

The Impact of Downtime Against Service Performance System Indonesia National Single Window (INSW)

Saraya Dwi Fitharti^{1*}, Anneke Apriliani Megawati², Sita Aniisah Sholihah³,
Doddy Himawan Triyasa⁴, Aditya Nugroho⁵

^{1,2,3,4,5} Institut Transportasi dan Logistik Trisakti, Jakarta, Indonesia

*Corresponding author: sarayaadwi.f@gmail.com

Abstract. Trade facilitation is a simplification of trade transactions, transparency, and professionalism of customs and environmental arrangements as well as harmonization and standardization. Therefore trade facilitation has an important role in increasing global trade by expediting the movement, expenditure, and permits in and out of goods. Based on that, trade facilitation has a role in increasing economic matters. The Indonesian government's effort to increase logistics performance in trading across global (export-import), was in 2007 the Government built Indonesia National Single Window (INSW) to facilitate the export-import process. INSW is a national electronic system, which INSW portal serves as the gateway to the system for users will be able to submit clearance and licensing requests, monitor the process and obtain clearance/licences online. One of the risks of an online system is the breakdown system, whether it's regular maintenance, emergency maintenance, etc. This condition will give a loss to business agents and export-import service providers. The purpose of this study is to identify the type of down system in INSW, the percentage of down system, and to evaluate effects of the down system in performance of INSW services, the study is conducted the quantitative and qualitative method. The data collection is obtained through interviews and questionnaires In the INSW system, there are 2 categories of downtime that occur in the INSW system, namely Unplanned Downtime and Schedule downtime that can affect INSW systems. In managing downtime insw using system backups and devices or Disaster Recovery Centre (DRC).

Keywords: Trade facilitation, export-import process, internet-based system, breakdown system, indonesia national single window

1. Introduction

The logistic global, trade facilitation has an important role in determining the economic increase and the volume of the trade in every country. Indonesia is a strategic location, Indonesia is crossing routes for world trade. Trade facilitation according to World Trade Organization (WTO) and World Trade Customs Organization (WCO) is a simplification of trade transactions, transparency and professionalism customs and environmental regulations, such as harmonization and standardization. And these become main pillars in Trade Facilitation. The pillars are Simplification, Transparency, Harmonization, and Standardization. A fourth of the pillars become a reference in measuring trade facilitation has been done by member countries WTO and WCO. The aims of trade facilitation to increase global trade by facilitating movement, release and clearance of goods, including those on the trip (transit). Help faster cross-border trade (export-import), cheaper and predicted about safety and security. To improve logistics in Indonesia, especially export-import trading facilities. In 2007 Indonesian Government build new system called Indonesia National Single Window (INSW), aims of the new system to increase speed of export-import completion, through increasing effectiveness and performance of an integrated service system among all entities that are recognized, in handling traffic of export-import goods, increase the validity and accuracy data and information related with export-import activities, and increasing the competitiveness of the national economy and encourage the investment. In this case INSW integrated with ASEAN Single Window (ASW) connected to System Single Window ASEAN countries. INSW were integrated with 15

ministries or institutions. In terms of logistics, INSW facilitates the smooth flow of goods by integrating ship loading and unloading systems through Inaportnet and accelerating the process of shipping goods. INSW is an electronic based system for exchanging documents / information where distributed system reliability is one of the main keys. Reliability here can be interpreted as reliability in the context of security, resources or system service failure. (Sharma, 2016) Therefore, reliable system connectivity reliability is a prerequisite for implementation (Sholihah, 2018) One of the risks of an online system is a breakdown system, whether it's regular maintenance, emergency maintenance, etc., which are process and managing logistics costs and costs. This condition will give a loss to business actors and export-import service providers. (Sharma, 2016). The purpose of this study is to identify the type of down system in INSW, the percentage of down system, and to evaluate effects of the down system in performance of INSW services.

