



OPTIMIZATION OF COMPLETING DOCUMENTS ON THE INTRODUCTION OF THE NATIONAL SINGLE WINDOW, CASE OF MARITIME TRANSPORT SLOVENIA

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ABSTRACT: International trade includes physical movement of goods and extensive documentation flow, which includes all needed information about goods – information for identification, delivery and security control (Teo, Tan &Wei, 2014). Port of Koper is an important entry gate for international trade in Slovenia and some other European countries. Only in the first half of 2017 around 24 000 000 tons of goods were brought into the Port of Koper. Compared to the year 2017, this means 3 % growth of transshipment in the port ("Pretovor v letu 2018 obpolletju" [Luka Koper], 2019). More of goods in the port means more of the documentation, which needs to be processed and more time spent on fulfillment and inspection of documents. The system of National maritime Single Window was introduced in May 2017 in Slovenia. This system has unified some of the needed documentation and decreased the time needed for the fulfillment of documentation because each information needs to be entered only once. The article analyzes the time, spent on entering information in the documentation for the ships, which come into the port of Koper. Software tool FlexSim was used for simulation condition before and after the introduction of National maritime Single Window in Slovenia. In the article the time component of the fulfillment of customs documents in Port of Koper is presented in the article. Time savings we get with the analysis, represent an increase in the effectiveness of the document flow itself which monitors freight traffic.

INTRODUCTION

Participants in the maritime transport process need to prepare a lot of documents and submit them to various national authorities. The main problems are the number of authorities to whom a large number of the document is delivered and the inconsistency of documentation needed. Some of the participant authorities required the electronic form of the documents and some of the paper form. Because of that, the fulfillment and inspection of documents are long lasting processes and represent a serious problem for all of the participants in trade (Economic Commission for Europe, 2005).

UN/CEFACT (United Nation Centre for Trade Facilitation and Electronic Business) for simplification of the processes recommends the implementation of Single Windows. Single Window is identified as an object which enables one entry point for the fulfillment of every needed document for all participants in trade and transport field (Economic Commission for Europe, 2005). The system also delivers information saved to the right recipient. Every information shared into the system does not need to be inserted again.



Single Window for logistics includes all import, export and transit operation and all participants in the field of logistics: business owners, shipping agents, customs agents, freight forwarders, importers and conveyors. The goal of the implementation Single Window is to strengthen the impact of increase goods export at least EUR 100 million by the year 2018 (GospodarskazbornicaSlovenije, 2016).

The implementation of the Single Window covers the following stages (Kapidani&Kočan, 2015):

- (1) the phase of development of functional specifications;
- (2) the phase of development of technical specifications;
- (3) technical execution phase;
- (4) testing phase;
- (5) the initial phase of operation.

The advantages of Single Window for the country are (UN/CEFACT, 2005):

- (1) more efficient and effective use of human resources;
- (2) more effective control of benefits;
- (3) often higher revenues;
- (4) improved trading controls;
- (5) improved security, greater integrity and transparency of operations.

For users, a single window represents the following benefits (UN/CEFACT; 2005):

- (1) reducing costs by reducing delays;
- (2) faster acquisition of the license for the release of goods for free circulation;
- (3) the intended use and interpretation of the rules;
- (4) more efficient and effective use of resources;
- (5) greater transparency of operations.

In the year 2012 73 countries all over the world implemented the concept of Single Window ("Good Practices Around the Globe on Single Window and Related Matters", n. d.). Below we present some of the successful implementations of this concept worldwide.

In Singapur concept of Single Window - TradeNet (TDB) was established in 1983 by the government. TDB plays a key role in Singapore's economy. Also, it is one of the most important public sector organizations. It generates around four times the value of the gross domestic product. The concept was developed for two years and cost around 33 million dollars. The time spent by staff was decreased from two days to 15 minutes for controlled cargo and from four days to four hours for taxable cargo (Teo, Tan & Wei, 2014).

In the Republic of Macedonia the concept of Single Window has been developed from 2007 to 2009 and has positive results. Customs Administration of the Republic of Macedonia is in charge for management of the concept (Tosevska-Trpcevska, 2014). The positive results observed are: saving time and costs, increased efficiency and legal security in the European Union (EU), easier exchange of information because of standardization of information, easiest ways of searching and better



communication between participants (Kutirov, 2009 & Kotovski, 2001). Time of the customs clearance process decreased from 20 hours before the implementation to 6,77 hour after implementation.

In Slovenia implementation of National Single Window (NSW) for maritime transport has the key role because of rising transshipment in Port of Koper. Table 1 shows the annual transshipment in tons and units of cargo. The figure for 2017 is the amount of cargo in only the first half of the year.

