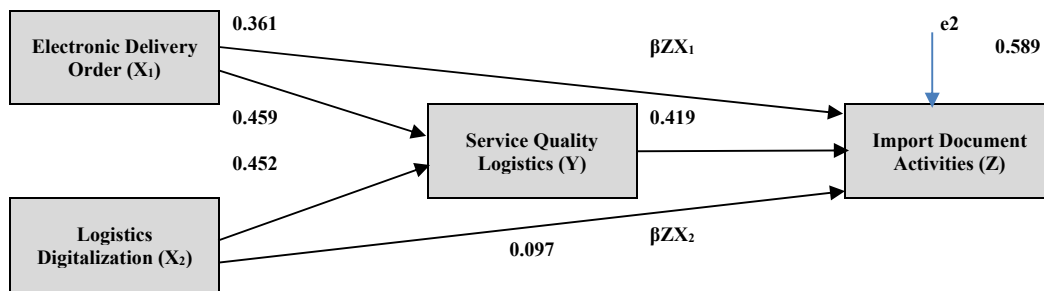
Based on the results of the  $t_{test}$ , the significance value of E-DO (X<sub>1</sub>) is 0.000, which is less than  $\alpha$  (0.05). Thus, it can be concluded that logistics digitalization (X<sub>2</sub>) significantly impacts logistics service quality (Y).

**Results of Sub-Structural I**

The significance test of E-DO and logistics digitalization affects logistics service quality because they have a value of  $sig < 0.05$ . The value of 0.459 indicates the influence of E-DO on logistics service quality. Thus, logistics service quality is influenced by E-DO as big as 45.9%, and the value of 0.452 indicates the influence of logistics digitalization on logistics service quality. Thus, logistics service quality is influenced by as big as 45.2% of logistics digitalization.

*4.2 Analysis of Sub-Structural II*

Analysis of sub-structural II is used to know the influence of independent variables (X<sub>1</sub>, X<sub>2</sub>) and intervening variable (Y) on the dependent variable (Z).



**Fig. 3.** Sub-Structural Correlation of X<sub>1</sub>, X<sub>2</sub>, to Y

**Table 2**  
Result of the Test of Determination Coefficient of Sub-Structural II

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.807	0.652	0.641	3.988

From Table 2, it can be seen that the value of R Square is 0.652 or 65.2%. Thus, the ability of E-DO (X<sub>1</sub>), logistics digitalization (X<sub>2</sub>), and logistics service quality (Y) in explaining the import document activity (Z) is 65.2%, and the value of error terms (e) is 0.589.

**T Test: Partial Test of Logistics Service Quality (Y) on Import Document Activities (Z)**

The significance value of logistics service quality (Y) is 0.000 less than  $\alpha$  at 0.05. Thus, it can be concluded that logistics service quality (Y) significantly influences import document activities (Z).

**T Test: Partial Test of E-DO (X<sub>1</sub>) on Import Document Activities (Z)**

The significance value of E-D.O. (X<sub>1</sub>) is 0.000 less than  $\alpha$  0.05. Thus, it can be concluded that E-DO (X<sub>1</sub>) significantly influences import document activities (Z).

**Partial Test of Logistics Digitalization (X<sub>2</sub>) on Import Document Activities (Z)**

The significance value of logistics digitalization (X<sub>2</sub>) is 0.299, which is more significant than  $\alpha$  at 0.05. Thus, it can be concluded that logistics digitalization (X<sub>2</sub>) does not significantly impact import document activities (Z).