2. Literature Review

2.1. Export and Import

According to the Law of the Republic of Indonesia Number 17 of 2006, exports are activities to move goods from the customs area. If the buyer is from abroad and the seller comes from within the country, then the activity can be considered as export. Exports of goods can be assessed based on the price of Free on Board (FOB), the calculation of export of goods is done by multiplying the value of goods (according to the export goods notification or PEB) with the exchange rate. According to the Law of the Republic of Indonesia, import is the activity of entering goods into the customs area. Literally, import can be interpreted as the activity of entering goods from foreign countries into the customs area of our country. Exports and imports are important factors to stimulate economic growth in a country. These activities enlarge the consumption capacity in a country. (Kartikasari, 2017).

2.2. Trade facilitation

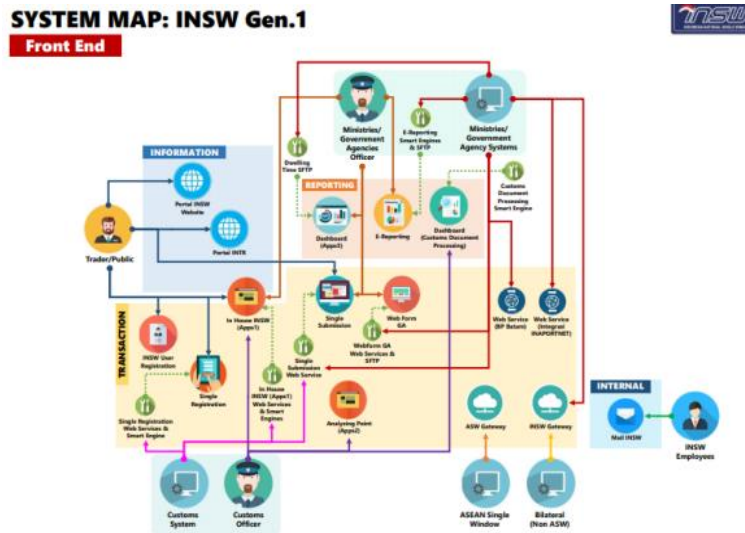
There is no standard definition of trade facilitation. Some definitions of trade facilitation (Sholihah, 2018), that is:

- Simplification and harmonization of international trade procedures, including activities, practices and formalities involved in collecting, delivering, communicating and processing data needed for the movement of goods in international trade (WTO and UNCTAD).
- Trade facilities generally refer to the simplification, harmonization, use of new technology and other actions to deal with procedural and administrative barriers (APEC). Bernal Turnes & Ernst (2015) divides trade facilitation into 3 parts, that is:
- Physical infrastructure related to the flow of goods.
- Customs and border / cross country administration processes, transport formalities, tariffs and the application of trade laws and regulations.
- Use of information and communication technology (ICT) to harmonize and standardize trade procedures between countries and among all stakeholders involved in international trade.

2.3. Indonesia National Single Window (INSW)

Indonesia National Single Window or INSW, According to (Law of the Republic of Indonesia Number no. 44 of 2018) INSW is a national system integration that enables the delivery of data and information singly, processing data and information singly and synchronously, and submitting single decisions for granting customs permits and issuing goods in accordance with statutory legislation. System INSW abbreviated as SINSW is electronic systems that integrate systems and or information related to export/import documents and INSW can be accessed through its official website, www.insw.go.id The INSW website contains menus of operational activities related to customs services, export and import licenses, harbor or airport and other service activities incorporated into the INSW System. Services in the

be divided into 3 scopes, that is information, transaction, and reporting.



Source: INSW

Figure 1. System Map: INSW Gen 1

2.4. Downtime

According to (Sharma et al., 2016) a failure is defined as an event in which the system fails to operate according to its specifications. A system failure occurs, when a system deviates from fulfilling its normal system function for which it was aimed at.

Based on the characteristics of the failures in cloud computing, we have generated two different classes of failures: architecture based and occurrence. In the architecture based classification, the failures are further divided into two categories, Resource Failure and Service Failure. As name implies, resource failure is caused by the outage of some physical resources like system breakdown, network or power outage, software error etc. The failures could be correlated in two different ways: spatial correlation and temporal correlation.

