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Evaluation of development partnership scenarios of the Croatian seaports using MAMCA analysis

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ABSTRACT

The aim of this paper is to evaluate development partnership scenarios of the seaports in the Republic of Croatia using the Multi-Actor Multi-Criteria Analysis (MAMCA). Previous author's research indicated a number of effects and criteria that PPPs need to achieve in order to ensure sustainable port development. However, implementation of partnership models in seaports in the Republic of Croatia has not reached its full potential although there has been significant progress over the last ten years. For that reason, the evaluation of the partnership models in Croatian seaports is a poorly researched issue. The author has defined three models of port development according to the degree of private investors' involvement in Croatian ports (status quo, minimal participation and maximal participation of private sector). The author uses MAMCA as a tool to evaluate the PPP model, using relevant criteria for the evaluation of public-private partnerships (economical-financial, organizational, technical-technological, social criteria and the criteria aiming at harmonization with the policies of the European Union), from relevant stakeholders' point of view (public interest, private interest and the interest of the wider community). The research results show that the best-evaluated model is maximal participation of private sector. It has positive influence on port development from economic and technological side, it directly contributes to different stakeholder's interests, and in the long term, it contributes to the local community development.

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1 Introduction

The process of globalization and liberalization in international trade has resulted in a monopoly position on maritime transport when it comes to mass transit cargo. Under these influences, port development has radically changed, especially from the technical, technological, legal, and economic aspects. The maritime sector and port systems need to adapt to new business conditions to ensure a competitive position on the global market. Facing the impossibility of ensuring the continuous development and achievement of their objectives, the ports turned to the private sector as a partner in their financing and management, which enabled the development of different modes of PPPs, such as concession agreements, greenfield investments, management and lease contracts, the sale of interests in equity, etc [27]. Despite these trends, the largest and the most efficient ports in the world are still public ports, but only a few of them are publicly managed [5]. Today, the principle of the landlord structure is the most common form of the port organization, where the public sector is responsible for port planning, regulatory functions, and ownership of port-related land and basic infrastructure [8]. The private sector would, in turn, be responsible for marine and terminal operations as well as the ownership, construction, and acquisition of suprastructure and equipment [2, 28]. As ports are located on a maritime domain that is usually of special state interest, the governance plays a critical role in determining both success and failure of public-private partnerships (PPPs) [29]. Economical viability for the public sector, financial viability for the private sector, appropriate balance of risk and reward, and value for money are the basic criteria of expected outcomes of a well-structured PPP project [17].

The current management model in Croatian seaports is still not effective enough. Government subsidies that are unsustainable, limited access to sources of long-term financing and insufficient own resources for financing major capital investments result in the slow development of most Croatian ports. The legal framework has not yet resolved the complex issues of capital investment to establish a comprehensive, clear, and transparent integrated model of managing at the maritime domain.

Application of the idea of PPP has in practice been very different in Croatian ports. The progress has been made in the last ten years. Today, Croatian ports have projects with the characteristics of the PPP: strategic partnership in the container terminal of port of Rijeka (based on concession agreement from 2011), joint venture arrangement for operating the Zagreb Deep Sea container terminal in port of Rijeka (based on concession agreement from 2021), the agreement on joint investment in the development of terminals for storage and transhipment of petroleum products in the port of Ploče from year 2016. Also, there were some examples of recapitalization of the company or shares sales in Luka Rijeka d.d., Luka Pslit d.d. and Luka Ploče d.d. Although it is difficult to assess the success of individual projects, especially if they are relatively new, further deliberation of the Croatian seaport system development on the principles of public-private partnership is the only viable solution.

Considering the above- mentioned, this paper aims to evaluate possible development partnership scenarios of seaports in the Republic of Croatia using the Multi-Actor Multi-Criteria Analysis as a tool for evaluating the port development with a tripartite structure including different scenarios, criteria, and stakeholders. Analyzing the present knowledge and based on the author's own research experience, some effects and criteria that public-private partnerships can provide to ensure sustainable port development have been identified. According to the degree of private partner involvement (status quo, minimal participation, and maximal participation), the author has defined three possible development scenarios, measured by the relevant criteria for the evaluation of public-private partnerships (economical-financial, organizational, technical-technological and social criteria) from a relevant stakeholder's point of view; government sector, private sector and civil society [21].

In this paper, the MAMCA analysis of partnership development scenarios in Croatian ports was applied. It is used for the optimization and ranking of scenarios according to specific goals, research problems, criteria, and attitudes of stakeholders. The selection of the appropriate development scenario and implementation of the PPP is based on certain assumptions and includes numerous activities related to the preparation, implementation, and control of models. The success of the implementation of PPP can be measured by the actual economic effects, such as creating better conditions for the development of port activities, greater availability of long-term sources of finance, relieving the public (local) institutions of funding from the budget, development of the local, regional and national economy.

The research results show that the best-evaluated scenario for port development is the maximal participation of the private sector. It has a positive influence on port development from the economic and technological side, directly contributes to the different stakeholder's interests, and in the long term contributes to the local community development.

The paper contains six sections. In the section named Literature Review, the author provides a brief review of the literature, emphasizing the gaps and putting them in the focus of this paper. In the next section, Methodology, the conception of the MAMCA as a tool for the partnership scenario evaluation is explained. In the following section, Empirical Data and Analysis, the author analyzes the theoretical results of evaluation scenarios in Croatian seaports in detail. In the section Results and Discussion, the author shows the results of the empirical research. The paper finishes with concluding remarks.

