

## SYSTEMATIC APPROACH TO DETERMINING THE FACTORS OF QUALITY OF MARITIME TRANSPORT SERVICE

Suzana Šamija<sup>1</sup>, Ines Kolanović<sup>2</sup> & Čedomir Dundović<sup>3</sup>

UDC / UDK: 656.61:658.56

JEL classification / JEL klasifikacija: L91

Review / Pregledni rad

Received / Primljeno: August 1, 2015 / 1. kolovoza 2015.

Accepted for publishing / Prihvaćeno za tisak: November 25, 2015 / 25. studenoga 2015.

### Summary

*The subject of this paper is to determine the fundamental factors of the quality of maritime transport services and analyse them, all with the aim of meeting the requirements of service users. These factors determine the quality of desired service results and must be in accordance with the policy of quality that is set at the level of a maritime organization, region or maritime countries in general. Contemporary economic turmoil, the process of globalization, the instability of the world market and the continued pressure of competition lead to strict requirements in terms of quality of services and the creation of the concept of a systematic and managerial approach within the system of maritime transport. The contribution of this work is reflected in the implementation of a systematic approach as the key condition for research and analysis of the factors of quality of maritime transport services in the complex and dynamic system of maritime transport, whose main purpose is to meet the needs and the demands of service users and all participants in the maritime business.*

**Key words:** maritime transport service, quality, systematic approach, factors of quality.

---

<sup>1</sup> Suzana Šamija, Ph.D. student, Faculty of Maritime Studies Rijeka, University of Rijeka, E-mail: [suzana.samija@gmail.com](mailto:suzana.samija@gmail.com)

<sup>2</sup> Ines Kolanović, Ph.D., Assistant Professor, Faculty of Maritime Studies Rijeka, University of Rijeka, E-mail: [ines@pfri.hr](mailto:ines@pfri.hr)

<sup>3</sup> Čedomir Dundović, Ph.D., Full Professor, Faculty of Maritime Studies Rijeka, University of Rijeka, E-mail: [dundovic@pfri.hr](mailto:dundovic@pfri.hr)

## 1. INTRODUCTION

In the framework of the provision of its services, maritime transport is a fundamental factor in the development of the national economy of any maritime country. Moreover, an economic activity is in this day and age strictly subordinated to the mechanisms of global markets and the world economy, giving crucial importance to the concept of quality in the competitive and variable market conditions of supply and demand of goods and services. Whereas maritime transport services represent an economic product of maritime shipping, it is extremely important to evaluate their quality, taking into account all the factors that lead to reaching a higher level of quality and competitiveness in the maritime market.

The maritime transport system is characterized by high demands for quality, safety and reliability due to its influence on the global economic system. It is also characterized by extremely high value of assets as well as high likelihood of damage when transporting a large number of people and / or a large amount of cargo. Moreover, ships in the trade are exposed to a certain degree of risk from maritime accidents that can be caused by the human factor, technical failures, damage to cargo, etc. This means that, other than reliability and the speed of implementation, high quality shipping services have to work on prevention and provide protection from the risk of maritime accidents, where particular attention is paid to the safety of shipping services and safe navigation in general. In recent years, good management has significantly reduced the number of maritime accidents at sea, influenced the protection of human lives and preservation of the natural sea resources <sup>4</sup>

Research of quality and the structure of its factors in different service sectors, especially in maritime transport, is based on the specificities of the service in question and the analysis of interested entities participating in the process of effectuation of services, especially the users of these services. The process of quality management of maritime transport services is based on the design and implementation of all necessary activities based on well-studied current and future needs of users and concentrated on the provision of services that are market-based and market-conditioned. The common goal of all these activities is to achieve optimal profitability, appropriate position on the transport market and adequate competitiveness in satisfying the demand for maritime transport services. This means that quality management in the transport process involves continuous improvement and enhancement of quality factors with a view of increasing competitiveness on the market. Studies on the quality of services in the field of maritime transport are not numerous because of its specificity and complexity as an economic activity and a large number of actors involved in the transport chain. It is for this reason that the present study especially emphasizes the importance of a systematic approach to examining all the factors that determine the quality of maritime transport services. Defining and measuring service quality is based on the difference between the

---

<sup>4</sup> Šamija S, Kolanović I, Dundović Č., Basic features of a systematic approach in quality management services in maritime cargo shipping, Proceedings of the International Conference IMLA 19. 2011 Sept 28 - Oct 01; Opatija, Croatia, p. 262

actual and the expected quality of service, and effective consideration of all factors of quality demands a systematic analysis and research of business processes that take place in the maritime market.

## 2. TERM AND DEFINITION OF QUALITY OF MARITIME TRANSPORT SERVICES

Quality assurance of transport services and its management is one of the basic tasks of any business system existing on the market of transportation of people and / or cargo. In general, quality is a dominant business function in the modern world that has taken root in all forms of social, economic and business life. It can be said that: „*Quality of goods and services is directly proportional to the achieved social and civilizational level of development of a country*“.<sup>5</sup> The definition of quality by author Stevenson is acceptable and says: „*Quality is the ability of products and services that consistently meet or exceed customer expectations*“.<sup>6</sup>

The concept of quality can be examined in terms of products, services and processes. In this respect, analysis and research of service quality is significantly different from the concept of product quality, since the concept of service is neither physical nor material in nature. Therefore, there are more complex criteria for its measurement and evaluation. Regardless of whether a product, service or process is being examined, it can be said that its quality is determined by certain specific features, and its properties define the achieved level of quality according to set standards. Thus, according to the definition of quality in accordance with ISO 8402 „*quality is a set of properties and characteristics of products, processes or services that relate to the possibility of meeting the established or indirectly expressed needs*“.

