Keywords: maritime single window; port community; port; ship formalities; information

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INTRODUCING ELECTRONIC MARITIME SINGLE WINDOW BY PORT COMMUNITIES IN THE ADRIATIC REGION

Summary. The article analysis specific fields of procedures for ship arrival and acceptance in the port, that are predefined by the Directive 2010/65/EU. The directive poses the framework for the Maritime Single Window (MSW) development in EU. The article brings original and scientific contribution, as it presents the model for Slovenian MSW (SI MSW). The model covers the need of different groups of stakeholder from the local port community. The proposed MSW architecture unifies communication channels and reduces interfaces in business to port (B2P) and business to administration (B2A) operational processes for ship formalities. Consequently, the business to customer (B2C) relationship benefits from lean operation procedures. The focus is also on information exchange standardization. The paper presents principal benefits of the model implementation in the Slovenian port community. The SI MSW model might be adopted also in other port communities in the Adriatic region or to be used as the main platform for further local improvement.

WPROWADZENIE ELEKTRONICZNEGO SYSTEMU „MARITIME SINGLE WINDOW" WE WSPÓLNOTACH PORTOWYCH W REJONIE ADRIATYKU

Streszczenie. W artykule przeanalizowane zostały poszczególne aspekty procedur przybycia statku i przyjęcia go w porcie, które są predefiniowane przez Dyrektywę 2010/65/EU. Wspomniana Dyrektywa stwarza ramy dla rozwoju systemu Maritime Single Window (MSW) w Unii Europejskiej. Artykuł zawiera oryginalny i naukowy wkład – co zostało przedstawione na przykładzie modelu słoweńskiego MSW (SI MSW). Model obejmuje potrzeby różnych grup interesariuszy ze społeczności lokalnej portu. Proponowana architektura MSW łączy kanały komunikacji i redukuje formalności zarówno na płaszczyźnie biznes-port (B2P), jak i biznes-administracja (B2A). W związku z tym relacja „biznes do klienta" (B2C) przynosi korzyści z racji uproszczonych procedur operacyjnych. Koncentruje się również na standaryzacji wymiany informacji. W artykule przedstawione zostały główne korzyści wdrożenia modelu w słoweńskiej społeczności portowej. Model SI MSW może zostać wdrożony również w innych wspólnot portowych w rejonie Adriatyku lub posłużyć jako główna platforma dla dalszych usprawnień lokalnych.

1. INTRODUCTION

The concept of Single Window relies on trade facilitation idea in order to support easier cross-border procedures. The concept is recognised and supported by different world organisations such as the United Nations Economic Commission for Europe (UNECE), World Customs Organisation (WCO), International Civil Aviation Organisation (ICAO) and the Association of Southeast Asian Nations (ASEAN). UNECE sees Single Window as an important tool that supports the efficient data exchange between business and government, because trade related information and requested documents can be submitted once at a single entry point. It is a wider concept that removes administrative barriers in international trade. The Single Window is therefore a practical application that basis on ICT platform to reduce non-tariff trade barriers and deliver immediate benefits to all stakeholders of the trading community [1].

The Single Window (SW) concept is therefore influencing the development of transport SW. The UN Centre for Trade Facilitation and Electronic Business (UN/CEFACT) as part of UNECE introduced the idea of Maritime Single Window (MSW) that lies on the same platform as trading support Single Window. According to Fjortoft *et al.* [2] different types of transport SW systems emerged around the globe, but the main progress has been done in the maritime sector. The reasons are connected to constantly increasing types and amounts of commercial, maritime and ship information that must be provided during the maritime navigation and entrance to the port. Urbanski *et al.* [3] expose the impact of these processes on the development of different Port Community Systems (PCS) within the EU and also across the world. Moreover, Long [4] claim that local PCS were developed due to the past miss-coordination between port community subjects and various interests of national administration offices. On this basis different proposal for MSW have been elaborated, since various governmental authorities and administration offices as well as port systems presented their interests in the future platform of MSW [2].

The European Union (EU) aims to standardise as much as possible the reporting formalities for ship related information in arrival to the EU port. On this basis the EU Directive 2010/65/EU (commonly known as the 'Reporting Formality Directive') has been adopted, in order to pose some alignments in the development of national MSW. Moreover, the Directive mandates EU States to establish an electronic MSW for ship formalities reporting via a single platform no later than 1st June 2015. The adoption of MSW should enhance the quality of information received in accordance with the reporting formalities provided in EU through SafeSeaNet (SSN) system [5-7].