2 Literature Review

The concept of the PPP, as a part of sustainable economic development, is an important model for financing of the public sector. The main idea is based on a desire to improve the quality and availability of goods and services by financing new projects, without the imposition of additional taxes. The sustainable approach of funding through the PPPs needs to ensure, from the standpoint of public interests, better performance of port activities, and from the standpoint of private interests, PPPs need to ensure all benefits (motives, purposes) of private businesses [20]. Previous studies have indicated some effects of PPPs in ports needed to achieve the sustainable development of the port community, for example, to maintain the level of competitiveness in the world market, to enable the formation of integrated supply chains, to increase efficiency and technological equipment, to obtain additional capital and provide better value for money, to introduce private management, to achieve trust and cooperation between partners, to reduce the role of the public sector and public deficits, to share risk, etc. [1].

PPPs in Croatia have a particularly important role in the development of infrastructure projects and the provision of quality public services. More challenging PPP projects emerge in the fields of transportation, education, and sciences as well as in construction of sports facilities and public administration buildings, and development of health and social welfare [13]. In the Strategic Framework for the Development of Public-Private Partnerships in the Republic of Croatia [15], the basic framework and goals of PPPs have been set out, noting that the key to a successful establishment and application of PPPs is the best value for money.

As regards the institutional framework for the implementation of partnerships in seaports, the Maritime Do-

main and Seaports Act [18] and the Concessions Act [19] are of utmost importance. The Concessions Act complies with EU directives, and it highlights the maritime domain and the port as the subjects of concession. The main problem arises from the "anti-property" concept of the Maritime Domain and Seaports Act since it does not provide the possibility of acquiring mortgages and other real rights in the maritime domain. That represents a serious obstacle and issue for potential investors and financial institutions in sense of their investment in port projects in the Republic of Croatia. Although a lot of important scientific and professional papers deal with PPPs in Croatia [4, 13, 14], few of them refer to the models of partnership management in seaports [5, 17, 21]. Also, there is a lack of papers referring to quantitative methods and optimization techniques in transport development planning.

The traditional methods of selecting solutions have implied the consideration of investment in the transport system only from the standpoint of investors, and the benefit has been expressed exclusively in the direct material and cash profit. The difficulties that arise when measuring all relevant impacts of a project in monetary terms, in particular concerning intangible aspects and externalities, have led to the expansion of monetary evaluation (unique criterion) to evaluation methods using more than one criterion, e.g. Multi-Criteria methods [23, 21]. Therefore, the process of finding the appropriate solutions requires the consideration of different options, i.e. solutions, as well as a detailed analysis and comparison of solutions by a larger number, usually the differently dimensioned transport, economic, technological, social and environmental criteria. Depending on the nature and condition of a particular transport problem, the specific criteria and hierarchy of criterion importance, i.e. of the weight of individual criteria are being defined.

Banville et al. [3] proposed the inclusion of the stakeholder concept in Multi-Criteria Decision Analysis (MCDA) to improve the integration of socio-political aspects. Besides including the issues mentioned above, MCDA also allows the analyst to include the objectives of different interest groups or stakeholders [7, 9]. The inclusion of multiple stakeholders in the decision-making process is an important, even more, a crucial factor in the transport sector, for successful implementation of the measure or project under consideration. To accomplish the acceptance of measures, the interests of various stakeholders should be taken into account [26]. According to Macharis [9] and Tsamboulas [23], the stakeholders are consulted to identify the criteria. A methodology that allows the explicit inclusion of stakeholders in the analysis is the Multi-Actor Multi-Criteria Analysis (MAMCA) developed by Macharis [10].

3 Methodology

The multi-criteria analysis allows for the creation of a framework for assessment (evaluation) of different transport scenarios (alternatives) based on several different evaluation criteria. The task of multiple criteria decision making (optimization) is to choose the best scenario from several possible ones based on the adopted criteria. The criteria need to define quality and represent a measure for comparison in the procedure of choosing the best scenario. The criterion is an expressed criterion (target) function, which for the best solution should reach the global