Quality management of maritime transport services implies the design and implementation of all necessary activities based on the analysed needs of service users, whose main goal is to achieve profitability, competitiveness and the corresponding position in the maritime transport market. The notion of quality of maritime transport services can be observed from several aspects:

- Research, analysis and identification of the requirements of potential users of maritime transport services;
- Ensuring all necessary prerequisites for the effectuation of the services taking place in accordance with the designed service characteristics and the application of information technology;
- Provision of services in accordance with the defined characteristics of maritime transport;

<sup>5</sup> Krakar Z., Quality management (in Croatian), Infotrend (Internet). 1993 July (cited 2014 May 15); Available on: [http://kvaliteta.inet.hr/t\\_it12.htm](http://kvaliteta.inet.hr/t_it12.htm), pp. 34-35

<sup>6</sup> Stevenson W.J., Production/operations management, 4th ed. Boston: Irwin, Homewood; 1993, p. 96

- Analysis and control of the achieved level of quality in the complete transport chain from the sender to the recipient and taking preventive measures, adequate measures and procedures in order to meet users' requirements.

In accordance with the above, the quality of maritime transport services can be defined as „*the totality of features and characteristics of the transport infrastructure, traffic superstructure and conditions of carriage of goods (cargo, material goods), people and energy on which depends their ability to satisfy express or expected (assumed) requirements and customer needs*“.<sup>7</sup> From the aspect of maritime transport, transport infrastructure and traffic superstructure relate to the ships and the port infrastructure as the place of acceptance of these vessels in terms of performance of commercial operations, i.e. loading / unloading of goods, people and energy. Furthermore, the quality of maritime transport services can be analysed from two basic standpoints:

- Quality of processes that take place within a navigation system in maritime transport;
- Quality of maritime transport services from the perspective of users.

### 3. ROLE AND IMPORTANCE OF A SYSTEMATIC APPROACH IN THE STUDY OF QUALITY OF MARITIME TRANSPORT SERVICES AND ITS FACTORS

In today's competitive environment of maritime transport of people and / or cargo, the nature of maritime transport services requires quality that is geared toward continuous development and improvement and whose fundamental objective is the maximization of business efficiency. This means that the improvement of the quality would at the same time lead to the growth of profit and competitiveness, as well as increased productivity, efficiency and profitability.

A systematic approach is a fundamental prerequisite in researching quality in the context of maritime transport services. This is primarily due to the fact that, in its nature, maritime transport is a complex stochastic system interacting with other transport systems, within which there are a large number of entities directed towards the same goal: quality and safe transport of passengers and / or goods.

The basic principles of a systematic approach that are applicable to the study of the factors contributing to the quality of maritime transport services are:<sup>8</sup>

- *Principle of complexity* – applicable to complex and adaptive systems such as the system of maritime transport. It is based on the interaction and intercon-

<sup>7</sup> Poletan-Jugović T., A contribution to the definition of transport-logistics services offered on a transport route (in Croatian), Pomorstvo. 2007 Dec; 21(2): p. 97

<sup>8</sup> <http://www.ritam.hr/index.php/blog/53-poslovni-informacijski-sustavi/149-projektiranje-informacijskih-sustava>, (cited 2015 July 23 )

nectedness and conditionality of all the factors that define a maritime transport service. The principle of complexity is applicable to research of the causes and consequences as fundamental determinants in measuring service quality.

- *Principle of unity* - implies the comprehensiveness of subsystems and all the elements that define the system of maritime transport as an integrated, dynamic and stochastic system. This principle is reflected in the fact that when defining the quality of maritime transport services, all the factors and changes that determine its final effectuation should be included.
- *Principle of dynamism* – the system of maritime transport is a complex dynamic system, flexible and dependent on a large number of elements that define it and affect its proper functioning. The elements or factors of the system are mutually dependent variables. Change in one element or factor affects the functioning of other elements, factors and the system as a whole.
- *Principle of interdisciplinarity* – sea transport is an interdisciplinary branch whose implementation is made possible through the interaction of a large number of aspects such as: the national economy, the international market, social and political aspect, international environment, etc.
- *Principle of orientation towards decision-making* – under the influence of technological development and constant changes in global economic trends, contemporary international maritime transport has to continually improve and develop the quality and efficiency of its services to the satisfaction of numerous users in the transport chain. It is therefore extremely important to make optimal decisions in terms of systematic and integrated management of flows of goods and services in the transport chain. Planning logistics and controlling the processes that take place during navigation can significantly decrease the waiting time of the ship during loading / unloading operations, and accordingly, the ship's stay in the port.
- *Principle of self-organization* – the system should be organized in a way that it is adaptable to the changed conditions on the market. For this purpose, the maritime transport system should have the ability to self-organize and adapt to the changes in the environment and the changes in user requirements of maritime transport services, in order to keep its own stability and elasticity without external intervention.
- *Principle of openness* – assumes connecting the maritime transport system with other systems, for example with the system of rail or road transport, i.e. the possibility of unifying transport services in a multimodal or intermodal concept.

Given the importance of quality in the process of producing goods and services, which is one of the basic measures of success of any modern enterprise, special importance is given to a systematic approach as a method of complete review of the research topic. A systematic approach in determining the dimensions of quality and measures

of quality is important because its implementation achieves a better level of quality of maritime transport services. A systematic approach also creates a space for continuous improvement leading to increased customer satisfaction with the services, and consequently creates confidence that the organization is able to provide high-quality and safe services.

## **4. DETERMINING THE FACTORS OF QUALITY OF MARITIME TRANSPORT SERVICES**

### **4.1. Dimensions and measurability of the quality of maritime transport services**

In order for the client and user to recognize their quality, it is necessary to specify the dimensions of the quality of maritime transport services. The most common are measured by using different models and methods.

To this end, we investigate and examine expectations and user satisfaction, in order to determine the degree of customer's satisfaction during a specific time interval. The models and methods for achieving this include:<sup>9</sup>

- Contacting clients;
- Surveying clients about the value and its dimensions;
- Analysing value for clients.

