

# INFORMATION SYSTEM DEVELOPMENT IN SHORT SEA SHIPPING

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## Abstract

In the strategic goals of maritime policy for the period until 2009 the EC has stressed the need for a sustainable transport development. Maritime transport regarding the scope of operation, diversity of transport of goods, vehicles and people, and the possible influence on the world and national economy, and the foreign trade exchange represents an important economic activity. Intercoastal navigation – short sea shipping – SSS has effected very good results, both in economic and ecological justification. This paper deals with SSS information system according to the defined users requirements. The result of this research is a model of information system development including benefits, characteristics and proposal of the required resources.

**Key words:** information system, Short Sea Shipping, maritime transport

## 1. INTRODUCTION

Information and communication technologies have become the basis for the post-industrial society, the developing new world order. The latest terminology for the future developing society is the networked society, which forecasts in a way the relations in the society. Although it is difficult, maybe even impossible to forecast the flow of the development of new technologies, it could still be stated that the networking will represent the main characteristic of the future society.<sup>1</sup>

The development trend of new technologies has not bypassed the complex transport environment that provides a fruitful basis for the implementation of new information systems and technologies with the aim of increasing the efficiency of the overall process.

The information system is the system which processes, stores and distributes information, accepts input data from the environment, processes them and returns the processed information back into the environment. Every information system acts within the context which understands the political, legal and economic environment, which includes the rules, business processes, management techniques and human and organizational restrictions. The key to the successful development of the system

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<sup>1</sup> Adam, N. R., Yesha, Y.: Electronic Commerce: current research and issue and application, Springer, New York, 1996, p. 5.

is the understanding of the method in which the proposed information system interacts with the environment in which it is to function.

Modern transport network consists conceptually of two main parts: information network, marked by the transfer of pulses in binary form, and the cargo transport network, which carries the goods and people. While the information network is optional, but extremely useful, the cargo transport network is the basic necessity. The availability of computation machines has given incentive to another big revolution of the transport systems in which fast and precise computers have been used for efficient control and coordination of the traffic system.

## 2. INFORMATION SYSTEM ASSESSMENT CRITERIA

In assessing the information system management, the criteria are defined used to assess the system parameters. The criteria for the assessment of reliability, availability and user-friendliness are closely related to the availability and are formatted for easier application. Within the timeliness and availability there are elements of reliability<sup>2</sup>.

Table 1: Information system assessment criteria

Assessment criteria	Definition
Timeliness	Available information is momentary regarding the situation
Punctuality	Available information has no error
Availability	The information can be obtained when and where it is necessary
Format for easier implementation	Information plan is composed so that it classifies data used parallel
Common usage of information	Readiness of common usage of information in different functions within the system
Flexibility	Adaptability of information processes and possibilities of satisfying the needs of specific users segments
Internal connections	Capability of efficient information exchange through several managerial areas within the system
External connections	Capability of efficient information exchange with potential users

Source: Closs, D. J., Goldsby, T. J., Clinton, S. R.: Information Technology Influences on World Class Logistics Capability, International Journal of Physical Distribution and Logistics Management, Vol. 27, No. 1, Michigan, 1997

## 3. TRANSPORT SYSTEM INFORMATION SUPPORT

Intercommunication and connection of a number of participants in the transport and logistic process is ensured by using the electronic means of managing transport technologies and electronic information exchange. The information support

<sup>2</sup> Jolić, N.: Luke i ITS, Fakultet prometnih znanosti, Zagreb, 2005, p. 181.

of transport logistics is realized by means of direct information reports, for which all the logistic chain participants are responsible, as well as by using standardized transport documents. Economically, the unique information and logistic systems ensure a big change regarding reductions in coordination and manipulation costs, as well as in the increase of the quality of functioning of the overall system.

Logistic information and its elaborated, fast, timely, high quality and flexible flows are the binding structure of the integrated marketing logistics system and one of the key factors of the influence on its competence. Without a developed information support and information and technological networks, the implementation of supply chain management (SCM) would not be possible, which is closely connected with the resource planning within the organization (ERP – Enterprise Resource Planning). Five strategic tendencies are considered to be dominating in this region:<sup>3</sup>

- improvement of information products,
- capability for integration,
- elimination of indirect links,
- globalization,
- convergence.

The information approach to the development of economy, and therefore also to the development of maritime industry, starts from the basic assumption that each organizational unit or structure and each conceptual unit are conceived as subsystems of an adequate technological system. The technological systems are systems in which the human work and knowledge are eventually materialized. Therefore, the most suitable definition of the technological system is that the technological system is defined as interaction whole of technical means, natural resources, human potentials and social facilities. It should be noted that different system elements can be interconnected only by means of information that are processed in an organizational scheme, using the processing structures.

