

# CRITERIA ESTABLISHMENT FOR EVALUATION OF COUNTY AND LOCAL PUBLIC PORTS MANAGEMENT SYSTEM

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Received: July 8, 2018

Received revised: August 22, 2018

Accepted for publishing: August 23, 2018

## *Abstract*

This paper aims to establish criteria appropriate for evaluation of county and local public ports management system in the process of selection of an appropriate management system for different port authorities within coherent national port governance system. Different functional development directions of county and local public ports are defined together with four different development directions on the field correlated with four analysed groups of end users. Four main groups of criteria (economic and financial, functionality, prioritization, successfulness) are developed encompassing 10 different criteria in total. The accent is given to successful fulfilment of county and local port services while in the same time achieving wider direct and indirect economic and social effects. The importance of adequate modelling and selection of optimal model for management of county and local public ports is emphasized together with the necessity to adequately evaluate effects of possible development models and directions.

**Key words:** port, management, SMEs, criteria, evaluation

## 1. INTRODUCTION

Development of ports, especially development of county and local public ports (ports that are of county and local importance) can be perceived through an overview of their developmental role in the overall economic and social life of the region and the local community. Such approach to development direction through the analysis of the port role requires planning of port development in accordance with the planned

economic development of its surroundings, or hinterland of the port, so the management system must be successful in realizing set objectives of port development.

Functional approach to management and development of the port is based on a concept of multiplicative effect of the port, with port being the generator of socio-economic development of the surrounding area, or economic and other activities in the area. Modern development of county and local public ports is significantly influenced with modern economic and social development. Unlike national public ports dominantly oriented on freight and/or passenger transport in large scales, county and local public ports are dominantly oriented to local economic and social environment in order to fulfil vast majority of different expectations from different stakeholders. Recently, with strong growth of nautical tourism there is also a significant pressure on county and local ports generated through significant increase in demand for nautical berths, and this also brings collision of interest with local population primarily exploiting municipal berths within the limited port areas. The pressure on county and local public ports to satisfy different demands and expectations is very high, especially considering their, often present, prominent role in social and economic life of local urban places and municipalities. Such a pressure brings a strong need to select best possible county and local public ports management system capable to successfully and productively address complexity of requirements and achieve desired governing and management goals.

## **2. THEORETICAL BACKGROUND AND DEVELOPMENT ORIENTATION APPROACHES**

As complexity of port systems governance and management continuously rises, significantly as a result of increasing pressure from transport and tourism growth, demanding an increasing amount of more and more specialized port services, it is also an interesting research area for scholars trying to shed some light on demand driven port development in conjunction with surrounding area. Different transportation research frameworks and their applications has been studied (Murphy et al., 1992.) as well as application of multi-criteria analysis in port system (Notteboom, 2011; Zavadskas et al., 2015; Duran et al., 2017; Nyunt & Kim, 2017). Researchers were also focused on sustainability criteria (Lim et al., 2013) and integrated multiple criteria preference ranking (Ke et al., 2012) addressing ports congestion problems. Evaluation and categorization of fishing ports, as specialised ports, has been studied by Onden et al. (2017) dealing with spatial and non-spatial characteristics, while Grosso & Monteiro (2008) were focused on investigating main factors and criteria influencing the decision of choosing a container port. The port authorities' perspective in the European short sea shipping market was also analysed (Paixao Casaca et al., 2010) demonstrating importance of port choice for development. Recent research attention was also given to benchmarking of dry ports in Europe (Oláh et al., 2018) as well as to customer satisfaction in ports (Filina-Dawidowicz & Gajewska, 2018) regarding port service complexity and quality (Bendeković et al., 2010; Vojković et al., 2016).

General functional development directions of county and local public ports (Kesić, 2003; Jugović, 2012; Kesić & Debelić, 2014) focused on improving local and wider regional community can be defined as follows:

- Port used by public transport, including air traffic;
- Port used for communal purposes (municipal berths for local population);
- Port used by fishermen (fishing vessels berths with loading /unloading capacities);
- Port used by nautical tourists (nautical berths, seasonal and/or transit);
- Port as the key point (node) of the transport route;
- Port as the heart of an urban area (cultural heritage);
- Port used for industrial purposes.

Port used by public transport (Jugović, 2012, 2008), including air traffic, is a functional development direction of ports open to public traffic of county and local importance focused on development of public liner passenger transport or airline transport by hydroplanes. Such a role of the port, or its developmental direction, relates to investments (tangible and intangible) in development of the port that will meet technical, technological and organizational requirements for line transport, connecting coastal area and island places.

Port used for communal purposes primarily meets the needs of local population for municipal berths. Such developmental direction is accompanied by all other activities closely related to the life and work of the local population by the sea and at sea, or exploitation of the coastal area and the sea, such as fishing for personal needs, tourism activities, maritime transport of passengers for shorter distances, development of services related to maintenance and repair of boats, sports and other activities (Kesić & Debelić, 2014).

Port used by fishermen meets the requirements of the professional local fishermen for berths and ancillary port services, providing appropriate placement and maintenance of fishing vessels, as well as transshipment of fish and other seafood (Kesić, 2003). This developmental direction focuses on the role of the port in the overall economic development regarding the infra and superstructure, as well as organization of port business aimed at providing the full port service and additional services of catch manipulation and its marketing. The basic purpose of such developmental direction is to improve competitiveness of fisheries and develop new production and processing capacities of fisheries and other marine products.

Port used by nautical tourists (on annual, seasonal and/or daily basis) is a functional development direction focused primarily on providing structures and facilities for accommodation of nautical vessels and providing additional accompanying services to yachtsmen, berth users, in order to create a higher level of the added value of the port itself, its surroundings and of tourism economy. Such developmental direction is linked to the accommodation of nautical vessels, which take up the greater part of such port's capacity, with special emphasis on the use of available capacities in the summer months (tourist season) for provision of transit (daily and several-day) mooring. Additionally, such development approach also includes the use of berths for smaller vessels used for tourist rentals on a half-day, daily and/or several-day basis. Overall, considering this developmental direction, it

can be deducted that it is primarily focused on the role of the port in development of nautical tourism and its use as the level for development of the local area by supporting other tourism services such as catering, maintenance and repair services for tourist boats, lifting the boats out of the sea and lowering them into the sea, underwater washing, etc.