In contemporary research, the most commonly used quality model is SERVQUAL which was identified by Parasuraman, Zeithmal and Berry in the year 1985. According to those authors, the quality of service is defined as the relationship between expectations and perceptions. If customer perceptions are consistent with their expectations, the customers are satisfied; if there is a statistical difference between perceptions and expectations in a way that the perceptions are exceeding expectations, the customers are "delighted". If it is statistically determined that expectations are greater than the perceptions, the customer is dissatisfied.<sup>10</sup>

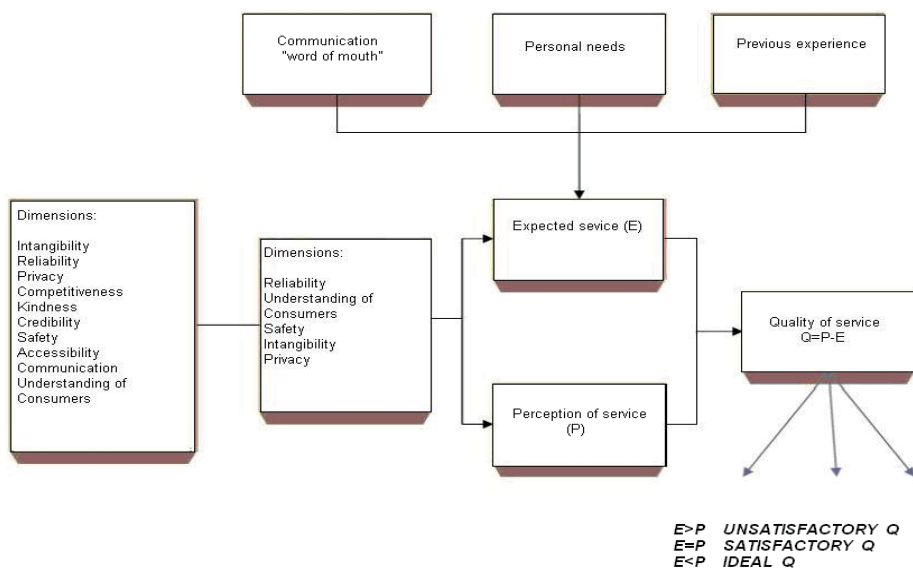
The first phase of research using the SERVQUAL model refers to the qualitative research which includes users of services themselves. The second phase of the research deals with putting in place the model of service quality in terms of service users, and developing a methodology for measuring the quality of service. The third phase of the research focuses on one part of the model of service quality that deals with service pro-

<sup>9</sup> Marković S., Service Quality Management Measurement in Hospitality Industry – Attributive Approach (PhD thesis, in Croatian), Opatija, Croatia: University of Rijeka, Faculty of Tourism and Hospitality Management Opatija; 2003, pp. 77-78

<sup>10</sup> Kulašin Dž. Contribution to the development of methods of measuring customer satisfaction with services of high school according to ISO 9000:2000 (Master thesis, in Bosnian), Zenica, Bosna and Hercegovina: University of Zenica; 2004, (Internet), (cited 2015 April 14), Available on: <http://www.pravos.unios.hr/katedra-metodolosko-informacijskih-znanosti/statistika-i-pravna-informatika>

viders, and as such is the most complex. The fourth phase of the research refers to the concept of “quality expectations” that shows how clients shape their expectations and which are the most important influences on this process.

**Figure 1:** Dimensions of the SERQUAL measuring instrument



Source: Kilibarda M., Quality management in logistics, Faculty of Transport and Traffic Engineering, University of Belgrade, 2007, page 27.

The SERVQUAL model puts in place five most important dimensions for determining the quality of services that are applicable in the field of maritime transport. (Figure 1):

- *Reliability* – Reliability is assessed according to the final result of the services received and is defined as the ability to provide the contracted services responsibly, accurately and according to professional rules. In the context of maritime transport services this would mean a fixed timetable with liners, safe transport of cargo from the port of loading to the port of disembarkation to the satisfaction of the client, transport in an optimal timeframe and responsible, professional and safe loading / unloading of cargo in ports;
- *Confidence* – Knowledge, professionalism and courtesy of maritime and administrative staff and their ability to inspire feelings of security and trust to customers;
- *Tangibility* – Continuous maintenance and modernization of the fleet, ship's facilities, navigation and communication equipment, provision of vocational

training and continuous training of personnel on ships and in shipping companies;

- *Affability* – Individualized attention to customer service;
- *Identification* – Willingness to help service users through a quick transport service. This dimension of service means the provision of appropriate level of care and of individual attention to the client.

Based on the above dimensions of quality in the modern competitive environment, the quality of maritime transport services and their factors should be geared toward development and improvement thanks to a systematic approach taken by the management structures.

#### **4.2. Unique factors of quality of maritime transport services and their specificities**

Shipping organizations transporting people and / or cargo in conditions of modern global economy must be competitive. Competitiveness is an important factor which determines whether one shipping company prospers, merely survives or goes bankrupt. In the competitive environment of the maritime transport market, the concept of quality of service is given its full meaning. In such a situation, the interests of service providers and users, who are often perceived as conflicting, are coordinated and synchronized. By analysing the structure of individual factors of the quality of maritime transport services, customer expectations with regard to the quality of services offered can be established and evaluated.

Starting from the structure of a maritime transport service and its role within a complex system such as sea-transport, we can extract several basic factors that characterize the quality of the services concerned. These are:<sup>11</sup>

- a) Organizational factors of the quality of maritime transport services:
  - Spatial and temporal availability of maritime transport services;
  - Human Resources Management and Investment;
  - Market information – information about customer service, competition, fare trends;
  - Quality Policy and Quality Management – standards and levels of quality.
- b) Technical and technological factors of the quality of maritime transport services:
  - Speed of transportation – duration of voyage;
  - Transport capacity – carriage capacity and available tonnage.