After having defined the traffic system in a satisfactory manner, the scope of the traffic engineering problems can be identified. The important parts of the problems of traffic engineering include:<sup>4</sup>

- planning and functional design of traffic routes according to transport demand,
- management by redistribution of demand to modes and routes,
- functional adaptation traffic entities,
- supervision and operative control of traffic flows,
- traffic analysis of the processes at nodes and links,
- traffic and technological design of the processes at terminal subsystems,
- safety separation of vehicles, aircraft, ships, etc.

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<sup>3</sup> Drašković, M.: Integraciona informacija u marketing logistici transportnih sistema, Montenegrin Journal of Economics, No. 3, Fakultet za pomorstvo u Kotoru, Kotor, 2006, p. 203.

<sup>4</sup> Bošnjak, I., Badanjak, D.: Osnove prometnog inženjerstva, Fakultet prometnih znanosti, Zagreb, 2005., p. 8.

- modelling of throughput capacity and various services of network elements,
- traffic management,
- calculation of safety risks in traffic,
- preventive maintenance of availability, etc.

For successful detection, defining and solving of the traffic problems it is imperative to master the approach and the methods of system engineering with adequate knowledge, methods and aids from the “neighbouring” technical disciplines.

The conceptual and information parts of the systems come to the fore through the organization and management, and they consist of<sup>5</sup>:

- functions,
- structural forms,
- means,
- methods.

Various functions in the system are realized through diverse organizational forms using the information by different methods.

The basic characteristics of the information approach start from the following assumptions:<sup>6</sup>

- information system of the complex technological whole is the means to realize the interaction channels among the elements which form this whole at all levels of systemic organization, with the aim of successful management of adequate technological system (subsystem);
- a systemic approach in the building of complex technological wholes precedes the building of the information system;
- computers and telecommunications are only the technical components of the information system;
- the building of the information system has to include all the decision-making structures;
- integration of the function of operation subsystems, input and output elements, regulation mechanisms, etc. The essence of the information system consists of mechanisation and automation of the processes or the subsystem for data processing, are the by-products of the information approach and has to be considered as such.

The development of the information system has to take into consideration the restrictions that hinder its building, and these can be external and internal regarding the total technological system.

The external restrictions result from:

- general policy of the country’s technological development;

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<sup>5</sup> Dundović, Č: Pomorski sustavi i pomorska politika, Pomorski fakultet u Rijeci, Rijeka, 2003., p. 42.

<sup>6</sup> Ibidem, p. 43.

- social and economic position of individual economic activity;
- legal regulations;
- slow building of infrastructure information systems in the country;
- country's lagging behind in the development of information and telecommunication systems.

The internal restrictions result from:

- not developed information systemic approach;
- not adapted organizational solutions;
- occasional dominance of the policy of partial development;
- lack of creative structures and adequate education;
- unsolved financing problems.

#### 4. INFORMATION-COMMUNICATION TECHNOLOGIES IN SHORT SEA SHIPPING

The applications of information and communication technologies in short sea shipping realize a combination of all the entities present in the logistics chain of short sea shipping, service providers and potential users, and they contribute to the development of short sea shipping, understanding the harmony of the short sea shipping network and its integration with the maritime traffic.

The information exchange in short sea shipping is realized through communication channels between the activity performers and the database. The designed information system considers the needs of the users and determines the framework which contains their needs. The existing and future functioning has to be considered in order to identify the areas that require supervision (monitoring) and improvement. The information flow in the short sea shipping system has been presented in Figure 1.