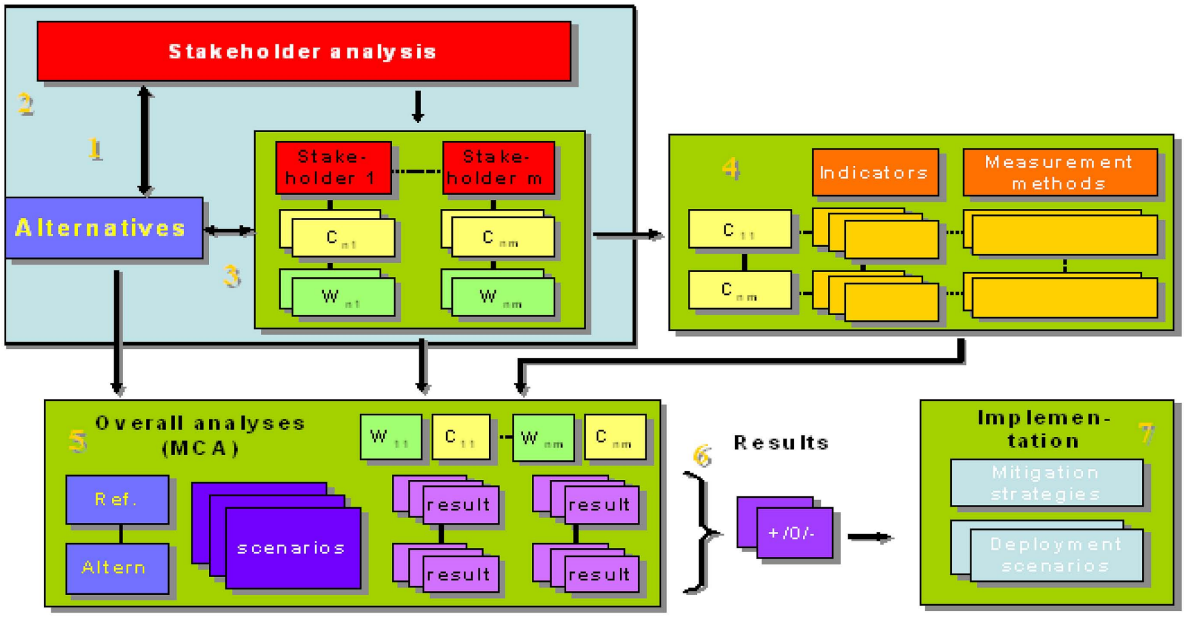

Fig. 1 Simplified presentation of MAMCA methodology

Source: Macharis, C., De Witte, A., Turcksin, L. (2010)

extreme of taking into account the constraints, which represent the probability of achieving the goal. In the procedure of multi-criteria analysis (optimization), the multiple criteria are being simultaneously optimized with respect to a given finite number of alternatives, or scenarios.

Given that the PPPs, in addition to other possible scenarios of implementation, include a variety of selection criteria, and also different views of participants in terms of these criteria, the multi action – multi-criteria analysis (MAMCA) proved to be an excellent tool for use in selection of scenarios for development of PPPs in Croatian seaports. Accordingly, the MAMCA consists of seven key steps that are shown in Figure 1.

The remainder of this paper will attempt to analyze the methodology and propose options to solve the complex issues of the PPPs that can provide the verification model of the public-private partnership in Croatian ports.

4 Empirical Data and Analysis

Pursuant to the above stated MAMCA methodology, the issue of selecting the best scenarios for development of the public-private partnership in the function of developing Croatian ports is solved.

4.1 Defining the possible scenarios of development of PPP in Croatian ports

In the context of PPP development, the focus in this paper is given to public ports of special (international) economic interest for Croatia: Rijeka, Zadar, Šibenik, Split, Ploče and Dubrovnik. Each of them has its specific function within the system, often based on historic developments, handling cargo flows, passenger traffic flows, and flows of cruise passengers. The ports are managed through port authorities; non-profit institutions managing development of ports areas and capacities (construction, maintenance, management, protection and improvement of the maritime domain that represents the port area) through granting concessions for economic activities in port areas to private concession companies.

Practice in Croatian ports was very different in applying the idea of a partnership. Unfortunately, first attempt to implement several public-private partnerships 15 years ago was unsuccessful. The first project in Croatian ports with the characteristics of a PPP was a strategic partnership between the International Container Services Inc. – Manila and container concessionaire Jadranska vrata d.d., in year 2011. The Philippine-Croatian company Adriatic Gate Container Terminal Inc. was established as the concessionaire of the container terminal of the port of Rijeka until the year 2041. The new PPP project in port of Rijeka is Zagreb Deep Sea container terminal, after being granted a concession for 50 years for the development and economic use of the container terminal Zagreb Deep Sea in the port of Rijeka. A joint venture company Rijeka Gateway was established in year 2021, which will include A.P. Møller-Mærsk Terminals, one of the world's largest port and terminal operators, and Croatian company Enna Logic, from the Enna Group. Also, the agreement on joint investment in development of terminals for storage and transhipment of petroleum products in the port of Ploče resulted in establishing a model of PPP in year 2016. The company Adriatic Tank Terminal Ltd. – ATT was established between global independent energy storage operator VTTI, as a private entity, and private company Energia Naturalis Holding (ENNA), which owns 25% of shares in the Luka Ploče d.d. Also, there were some examples of recapitalization the company Luka Rijeka d.d. in 2018 or sales of company shares in Luka Split d.d. and Luka Ploče d.d. This model of PPP was one of the most prominent at that point of time, while the raised funds were intended for investments of various projects for the port's development. For example, in Rijeka the funds are mainly directed to the construction of hinterland warehouse in Škrljevo.