Table 1. The quantity of cargo transhipped in the Port of Koper

Year/Goods	Tons
2015	12.861.799
2016	13.721.848
2017	19.063.587
2018*(just for 10 months)	22.310.751

Source: SURS, 2017

More and more cargo with which Port of Koper manipulates means an increasing amount of necessary supporting documentation and more time consuming to fulfill it. Given the state of general digitalization in Slovenia, Slovenia is currently ranked 28th in the Digital Evolution Index ranking (DEI) means that Slovenia is ranked among the countries that falling back on the field of digitalization (GospodarskazonicaSlovenije, 2016).

Nevertheless, Slovenia is at the very top of the EU for the last couple of years In the field of digitalization of customs procedures. The system already existing allows customs clearance of cargo on a daily basis and regardless of the time of the day. On 1st June 2015, the Financial Administration of the Republic of Slovenia (RS) began to verify the validity of the Common Veterinary Entry Document (CVED). Verification of the document is completely automatic (Finančnauprava RS, 2016).

In addition to the need of the Port of Koper, Slovenia is also suitable for introducing the concept of a single window due to the increasing volume of cargo through the international freight airport, which also has a strategic role in the European market. Also, logistic operators in Slovenia are already equipped with good information infrastructure, have experience in electronic business in logistics and are well aware of the importance of such a concept. For its implementation are also interested in companies, dealing with information technology and educational institutions in Slovenia (Kramberger&Rosi, 2008).

The European Commission has implemented the project AnNa (Advanced national Networks for Administrations) to which Slovenia also joined. As a part of this project, a pilot web application was developed. It enables e-commerce with all stakeholders involved in the NEO for maritime transport ("ProjektAnNa", n. d.). The purpose of the project was to design and develop a reliable information infrastructure for the submission of information and their further distribution, which corresponds to the Slovenian environment. Due to the inability of all entities to develop their own XML-based solutions, the goal was to develop a useful web interface that would facilitate the submission of data ("Slovenian AnNapiLOTS factsheet", n. d.).



During the duration of the project, various models for the exchange of XML messages were developed. Special attention was paid to the protection of personal and other sensitive data, as well as the development of a mechanism that allows each participant to see only the part of the data set as important to him in the process of receiving the ship into the port. However, the data recorder can check which other entities have seen his data at any time. National Single Window modules allow operators to create new types of users and spread the circle of users of the National Single Window (Bordon, 2015).

Study about the implementation of the Single Window for maritime in Slovenia, made by THE Port of Koper, also carried out the process of taking the ship to the Port of Koper before and after the introduction of the NEO. The process before the introduction is shown in Figure 1, and the process after the introduction is shown in Figure 2.

We can see that after the introduction of the NEO, several phases of the ship's arrival process to the Port of Koper can be eliminated. It should be emphasized that for individual stages of ship arrival, some of the documents are repeating, which is not apparent from the pictures. Below the article we are going to present an analysis of the documentation flow before and after the establishment the NEO.

METHODOLOGY

We have simulated the process of completing the required documents for three types of input cargo (cars, coal and container cargo) based on study Krovnaštudijazaopredelitevizvedbevzpostavitevnotnegaoknazapomorskipromet v RS (2013). The Slovenian Maritime Administration (URSO), the Customs Administration of the Republic Slovenia (CURS) the Health Inspectorate, the Police of Slovenia, Port of Koper and the Maritime Agent participated in the study.

With the help of participants in the process of maritime transport in the Port of Koper we have collected documents that are present in the process of receiving the ship in the Port of Koper. We printed out all the items that need to be entered into each document and analyzed the duplication of entire documents and also the duplication of individual items in different documents.

We completed the document completion process using the FlexSim program, which enables the transfer of any real environment into virtual. The steps of making the simulation can be divided into six phases (Zhang, Peng, Wu, 2009):

- creating a model layout;
- determining logistic processes in the model;
- determining model parameters;
- preparation and commissioning of the model;
- display of simulation results;
- analysis of the results obtained.

Table 2 presents time attributes for entering the data used in the simulation model. We came to them with measurements and calculating the average data entry times.



Table 2. Time attributes of the model

Type of data	Entry time (sec)
Numeric data	6
Company name	12
Descriptive data	180
Other data	2

The duration of the completion of the documents depends on the type of ship that arrives at the Port of Koper. The type of ship determines which type of cargo is being transported. It also determines some other parameters that are very important for determining the time of filling in the necessary documents. Table 3 presents the parameters for three different types of ships.