2.5. Assessment Criteria

In a logistics system, the assessment of system performance can be measured based on output, outcome and impact (Sholihah, 2018). Output is factual data that is objective, measurable and can be felt directly. Outcome is subjective information obtained from the impression of the experience of respondents in interacting with the system. Impact is a long-term impact obtained by the community. In the assessment of INSW's performance, there will only be an assessment based on the outcome and impact, this is because the output performance can only be obtained from the existing model. In addition, an assessment will also be carried out regarding the implementation of the system. Outcome performance, impact and implementation are dimensions of assessment. Each dimension consists of elements, where each element consists of indicators which then the indicator will be lowered into items in the assessment questionnaire (Sholihah, 2018).

2.5.1 Outcome Dimension

Table. 1. Mapping the structure of the outcome dimension elements

Element	Multimodal Process Evaluation Indicators (Marlow & Casaca, 2003)	Logistics Performance Index Indicators (World Bank, 2014)
Logistic Costs	- Value for money - Transportation fees	
Documents	- Accuracy of information regarding the status shipment - Accuracy in processing information	Customs - Efficiency of the clearance process by Customs and other agencies
Punctuality	Timeliness in taking and shipping goods	The frequency with the shipment of goods to arrive at the consignee can be in accordance with the schedule or estimated delivery time

Based on the mapping of elements in Table 1. then this outcome dimension consists of the following elements:

- Logistics costs
- This element shows the size of a system affects the cost of logistics. The logistics costs here are the costs of managing the entire export, including documents and transportation. (Sholihah, 2018)
- Documents
- This element shows the processing and handling of import-export documents and the level of accuracy in processing information.
- Punctuality
- This element shows the level of timeliness in the management of export or import documents and the timeliness in shipping goods that meet the specified due date

2.5.2. Impact Dimension

Seamless Connectivity

This element shows a smooth transfer of connectivity to data information in an INSW system that makes the flow of goods or use of goods between modes run well. Recommended connectivity is connectivity to multimodal services related to registered document reliability in export-import activities. (UNCTAD, 1976)

2.5.3. Implementation Dimension

Implementation performance can be seen in terms of ease of implementation and failure system.

- Ease of implementation

This element shows how easily the system can be implemented. The easier it is, the greater the possibility of implementing the system. This easy implementation element includes the ease of overall system implementation and ease of implementation of each process in the system. There are 5 (five) indicators in this element, namely the ease of implementation in: (1) the whole system; (2) document processing process; (3) quarantine inspection process; (4) Customs inspection process; and (5) the process of transportation and handling of in land. (Sholihah, 2018)

- Failure system

According to (Sharma, Javadi, Si, & Sun, 2016) A system failure occurs when a system deviates from fulfilling its normal system function for which it was aimed at. If a failure has occurred in a part of the system that causes failure in other parts of the system which can lead to failure in the entire system, it can be said that there are several correlations between these failures and shows the frequency of down systems and the average duration of downsystem.

3. Data Collecting

Data collection techniques in this study with Primary and Secondary data. Primary data is data collected through in-depth interviews (dept interviews) were conducted on the co-founder of INSW and expert judgment who filled out the questionnaire. Done through the distribution of questionnaires. Respondents who were collected were 10 respondents. While secondary data is data gathered from published journals, articles, books, etc. (Bbamantra, n.d.). Based on survey. 50% of those filling in the questionnaire are Freight Forwarding, while the Shipping Line is 30%, and ASN and customs are 10%. And there were 72% of the 10 respondents, stated that the respondents had used the INSW system for 3 until 5 years.