When it comes to the implementation of PPP in Croatian seaports, based upon considerations in the previous chapters, the review of global practice, Croatian institutional and legal framework, and the like, it is possible to set up three scenarios of public-private partnerships:

1. Scenario 1: *Development of the seaport system without the participation of the private sector (the so-called Status quo)*

The scenario "Status quo" describes the current situation in the ports where there is no development of the seaport system based on the principles of the public-private partnership. The characteristics of such a system could briefly be stated as:

- The Port Authority provides infrastructure, moorings, docks and equipment, and participates in decisions on the management of all parts of the port system.
- The development is based and funded entirely through state funding resources (the state aid subsidies) and the revenues from concessions and loans. Funding from credit relations (e.g. WB) is more than obvious, thus increasing the level of indebtedness.
- Management over terminals is allocated to the concessionaires who are in majority state- owned, without a clear plan for further course of privatization.
- Management over auxiliary activities is assigned to small concessionaires whose equity origins are private. However, these companies perform activities whose main function is not the participation in the development of the seaport system.
- Commercial activities are not developed at all, or are poorly developed, and management is performed by the port authority or small concessionaires.
- Revenues from concessions for the use of facilities, or from port activities, are extremely small, which means that the system of concessions has not been widely accepted in its true form.

- The Law on Maritime Domain and Seaports does not address the complex issues of capital investment in maritime domain, acquired rights as well as series of questions on the legal nature of the property.
- Lack of development of the seaport hinterland is the obstacle to development of the port systems.

2. Scenario 2: Development of the seaport system with minimal participation of the private sector (the so-called minimal participation)

The Scenario of the seaport system with the minimal participation of the private sector assumes the development of the public-private partnerships, but not the dominant development of ports according to that principle. Theoretically, it represents a transitional stage between the two dominant scenarios, which considers the concept of development based on the PPP and still unsettled legal and institutional framework necessary for the more intensive implementation of the partnership in the port system of the Republic of Croatia. Some of the possible characteristics of such a model of development, and the assumptions on which it could be based, can briefly be stated as:

- This scenario does not require specific changes in the legislation, or in the role of the port authorities, it entails the entry of the private capital in the forms which are nowadays lawfully possible in some port areas, given their real and specific position.
- The Port Authority still owns the land, infrastructure and suprastructure, management, care of investment and further development, and cares for docks and moorings.
- The main concessionaires of the port terminals are both state-owned and private.
- In spite of the legal, regulatory and institutional ambiguities on a number of issues relating to the maritime domain, the models of PPP are developing (as stated in the paper before).
- The entry of the private capital in port areas has been achieved through rental of equipment and space for cargo handling. So, it is the case of a large number of small private companies which are concessionaires for commercial activities; control over the quantity and quality of goods, ship supply, washing shipping goods, keeping ports, etc. The contribution to development of the entire seaport system is in this case marginalized.
- Commercial activities are less developed and they are managed by the port authority or small concessionaires.
- The Law on Maritime Domain and Seaports does not address the complex issues of capital investment in maritime domain, acquired rights, especially in the port areas open to public traffic, as well as a series of legal and property-featured questions.
- Insufficient development of the seaport hinterland is also an obstacle to development of port systems.

3. Scenario 3: Development of the seaport system with maximum participation of the private sector – Intelligent port of the 21st century

The scenario of development of the seaport system with maximum participation of the private sector opens for a wide scope of actions by the private sector in almost all structures of governance over the port system. The assumptions of such a scenario are reflected in the following:

- The public administration still owns the land and the basic infrastructure, but allows the private sector to hire piers, moorings and certain areas, either through lease agreements, concession agreements, or through a permanent process of recapitalization and privatization. The public sector continues to be responsible for the regulation, infrastructure design, road and rail links, while sharing the responsibility and risk of capital investment with the private sector. The suprastructure and port operations are managed by the private sector, representing the best way for inclusion of the private sector in the provision of the port services and capital investments.
- The private sector has been entrusted with numerous activities; from piloting, cargo handling and warehousing, consolidation and packing of goods, equipment maintenance, mooring services, towing services, to maintaining suprastructure, supplying movable equipment, maintenance and protection of terminals, purchasing real estate, infrastructure construction.
- In the segment of reviving the partnership, it is necessary to initiate the process of further privatization of the remaining portion of the state companies, whereby a number of new private companies would be created, which would take over the duties and responsibilities of port operations or management over most terminals within the port system.
- Increasing efficiency and productivity in ports, orientation of the administration towards the end user and flexible tripartite structure of government, employees and private management play a key role in development of ports.
- The state subsidies still continue, but according to the transparent form of development of the port systems at a level that is sustainable from the standpoint of the state.
- The development of the concession system in the maritime domain, which preserves the maritime domain and determines the concession fee, but also strengthens the economic and legal security of the concessionaires. The legislative changes over the "anti-property" concept in the maritime domain towards direction of the exemption of certain ordinances and regulations when it comes to maritime domain in the port area.
- Definition of strategic investment priorities within the ports area and establishment of a comprehensive, clear, transparent and integral management model of

the maritime domain, ensuring the maximum economic benefits and protection and conservation of natural resources.

4.2 Interest groups

For the required testing of Croatian ports and the possible developing scenarios of the PPPs, three interest groups that may affect the selection of projects shall be selected and namely: the interests of public sector, private sector and civil society.