Port as the key point (node) of the transport route (Debelić et al. 2016, 2015) represents a developmental direction focused on connecting the land and island road system using ro-ro ships. In this functional developmental role, the port is primarily focused on meeting the requirements of scheduled ferry routes, connecting key county roads, with the development of accompanying port and non-port services which are primarily focused on meeting the needs of passengers who are waiting for transport.

Port as the heart of an urban area, or port as cultural heritage of an urban area regards the developmental direction and functional role of the port seen as the need to preserve the way of life of the local population, which is tightly connected to the port that is also the central point of an urban area and one of the key points of social life, both in terms of appearance and functional integrity of the place, and in terms of the wider social context of life and work of the local population, from cultural, recreational, sporting to religious and socially-connected values that are connected to the sole and significance of the port to a particular urban area (Jugović, 2007). In this regard, the port must be viewed as one of the key components of the overall style of life and work, and developmental direction must focus on preservation and "smart" protection of the above mentioned social values of the local population, i.e. community as a whole. Of course, the developmental component is needed and highly necessary, and "status quo" approach is inappropriate. In this case, development must be considered and implemented through preservation and protection of the port area, enriching the overall offer and stature of the port, strictly considering the respect for the existing functional integrity and long-term sustainability of the port as the centre of the urban area.

Port used for industrial purposes regards the direction of overall port development which is focused on satisfying the needs of local and regional industry, primarily processing industry and usually of smaller capacity. In this regard, development of the port can be considered as connection point between sea and land transport for supply of raw goods and production materials, and shipping products.

### **3. COUNTY AND LOCAL PUBLIC PORTS' ROLE AND IMPORTANCE FOR ECONOMIC DEVELOPMENT**

Seven theoretical development directions of county and local public ports represent possible directions for development and specialization of ports and could also be combined on the field. Given the practical circumstances and comprehensiveness of life and work of local and regional environments in which ports are located, as well as various levels of necessary investments in the port infrastructure and superstructure, there are four possible development directions, which in large or small part represent a sum and/or various combinations of the above seven theoretical development directions, or sublimate the above seven theoretical development

directions into four on the field development directions (Jugović et al. 2006; Jugović 2008):

- Development focused on public transport services,
- Development focused on tourism activities and nautical services,
- Development focused on traditional activities ensuring higher quality of services for the local population,
- Development focused on protection of natural, social, cultural, historical and environmental values.

Given that various developmental directions/scenarios are possible by different groups of end users of port services. Below listed are the main groups of beneficiaries depending on certain development direction/scenario:

- Passengers – users of public transport services regardless of their basic origin (local population, businessmen, tourists, etc.),
- Tourists – users of nautical berths, customers of excursions, tourist offer and occasional transport, passengers on cruise ships, users of other economic activities related to tourism in the port area,
- Local population, fishermen and small and medium-sized enterprises (SMEs) in traditional trades and crafts related to use of the port area,
- Local population, local government.

To encompass basic functional aspects of the port, as well as economic and financial development factors, it is necessary to include transport, social, economic, financial and business effects of the management system and its results on the development of the port, port authority, local or regional community (Rak et al. 2016).

Such relationship can be represented as:

$$\text{Results of the management model} = \text{Generated value added for end users} + \text{Impact on revenues/costs flow of the port authority} + \text{Externalities}$$

Generated value added for end users includes a positive impact on end users of port services or totality of changes in benefits that users of port services have, and in terms of creating end user benefits.

The following can be taken as development criteria in this group:

- Changes in benefits of targeted end users through better quality performance of basic port activities
- Cost savings for end users through better performance of basic port activities

Impact on revenue/expenditure flow of the port authority includes changes in revenue/expenditure items of the competent port authority, especially in terms of creating a service (production) surplus, considering consequential direct and indirect (economic and financial) impacts on the public sector (local, county and central government).

The following can be taken as criteria in this group:

- influence on port authority own revenues,
- influence on port authority total revenues (including budgetary),

- influence on port authority operating costs,
- influence on (other) public sectors.

External influences, or the intensity and direction of change of external effects (positive and/or negative) are primarily reflected in the influence of a certain development direction and management system of the port on business, ecological (Šantić et al, 2011), safety and other qualitative development aspects of the port and its surroundings.

The following can be taken as development criteria in this group:

- business impact,
- ecological impact,
- impact on safety and decrease of external expenses of maritime and other accidents ,
- impact on social and cultural aspects of the local community life.

From the implementation standpoint, one of the key components for successful practical evaluation using proposed criteria is also the level of possible demand for planned port services within a development direction.

#### 4. PORT MANAGEMENT SYSTEM EVALUATION CRITERIA

We analyse and propose four main groups of criteria possible for evaluation of port management system. In order to elaborate individual criteria for determining the justification, necessity and successfulness of the management model, the criteria are analysed in content and presented below in detail. In the following table (Table 1), for each of the criteria there is also specified the optimum direction – maximum for benefit criteria and minimum for cost criteria.

**Table 1.** Criteria for the evaluation of the management system of county and local public ports

	Criteria	Optimum direction – benefit (max.) or cost (min.)
<b>1.</b>	<b>Economic and financial criteria</b>	
1.1.	Budgetary impact on port authority and public sector	max.
1.2.	Financial sustainability	max.
<b>2.</b>	<b>Functionality criteria</b>	
2.1.	Ability to perform port authority's basic tasks and preservation of ports functionality	max.
2.2.	Impact on socio-cultural aspects of local community	max.
2.3.	Impact on overall economic development	max.
2.4.	Impact on entrepreneurship development	max.

<b>3.</b>	<b>Prioritization criteria</b>	
3.1.	Compliance with core strategic and policy documents	max
3.2.	Absorption capacity	max
<b>4.</b>	<b>Successfulness criteria</b>	
4.1.	Generated benefits for end users and beneficiaries	max.
4.2.	Negative impact on existing users	min.