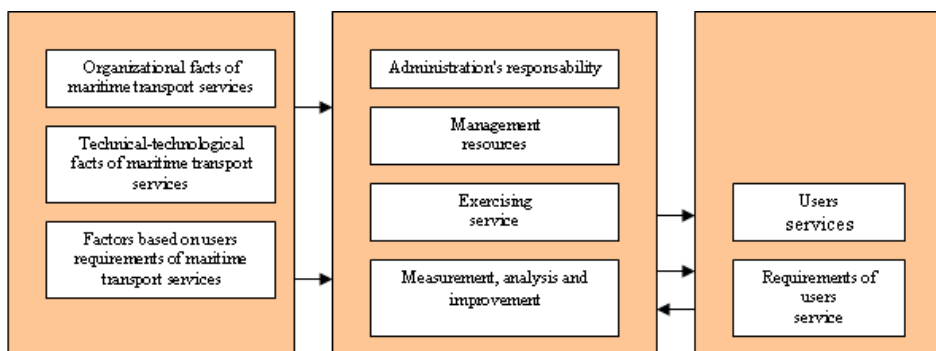
<sup>11</sup> Kolanović I, Dundović Č, Jugović A., Customer-based port service quality model (in Croatian), Promet – Traffic&Transportation. 2011 Nov; 23(6): p. 496



c) Factors of quality based on user requirements of maritime transport services:

- Regularity, accuracy and frequency of transport;
- Comfort and safety of transportation.

**Figure 2:** Systematic presentation of the links between the factors of quality of maritime transport services, the quality of the management process and service users



Source: Kraš A., Sviličić B., Čovo P., Access to quality management activities of the Department of Transport and Maritime Affairs of the University according to ISO 9001:2000, University of Zadar, 2007, page 19.

The figure above gives a systematic presentation of the links between these factors, the quality of maritime transport services, the quality of the management process and service users. The implementation of a systematic approach to the establishment and implementation of a quality management system consists of several stages, namely:

- Identification of fundamental factors that define the quality of a maritime transport service;
- Determination of the quality policy and quality objectives and responsibilities for achieving them;
- Identification of business processes for achieving the objectives of quality;
- Identification and management of resources necessary for achieving quality;
- Determination of the needs and expectations of service users;
- Identification and implementation of methods for the analysis and measurement of customer expectations and improvements.

#### *4.2.1 Spatial and temporal availability of maritime transport services*

The importance of these factors is reflected in the availability of maritime transport services to customers. Maritime transport is one of the most internationalized activities in the global industry, and that means that maritime transport services, in its spatial comprehensiveness, encompass the world market for maritime transport and world ports. In this sense, a high level of quality and efficiency is expected of maritime transportation, since the sea is also a natural eco-system. Moreover, maritime transport roads are not man-made, unlike the roads in other modes of transport. They are natural and passing through seas and oceans. Some of these maritime waterways are artificially constructed, such as the Suez, Panama, Kiel or the Corinth Canal. There is freedom of movement at sea routes, which is somewhat limited by various regulations or natural phenomena.<sup>12</sup> Basic characteristics of maritime transport in terms of its spatial accessibility are the following:

- The sea, as a great shipping route, connects the whole world;
- The sea, as a natural shipping route, does not require special investments;
- Hundreds of types of cargo can be transported by sea.

It is important to emphasize the geographic fact that maritime transport connects all the world seas, while continents themselves are nothing more than large islands that rise from one single sea. If there were no ships, numerous islands and whole continents would be completely isolated and inaccessible, as they actually were once upon a time in the human history. After the great geographical discoveries, the sea as a former insurmountable natural barrier has become an ideal natural route, which connects all the parts of the world accessible by sea. Moreover, sea routes are often the best connection between areas of land, because often even longer sea routes have fewer obstacles than various land routes with barriers such as mountain ranges, deserts, etc. It is then natural that maritime transport today has a dominant significance in foreign trade. About three quarters of the world's international trade is conducted by sea. This basic fact reflects the specific functions of maritime transport and its quality in comparison to other types of transport.

In addition, maritime transport services are time-unlimited since they are performed continuously and without interruption, and are based on established navigation timetables (in passenger shipping or line cargo shipping) or on contracted terms of navigational work between charterers and owners / ship managers, meaning that the ship's arrival in the port and laytime are important elements of the fixture (in tramp shipping). The conclusion is that one of the most important features of the services is the ability to contract transportation from / to any world port or at any period in accordance with the interests of the users of these services.

---

<sup>12</sup> Drokán, I., Basics of transportation and traffic, (Internet), (cited on 2015 July 26) Available on: <http://bs.scribd.com/doc/190519003/Osnove-Prijevoza-i-Prijenosa-POU#scribd>, pp. 6

#### 4.2.2. *Human Resources Management and Investment*

It is believed that the development and sustainability of a maritime economy depends largely on the professional staff involved in the implementation of maritime transport services, regardless of whether human resources at sea or on land are concerned. Efficient and competent workforce demands high standards of professional education and professional development in order to meet the customers' needs. In order to meet the needs of the maritime industry from the aspect of human resources, close cooperation between the shipping industry, universities and shipping companies are simultaneously required at all levels of training and education.

The capital of a shipping company includes its professional staff, its leadership and its market position. Therefore, the main task of any well-organized company management is to be surrounded by the best and the most qualified people, so that high-quality service can be provided to the client. In doing so, it is necessary to monitor and study the overall quality of the people in the maritime industry. Their quality should conform to international regulations and public pressures that demand high performance standards during the implementation of maritime transport services.