According to Navarro *et al.* [8] and Katsoulakos [9] some EU States have already taken significant steps in the MSW platform adoption, where national governmental systems and PCS are already modified for electronic reporting of ship formalities. Good example is Finland that uses Portnet as a platform for the National Single Window (NSW) and already connects all ports in Finland. According to Arkima [7] the NSW platform has over 2.500 registered users and covers over 40.000 ship calls annually with over 80.000 exchanged messages among different stakeholders.

On the other hand the situation in some other EU regions is not at the same level. This is the case of Adriatic region in SE Europe. Revedin [10] exposes that ports in North Adriatic like Venice, Ravenna, Trieste, Koper and Rijeka use different forms of PCS or web-based tools for business to port (B2P) and business to customer (B2C) communication. Establishing the national MSW will help governmental institutions, business oriented subjects and other stakeholders to improve the actual communication and administrative process. It would be very important to have the harmonisation also between the national MSW, including Slovenia and Croatia as EU member states and perhaps also with southern countries as Montenegro and Albania.

On this basis the research about the actual situation in Slovenian port community has been elaborated. Different communication channels and documentation in use for ship formalities in the port were analysed. Finally, the model for Slovenian MSW (SI MSW) implementation is proposed. The model shall be extended also to other port communities in the Adriatic region, where some local modifications would be required.

2. A MARITIME SINGLE WINDOW

2.1. Basis for Maritime Single Window development

The MSW development basis on different initiatives, that have been adopted in the world trade during last decades. The first one is the National Data Set (NDS) which supports efficient interaction between national and international systems to facilitate the trade and provides safety, security and environmental risk management [9]. The NDS secures complete protection and control of business data. Pipitsoulis [11] exposes that different standards have been developed by international agencies and organisations which help with the implementation process and future communication between international trade systems.

The second initiative important for the MSW development is the European e-Customs initiative. The initiative incorporates the Decision on the paperless environment for customs and trade. Said decision prescribes the electronic customs processes and interoperable electronic customs system [4]. The Single Window approach for e-customs is valid for different Customs Trans-European Systems such as Export Control System (ECS), Import Control System (ICS) and New Computerised Transit Systems (NCTS). The Single Window for customs purposes must cover also notification and certification of the health control and sanitary or phyto-sanitary control, as prescribed by Decision 2002/459/EC19.

Finally, the background to the MSW is provided in the already developed PCS that are in operation in all major European port communities. These systems provide EDI between different stakeholders in port community. The main focus is on EDI with the port and in with some governmental institutions [12]. The study performed by EMSA on EDI within port communities for the ship's inbound or outbound movements in 40 EU ports indicates that 65% of these systems use a certain form of PCS [13]. Although the PCS already exists there is still a lot of paper based communication with and between governmental institutions, because hard copy documentation was not completely eliminated.

2.2. European MSW policy

The initiative to build and use the EU MSW was launched more than a decade ago, when the Directive 2002/59/EC for vessel traffic monitoring (the "VTMIS Directive") was introduced to improve the safety and environmental protection in the European seas [14]. Later, in 2010, the Directive 2010/65/EU was issued covering ships formalities in arrival and/or departure from Member States (MS) ports. The Directive is particularly focused on the efficient electronic information exchange systems in use by port systems and national governmental institutions [11].

Katsoulakos [15] exposes that an electronic unified platform with electronic transmission of information standard has to be built. The platform should be developed in accordance to the national rules, EU legislation and International Maritime Organisation Convention on Facilitation of International Maritime Traffic (FAL Convention). This way, different platforms can be under operation by MS, but all MSW have to fulfil following main requests:

- Providing electronic reporting formalities with e-transmission through a single window not later than 1st June 2015;
- Develop a one-shop-point platform for reporting that is available to various governmental authorities and to the Member States;
- Receiving information in accordance with the reporting formalities provided in EU legislation that must be available in the national SSN and consequently also to other EU authorities via the SSN system.

The main responsibility for MSW development is on the National Maritime Administration Offices (NMAO) and Port Authorities. Port community stakeholders expect every-day operational work reduction and simplification of crucial operational and commercial activities. The benefits should be visible also in business to port (B2P) and business to administration (B2A – including Customs administration) communication, because the data proceeding is expected to be faster and more reliable for the statistics data processing. Kuikka [14] highlights that in this way administration to

administration (A2A) communication among MS could be raised to a higher level as well. This will bring efficient risk control and safety measures in European ports.