Source: Authors

#### 4.1. Economic and Financial Criteria

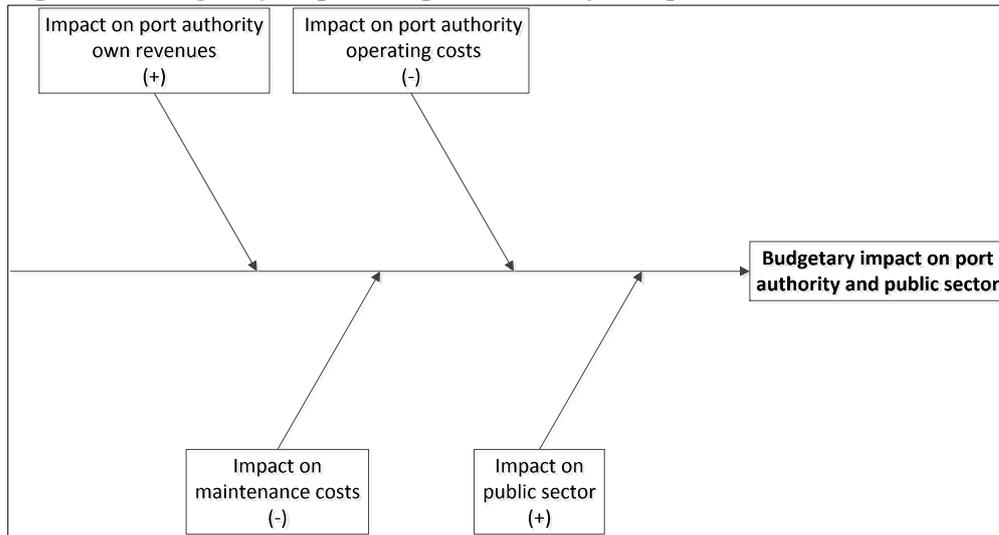
Budgetary impact on port authority and public sector is expected to work through increase in volume (intensity) of the overall net financial impact of a particular management system on the budget of the competent port authority and the public sector in general (Figure 1). Net effects include overall inflow into reference budgets minus total outflow.

When it comes to the port authority budget, this primarily relates to the increase of port authority's own revenues based on port dues and fees, or concession fees in event of possible concessions, and to all possible changes in terms of reduction of total costs and/or maintenance costs, tangible and intangible operating costs in form of employee expense, amortization expenses and financial expenses. In this respect, it is important to consider the possible surplus of income from providing services over regular operating expenses.

In the case of budgetary effects on the public sector, the net impact of the value added tax can be considered in the event of possible concessions and based on possible realization of taxable incomes during the exploitation period. In addition to the effects of the value added tax, the compulsory contributions from and on salaries from employment based on higher level of employment and level of personal incomes in the sector can be taken into account. This primarily regards income from tax and contributions on salaries.

Possible concessions also consider the effect of profit taxation based on linear estimate of income effects minus estimate of expenses during the concession period for planned activity while considering the amortization of long-term assets in the concession period, where the investment would largely depreciate, with a small amount of residual value of long-term assets at the end of the concession period. It also considers the possible cost of employee salaries in terms of income based on performance, concession fee (fixed and variable part) calculated according to possible income generation, and direct material cost, equipment maintenance cost, energy costs, external service costs and other costs.

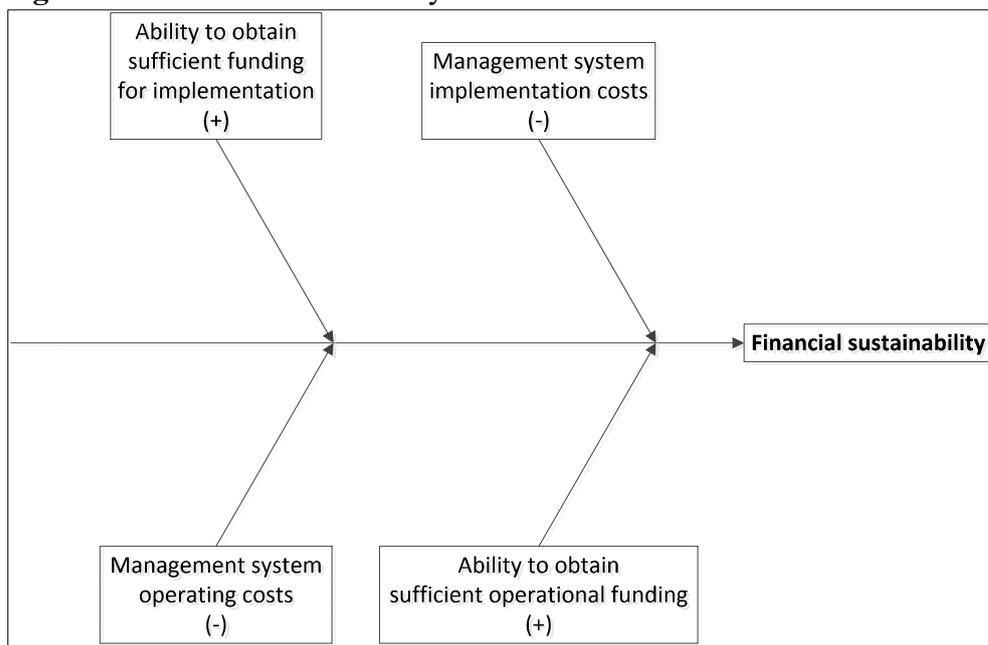
**Figure 1.** Budgetary impact on port authority and public sector



Source: Authors

Financial sustainability is characterized by the possibility, or ability and ways to obtain sufficient founding necessary for complete and successful implementation and long-term maintenance and sustainability of a certain management system (Figure 2).