4. Analysis

4.1. Current System of INSW

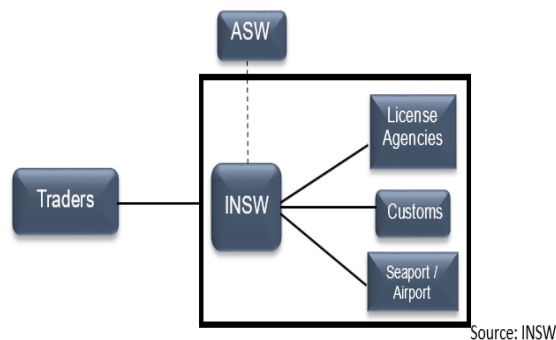


Figure 2. Current system in INSW

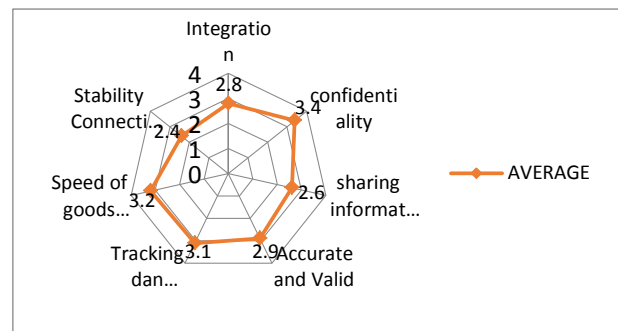


Figure 3. Performance in INSW system.

The INSW system is an electronic system that integrates systems and / or information relating to the process of handling that related to import-export documents. Based on **Figure 2**. There are entities within INSW, which is an Electronic System that integrates systems and information relating to the process of handling that related to export/import documents. License Agencies relating to licensing arrangements, customs relating to validating and reconciliation of submissions made by service users, on permits needed for export-import activities, seaport or airport related to dwelling time, traders, ASW is connected Single Window in another country. Documents that are administered or handled in the INSW system are licensing documents in electronic form, consisting of final permits and recommendation permits. Final permit is the permit required when goods enter Indonesian customs territory. A recommendation permit is a permit needed to issue a final permit used by a business agents. Main documents that are processed are customs declaration documents such as PIB and PEB, Packing List and Certificate of Inspection accompanied by complementary customs documents such as invoices, insurance policies, etc. and licensing documents relating to imports and exports, LC, B/L, invoices (complementary customs documents). Based on **Figure 3**, The result of the total average of performance in INSW system based on the survey is 2.9. Those performance who have exceeded or bigger than the total average are, confidentiality is 3.4, Goods Flow Speed is 3.2, and Tracking and Tracing is 3.1. But user still disagrees or hesitant, so they is still need improvement and evaluation to maximize the effectiveness of performance in the INSW system.

4.2. Downtime

There are 2 categories of downtime that occur in the INSW system, Unplanned Downtime is any form of event that reduces the return on investment by causing disruptions in quality, cost and cycle time. While usually the equipment is poor maintenance or hardware or software errors, operators error, performance and slow changeovers can contribute to lost time and revenue because the network converting equipment is not up and available for production (Hansen, 2018). One of example of unplanned downtime that occurs on the INSW system is on

a problematic dashboard service or downtime on the server device because the interference is linked to the provider (network). Caused by broken fiber optic cable or broken due to accidental termination or occur due to natural disasters. There are 6 service support components in the INSW system such as electricity, network, main devices, servers, applications and databases. The component contributes to several sustainable services, one component that is suspended will involve the other 5 components.

Schedule downtime (maintain or upgrade process) is time specifically scheduled to address equipment performance, hardware or software upgrades, facility maintenance, breaks tools, inspections, and other necessary upkeep (Hansen, 2018). Because planned downtime is anticipated it is also controlled in terms of time and money invested, as well as productivity and labor losses. However, this cannot be called downtime because there is an early notification to the user that there will be temporary downtime to maintain the process to improve the performance of the INSW system to be better.

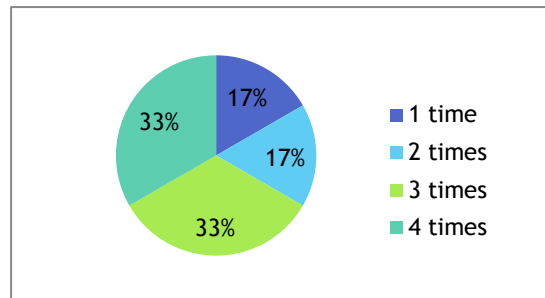


Figure 4. Frequently of INSW systems experience technical problems within 4 months.