## Result of Sub-Structural II

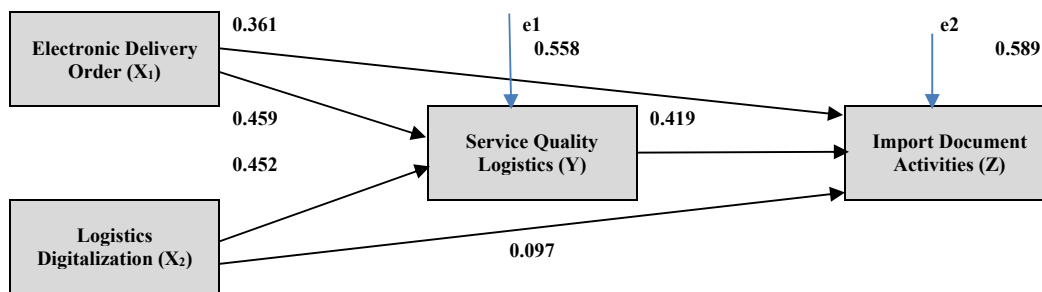
Based on the significance test, the variables E-DO ( $X_1$ ) and logistics service quality (Y) have an impact on import document activities (Z) with the value of sig. < 0.05. Whereas logistics digitalization ( $X_2$ ) does not impact import document activity with the value of sig. > 0.05. The value of 0.361 indicates the impact of E-DO ( $X_1$ ) on import document activity as big as 36.1%. On the other hand, the value of 0.097 indicates the impact of logistics digitalization ( $X_2$ ) on import document activities (Z) as big as only 9.7%. The value of 0.419 indicates the impact of logistics service quality (Y) on import document activities (Z) as big as 41.9% (Table 3).

**Table 3**

Direct Impact

Variable	Significance	Size of Impact
Electronic Delivery Order ( $X_1$ ) on Logistics Service Quality (Y)	0.000	0.459 = 45.9%
Logistics Digitalization ( $X_2$ ) on Logistics Service Quality (Y)	0.000	0.452 = 45.2%
Electronic Delivery Order ( $X_1$ ) on Import Document Activities (Z)	0.000	0.361 = 36.1%
Logistics Digitalization ( $X_2$ ) on Import Document Activities (Z)	0.299	0.097 = 9.7%
Logistics Service Quality (Y) on Import Document Activities (Z)	0.000	0.419 = 41.9%

Therefore, the path analysis from the results of the sub-structural II analysis can be depicted as follows (Fig. 4).



**Fig. 4.** Structural Model

### 4.3 Mediation Test Using Sobel Test

This mediation test uses *the Sobel test* to determine whether logistics service quality can mediate E-DO toward import document activities. Logistics service quality (Y) can mediate logistics digitalization ( $X_2$ ) toward import document activities (Z)

#### Mediation Test of E-DO toward Import Document Activities through Logistics Service Quality

Based on the result of logistics service quality regression toward import activities, it can be seen that coefficient b in the impact of logistics service quality (Y) on import document activities (Z) is 0.809, with the standard error at 0.068. For the coefficient in the E-DO ( $X_1$ ) variable, the impact on import document activities (Z) is 0.624, and the standard error is 0.161. Based on the result of logistics service quality regression toward import activities, it can be seen that the result of the Sobel test indicates a value of 3.685 and a p-value as significant as 0.000. Thus, its indirect impact is significant at the significance level of 0.05, with a p-value less than 0.05. Therefore, the value of the Sobel test or z-value is more significant than 1.96. So the variable of logistics service quality (Y) can act as a mediator, or it can mediate and has an indirect impact on E-DO ( $X_1$ ) on import document activities (Z).

A mediation test is also done on the impact of logistics digitalization on import document activities through logistics service quality. The coefficient of the impact of logistics digitalization ( $X_2$ ) on import document activity is 0.102 as a and standard error at 0.098 as Sea. Based on the result of the regression, it can be seen that the value of the Sobel test or z-value is 1.036, and the p-value is 0.301. Thus, its indirect impact is significant at the significance level of 0.05, with a p-value more significant than 0.05. The value of the Sobel test or z-value is less than 1.96, so it can be concluded that the variable of logistics service quality (Y) does not act as a mediator or does not mediate the impact of logistics digitalization ( $X_2$ ) on import document activities (Z).

Therefore, the result of the Sobel test can be concluded in Table 4.

**Table 4****Indirect Impact**

Variable	Mediation	Significance
E-DO ( $X_1$ ) on Import Document Activities ( $Z$ )	Logistics Service Quality ( $Y$ )	0.000
Logistics Digitalization ( $X_2$ ) on Import Document Activities ( $Z$ )	Logistics Service Quality ( $Y$ )	0.301

**4.4 Discussion**

Based on the result of hypothetical testing, all the hypotheses proposed in this research can be accepted significantly.