**Figure 2.** Financial sustainability



Source: Authors

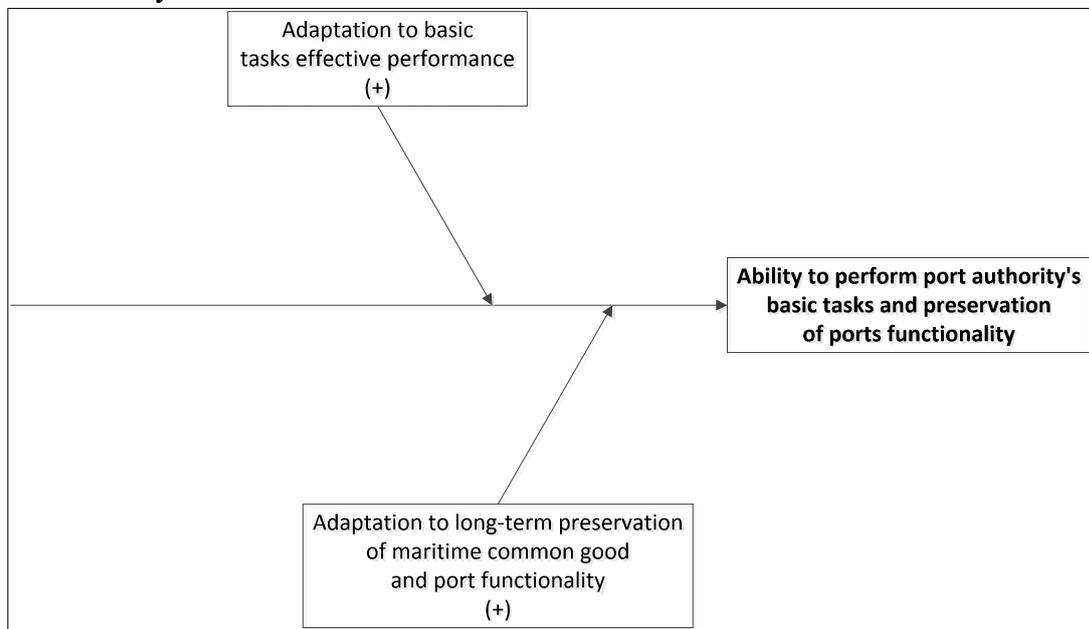
#### 4.2. Functionality Criteria

Ability to perform port authority’s basic tasks and preservation of ports functionality is reflected in the adequacy of a certain management system in order to provide opportunities and meet prerequisites for the port authority to effectively carry

out its basic tasks and to preserve in the long run the coastal zone and maritime common good (Debelić, 2018) and functionality of the port in terms of quality completion of the port's purpose (Figure 3). Special emphasis is placed on the technological and technical sub-criteria, in the sense of:

- Necessary investments in the port infrastructure
- Standardization of methods and criteria
- Realizing quality port services
- Achieving the desired traffic volume
- Technical requirements
- The existing and planned transport infrastructure

**Figure 3.** Ability to perform port authority's basic tasks and preservation of ports functionality



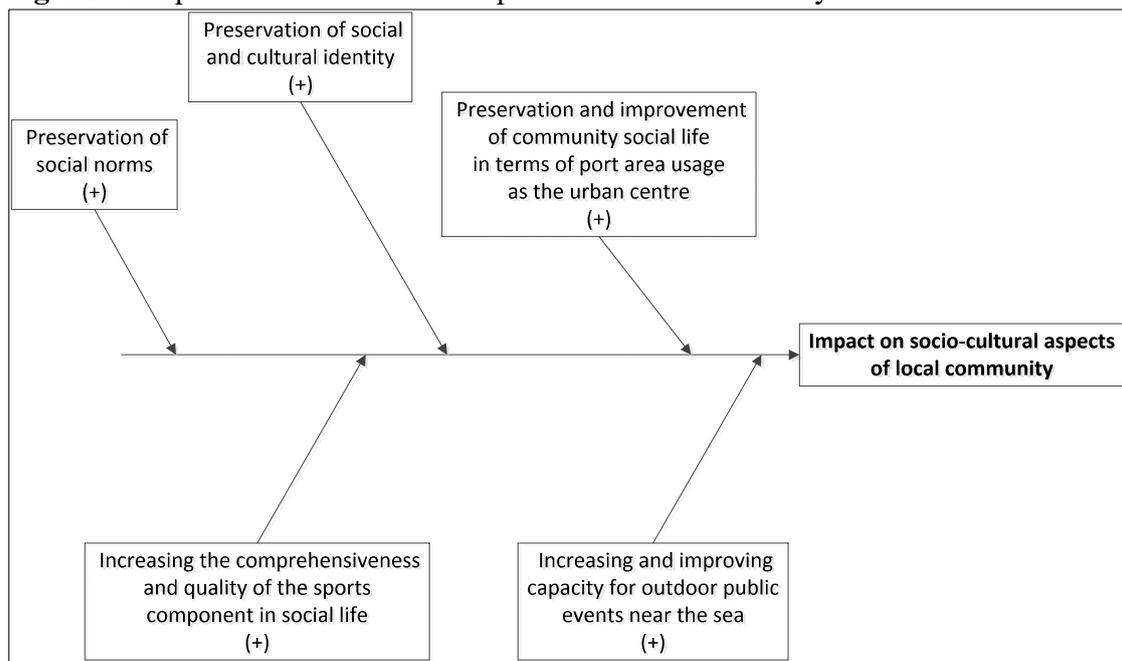
Source: Authors

Impact on socio-cultural aspects of local community refers to the existence of a positive overall impact of a particular management system on the life and work of the local population, primarily in terms of preserving social and cultural values of the local community (Figure 4). This particularly refers to the habit of using the port area in the broadest sense, e.g. as a promenade, for recreation, sport, culture, public events, religious events, etc. Some of the possible positive impacts on the social and cultural aspects of local community life can be:

- Preservation of social norms,
- Preservation of cultural and social identity,
- Increasing the content and quality of sport components in the social life,
- Increasing and improving the capacity for public outdoor events in the immediate proximity to the sea,

- Preservation and improvement of the social life of community in terms of use of the port area as the urban area centre,
- Valid legal regulations,
- Influence of local and regional government,
- Port area,
- Geographical dislocation, etc.