The interests of the public sector are reflected in the interests of the state bodies and institutions such as: The Port Authority, the Ministry of Finance – Department of Concessions and PPP, the Ministry of Regional Development, the Ministry of Maritime Affairs, Transport and Infrastructure, the Agency for Public-Private Partnerships, the Agency for Export and Investment Promotion, etc. Their interests in the projects of partnerships with the ports can be categorized into:

- continuity in provision of port services from the basic port activities with the corresponding infrastructure and suprastructure to other economic activities,
- increase in efficiency and improvement in the environmental and social conditions in the ports as part of a long-term implementation of a wide privatization program,
- settlement of additional capital funds for infrastructure construction, reconstruction, and replacement of the equipment,
- increase in financial resources and investment opportunities, rapid creation of new capacities in a short period of time and distribution of cost in the longer term,
- creation of additional financial resources through revenues from the project (such as concession revenues), thus avoiding the debts of the state budget, improvement in the financial results in order to reduce the contribution of the Government in the medium term,
- development of local, regional and national market, local banks and commercial multilateral foreign investments,
- emergence of new investors/partners whose experience and recognition in the world port market shall create new jobs; in the case of shippers, establishing completely new lines and freight transportation corridors,
- improvement of operational efficiency, shifting some of the risk to the private sector and thus reducing the government sector's costs, commercialization, developing of new markets, and improvement of management,
- greater social efficiency and utility through a competitive and non-discriminatory market competition between the potential investors / partners,
- support in optimization of the capacity of public sector and its functions to meet the policy objectives of the European Union and development priorities of the transport infrastructure.

When it comes to the interests of the private sector, it is mostly the users of port services that appear as strategic partners. It refers to the shippers, carriers, logistics operators, freight forwarders, agents and the like. Their interests in the projects of the public-private partnerships are reflected in:

- need for the private partner who focuses its investments in order to increase its own business and profits whereby it uses its experience and knowledge of the business, employs workforce and machinery, uses the resources under favorable conditions, and manifests itself through financial payments and availability of money,
- achieving profits through long-term investment in the port infrastructure and suprastructure, and ensuring higher standards and quality of the service with a customized price,
- better positioning on the global port markets for better diversion of cargo to its final destinations and creating own transport networks in the region,
- creating the long-term relationships and stability of the partnerships in compliance with the conditions prescribed by the contract. If it is a case of concession agreement for the management of terminals, then the partnership shall last for at least thirty years, and in a case of recapitalization and entering into the ownership structure, the time period is theoretically unlimited. In a case of performing the ancillary port activities, the contracts are to be signed for a shorter period of time, but certainly long enough to enable the recognition and survival on the market,
- stable political conditions and protection of property and copyrights of the private companies in accordance with the legislation and agreed ways of operating.

The interests of the wider community and civil society in the projects of the public-private partnership can be reflected in:

- creation of new jobs, acceleration of economic development, creating new businesses at the local level, affirmation of existing companies, non-imposing new taxes, and facilitating and achieving the optimal economic and social development;
- freeing the part of government investment in ports system which can be redirected to other social programs, such as construction of kindergartens and schools, arranging children's parks and green spaces, programs in culture, education, sports and recreation, solving various problems of the utilities, etc., all in order to achieve a better standard of living. Thus, the benefits for the community (society) that are being achieved are the highest ranked factor, according to the holistic approach.

– implementation of various projects of the current port activities relocating the port from the City center, for example, through which the port facilities in the very center of the city would be repurposed for urban facilities and other commercial projects, such as the construction of a nautical and diving center, green spaces, concert halls, offices, apartments, hotels, and a number of other attractive contents.

4.3 Criteria

Based on previous author's research, the possible criteria in the evaluation of PPPs have been systematized according to the sequence of research [21]. Criteria are divided into four main groups: economic-financial, organizational, technical-technological, social criteria and criteria for the long-term harmonization with the EU policies. Each of these criteria group is divided into sub-criteria. The economic-financial criteria attempt to assign certain financial and economical values to the possible models of PPPs such as: contribution to the GDP, economic growth acceleration, smaller public expenditure, long term budgetary sustainability, invested capital return and allocation, risk management, facilitated capital raise. Organizational criteria should contribute to the improvement of organizational elements in the seaport systems by using PPPs as follows: improvement of management, increment of the beneficiaries' participation, business process control, partnership duration, intellectual capital. The technical-technological criteria should contribute to the technical-technological development in the port system. A number of significant sub-criteria are identified: port service quality improvement, port infrastructure modernization, the development and application of innovative technologies, port superstructure and port moving machinery modernization. The social criteria include those that contribute to development of wider social community interests and social welfare such as: legal regulations change, reducing of impact of public (state) sector, local government involvement and ecologically sustainable development. Criteria for harmonization with the European Union policies are at this moment very important for the Republic of Croatia. The main sub-criteria are as follows: program of privatization, ensuring open access to market and market competition, protection of public interest and maximizing added value, defining the optimal level of subsidies (payments).

The indicators provide a rating scale (1 to 10) for assessment of the value of criteria for each alternative from the standpoint of "stakeholders." The indicators are usually quantitative in nature, but can also be derived through qualitative indicators. The basic principle, according to which the selection criteria for the selection of the PPPs in ports was performed, is the result of the performed and analyzed survey and the conducted detailed research [21].