**Sub-Structural I**

Based on the result of sub-structural I analysis, E-DO, and logistics digitalization variables impact logistics service quality. The impact of E-DO on logistics service quality is 0.459 or 45.9%. Thus, the logistics service quality in import documents is obtained from the E-DO implemented by PT Bhum Mulia Prima. Through the implementation of E-DO by utilizing the website to fulfill customers' needs, the customers feel helped using the services provided by PT Bhum Mulia Prima. This research concerning logistics digitalization and logistics service quality supports the study by Hidayati et al. (2023), Jarašūnienė et al. (2022), and Ahmed and Rios (2022). The conceptual model for cargo transportation in the port and the maritime industry, in general, can improve service quality based on digitalization technology. This research is also in line with the study by Herold et al. (2021) that the increase in interest in digital services and products has brought up digitalization in the logistics industry and supply chain. The impact of the logistics digitalization variable on logistics service quality is 0.452 or 45.2%. Thus, the logistics service quality in PT Bhum Mulia Prima is supported by the technology of logistics digitalization implemented in such a way that customers give appropriate and accurate information to the company (PT Bhum Mulia Prima). In addition, logistics digitalization can save time and increase the work speed to be more efficient in delivering logistics service activities. This research concerning E-DO and logistics service quality is also in line with the studies by Kayikci (2018) and Stojanović and Ivetić (2020), analyzing and studying the impact of digital technology on the performance of micro logistics and the impact of incoterms clauses on logistics performance. In addition, they also study the benefits of using a logistics application experienced by the respondents, such as making it easier to get a customer, accelerating payment, and speeding up delivery time.

**Sub-Structural II**

Based on the result of sub-structural II analysis, the variables of E-DO, logistics digitalization, and logistics service quality impact the performance of import document activities. The impact of E-DO on import document activities is 0.361 or 36.1%. Thus, it can be concluded that E-DO impacts import document activities. However, the value is smaller than the impact of logistics service quality. The company can make innovations and other things more efficient to improve the import of document activities and process performance on PT Bhum Mulia Prima. The E-DO itself can still have an impact on import document activities by utilizing the website. This technology supports information systems to facilitate the customers who work and cooperate with PT Bhum Mulia Prima. Therefore, this research is in line with the study by Pu and Lam (2021), that is, through the digitalization of shipping documents in the delivery of maritime supply chains at the national level.

In testing, the impact of the logistics digitalization variable on import document activities is 0.097 or 9.7%. Therefore, the logistics digitalization implemented by PT Bhum Mulia Prima has a negligible impact on import document activities. In that case, the company must increase the productivity of human resources and more sufficient digital technology facilities and sophisticated information systems for the company's needs. By improving the quality of digitalization, the company can obtain good results in supporting the performance of import document activities.

The impact of the logistics service quality variable on import document activities is 0.419 or 41.9%. This indicates that the impact of logistics service quality on import document activities implemented by PT Bhum Mulia Prima affects the import section employees' performance in performing their duties and responsibilities. For example, it provides an excellent and punctual service system, quick response in coping with problems, and makes each step easier in performing logistics activities. In general, Ramadhan et al. (2020) research states a positive and significant relationship between document digitalization and logistics service quality. This research also supports a study by Syntia et al. (2020), which showed that companies would easily handle Delivery Order documents in import activities through the online D.O. system.

Furthermore, in general, this research supports the findings of a study by Sultra et al. (2020) that online Delivery Order facilitates the service acceleration of import document flow and payment in the company. Thus, logistics service quality was implemented in PT Bhum Mulia Prima by following the government regulations involving E-DO. Furthermore, this means of fulfilling the need of employees in the import activities section can increase the loyalty of service users, which is supported by an easy-to-understand information system so that the process of import activities runs well.

Logistics service quality as the intervening variable strengthens the impact of E-DO on the performance of import document activity. Logistics service quality can mediate between logistics digitalization and import document activity. Thus, the logistics service quality implemented by Bhum Mulia Prima is supported by a logistics digitalization system to make it easier for customers to perform their tasks and responsibilities to increase the productivity of document activity performance to achieve the company's target. Thus, logistics digitalization impacts the performance of import document activity mediated by logistics service quality.