Human resource management is an integral part of the function of managing the organization and is defined as the process of forming and directing human knowledge, ability and will as a response to the demands resulting from the organization's objectives. In modern business, the quality of human resources is a fundamental component of quality in many sectors, including maritime transport. Personnel performing this work affect the quality of the service (crew and administrative staff in offices ashore) must be capable and competent and have appropriate education, training, acquired skills and experience. In this regard, it is necessary to:

- Establish necessary qualifications and competences for personnel doing work that affects the quality of services;
- Provide training or take other measures to meet those needs;
- Evaluate the effectiveness of initiated measures and ensure that personnel is aware of the significance and importance of their work and how this contributes to achieving the objectives of quality;
- Keep appropriate records of education, training, acquisition of skills and experience.

Furthermore, maritime companies need to develop a broad and comprehensive system to motivate employees and take into account all the different individual needs and aspirations, and develop a variety of mechanisms to fulfil them. A high-quality motivational system must satisfy the following requirements in terms of human resources of a shipping company:

- Maintain highest quality professionals;
- Ensure effective execution of tasks;

- Foster creativity;
- Develop an interest in the development of the enterprise.

On the other hand, the development of maritime shipping, its renewal and constant growth takes place thanks to investments. The ship is the basic capital resource in maritime transport. It means that in a highly competitive shipping market, a shipping company has to renew and technologically modernize its fleet in order to survive and offer high-quality transport service. As the market demand and supply of maritime transport services is highly variable and occurs in irregular cycles, the degree of investment risk is high compared to other branches of economic activity. The issue of investment in maritime transport is related to defining the type of vessel in which to invest and estimating the best time to invest. The optimal solution to these two parameters directly reflects on the quality of the maritime transport services in terms of fleet modernization and modernization of equipment on ships.<sup>13</sup>

Investment is the process through which the product range adapts to real market needs and the needs of service users, technical obsolescence is bridged, work productivity is increased, costs per unit of output are lowered and the quality of maritime transport services is directly affected. If an organization on the maritime market wants to stay and be competitive, it must be subject to investment. The decision as to when and in what to invest has a dual character. First, investment is a long-term business decision and second, investment is associated with high financial resources and represents a capital cost of a company.

#### *4.2.3. Market information – information about service users, competition and freight market*

In the midst of continuous changes in the environment and the state of the maritime economy, which have a direct impact on business processes within maritime organizations, they themselves have to hold fast, accurate and efficient flows of information that can provide relevant information necessary for the adoption of optimal decisions.<sup>14</sup> These flows of information in the field of maritime affairs supported by electronic technology can have a wide practical application through:<sup>15</sup>

- Information on the movement of vessels (information about the position of ships, their ports, commercial operations, ship's expenses on voyages, etc.);
- Information about ship's management (information about ship's voyage, information about necessary maintenance, information about ship administration, etc.);

<sup>13</sup> Domijan – Arneri, I., Investment risks in shipping, Naše more, Vol.51, 2004, No 3-4, pp. 81-82.

<sup>14</sup> Tazović, J.: Ship exploitation (in Croatian), Dubrovnik, University of Dubrovnik, Faculty of Maritime Studies in Dubrovnik; 1989, p. 257

<sup>15</sup> The same source as under 14, p.259

- Information about trade flows for the main bulk cargo – cargo flows can be determined on the basis of their embarkation and disembarkation ports, countries or regions within very short intervals;
- Information related to the situation on the current freight market;
- Information related to international trade, import and export of some countries and areas, regional integration, international agreements, international rivalries, financial requirements of international trade, policy interests, etc.;
- Various competitive analyses that provide a ship operator with a good basis for negotiating optimal cargo under optimal conditions;
- Information about procurement of new ships;

Analysis of users of transport services in the research area without studying the maritime market would not be complete. Studying clients (namely shippers and charterers) and their needs is considered a fundamental research that contributes to the quality of service. The specificity of analysing users of maritime transport services is that they are not the final consumers of the goods, but owners of the goods appearing in the ports of loading / unloading. Furthermore, it is necessary to analyse the movement of cargo in order to identify transport needs (in-line, classic, container, bulk or tanker transport), as well as which ports are most acceptable for such transportation. The mentioned research provides data based on which a shipping company determines the market segments in which it can offer ship tonnage. Hence the need for checking the data on the shipper, the type of cargo, transportation routes and transportation dynamics, and for determining the optimal transport plans, which ultimately reflect on the regularity and accuracy of maritime transport services.

By taking into account the abovementioned factors, it is possible to assume the importance of timely information through the transmission, gathering and processing of the mentioned data and making optimal decisions in maritime transport. It improves the quality of maritime transport services in all business segments.

#### *4.2.4. Quality policy and quality management – standards and levels of quality*

Quality policy and quality objectives should be established in order to determine the direction a shipping company is to take. They determine the desired results and help the organization use all of its resources to achieve them. Quality policy provides a framework for the establishment of quality objectives, and the objectives themselves have a positive impact on service quality, operational efficiency, financial performance and customer satisfaction. Quality policy of a shipping organization includes the systematic quality management of its maritime transport services.

The speed and complexity of today's transport systems, such as the maritime transportation system, require high-quality process management systems, with highly developed structures and a high prevalence of information technology. In quality the-

ory, this requirement is known as TQM (Total Quality Management), which represents the integration of all processes (in this specific case, in foreign maritime transport services), in time and space coordinates. According to author Hrvoje Skoko *“total quality management is the concept and system that is based on the philosophy which presupposes a comprehensive way of improving and promoting quality, as well as other performances, and which can be achieved by researching and continuously improving each process within the entire organization, while activities to that end take place in a systematic, integrated and consistent manner.”*<sup>16</sup> In quality management theory, there are eight basic elements of the TQM model, which are also applicable to shipping companies and whose optimal management leads to business success of the shipping company. These are the following elements:<sup>17</sup>

1. company policy and strategy;
2. commitment (attitude) of the administration;
3. commitment of all employees;
4. making use of resources;
5. management of processes;
6. satisfaction of customers and users;
7. positive impact on society;
8. achieved improvement and business success.