4.4 Comprehensive analysis and ranking using analytic – hierarchy process

Among many listed different methods of multiple criteria decision making, and in accordance with the needs and goals of the research and the advantages and disadvantages of the application of various methods, the analytic hierarchy process (AHP) was selected. The analytic hierarchy process is one of the most popular methods of scientific analysis of scenarios and decision-making through the consistent evaluation of hierarchies, whose elements are the objectives, criteria, sub-criteria and alternatives [6]. According to many opinions, the AHP is a decision support system (DSS), and the ideological and mathematical setting of the AHP was given by Thomas Saaty [22]. Basically, this is a specific tool for creating and analyzing the decision-making hierarchy that allows interactive creation of a hierarchy of problems to prepare scenarios of decision making, and then evaluate the elements of hierarchy in doubles (objectives, criteria and alternatives) in the *"top-down"* direction. In the end, the synthesis of all evaluations is performed, and the weights of all the elements of the hierarchy are being determined, in a strictly regulated mathematical model. The sum of element weight coefficients on each level of the hierarchy is equal to 1, which allows the decision maker to rank all elements in a horizontal and vertical aspect.

To analyze possible scenarios of the PPPs, a hierarchical research problem is defined – the choice of scenarios of the development of the PPPs in the function of rapid development of Croatian seaports. After defining all the elements of the model; goal, evaluation criteria, interests of the participants and possible scenarios of the development of the public-private partnership in the Croatian seaports, it is necessary to create a software solution by using a computer program Expert Choice Solutions. The process is handled via the complex matrices of parity, i.e. all relationships and weights are calculated from the analytical data shown in Picture 1.

Establishing the parity in mutual relations represents the most complex part of the data input into the programming software because it is preceded by the statistical analysis of the relationship between:

1. *The intensity of relationship between individual stakeholders in relation to the goal* – the relationships are defined by the strength of influence of particular interest groups in decision-making in the PPP projects. The power of the stakeholders (public sector, private sector, broader community) should be balanced. This is not the case in the real-world decision-making process in port management systems, but for this research the balanced power was considered.

2. *The intensity of individual groups of criteria within certain interest groups* – includes the study of the relationship among all the different groups for each interest group. For example, intensity of groups of criteria within the private sector is calculated in Table 1.

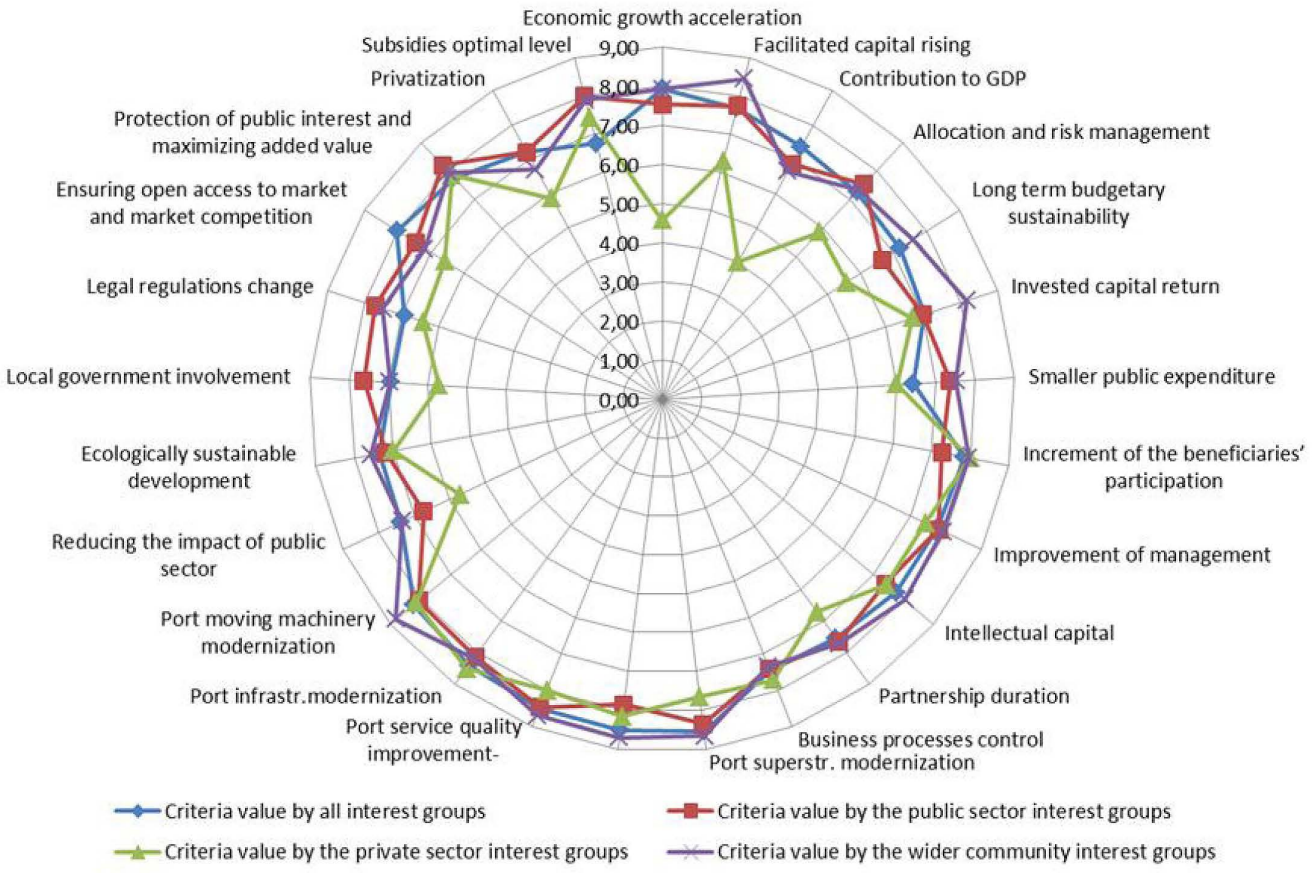

Fig. 2 Results of the criteria analysis for the evaluation of PPP in Croatian ports by stakeholders