Based on **Figure 4.** it is stated that the frequency of the INSW system is experiencing technical problems within 3 to 4 times. The frequency of downtime in INSW systems can be said to be around 1-3 times per month. (deputy for INSW system development and operations) and duration of each downtime on INSW systems is 217 Minutes.

4.3. Managing of Downtime

In INSW systems, backups are available on the main system or data centre (DC). Data centre is a facility that is used to place data in related components for the purposes of data placement, storage and management. So if an unplanned downtime occurs, the data centre will be backed up by the backup system that has been provided to minimize the impact of downtime. In INSW systems, available backup systems such as Disaster Recovery Centre (DRC) are facilities that are used to recover data or information and important functions that are disturbed or damaged due to natural or human disasters. ICT devices are operational Data Centre (DC) devices or Disaster Recovery Centre (DRC) which consist of (Law of the Ministry of Indonesia Number 97 of 2017): (Hardware includes servers, storage media, backup media. Network devices, among others, core switches, routers, Software, including server operating systems, applications, server backup tools) Service level agreement (SLA) is an agreement between the manager of ICT services and users. The SLA set by the INSW system is 99.86% and the Ministry of Finance sets an SLA of 99.68%. (Law of the Ministry of Indonesia Number 97 of 2017).

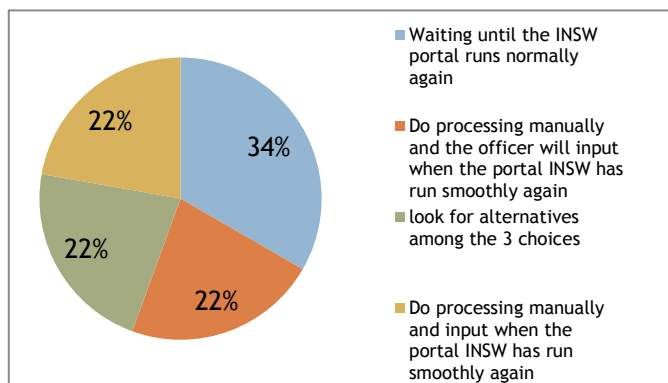


Figure 5. Export-import processing procedures when there is interference with the INSW system

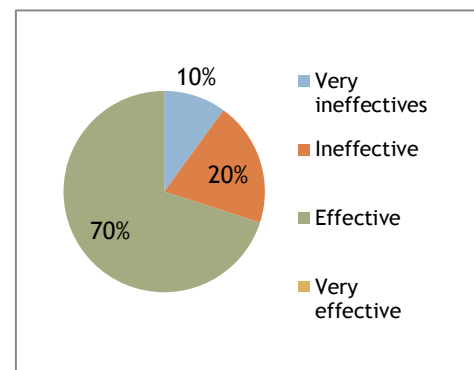


Figure 6. Effective handling procedures when technical problems occur in INSW systems

Based on **Figure 5**. As many as 34% of the 10 respondents, the export-import processing procedures when there was a technical or down-system disruption in the INSW system were carried out Waiting for the INSW Portal to run normally again. Based on **Figure 6**. As much as 70% according to respondents the handling procedure when there is a technical disturbance on the INSW system is effective.