More specifically, the requirements of TQM in maritime transport include the following levels of quality management:

- Higher level of quality of transport infrastructure;
- Higher level of quality of ship tonnage and loading / unloading machinery in the ports;
- Existence of applied standards and declarations as regards the safety of passengers, goods and environmental protection;
- Wide use of standardized units for storage, packing and distribution of cargo (intermodal units) which are in line with the model of standardization;
- Standardisation in accordance with the requirements of the ISO 9000 series (9001, 9002, 9003), and ISO 14000, as well as new standards specifically related to transport (QS, TE, TS), and a sound national policy regarding the certification of standards of quality;

<sup>16</sup> Skoko H., Quality management (in Croatian), Zagreb: Sinergija d.o.o.; 2000, pp. 89-90

<sup>17</sup> Marković S., Service Quality Management Measurement in Hospitality Industry – Attributive Approach (PhD thesis, in Croatian) ), Opatija, Croatia: University of Rijeka, Faculty of Tourism and Hospitality Management Opatija; 2003, p. 117

- Respect and recognition of the requirements of users of maritime transport services with the aim of creating opportunities for profit and high-quality services.

In the maritime transport market, the implementation of total quality management has led to a higher level of quality of transport services and their factors, in terms of:

- Better utilization of the advantages of certain types of maritime transport (use of those modes of transport which are, according to their technical and exploitation characteristics, closest to the design requirements of users);
- Need for a better connection of a large number of senders and recipients of services which are spatially dispersed;
- Need to reduce transport costs;
- Protection of the sea and the environment, in particular from transport pollutants and negative effects of transport of dangerous goods by sea;
- Greater reliability and safety of transportation of people and/or cargo and delivery of goods;

#### *4.2.5. Speed of transportation – duration of voyage*

This is an important factor for users or clients in maritime transport who want to sell their goods on a particular market and have specific dates of arrival of their goods at the port of discharge. Users select the fastest available service and reduce to a minimum the time interval between the time of order and time of delivery to a particular market.<sup>18</sup>

Speed of transportation is a factor that can be viewed from two perspectives, namely: the speed of transport which can be accomplished on the basis of technical and technological characteristics of the ship and the commercial speed of transport by which the goods and / or passengers are transported from origin to destination. If commercial speed is closer to the speed of navigation, technical and technological characteristics of the ship and the quality of transport organization come to the fore, which includes keeping the ship in ports and the entire process of loading and unloading cargo. Thus, when it comes to the speed of transport, the importance of reducing unproductive time in ports should be taken into account as well, which influences the increase in productivity of transport systems and reduces transport costs.

Speed, as a factor of quality of maritime transport services is also a relative term, since it does not have the same importance and the same evaluation criteria in all sectors of maritime transport. For example, the speed of maritime transport services is a critical quality factor in scheduled line passenger and cargo transport, but may not be decisive in the implementation of services in tramp shipping where cargo freight con-

<sup>18</sup> Tauzović J., Ship exploitation (in Croatian), Dubrovnik, University of Dubrovnik, Faculty of Maritime Studies in Dubrovnik; 1989, p. 25

tracts are made on the free market. Of course, the time of delivery of goods is always an important quality factor, but in tramp shipping it is more susceptible to flexibility and elasticity than in the case of liner services where ships must be in ports at a specific time and load / unload cargo at a precisely determined time.

#### 4.2.6. *Carriage capacity and available tonnage*

The ship's basic technical and economic unit in providing maritime transport services is the capacity of the ship, which is expressed through deadweight cargo capacity expressed in metric tons and total or the volumetric capacity of the ship, expressed in cubic meters. Regardless of the type of capacity, the exploitation capacity of the ship is always expressed as a function of time in which a ship accomplishes a commercial operation. The ratio of the actually transported cargo and the exploitation capacity of a ship in a given time period (usually one year) is called the utilization coefficient of the ship. This coefficient is a common indicator of productivity of a ship during its commercial exploitation.<sup>19</sup>

Monitoring economic success in shipping is also connected to the total ship tonnage that is available on the market. The amount of shipping space that is available on the shipping market dictates at the same time the prices on the market of maritime transport services, and is an important factor of a ship's commercial employment, since the existence of a large number of ships that compete for cargo shippers fosters competition on the market.

In shipping economics, the demand for maritime transport services, and the demand for shipping capacity is the result of various factors, the most important being:<sup>20</sup>

- Shipping distance;
- Size and structure of the world trade;
- Ships' productivity;
- Incentives for certain types of cargo;
- Amount of raw material stocks possessed by main importers.

As a service industry, maritime transport should always be able to provide services in line with demand, although the demand for maritime transport services changes frequently and unpredictably. The present state of world's ship tonnage is estimated to be sufficient to satisfy the highest level of demand for maritime transport, either in absolute terms or through the use of replacement tonnage. This directly reflects on the quality of maritime transport services, which means that a shipping company should at all times be ready and able to offer its tonnage or replacement tonnage for transport of certain types of cargo, and thus respond and arrange cargo transport promptly and to the satisfaction of all parties in the maritime business.

<sup>19</sup> Tauzović J., Ship exploitation (in Croatian), Dubrovnik, University of Dubrovnik, Faculty of Maritime Studies in Dubrovnik; 1989, pp. 114-115

<sup>20</sup> The same source as above, p. 50



#### *4.2.7. Regularity, accuracy and frequency of transport*

Regularity and accuracy of transport means the ability to effectuate the contracted services regularly, accurately, responsibly and according to professional rules. In particular, regularity of transport means the quality of transport with respect to its implementation during a specific time period (day, week, month, or year), and transport accuracy means respecting the established timetable. For example, this would mean a fixed timetable with liners, safe transport of cargo from the port of loading to the port of disembarkation to the satisfaction of the client and in an optimal timeframe, as well as responsible, professional and safe loading / unloading of cargo in ports. On the other hand, frequency of transport affects the sale of goods in smaller quantities in certain markets.