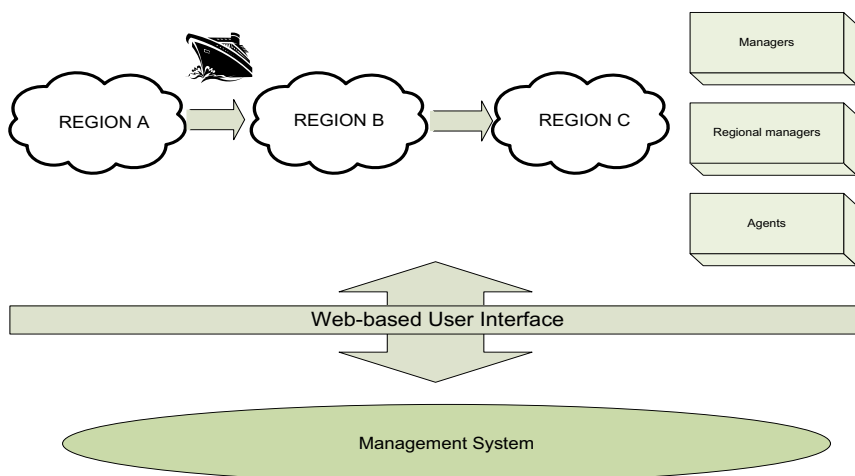


Figure 1: Example of information flow in short sea shipping system

The advantages of the information system can be considered through the assessment criteria, and they refer to timeliness, accuracy and availability of information in every situation, as well as flexibility and connections within the system, and also the possibility of efficient information exchange with potential users. The information technologies insure the necessary support to planning and control of short sea shipping.

The development of information and communication networks at short sea shipping centres understands primarily the provision of all the assumptions for the development of:

- e-commerce,
- electronic data interchange (EDI),
- electronic data exchange (B2B, B2C).

E-commerce in supply chain management divides clearly the information flow from the flow of goods, allowing separation and flexible optimization of the port processes, which is one of the greatest advantages of intermodal transport.

The effective form of communication connection is the computer communication network, known as electronic data interchange (EDI). EDI represents the transfer of structural data, by using the agreed communication standards, from computer to computer, electronically (Figure 2).

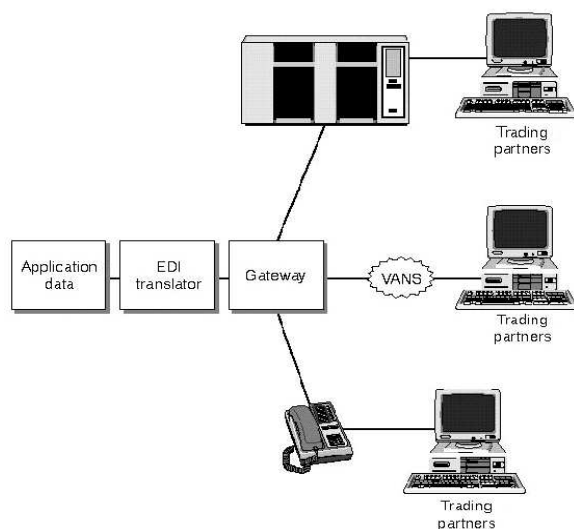


Figure 2: EDI [7]

Electronic business in the B2B system (Business to Business) represents the model of electronic business operation between the companies, whereas the B2C (Business to Customer) system understands doing business of a company with the end users.<sup>7</sup>

<sup>7</sup> Dundović, Č., Poletan, T., Kolanović, I.: Implementacija informacijsko-komunikacijskih tehnologija u lukama, Pomorski fakultet u Rijeci, Pomorstvo, God. 19., 2005, p. 116.

The information system is the base for establishing of the system with the possibility of using the information about different activities, subjects and their space and time dimensions and includes:

- conquering new markets;
- determining the profitability and economic power of potential customers;
- keeping of the acquired position on the market;
- establishment of the level of satisfying the user services;
- transport activities;
- managing the transport-transloading process.

The communication system allows connecting of subjects, offering numerous user services of information and communication system, with the following key activities:

- usage of various communication services such as voice and image transfer, video recordings and signalling;
- communication support between the central – control office and other participants having commercial benefit;
- communication support between the central – control office and service providers directly related to traffic;
- provision of services to mobile and fixed potential users.

The information level of short sea shipping should include application of information and communication technologies that would consist of computer preparation of the database with the possibility of checking, fast data interchange, automatic database updating, and as such it would acquire the characteristic of a fast, advanced operation system that would result in greater operation efficiency. The following should be provided:

- communication and information centre;
- design and connection of all the subjects of the so-called “e-port” community;
- liability for precision and timeliness of the input data.

The common database must be created in compliance with the existing standards and information transfer protocols and support the necessary applications in port transport, as well as have the possibility of two-way information flow between the users and the database.

## **5. CONCLUSION**

The traffic problems are complex ones which reflects the need for engineering design and integrated development of components and defining of relations between the components and relations towards the environment. The establishment of an

information system in short sea shipping is the precondition for solving the administrative and operative levels. Based on the defined characteristics of information support the paper provides the proposal for the information and communication technologies the implementation of which is necessary in order to establish the system of information interchange, data storage and their distribution. In accordance with the characteristics of short sea shipping as a complex, dynamic and open traffic system, the establishment of the information system is necessary for the coordinated work of a large number of participants, integrated implementation of technological activities and complementary development of the traffic in general.

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