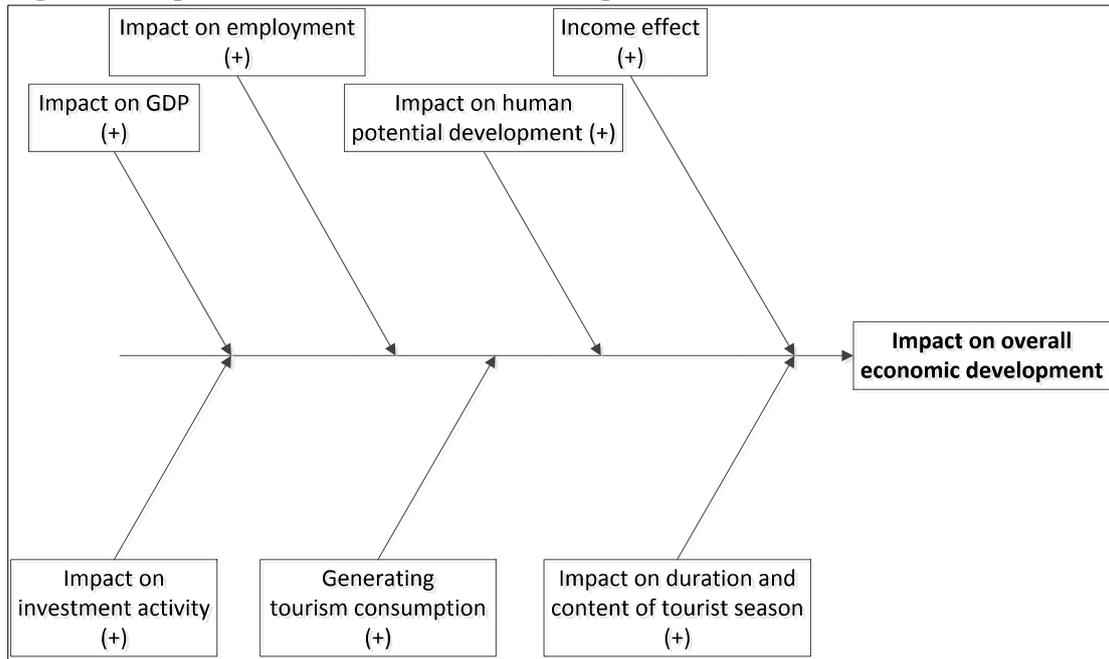
**Figure 4.** Impact on socio-cultural aspects of local community



Source: Authors

Impact on overall economic development is recognized through the size or intensity of overall multiplicative net effect of a particular management system on the speed and increase in development of the overall economy of the county (Figure 5). In terms of net effect evaluation, the difference between potential for positive and potential negative economic effects of a particular management system is evaluated. In this regard, the possible intensity of impact of each individual management system on the overall economic development is considered through:

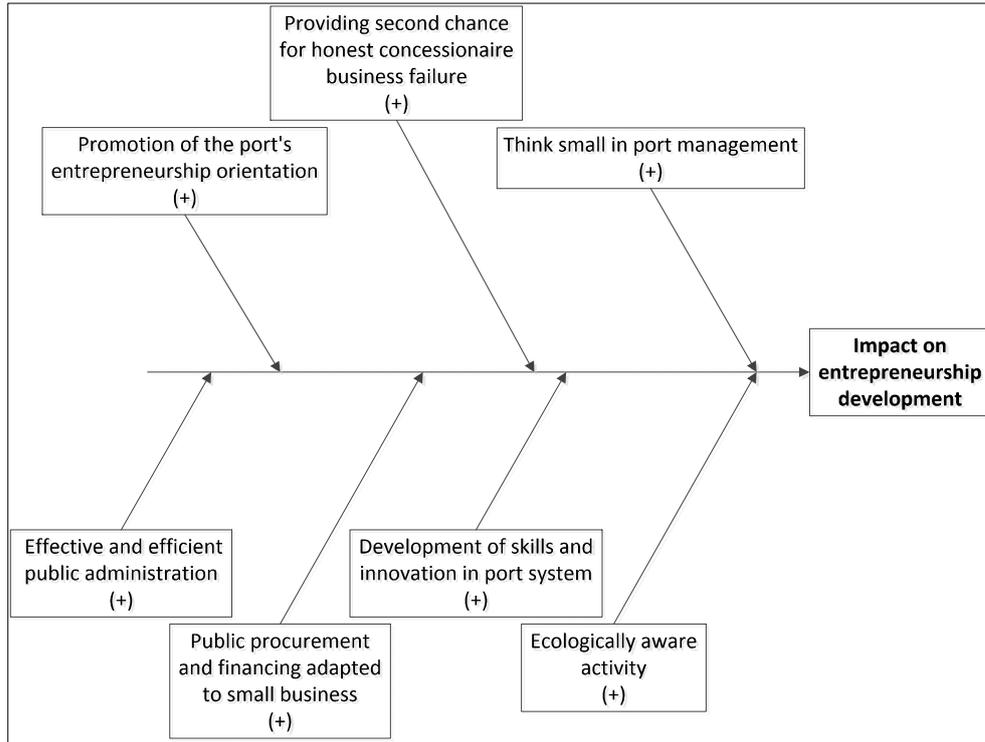
- The effect on gross domestic product and value added,
- Creation of new jobs and employment,
- Effect on qualification structure of jobs,
- Revenue impact,
- Impact on investment activity and attracting investment,
- Generating tourist spending,
- Import and export, i.e. foreign trade component,
- Extending the duration and adding to the content of the tourist season, increasing the overall quality of tourist offer, etc.

**Figure 5.** Impact on overall economic development

Source: Authors

Impact on entrepreneurship development is reflected in performance and compliance of management system with principles oriented on entrepreneurship strengthening, in order to create a favourable environment for encouraging the inclusion of business (micro, small and medium businesses) in the port system, as well as achieving the necessary level of port authority's public function (role) as a prerequisite for further development and strengthening of business competition in and around the port (Figure 6). The basic purpose of this criterion is to encourage the development of small, medium and micro businesses and trades in activities related to sea, marine technologies and by the sea.