## 5. Conclusion

Based on the average score, the E-DO variable has the lowest score of 4.01 related to the display of web design for E-DO, which should be attractive and easy to use by customers. Web redesigning by using the Indonesian language as a choice makes it easier for the customers to input the shipment document. The average score of the logistics digitalization variable has the lowest score of 3.95, which is related to the utilization of digitalization technology. Such conditions can be improved by selecting a quality and competent human resource who understands what they are doing. For the logistics service quality variable, the lowest average score is 3.81, which is related to the ability of logistics service officers to respond quickly to problems. This can be improved by organizing customer service training in the form of practical communication skills for quick response, which is supported by a sophisticated information system network. For the import document activities variable, the lowest average score is 3.94, related to customer services in the import activities. Such a condition can be improved by changing the leadership style practiced by the leaders toward giving spirit, motivation, and award to the employees because leadership style significantly impacts customer service in the import activities.

The findings of this research indicate an insignificant impact of logistics digitalization on import document activities. This research also suggests supporting the ease of digitalized logistics services. It is recommended to improve the use of electronic documents and electronic transactions or to hold electronic-based document services to make import activities easier. It also needs some tests by comparing the digital systems between the shipping companies that still use manual documents and those that have used online processes in the import activities.

## References

- Ahmed, W. A., & Rios, A. (2022). Digitalization of the international shipping and maritime logistics industry: a case study of TradeLens. *The Digital Supply Chain*, (pp. 309–323).
- Akil, S., & Ungan, M. C. (2022). E-Commerce Logistics Service Quality: Customer Satisfaction and Loyalty. *Journal of Electronic Commerce in Organizations (JECO)*, 20(1), 1–19.
- Akoğlu, N., Civelek, M. E., & Başaran, Y. (2022). Information technology's role in innovation capability's affection logistics service quality. *İşletme Araştırmaları Dergisi*, 14(1), 249-265.
- Aprilia, E. A., Ramadani, D. D., Oktafiana, A., & Septya Laras, Y. V. (2022). Analysis of Incoterms Selection and Involvement of 3PL (Third-Party Logistics) in Export Import Logistics Activities. *Asian Economic and Business Development*, 4(1), 83–90.
- Bae, H. S., & Lee, Y. K. (2016). Role of Delivery Order in International Container Transportation. *Journal of International Trade & Commerce*, 12(4), 71–91.
- Barata, F., Ricardianto, P., Mulyana, A., Perwitasari, E., Arubusman, D., Purwoko, H & Endri, E. (2022). Berthing time in the port of Tanjung Priok, Jakarta, Indonesia. *Uncertain Supply Chain Management*, 10(4), 1387-1396. DOI: 10.5267/j.uscm.2022.6.018
- Berger, R. (2016). Digitization in the Construction Industry. *Think Act*, pp. 1–16.
- Del Giudice, M., Di Vaio, A., Hassan, R., & Palladino, R. (2022). Digitalization and new technologies for sustainable business models at the ship–port interface: A bibliometric analysis. *Maritime Policy & Management*, 49(3), 410-446.
- Ercan, E., & Çelik, M. (2022). Logistics Flexibility, Relationship Flexibility, and Logistics Service Quality: The Moderating Role of Environmental Uncertainty. *International Journal of Management Studies*, 29(1), 1-36.
- Gupta, A., Singh, R. K., & Mangla, S. K. (2022). Evaluation of logistics providers for sustainable service quality: Analytics based decision-making framework. *Annals of Operations Research*, 315(2), 1617–1664.
- Gupta, A., Singh, R.K., Mathiyazhagan, K., Suri, P.K., & Dwivedi, Y.K. (2022). Exploring relationships between service quality dimensions and customers satisfaction: an empirical study in context to Indian logistics service providers. *The International Journal of Logistics Management*, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/IJLM-02-2022-0084>
- Helmke, B. (2022). Digitalization in Logistics. In *Project Management in Logistics and Supply Chain Management*. *Project Management in Logistics and Supply Chain Management*, (pp. 179–201).
- Herold, D. M., Ćwiklicki, M., Pilch, K., & Mikl, J. (2021). The emergence and adoption of digitalization in the logistics and supply chain industry: an institutional perspective. *Journal of Enterprise Information Management*, 34(6), 1917-1938.
- Hidayati, J., Vamelia, R., Hammami, J & Endri, E. (2023). Transparent distribution system design of halal beef supply chain. *Uncertain Supply Chain Management*, 11(1), 31-40. DOI: 10.5267/j.uscm.2022.12.003