3. ANALYSIS OF ACTUAL PROCEDURES AND PCS IN USE BY PORT COMMUNITY IN KOPER

Ports in Adriatic region use different forms of PCS that are mostly connected to ship movements and communication to B2P and B2B. Initially local PCS were developed to support the increasing information exchange for logistics activities related to inbound or outbound cargo flows. Nowadays, PSC are the basis for the message exchange within a port environment [10]. National platforms vary in B2A, B2P and B2B communication and protocols in use. Namely, very often autonomous applications are used for providing the ship information to the administration (B2A) and for goods pre-declaration to Customs offices.

Port of Koper has an EDI in use with port community stakeholders already for 27 years. After several modifications the Port of Koper introduced the system called TinO (operational and marketing IT system) in 2007 [16]. It is based on the framework of Microsoft.NET and represents the main platform of national PCS for the data exchange between all entities present in the area of the Port of Koper. The system represents a standardised and multifunctional platform as connections to various subsystems and background business information systems are possible through SAP software applications [17]. The main orientation is on B2P and B2A electronic communication. Presently, the platform does not include communication about good's commercial data for Customs purposes. Namely, just statuses about customs formalities are visible.

Besides the PCS in use for port/cargo related formalities, all ship based formalities must be reported to the NMAO through Slovenian SafeSeaNet (SI SSN), which is in use from 2009. The data must be sent via an Extensible Mark-up Language (XML) EDI format that can be produced by local IT tool in use by shipping agents or reported through a web-based entry data application for SI SSN [18].

Moreover, port community subjects must also use other autonomous applications, such as e-CURS for customs purposes. The agent or port forwarding agent can still hand-over hard copy documentation, as they are not obliged to use e-CURS. The declaration for Police office, Veterinary and Phyto-sanitary inspections are also provided in hard copy format. The entire protocol for ship-port-administration formalities is presented in Figure 1.

The present situation poses limitations to operational efficiency even e-communication is used by the port community. The number of ICT tools should be minimised to decrease operational and manpower costs and to achieve higher productivity in ship-port formalities. Namely, the Port of Koper services between 1.950 and 1.980 ships per year, therefore savings can be achieved by MSW platform, in case the platform combines different communication channels as one-shop-point for port community stakeholders.