Aside from the factors such as speed, safety and convenience of transportation, the literature on transport technology stresses important factors such as regularity, accuracy and frequency of transport. Due to the fact that a transport service is a product exchanged on the market, in this case the shipping market, it must be designed in a way that is acceptable to that market. In this sense, regularity, punctuality, frequency, safety, comfort and speed of transport are “designs” of that product, signifying the quality of that service. These factors are often taken as criteria for comparison between exploitation willingness and abilities of transport sectors in the transport system.

Since maritime transport services include loading and unloading of passengers and / or goods, its regularity and punctuality implies the regularity and accuracy of the process of loading and unloading. Depending on whether we are dealing with passenger or cargo shipping, this calls for respect of the agreed date of arrival, ship boarding, contractual norms of loading / unloading cargo, minimizing the ship's stay in port, etc. All this determines a maritime transport service as regular or irregular, prompt or delayed, and affects the level of its quality.

#### *4.2.8. Comfort and safety of transportation*

Comfort and safety of transport are, among other factors, also important for achieving an optimal level of quality of maritime transport services. However, while transportation safety is not a factor of economic nature, the category of comfort is required mainly by customers with a higher standard, in the field of tourist or business travel. Comfort of transport, as a factor of quality of passenger transport is a collection of impressions and feelings passengers have and is the result of effort and capabilities of the provider to meet their needs during the journey.

Furthermore, the quality of maritime transport services in the broad sense is closely related to the safety of services. Safety of service is in fact the minimization of the level of risk for people and goods in the course of transportation. This important factor is affected by three main factors: the human factor, the ship as a means of transport and the demands of the waterway. The human factor is the most important factor that affects the safety of travel, because people manage and maintain the ship as a means of

transport, use and maintain the waterways and comprehensively manage the traffic. Safety of transport is never absolute because of the human factor. One of the main tasks of the carrier is to provide maximum safety during transport of passengers and goods. Safety of transport can be viewed from three aspects: safety of the personnel performing transport as part of their professional duties, safety of passengers and goods being transported, and environmental safety.

Safety of maritime transport services and the safe navigation of the sea is certainly a separate area of research. In 1993, the International Maritime Organization (IMO) adopted the ISM Code – International Management Code for Safe Operation of Ships and for Pollution Prevention within Resolution A.741.<sup>21</sup> The ISM Code is primarily aimed at ensuring safety at sea, protecting human lives, preventing pollution of the sea and the seabed. On the other hand, shipping organizations implementing quality systems such as ISO 9001, which is one of the most widely used standards for quality management, directly control and improve the quality of their maritime transport services. This control covers all aspects of the organization of work in the administration and on ships, and is based on identifying problems, defining them, carrying out education, prevention, implementing procedures, preparing documentation, eliminating non-compliance, and implementing quality systems to the satisfaction of service users and other operators in the transport chain.

Thus, the introduction of quality in shipping, the implementation of the ISM Code, as well as its improvement and maintenance is the primary task of the control performed by the management of each shipping company in order to minimize the level of risk from maritime accidents.

Given the global reach of maritime transport, it is necessary to mention that the International Maritime Organization (IMO) developed international standards that comply with national legislations of maritime countries. The most important are: International Convention for the Prevention of Pollution from Ships (MARPOL), International Convention for the Safety of Life at Sea (SOLAS) and International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW Convention).

## 5. CONCLUSION

Complex conditions of competition prevailing in the maritime economy affect continuous improvement of the quality of maritime transport services, both in terms of modernizing and increasing the available tonnage for transport of passengers and cargo, and in terms of setting clear management strategies and development plans within the maritime transport system. The processes that take place within this system are very complex and require a specific and systematic approach in researching them. They are

<sup>21</sup> Šamija S, Kolanović I, Dundović Č., Basic features of a systematic approach in quality management services in maritime cargo shipping, Proceedings of the International Conference IMLA 19. 2011 Sept 28 - Oct 01; Opatija, Croatia, p. 265

simultaneously based on the systematic study of all the factors of quality and safety of maritime transport services. Any well-organized shipping company has to optimally explore all the factors concerned in order to achieve the best result and optimal performance, to the satisfaction of all users. On the other hand, it is important to mention that some of the factors of quality can influence the formation of future demand for sea transportation in general, which more generally defines the national maritime potential of passenger and cargo transport.

Quality System Certification in maritime transport is a generally accepted way of proving to the buyer or partner that service requirements are met. Moreover, maritime transport includes a large number of participants in the maritime transport chain which requires the implementation of set quality standards and measuring the dimensions of quality in all aspects of maritime policy, taking into account all the factors that define maritime transport services. These factors can be of technical and technological nature, of organizational nature and conditioned by the requirements of service users. It is through a systematic approach and its application that existing problems in the implementation of maritime transport service can be perceived, and a high level of quality of maritime transport and each of its individual factors can be achieved. Finally, necessary measures for improvement can be introduced through this systematic approach. Consequently, whenever the expectations of customers in maritime transport are met, this results in their satisfaction, which in turn has many positive effects on the success of a shipping organization and beyond, on the entire national economy.