4.4. Impact of Downtime

- Data Loss

Basically, lost data or lost data will cause loss of information needed and consequently no further analysis of the data can be carried out. And resulting in the disruption of the Indonesian National Single Window (INSW) Portal in the form of data not flowing into the CEISA system (Customs-Excise Information System And Automation). CEISA is a customs and excise information system which is a special program owned by the Directorate General of Customs and Excise which consists of various applications, which are used for administrative, service, supervision, and matters related to DJBC's duties and functions. And the obstruction of the submission of export goods licensing (PEB) submitted by exporters and importers who cannot be served where the results of the questionnaire survey obtained the average length of processing of export / import documents before the INSW is 83-hours. While the average length of processing of export / import documents after the INSW is 15 hours, resulting in a decrease in the time of processing export / import documents by 82.1%. And when experiencing a disruption of the time the management of export / import documents becomes longer, which is 30%. So that it affects the export process, in fulfilling the due date (closing time) at the port before the INSW is 53%, while the percentage of containers that meet the due date (closing time) at the port after INSW is 77%. So that it increases by 45% and decreases when the container meets the closing date (closing time) at the port when the INSW down-system occurs at 17%, and affects container delay in meeting the closing time before the INSW for 53 hours and the length of time the container is delayed closing time after the INSW is 13 hours. So that the time of container delay in meeting the closing time has decreased by 75%. And when the interference occurs it increases by 12%. Influence on the import process, where the average length of time spent handling containers before the INSW is 59 hours and the average length of time for handling container expenditures after INSW is 26 hours, so that the time of handling container expenditures becomes faster by 56%. And when a disturbance occurs when handling container expenditure increases to a slower rate of 9%.

- Financial Loss

The customs and excise data base system at the Ministry of Finance's data center has been disrupted, causing obstruction of online customs services related to export-import activities in

all Indonesian ports, including through the Tanjung Priok Port. importing companies that cannot process the release of imported goods in accordance with a predetermined time cause the business actor to be harmed because it has an impact on logistical costs that have the potential to swell in the field. The cost of arranging export / import documents before the INSW implemented is Rp. 341,667 while the cost of arranging export / import documents after the INSW implemented is Rp. 158,333 so that there is a decrease in costs by 53.7%. And it experienced a 46% increase in the cost of managing export / import documents when downtime occurred in the INSW system.

4.5. Comparison before and after the INSW system implementation

Before INSW System is implemented, Customs Officers, Importers or Exporters, as well as the issuing agencies of export-import licenses carry out a lengthy process in validating documents and the accuracy of data and information related to export and import activities and often inputting data errors due to data input manual in handling import-export documents. After the INSW System is implemented, importers do not need to come directly to Customs officials to give their import permits from the relevant agencies. Because import licensing agencies have input the permits they issued in relation to certain importers in the INSW System. Thus, the Customs does not need to wait for the relevant Importer to permit, but the Customs officer can check directly in the INSW System whether the issuing agency has issued an import permit or not. And the validity and accuracy of data and information are also guaranteed and the time needed is faster than before.

Before the INSW System was implemented, Customs officers had difficulty identifying whether the issuing permit for export-import licenses had issued permits or not to the relevant Exporters or Importers and were inspected as there was no tracking and processing process, so users could not detect processes and errors or shortcomings. Document processing can take around 3 days. Now document processing only takes a few hours.

5. Conclusion

INSW is an electronic based system for exchanging related to export/import documents and information, where distributed system reliability is one of the main keys. Reliability here can be interpreted as reliability in the context of security, resources or system service failure. The INSW system is an electronic system that integrates systems or information relating to the process of handling that related to export-import document. In the INSW system, there are 2 categories of downtime that occur in the INSW system, Unplanned Downtime and Schedule downtime that can affect INSW systems related to export-import in terms of costs, shipping, collecting documents, and others. The frequency of downtime in INSW systems can be said to be around 1-3 times per month. The general average performance of the INSW system based on the survey results of the respondents is 2.9. But user still disagrees or hesitant, so they is still need improvement and evaluation to maximize the effectiveness of performance in the INSW system. The cost of managing export-import documents after the INSW system is implemented has decreased significantly by 53.7%. But unfortunately when experiencing downtime the export-import goods will be hampered at the port and cause costs to rise. The cost of managing export-import documents has increased by 46% during downtime. the processing of export/import documents when running normally is 15 hours, after interference becomes longer which is 19 hours. Export-import processing procedures when there is a disruption in the INSW system, namely the user waits until the INSW system is running normally when an INSW system is interrupted. The handling procedure according to service users is considered effective.

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