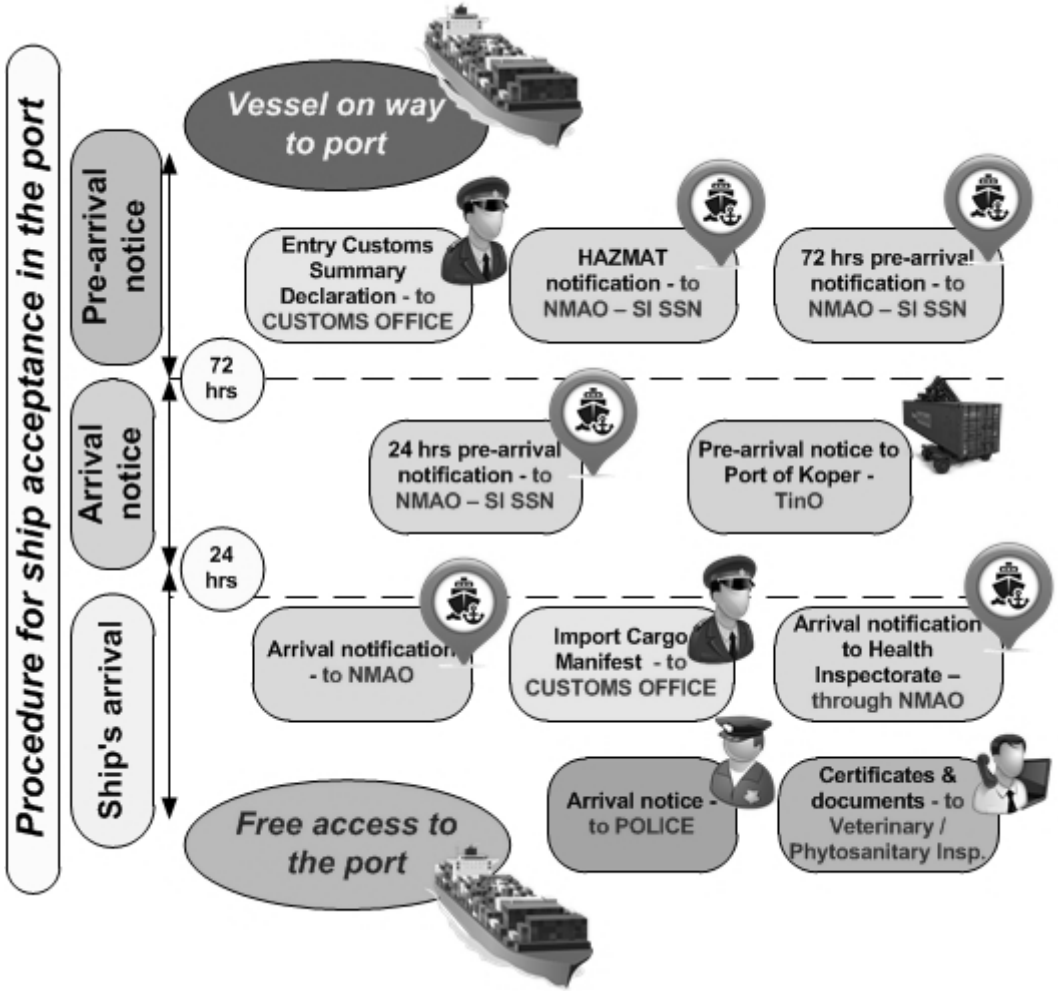
4. ELECTRONIC MSW MODEL DESIGN

4.1. MSW design

The port community in Slovenia is forced to implement presented EU regulations in the national MSW. The main issue is to introduce sophisticated ICT tool that might be used by a wider number of stakeholders, where the volume of multiple data entry is minimised. Therefore, in MSW design 3 groups of stakeholders are important. In the first group are Governmental authorities and administration; in the second are business oriented subjects and in the third group are EU agencies and EMSA.

The first group, consisting of Governmental authorities/administration, needs to develop unified ICT platform and web-based services, with communication protocols in accordance to SSN for

reporting, and to allow the pull-out of the required data from a MSW. It is important to highlight also the (A2A) platform for co-operation with authorities from other MS.



Source: Prepared by author

Fig. 1. Procedure for ship acceptance in the port
Rys. 1. Procedura przyjęcia statku w porcie

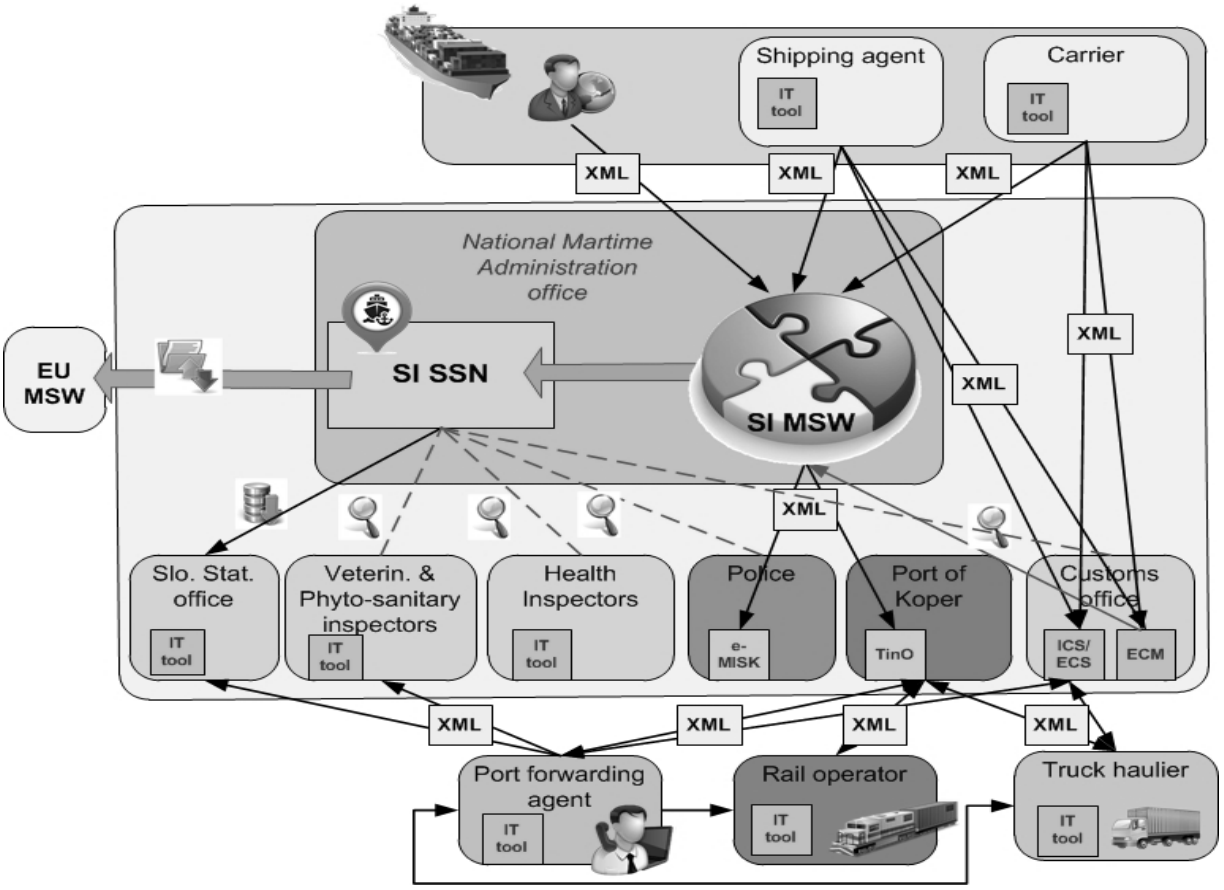
The MSW platform will work only if stakeholders from the second group are able to send information as EDI in pre-defined format that might be generated automatically from operational applications. For the regular use also in the future, it is important that business subjects can easily adopt all changes arisen from new national requests or from EU regulations. Finally, EU, European Commission and different agencies, such as EMSA, must support the development of national MSW with financial programme not just up to 1st of June 2015, but also later when the MSW might be part of a wider Intermodal SW.