Source: Prepared by Perić Hadžić, Jugović, Perić, 2015

Table 1 Intensity of individual groups of criteria within the private sector

Criteria	Economic-financial criteria	Organizational criteria	Technical-technological criteria	Social criteria	Criteria for harmonization with the EU policies
Economic-financial criteria		0,747126899	0,68782716	0,896545065	0,804116272
Organizational criteria			0,92062963	1,199990345	1,076278036
Technical-technological criteria				1,303445279	1,169067344
Social criteria					0,89690558
Criteria for the harmonization with the EU policies					

Source: Author's calculation

3. *Mutual parity of all criteria under each group of criteria* – for solving the research problem it is necessary to find the parity relations between all groups of criteria and record them in relation to all stakeholders. The relations of the economic-financial criteria parity for stakeholder – government sector are represented in Table 2.

4. *The behaviour of each criterion with respect to the chosen scenario for each interest group* that required to enter different relationships between the interest groups and the criteria groups, the specific criteria for each interest group and the relation of specific criteria to the given scenarios into the programming software. The criterion

Table 2 Mutual parity of economic-financial criteria for public sector

Economic-financial criteria	Economic growth acceleration	Facilitated capital raising	Contribution to the GDP	Risk management	Long term budgetary sustainability	Invested capital return and allocation	Smaller public expenditure
Economic growth acceleration		1,0267	1,1579	1,0540	1,1953	1,1343	1,0792
Facilitated capital raising			1,1200	1,0195	1,1561	1,0971	1,0439
Contribution to the GDP				0,9770	1,1079	1,0514	1,0004
Risk management					1,0944	1,0386	0,9882
Long term budgetary sustainability						1,1343	1,0792
Invested capital return and allocation							1,0792
Smaller public expenditure							

Source: Author's calculation

values have priority of importance over specific criteria in relation to the interest group and the selected scenario partly entered by the subjective assessment of the author. For example, the government sector has the greatest interest in the criterion for the GDP growth, and the largest increase can be expected in the long term in the scenario of development of the intelligent port. The criteria of the change of legislation (which is required only in scenario 3), given that the clear interest of the state in changing the legal framework is required, was given a "negative" rating in assessing the relationship of a scenario to scenario for the scenario of the intelligent port. In this case it is given a low priority, or a negative attitude in evaluating scenarios 1 and 2 in relation to scenario 3.

5 Results and Discussion

When all possible relationships between objectives, stakeholders, different criteria and alternatives have been entered, it may be proceeded to the definitive calculation and evaluation of scenarios. The total sum of the values of scenarios obtained via the sensitive analysis is 1, or 100%, provided that:

1. Scenario 1 – Status quo has a rating of 0.309
2. Scenario 2 – Minimum participation has a rating of 0.327
3. Scenario 3 – Intelligent port has a rating of 0.363

As it was expected, all stakeholders believe Scenario 1 to be the most unfavorable one (30.9%), while Scenario 3 has been selected as the best (36.3%). The programming software allows the analysis of the individual interest groups for the selected scenarios. The analysis is presented in the following Table 3.

The table shows that all stakeholders consider Scenario 3 – Maximum participation of the private sector (Intelligent port of the 21st century) to be the most desirable one, although there are some minor differences in the results. The private sector has the greatest interest in the PPP projects, followed by the state sector, and finally there is the wider community. It is logical to expect this outcome, given that the state and the private sector benefit most from these projects, therefore, their interests are stronger. Scenario 1 has been evaluated by all interest groups as the least desirable scenario, while Scenario 2 has been identically evaluated by both the private and public sectors.

Table 3 Scenario values according to different stakeholders

Scenario	Description	Public Sector	Private Sector	Wider Community
1	Status quo	0.306	0.305	0.318
2	Minimum participation	0.326	0.326	0.330
3	Maximum participation	0.368	0.369	0.352

Source: Calculated by author in Expert choice software

The analytic hierarchy process, as an applied method of programming within the MAMCA, has the ability to identify and analyze the inconsistencies of the decision makers in the decision-making process and to evaluate the qualitative elements of the hierarchy. In the solutions of selecting the scenarios of the PPPs in Croatian seaports, the overall inconsistency (CR) is 0.0007, which is very good, and these results should not be re-analyzed and identified as reasons for the inconsistency.

The maximum participation of the private sector to develop a base of the intelligent port of the 21st century is based on certain assumptions which are necessary to reflect on the strengthening of the role of the private sector in the Croatian ports. It should be noted that this scenario does not require the complete privatization. The JANAF d.d. – the concessionaire of the oil terminal (Omišalj) in port of Rijeka may be taken as an example. Currently the company is in a mixed ownership, with the majority of the state capital, and it is very likely that it will continue to be owned by the public authorities due to the specific activities which it performs at the oil terminal.

The combination of interests and linking the public and private sectors in some forms of the PPPs ensure the realization of the goals of both sectors, thus creating the conditions for development of high-quality port activities.