## REFERENCES:

1. Domijan – Arneri, I., Investment risks in shipping, *Naše more*, Vol.51, 2004, No 3-4, pp. 81-88.
2. Drokan, I., Basics of transportation and traffic, [Internet], [cited on 2015 July 26], Available on: <http://bs.scribd.com/doc/190519003/Osnove-Prijevoza-i-Prijenosa-POU#scribd>, pp. 6
3. Ivče, R., Kos, S., Gržinić, J., A contribution to the analysis of the ship's cost at port in order to improve the shipping services efficiency [in Croatian], *Pomorstvo*. 2009 June; 23(1): pp. 121-135.
4. Kilibarda, M., Quality management in logistics [in Serbian], Belgrade: Faculty of Transport and Traffic Engineering; 2007, pp. 27
5. Kolanović, I., Dundović, Č., Jugović A., Customer-based port service quality model [in Croatian], *Promet – Traffic&Transportation*. 2011 Nov; 23(6): pp. 495-502.
6. Kos, S, Šamija, S., Brčić, D., The impact of logistics systems performances on the quality of services in multimodal transport. *Proceedings of the 4<sup>th</sup> International Maritime Science Conference*. 2012 June 16-17; Split, Croatia, pp. 50-61
7. Krakar, Z., Quality management [in Croatian], *Infotrend* [Internet]. 1993 July [cited 2014 May 15]; Available on: [http://kvaliteta.inet.hr/t\\_it12.htm](http://kvaliteta.inet.hr/t_it12.htm), pp. 34-35

8. Kraš, A., Sviličić, B., Čovo, P., Access to quality management activities of the Department of Transport and Maritime Affairs of the University according to the ISO 9001:2000 [in Croatian], Zadar: University of Zadar; 2007, pp.19
9. Kulašin, Dž., Contribution to the development of methods of measuring customer satisfaction with services of high school according to ISO 9000:2000 [Master thesis].[in Bosnian], Zenica, Bosna and Hercegovina: University of Zenica; 2004, [Internet], [cited 2015 April 14], Available on: <http://www.pravos.unios.hr/katedra-metodolosko-informacijskih-znanosti/statistika-i-pravna-informatika>
10. Logistics – part II [in Bosnian].[Internet]., University of Sarajevo, Faculty of Traffic and Communication; [cited 2014 Aug 16]. Available on: <http://www.scribd.com/doc/23360161/Skripta-iz-logistike-II-dio>
11. Marković, S., Service Quality Management Measurement in Hospitality Industry – Attributive Approach [PhD thesis].[in Croatian], Opatija, Croatia: University of Rijeka, Faculty of Tourism and Hospitality Management Opatija; 2003, pp. 77-78, 117
12. Oslić, I., Approaches to competitiveness. Proceedings of 5<sup>th</sup> Croatian Conference on Quality, 2004 May 17-18; Šibenik, Croatia.
13. Poletan-Jugović, T., A contribution to the definition of transport-logistics services offered on a transport route [in Croatian], Pomorstvo. 2007 Dec; 21(2): pp. 95-108.
14. Radačić, Ž., Štefančić, G., Furlan, I., Defining the relevant factors affecting the regularity of tram traffic [in Croatian], Paper presented at: The Scientific meeting: Traffic problems of the city of Zagreb; 2006 June 12-13; Zagreb, Croatia.
15. Rubinić, I., Economics of shipping [in Croatian], Rijeka: University of Rijeka, The Faculty of Economics; 1976.
16. Skoko, H., Quality management [in Croatian], Zagreb: Sinergija d.o.o.; 2000, pp.86-91
17. Stevenson, W.J., Production/operations management, 4th ed. Boston: Irwin, Homewood; 1993, pp. 96
18. Šamija, S., Kolanović, I., Dundović, Č., Basic features of a systematic approach in quality management services in maritime cargo shipping, Proceedings of the International Conference IMLA 19. 2011 Sept 28 - Oct 01; Opatija, Croatia, pp. 261-269
19. Tauzović, J., Ship exploitation [in Croatian], Dubrovnik, University of Dubrovnik, Faculty of Maritime Studies in Dubrovnik; 1989, pp. 25-259
20. Vukčević, M., Bošković, D., Study on Logistic Factors Affecting the Carriage of Passengers by Sea, [in Croatian], Pomorski zbornik. 2003 May; 41(1): pp. 381-394
21. <http://www.ritam.hr/index.php/blog/53-poslovni-informacijski-sustavi/149-projektiranje-informacijskih-sustava>, [cited 2015 July 23]

## SUSTAVNI PRISTUP UTVRĐIVANJU ČINITELJA KVALITETE POMORSKO-PRIJEVOZNE USLUGE

Suzana Šamija<sup>22</sup>, Ines Kolanović<sup>23</sup> & Čedomir Dundović<sup>24</sup>

### Sažetak

*Predmet istraživanja ovog rada je utvrđivanje temeljnih činitelja kvalitete pomorsko-prijevozne usluge te analiza istih u cilju ispunjenja zahtjeva korisnika usluga. Činitelji kvalitete određuju željene rezultate usluga i moraju biti u skladu s politikom kvalitete koja je postavljena na razini jedne pomorske organizacije, regije ili pomorske zemlje općenito. Suvremena ekonomska previranja u gospodarstvu, proces globalizacije, nestabilnost svjetskog tržišta te kontinuirani pritisak konkurencije, uvjetuju visoke zahtjeve u pogledu kvalitete usluga i kreiranje sustavnog i upravljačkog koncepta unutar sustava pomorskog prijevoza. Doprinos ovog rada se očituje u implementaciji sustavnog pristupa kao ključnog uvjeta za istraživanje i analizu činitelja kvalitete pomorsko-prijevozne usluge u kompleksnom i dinamičkom sustavu pomorskog prijevoza, čija je osnovna svrha zadovoljenje zahtjeva i potreba korisnika usluga.*

**Ključne riječi:** pomorsko-prijevozna usluga, kvaliteta, sustavni pristup, činitelji kvalitete.

**JEL klasifikacija:** L91

<sup>22</sup> Suzana Šamija, doktorand, Pomorski fakultet, Sveučilište u Rijeci, E-mail: suzana.samija@gmail.com

<sup>23</sup> Dr. sc. Ines Kolanović, docent, Pomorski fakultet, Sveučilište u Rijeci, E-mail: ines@pfri.hr

<sup>24</sup> Dr. Čedomir Dundović, redoviti profesor, Pomorski fakultet, Sveučilište u Rijeci, E-mail: dundovic@pfri.hr