The model of Slovenian MSW (SI MSW) must fulfil presented predefined frameworks. According to Bordon [18] the SI MSW is to some extent predefined also by the SSN centralised approach for the mandatory reporting at the EU level, because the national MSW will receive data from the central European point (EU MSW). The national MSW will be able to send data in the opposite way as well. The data collection at the national level will be organized as a decentralised model. On this basis the SI MSW has to collect predefined-data and distribute them within the national port community under defined protocols and standardised formats.

This way, SI MSW will simplify the inbound our outbound procedures for B2A and B2P communication. According to collected data by the interviews in the local port community the main

issue is whether Customs administration will take an active part in SI MSW development. Consequently two possible scenarios are foreseen:

- that Customs administration is directly involved in receiving and sending data related to goods in arrival and departure via SI MSW or
- that Customs authorities send and partially receive data through SI MSW and partially through their application e-CURS or web-based access point.



Source: Prepared by author

Fig. 2. Proposed SI MSW model architecture
Rys. 2. Proponowany model architektury SI MSW

The second option is presented in model design as shows Figure 2. With this scenario Customs administration will require a direct data exchange with the ship agent through an XML EDI format for ICS/ECS or Electronic Cargo Manifest (ECM). Later would be still possible to connect Customs administration office with SI MSW through e-CURS database with XML message exchange.

The model architecture consists on protocols where ship agents or other accredited business subjects will send the requested data (pre-arrival data, FAL data etc.) through an XML EDI format. It is possible also to enter the data manually directly through a web-based application. Such option is more user-friendly for smaller shipping agencies that represent principals with just a few calls per year. In this way B2P and B2A communication procedures and operational work will be much simplified, in comparison to the actual procedures. Namely, just one EDI message will contain all the data that are presently sent by five different channels to different governmental administration offices separately. The model envisages that after the transfer of data from SI MSW to SI SSN the Police office, Veterinary and Phytosanitary Inspectors, Health Inspectors, as well as Customs office will have a direct access to all relevant data in SI SSN. These administration offices will not need a direct data exchange with ship agents or carriers any more. Moreover, today all business entities must send

statistical data also to SURS (Slovenian Stat. Office). After the SI MSW adoption the SURS will have a back-up of all statistical data directly from SI SSN and will pull the relevant data directly from the database.

4.2. Introducing information exchange standardization

The port community is looking over dataset standards for quite a long period. The SI MSW model will help to achieve this important goal. Presently different business subjects and governmental administration offices use different IT systems and databases for logistics purposes. The same is valid for Port of Koper, therefore a vast number of interfaces are used in every day operational process through Koper port. Consequently, it is very important to define dataset standards which can be commonly accepted by all the relevant stakeholders in the national port community.