Table 3. Numerical values for documents

	Transport of containers	Transport of coal	Transport of cars
Number of lifts on the ship	0	5	0
Contact with the ship	3	2	2
Sick people	0	0	0
Preliminary ports	10	10	10
Fare dodger	0	1	0
Objects on the ship	20	23	29
Crew members	25	24	26
Personal objects	58	50	54
Cargo	4857	2	1918

Source: PrimožBajec, 13th July 2017

We first introduced a snapshot of the current status of documentation that needs to be completed and submitted to various state institutions in the RS in the FlexSim software environment. Then we created a similar model for the envisaged structure in the Single Window system on the basis of experience and assumptions. This was at the planning stage during the phase of research and writing the article, so during the final release of NEO and the results of our research, there may be minor time deviations.

RESULTS

After a series of simulation in the FlexSim program (the model is shown in Figure 1) we obtained the estimated duration of the completion of documents for the current state and state after the introduction of the National Single Window.

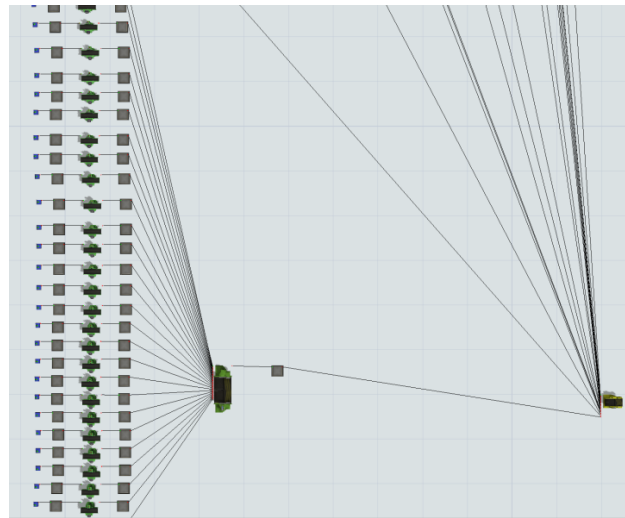


Figure 1. An excerpt from a simulation model

Source: FlexSim program

Figure 1 shows the model in the FlexSim environment. Processors represent the process of entering data into documents. Their operation is set so that each process performed on the processor (the final entered data) sends the permission to the next one in order to start running. The data wait until the moment when the last necessary information is entered in the queue and then trigger the submission of the document, done by the combiner.

Table 4. Number of data needed

	Current situation	Singel Window
Number of documents	33	20
Number of items	423	224

Table 4 shows the number of documents and the number of items before and after the introduction of the NEO. At present, 33 documents are required to receive the ship in the Port of Koper. Some of them are repeated several times in the process of receiving the ship:

- (1) FAL 3 (double repetition);
- (2) FAL 4 (double repetition);
- (3) FAL 5 (threefold repetition);
- (4) FAL 6 (threefold repetition);
- (5) Health statement (double repetition);
- (6) ISPS ship announcement (double repetition);
- (7) Waste form (double repetition).



After the introduction of the National Single Window system, remain only 20 documents, since we eliminate documents that are repeated several times so that each of them is entered only once in the system. The number of items to be entered in the documents is currently 423, after the introduction of the system, this number is reduced to 224, that means a 27.05% decrease in the entries for the ship's takeover to the Port of Koper.

The time required to enter the individual data types were the same regardless of the simulation version of the survey (Table 2). The results of the time required for completing the documents are presented in Table 5.

Table 5. Duration of completion of documents

Ship type	Current situation	Single Window
Transport of container	21 h 39 min 36 s	20 h 33 min 36 s
Transport of coal	2 h 44 min 6 s	1 h 38 min 24 s
Transport of cars	9 h 8 min 13 s	7 ur 59 min 38 s

In Table 5 we see that the filling time for all three types of ships was reduced in the case of the establishment of the National Single Window system, compared to the current situation in the country. Table 6 presents a time-saving in percent for all three types of ship presented.

Table 6. Time-saving when completing documents

Ship type	Saving time (%)
Transport of container	5,07
Transport of coal	39,93
Transport of cars	12,51

Time-saving for all three ships are, on average, for one hour and seven minutes. Depending on the current time needed to complete the necessary documents, this means savings of 5% when transporting containers, 13% for car transport and 40% for transporting coal.

CONCLUSION

There are many countries around the world that have implemented a national single window system for the trade and transport sector many years ago. Research on the efficiency of transport processes in them shows great time saving and, consequently, more efficient use of human resources. In the article, we highlighted the case of Singapore, where the time needed for the supporting documentation was shortened by an average of 97.7% of the time and the example of Macedonia, where the processing of the documentation now takes 66.5% less time. The results from the rest of the world show that the concept of a single window is an effective tool and it would be worthwhile to introduce it in Slovenia as well.