**Figure 6.** Impact on entrepreneurship development

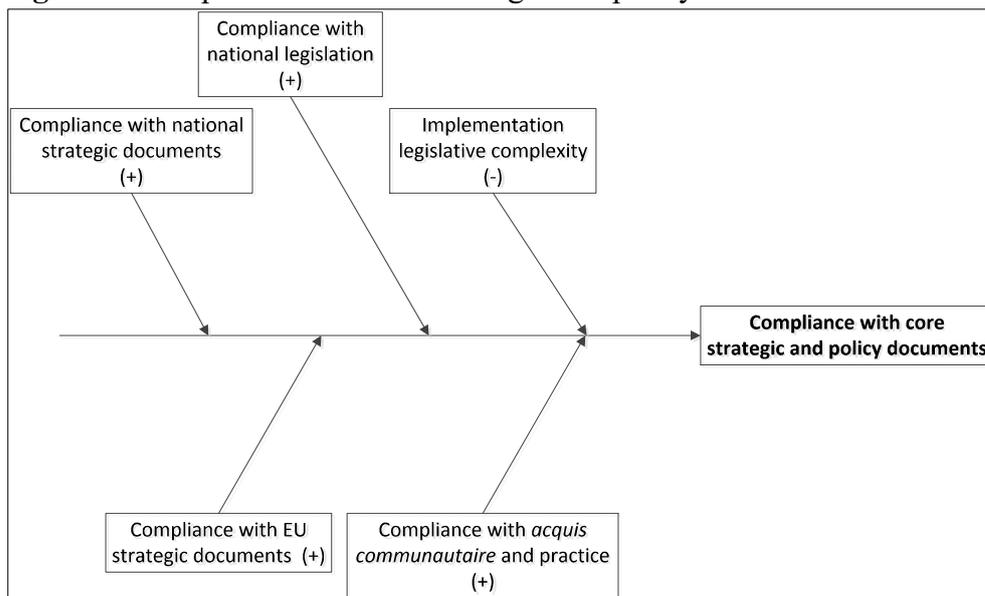


Source: Authors

### 4.3. Prioritization Criteria

Compliance with core strategic and policy documents relates to the compliance of a particular management model (system) with the basic national and international strategic and public policies documents (Figure 7).

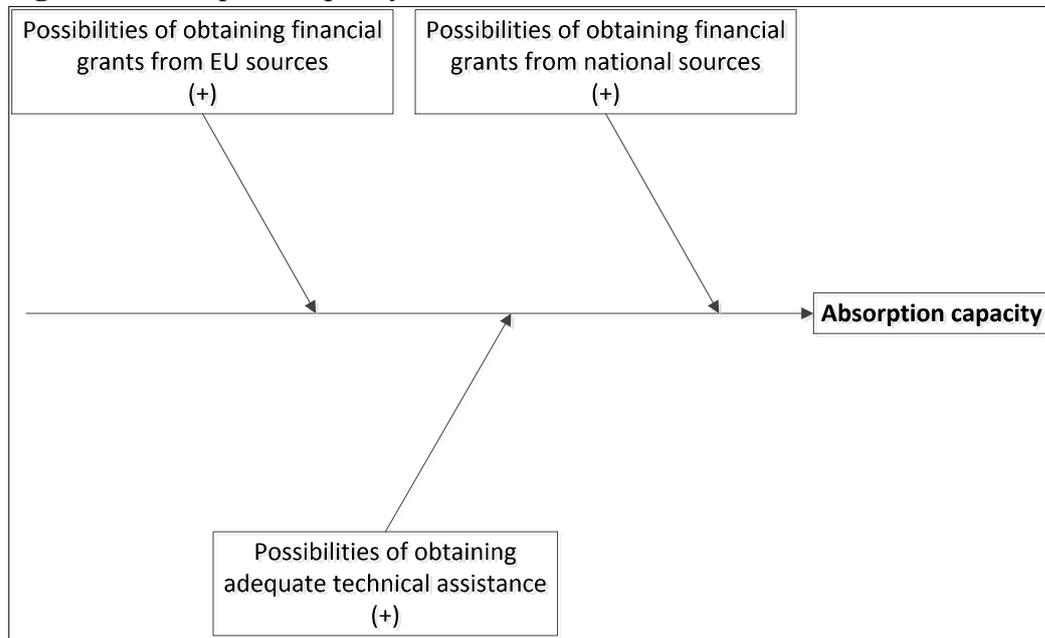
**Figure 7.** Compliance with core strategic and policy documents



Source: Authors

Absorption capacity is seen through the perspective of implementation of a management system that requires financial means, either from internal and/or external sources (Figure 8). In this regard the criterion of absorption capacity of a particular management system in terms of obtaining non-refundable/refundable financial resources from external sources for its application, realization and/or maintenance is considered. Absorption ability of a particular management model is an important criterion in favour of those development and management activities that are more likely to obtain and justify certain non-refundable incentives from external sources, or those that are more likely to provide adequate return on investment. In this respect, such criterion is correlated with the previous criterion of compliance with core strategic and policy documents, respectively public local, regional, national and international policies and guidelines. An important aspect of this criterion is also the evaluation of "strategic harmonisation" of a particular management system in the broadest sense, or evaluation of the ability to attract financial means from external sources for all direct and indirect expenses and aspects of its implementation – from funding of port facilities to various "soft" measures of technical assistance, etc. This criterion can also be observed in terms of quality of a particular management system when it comes to its ability to contribute to the efficiency of obtaining financial resources (primarily non-refundable) from domestic and external sources, such as the national budget and/or EU funds and programs.