The information exchange standardization can be built on the World Customs Organization (WCO) data model for B2A and A2A information exchange. According to Katsoulakos [9] the WCO data model consists of six elements to secure a reliable data exchange (potentially with the use of XML EDI form): Business process model, Harmonised dataset, Information model, International code standard, Message implementation guidelines and XML scheme for messages. Beside presented elements some predefined standards like ISO 28005 for efficient exchange of electronic information between ships and shore should be considered as well. The SI MSW database standard should incorporate also the Unique Consignment Reference, use of Harmonized System of Commodity Description and Coding, use of ISO country code, use of Codes for ports, codes of partners or subjects etc.

According to analysis of application in use by the Port of Koper their application TinO already has a prescribed protocol for receiving the data of goods and orders for good's or units manipulation. In the model it is anticipated that the Port of Koper will not change their IT system due to SI MSW development, therefore an interface between SI MSW and TinO will be needed. Almost the same situation is evidenced at administrative offices such as Police and Customs office. On the other hand there is no EDI established with Health inspectors and Veterinary and phyto-sanitary inspectors, because these entities do not provide communication channels for EDI. The SI MSW model relies on the assumption that these administration offices will introduce EDI communication in XML form in the near future.

The pressure on IT system modification is definitely also on ship agents and carriers, because they use different internally developed IT tools for data processing. Around 50% of all agents still do not have an EDI with e-CURS or other administration offices like NMAO. All these subjects face problems of multiple-data entry. The information exchange design and standardization would help them obviously.

4.3. Potential benefits

The entire port community in Slovenia recognizes benefits by SI MSW use, but on a longer period. They expose high investments they all will have by the modification of existing IT systems in use, by developing interfaces and by additional manpower to be hired in the initial period. Finally, according to performed research following three groups of potential benefits were highlighted:

a. Benefits for trade
- Simplified operational and commercial processes at Koper;
- Effectively planning of port resources;
- Effective administration procedures resulting in faster goods release;
- Increase in the reliability of transport and trade statistics.

b. Benefits for business entities:
- More effective and efficient deployment of resources
- Cutting operational costs related to manpower;
- Decreasing costs for IT by EDI communication through reduced number of channels - but on a longer period,

- Reduction of mistakes due to lowering communication through multiple channels.

c. Benefits for administration such as:
- Predictable application and explanation of rules;
- Quality of provided data and faster data processing;
- Better control of exports with less corruption in customs and participant entities;
- Reducing manpower costs and internal optimization.

Some evidenced benefits on a national level are in line with conclusions exposed by Ahn, Cane, Joszczuk-Januszewska, Arkima and Kuikka [5 - 7, 14, 19]. Namely, these authors expose the following benefits that are usually present in new IT systems and standardised protocols implementation in port communities:

- Increased quality and availability of information;
- Improved communication through B2A channel;
- Increased efficiency and effectiveness of administration offices resulting in shorter process time;
- Improved co-operation and coordination between authorities from different MS in fields of safety and health, cargo security, and environmental issues;
- Efficient use risk management techniques for goods and trade control;
- Higher reliability of information analysis and statistical reports.

5. CONCLUSION

The port community in Slovenia is in important phase of its development, as the MSW initiative will bring important changes in every-day working process of all stakeholders. By suitable MSW model design, with correct and lean architecture, the Slovenian logistics platform might benefit with faster operational procedures and shorter process time, leading to increased transit traffic through Koper port. Namely, the proposed national MSW model unifies different protocols and communication channels in one-shop-point.

The SI MSW model defines NMAO as the central entity of model development, because the entire model basis on already introduced SI SSN platform. It is important to connect all business entities, administration offices and port under one umbrella, with EDI communication. The number of interfaces should be reduced to minimum. For this reason ship agents or carriers might develop a single IT system that might be suitable for all of them. Said shall be valid at least for medium or small agencies that hardly develop personalised IT tools.

It is important that the entire port community recognises the benefits from the model adoption, because only in this way the entire supply chain through Koper port can be lean and customer friendly. The presented MSW model might be introduced also by other port communities in the Adriatic region. Namely, Port of Koper operates higher number of specialised terminals and handles much more cargo on a yearly basis compared to other port systems on the Eastern coast of the Adriatic Sea. Such solution might be feasible especially in smaller port communities like Split, Bar, Durres, where the number of ship agents and Carriers calling these ports are smaller and governmental-administration offices do not have sophisticated IT systems in use presently. Therefor it can be anticipated, that presented MSW model might be faster and cheapest solution for MSW adoption locally. But the latter should be further checked with analysis in mentioned port communities.

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Received 12.07.2014; accepted in revised form 20.11.2015