- Iman, N., Amanda, M. T., & Angela, J. (2022). Digital transformation for maritime logistics capabilities improvement: cases in Indonesia. *Marine Economics and Management*, (ahead-of-print). <https://doi.org/https://doi.org/10.1108/MAEM-01-2022-0002>
- Indrasari, A., Nadjmie, N., & Endri, E. (2022). Determinants of satisfaction and loyalty of e-banking users during the COVID-19 pandemic. *International Journal of Data and Network Science*, 6(2), 497-508.
- In-Hyeon, K. (2011). A Study on the Delivery of Cargo in Exchange with D/O and L/I: Focused on the Practice at Inchon and Pusan Port. *Journal of Korean Maritime Law*, 33(1), 61–100.
- Istomin, E., Golosovskaya, V., Gogoberidze, G., Shevchuk, O., & Petrov, Y. (2021). Geo-Information Support Digitalization for Northern Sea Route Logistics in the Context of Climate Change and COVID-19. *XIV International Scientific Conference "INTERAGROMASH 2021"*, (pp. 638-646).
- Jamkhaneh, H. B., Shahin, R., & Tortorella, G. L. (2022). Analysis of Logistics 4.0 service quality and its sustainability enabler scenarios in emerging economy. *Cleaner Logistics and Supply Chain*, 4, 100053.
- Jarašūnienė, A., Čižiūnienė, K., & Petraška, A. (2022). Sustainability Promotion by Digitalisation to Ensure the Quality of Less-Than-Truck Load Shipping. *Sustainability*, 14(19), 12878.
- Jensen, L. (2017). *Liner Shipping 2025: How to survive and thrive*. *Vespucci Maritime Publishing*.
- Jin-Hong, L. (2006). Legal Aspects of Delivery of Cargo without Collection of Original Bills of Lading. *Journal of Korean Maritime Law*, 28(2), 135–154.
- Jović, M., Tijan, E., Vidmar, D., & Pucihar, A. (2022). Factors of digital transformation in the maritime transport sector. Sustainability. *Sustainability*, 14(15), 9776.
- Jung-Won, L. (2013). A Comparative Legal Research on the Delivery Order. *Journal of Law in Hongik University*, 14(4), 401–425.
- Kayikci, Y. (2018). Sustainability impact of digitization in logistics. *15th Global Conference on Sustainable Manufacturing*, pp. 782–789.
- Ma, M., Shen, L., & Sun, X. (2022). Optimization of e-commerce logistics service quality considering multiple consumption psychologies. *Frontiers in Psychology*, 13, 956418.
- Mentzer, J., Flint, D., & Hult, G. (2001). Logistics Service Quality as A Segment Customized Process. *Journal of Marketing*, 65(4), 82-104.
- Moldabekova, A., Philipp, R., Reimers, H. E., & Alikozhayev, B. (2021). Digital technologies for improving logistics performance of countries. *Transport and Telecommunication*, 22(2), 207-216.
- Pangaribuan, G. P., Nender, R., Fitriana, R., & Sugiyanto, S. (2021). The Analysis of the Effectiveness of Delivery Order (DO) Online on Import Activities at Terminal 3 International PT. IPC TPK. *Advances in Transportation and Logistics Research*, 4, 935–947.
- Plomaritou, E., & Jeropoulos, S. (2022). The digitalisation in chartering business: special reference to the role of e-bill of lading in the bulk and liner markets. *Journal of Shipping and Trade*, 7(1), 1–22.
- Prastyorini, J., & Syaputra, F. A. (2020). Penukaran Delivery Order Online dan E-Container Equipment Interchange Receipt Terhadap Impor Barang Menggunakan Container. *Majalah Ilmiah Bahari Jogja*, 18(1), 57-70.
- Pu, S., & Lam, J. S. L. (2021). Greenhouse gas impact of digitalizing shipping documents: Blockchain vs. centralized systems. *Transportation Research Part D: Transport and Environment*, 97, 102942.
- Ramadhan, M. R., Lesmini, L., & Harahap, V. N. (2020). Document Digitization and Quality of Service Effect to Customer's Satisfaction in Soekarno Hatta International Airport. *Advances in Transportation and Logistics Research*, 3, 321-328.
- Ricardianto, P., Lembang, A., Tatiana, Y., Ruminda, M., Kholdun, A., Kusuma, I., Sembiring, H., Sudewo, G., Suryani, D & Endri, E. (2023). Enterprise risk management and business strategy on firm performance: The role of mediating competitive advantage. *Uncertain Supply Chain Management*, 11(1), 249-260. DOI: 10.5267/j.uscm.2022.10.002
- Ricardianto, P., Wibowo, H., Agusinta, L., Abdurachman, E., Suryobuwono, A., Fachrial, P., Setiawan, A., Rafi, S., Maemunah, S & Endri, E. (2021). Determinants of airport train operational performance. *International Journal of Data and Network Science*, 6(1), 91-98. doi: 10.5267/j.ijdns.2021.9.019
- Rusminingsih, D. (2022). Digital Technology, Education, and Economic Growth in a Green Economy in Indonesia. *ASIAN Economic and Business Development*, 4(1), 60–66.
- Seok-Wan, Y. (2008). A Study on the Legal Status of the Ship's Delivery Order. *The Journal of Comparative Private Law*, 15(2), 447–481.
- Setiawati, R., Eve, J., Syavira, A., Ricardianto, P., Nofrisel., & Endri, E. (2022). The Role of Information Technology in Business Agility: Systematic Literature Review. *Quality Access to Success*, 23(189), 144-149. DOI: 10.47750/QAS/23.189.16
- Singh, S. P., Adhikari, A., Majumdar, A., & Bisi, A. (2022). Does service quality influence operational and financial performance of third party logistics service providers? A mixed multi criteria decision making-text mining-based investigation. *Transportation Research Part E: Logistics and Transportation Review*, 157, 102558.
- Stojanović, Đ., & Ivetić, J. (2020). Possibilities of using Incoterms clauses in a country logistics performance assessment and benchmarking. *Possibilities of Using Incoterms Clauses in a Country Logistics Performance Assessment and Benchmarking*, 98, 217-228.
- Sudrajat, A., Sudirman, I., & Prasetyo, R. (2020). Digitalization of logistics processes and comparison with several Asian countries related to logistics information systems: propositions of National Logistics System Architecture. *Solid State Technology*, 63(3), 2824-2836.