**Figure 8.** Absorption capacity



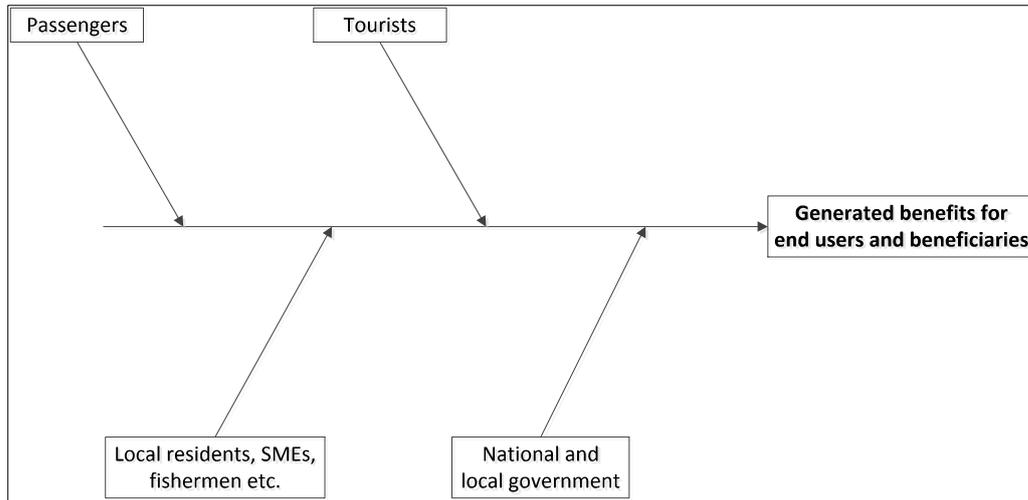
Source: Authors

#### 4.4. Successfulness Criteria

Generated benefits for end users and beneficiaries refers to the size (intensity) of overall generated benefit and/or potential cost savings for all end users of port services through the implementation of a management model (Figure 9). In this respect, this

criterion is reflected through direct effects achieved by increasing benefits and/or cost savings for targeted end users. The increase in end user benefits includes possible increase in direct tangible and intangible benefits for end users of ports services, which may relate to multiple aspects of port infrastructure and superstructure utilization and organization of port operations.

**Figure 9.** Generated benefits for end users and beneficiaries



Source: Authors

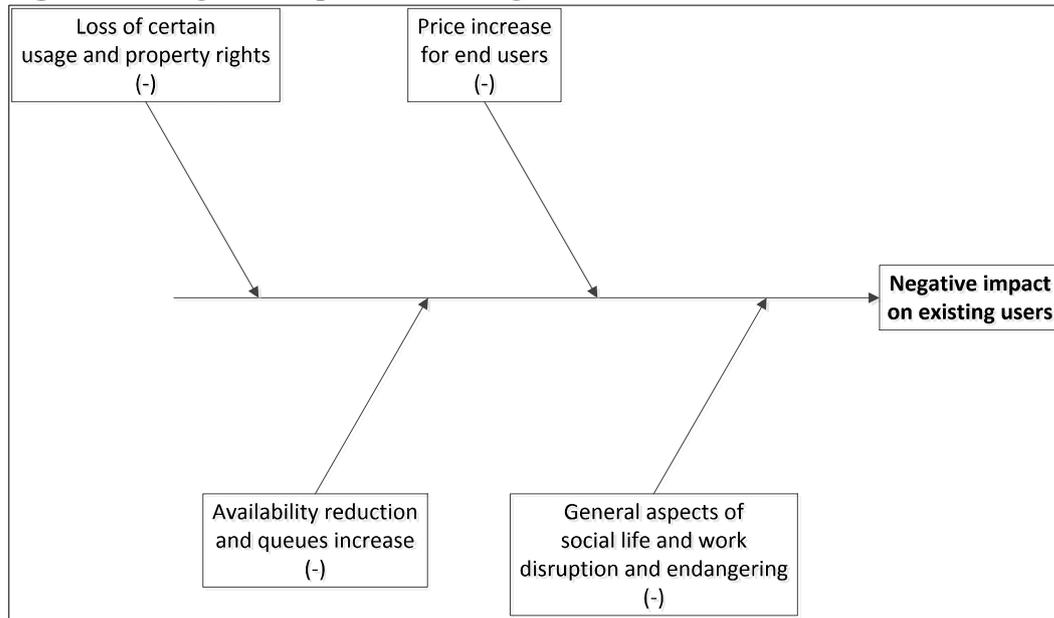
Some of the examples of benefits and cost savings for end users are illustrated below:

- Passengers, users of public transport services, such as the local population, tourists, businessmen, etc. may achieve multiple benefits such as:
  - Waiting time reduction,
  - Increased comfort,
  - Reduced queues,
  - Decreased time for travel preparations,
  - Increasing the safety of boarding / disembarking and waiting,
  - Increasing the level of content and quality of accompanying services,
  - Reducing waiting costs,
  - Possibility of better time utilization.
- Tourists, users of nautical berths, users of excursions and occasional transport, passengers-tourists on cruise ships, users of additional economic activities related to tourism in the port area, etc. may achieve multiple benefits, such as:
  - Increase in the number of available nautical berths,
  - Increase in safety and dedicated functional quality of nautical berths,
  - Reduction of redundant inter-impacts and interactions (disturbances) between end users and local population,
  - Reduction in port waiting time,

- Decreased time for travel preparations,
- Increase in boat/ship safety during manoeuvring and docking,
- Increase in the quality standards for basic and associate port services,
- Reduction in cost of accidents caused by narrow passages and manoeuvring,
- Reduction of waiting costs,
- Increasing comfort and availability of information.
- Local population, fishermen and other small and medium businesses in traditional trades related to the use of the port area, etc. may achieve multiple benefits, such as:
  - Increase in the number of available municipal and/or fishing berths,
  - Improvement of competitive potentials for development of business activities related to the use of port area at the level of small businesses and trades,
  - Increase in safety and functional dedicated quality of municipal and/or fishing berths,
  - Decrease in waiting time for municipal berth,
  - Increase in the speed of administrative procedures,
  - Increase in safety and port waiting time,
  - Increase in the level of content and quality of accompanying port and off-shore services that are of benefit to the local population and their boats,
  - Increase in availability and transparency of information for the local population, etc.
- Local population, state and local government may achieve multiple benefits, such as:
  - Preservation of cultural and historical sites in the local community
  - Preservation of landscape and overall attractiveness of a settlement,
  - Protection and preservation of ecosystems,
  - Attracting higher level of tourist demand due to historic and cultural preservation, sights, etc.