The implementation of the NEO model, which has been in use in Slovenia since May 2017, represents a huge step towards streamlining the necessary documentation in transport. A portal has been created, where every data on the upcoming ship should be entered only once, and it can be accessed by all the participants in the process who need certain data to perform their work in the process of receiving the ship.

In the study, we wanted to check the time component of the document flow. We did not take into account the time for waiting for the receipt of documents, the time to physically transfer the document from one to another institution in the process of customs clearance and the time for document validation. We focused only on the time when data were entered into all necessary documents. The results were obtained using simulation in the FlexSim program, where we developed models for three different types of ships carrying different types of cargo. The results of time savings are shown in Figure 2.

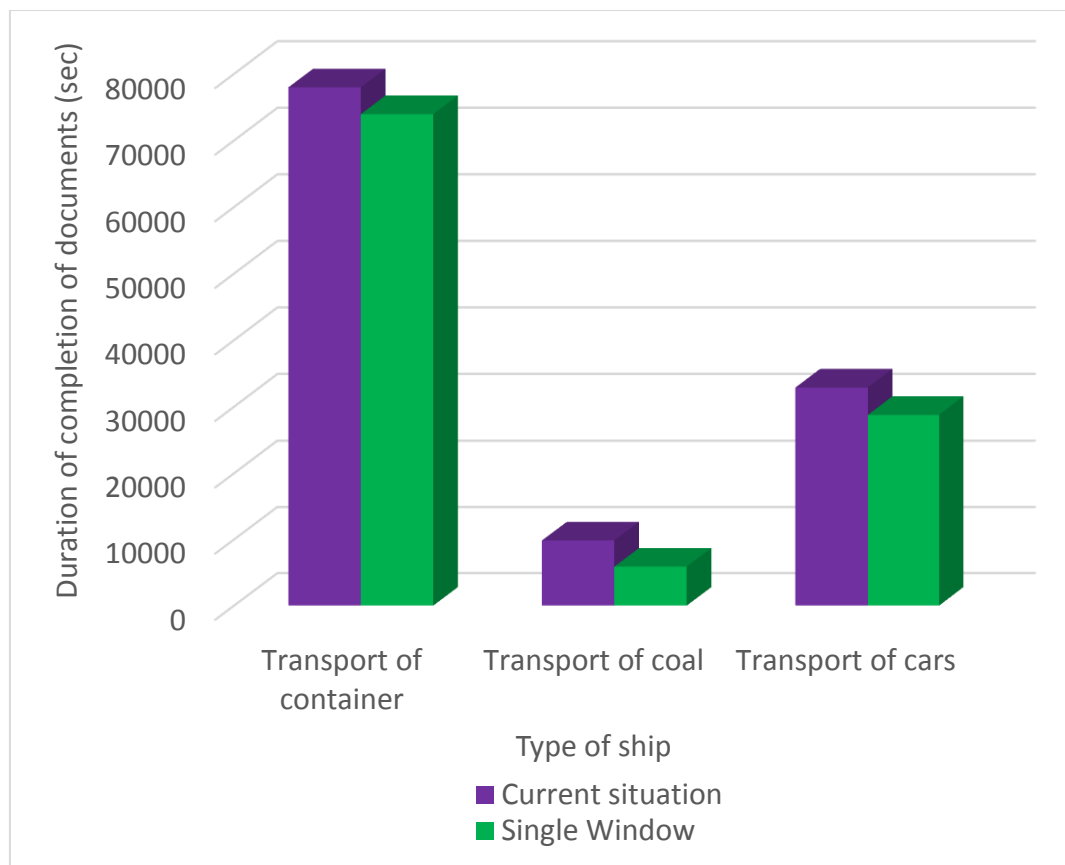


Figure 2. Time-saving when completing documents



The average time saving when completing the fulfillment documents is 18.97%. The greatest saving is achieved with the ship carrying coal.

Depending on the parameters used for individual types of ships, it can be reasonably assumed that the number of packages (different types of cargo on each ship) is most influenced at the time of data entry. It is precisely for this reason that the ships that transport coal have the shortest time to enter data and the highest time has the ship that transport cargo in containers. Containers often involve a large number of different cargo, which has to be described.

The savings in time and human resources seem to be quite high and we believe that the introduction of the NEO system has a positive impact on the trade and transport sector. What consequences will actually have the introduction of the NEO system will show more detailed research in the future.

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