- Sultra, R. A. P. J., Nabela, R. M. C., Wibisono, G., & Sirait, D. P. (2020). Delivery Order (D.O.) Online Implementation in Accelerating Document Flow Service of Imported Goods in Payment Companies. *Journal of Physics: Conference Series*, (Vol. 1573, No. 1, 012028).
- Susanto, Y., Nuraini., Sutanta., Gunadi., Basrie., Mulyadi., & Endri, E. (2020). The Effect of Task Complexity, Independence and Competence on the Quality of Audit Results with Auditor Integrity as a Moderating Variable. *International Journal of Innovation, Creativity and Change*, 12(12), 742-755
- Syntia, G., Fahira, J., Himawan, D., & Keke, Y. (2020). The Implementation of Delivery Order Online as an Effort of Operational Efficiency. *Journal of Physics: Conference Series*, (Vol. 1573, No. 1, 012031).
- Tavares, I., & Castañeda-Ayarza, J. A. (2022). Import and export process: the impact of bureaucratic simplification in customs clearance. *Independent Journal of Management & Production*, 13(2), 548-569.
- Thai, V. V. (2014). Logistics Service Quality : Conceptual Model and Empirical Evidence. *International Journal of Logistics*, pp. 1–34.
- Yen, T. T., Trang, N. T. T., & Anh, T. T. (2022). Impact of E-logistics Service Quality on Customer's Satisfaction and Loyalty: Evidence in Hanoi, Vietnam. *East Asian Journal of Multidisciplinary Research*, 1(5), 739-752.
- Yuen, K. F., Koh, L. Y., Fong, J. H., & Wang, X. (2022). Determinants of Digital Transformation in Container Shipping Lines: A Theory Driven Approach. *Maritime Policy & Management*, 1–16.



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