It is also necessary to consider some potential negative effects on end users caused by the implementation of a different management system. Therefore, negative impact on existing users caused by the implementation of a particular management system is developed as the (cost) criterion oriented opposite to the direction of action of generated benefits for end users and beneficiaries (Figure 10). However, it is important to stress that the acceptable management systems may not have a greater negative result according to this criterion compared to the positive result according to the previous criterion of generated benefits for end users. In this regard, this criterion measures direct impact of management system change on the existing users. Decrease of benefits includes possible decrease of tangible and intangible benefits, or losses compared to the existing condition.

**Figure 10.** Negative impact on existing users



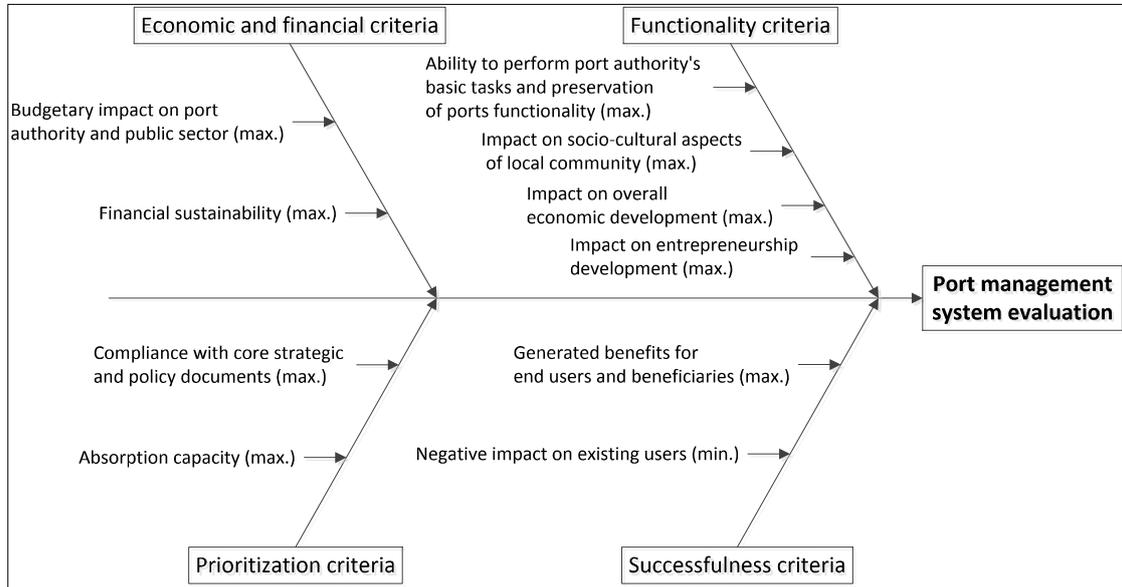
Source: Authors

Since users are very different from port to port as well as situation from situation, it is not possible to uniquely and fully identify all possible negative impacts on existing users, but possible types of decreases of benefits relevant for existing end users can be systematised as:

- Loss of existing berths,
- Loss of certain rights of use,
- Increase in the price of existing berths and port services,
- Reduction of availability of existing berths, shore and/or individual port services,
- Increase of waiting queues,
- Reduced comfort,
- Increased time for performing certain actions,
- Increase of individual direct costs,
- Limiting and/or substantial redirection of economic development
- Endangering cultural and historical sights,
- Distorting community life by limiting the use of the port area as the centre of the settlement,
- Distorting the landscape,
- Endangering cultural and social identity,
- Endangering social norms,
- Reducing the content and quality of the sports component of social life,
- Constraints of capacity for public outdoor events in the immediate proximity of the sea,
- Increasing ecological threats,
- Reduction of tourist activity due to disturbances of historical and cultural preservation, etc.

On the Figure 11 there is graphically presented the summary of port management system evaluation criteria.

**Figure 11.** Summary of port management system evaluation criteria



Source: Authors

On the Figure 11 it can be seen the four main criteria groups (economic and financial, functionality, prioritization, successfulness) that are developed encompassing previously analysed and elaborated ten different criteria for evaluation of port management system in county and local public ports.

## 5. CONCLUSION

For adequate modelling and selection of an optimal model for management of county and local public ports it is necessary to start with the possible effects of each of the possible development models and directions.

These effects are reflected in three levels, from the ability to create a certain level of added value for end users through the impact on revenue/cost performance of port authority to the possible external effects.

The totality of these tripartite effects should be considered through four basic criteria groups: economic and financial criteria, functionality criteria, prioritization criteria and performance criteria.

Economic and financial criteria group includes the estimate of possible budgetary influence of particular management system on port authority and public sector in general, as well as estimate of financial sustainability of a particular management system.

Functionality criteria group is reflected in the ability to carry out basic tasks of the port authority and preserve the functionality of port by implementing a particular management model, possible influence of a particular model on social and cultural

aspects of the local community life, overall economic development and development of businesses.

Prioritization criteria is related to compliance of a particular management model with basic strategic and policy documents and its absorption ability in terms of adequately obtaining and using financial resources from external sources.

Performance criteria tackles generated benefits for the end users of ports and the magnitude of possible negative impacts on some of the existing users caused by implementation of a particular management model. However, such seeming simplicity is exactly what makes it extremely complex to estimate.

In order to further refine criteria and test them on the field in the testing process of some management model for applicability to a certain county and local public ports, there is a need to consider carrying out new field researches of users, experts and other relevant participants. The research could be based on polling of experts, by using questionnaire and interview, with questions touching on past experiences, attitudes, opinions and preferences for the present as well as future expectations. This research could be beneficial for further understanding the complexity of relationship between entrepreneurship development and institutional arrangements in the port systems.

## 6. ACKNOWLEDGMENTS

This paper is based on the research conducted for the realisation of the project "Nacionalni plan razvoja luka otvorenih za javni promet od županijskog i lokalnog značaja" in 2016.

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