Each reloaded ton of cargo in any port in Croatia is directly reflected in the local, regional and national economy and provides income for a range of business entities in the country. Therefore, the investment planning and the port development are the basis for successful development of not only the selected port, but also the entire hinterland. The partnership carries a market principle in business conduct and the capabilities for realization of large infrastructure projects. Such large investments create new employment segments for part of the population and trigger a range of domestic enterprises, and the port itself is a large regional consumer. With such action it is possible to start up the economy and revive the entire local and regional community, and contribute to a better standard of the population. The project "Rijeka Gateway" should create about two thousand jobs in the City of Rijeka, and a thousand more in the region, and it is estimated that the revenues would total to about one hundred million Euros by 2025.

Furthermore, the model of the PPPs can significantly increase the *availability of long-term sources of financing and the use of other forms of financing the investment*. The ports in public ownership have a difficult and limited access to long-term investment financing, usually accompanied by the guarantees for reimbursement by public sector authorities. The most significant change is in the case of direct investment by the private sector in the port company when it comes to capital investment. For example, in the case of recapitalization and sale of shares to private sector (domestic or foreign), the capital investment would be performed and the cooperation between the private and public sector would be achieved at the same time. This also indicates a significantly increased possibility of direct foreign investment, which is a much better ratio of loan indebtedness, because the risk of the investment is no longer taken by the public sector only, but also by the private sector. Of course, the same applies when it comes to domestic private investors. The increased level of ability to attract other investors in various forms (stocks, bonds) or creditors should also be observed. Specifically, the engagement of the private sector involves a range of measures and steps which are entrepreneurial in character, which "must" reflect on the competence of the enterprise to seek better conditions and forms of participation in the capital market.

The aspect of public institutions budgets is a particularly important effect of the possible PPP model. Therefore, it is realistic to expect that models of achieving the common interest of the public and private sector result in release of the budget pressures and the burden of issuing a guarantee for repayment of loans, grants, or possibly to cover losses. Within this performance, the additional effect should be considered in the sense that certain released funds could be focused on other projects that are of importance to the entire population. These projects may be local or regional roads projects where there will be no direct payment system, projects of public landscaping, programs in the area of education, sports, culture, etc.

6 Conclusions

Under the influence of the processes of globalisation and liberalization, seaports development has radically changed with a need to adapt to new business conditions to ensure a competitive position on the global market. Facing the impossibility to ensure the continuous development and achievement of their objectives, the ports turned to the private sector as a partner in their financing and management and enabled development of different modes of PPPs.

The current management model in Croatian seaports is still not effective enough. Government subsidies that are unsustainable, limited access to sources of long-term financing and insufficient own resources for financing major capital investments result in slow port development. Today, Croatian ports have projects with the characteristics of the PPP: strategic partnership in the container terminal of port of Rijeka (based on concession agreement from 2011), joint venture arrangement for operating the Zagreb Deep Sea container terminal in port of Rijeka (based on concession agreement from 2021), the agreement on joint investment in the development of terminals for storage and transhipment of petroleum products in the port of Ploče from year 2016. Also, there were some examples of recapitalization of the company Luka Rijeka d.d. or sale of company shares in Luka Split d.d. and Luka Ploče d.d.

Based on the idea of development through PPPs the author tried to evaluate possible development scenarios

based on public-private partnership. For that reason, the author used Multi-Actor Multi-Criteria Analysis to evaluate three possible scenarios according to the degree of private partner involvement: the status quo scenario, minimal participation and maximal participation of private partner. The scenarios were evaluated according to the criteria that PPPs need to meet in order to ensure sustainable port development; economical-financial, organizational, technical-technological, social criteria, and the criteria aiming at harmonization with the policies of the European Union from relevant stakeholder's point of view; government sector, private sector and civil society. The research results show that the best evaluated scenario is that with maximal participation of private sector – Intelligent port of the 21st century. All stakeholders considered Scenario 3 to be the most desirable scenario, although there are some minor differences in the results. The private sector has the greatest interest in the projects of the PPP, followed by the state sector, and finally there is the wider community.

The combination of interests and linking of the public and private sectors in some forms of the PPPs, ensures the realization of the goals of both sectors, public and private, thus creating the conditions for development of high-quality port activities. The success of the implementation of PPPs can be measured by the actual economic effects, such as creating better conditions for development of port activities, greater availability of long-term sources of finance, relieving budget of public (local) institutions, development of local, regional and national economy. With the improvement of the institutional and legal framework of the partnership in the seaports, the public authority still owns the land and basic infrastructure, the responsibility for regulation, the hinterland connections, while it shares the responsibility and risk of capital investment with the private sector. The private sector has been entrusted with numerous activities; from piloting, cargo handling and storage, maintenance of equipment and suprastructure, mooring, towing, the supply of movable equipment, maintenance and protection of the terminal, etc., to even building the infrastructure, which binds the private partner to the investment in the long-term period. The long-term role of public institutions, as majority shareholders, should be understood as a transition system that will minimize, but not entirely exclude their role in terms of financing investment.

The shortcoming of the research is that different models of partnership were not evaluated or measured individually. The paper evaluates the general model of port development according to the principles of PPP. However, this opens the possibility of further research of the success of PPP implementation depending on the partnership model.

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