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# Locally Based Development—Tools for Identifying Opportunities and Evaluating Port Area Strategies of Rijeka

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**Abstract:** Cities are traditionally considered as centers of prosperity, but after a long process of deindustrialization, the classical opportunities presented by cities as administrative, production, financial and cultural hot spots can no longer be taken for granted without questioning the present organizational and spatial models. After an introduction to the decision-aid tools and processes needed to orient development in a sustainable way, the paper describes the characteristics and an application of the decision-aid tool created for analysis, diagnosis and evaluation of opportunities. The proposal briefly considers the reconnection of the city with its region, urban renewal, creative and productive activities, necessary support institutions, contemporary sustainable economic approaches and infrastructure. This approach is illustrated on the case of the incubator proposal for the City of Rijeka, Croatia, once an important port and industrial city with a long history. The technological modifications in the functioning of the port and abandoning of industrial production in the proximity, but also geological formation and prevalent building typologies, make the case exemplary of the problems faced in contemporary cities. The paper proposes a process and tools for analysis and evaluation and indicators for the sustainability of the proposal.

**Keywords:** sustainability; renewal; decision-aid tools; analysis tools; monitoring tools

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## 1. Introduction

Cities are places where many different factors come into close contact producing growth and prosperity. Today cities face significant problems—inequalities, ecological inefficiency, social exclusion and physical degradation, especially related to the lack of or low quality of jobs that characterize contemporary economy, with increasing division between a small proportion of well-paid

jobs and a majority of low-earning positions. Especially problematic was the case of certain transitioning countries. Even in Western countries it has been seen that industry-related job categories were not successfully replaced (Refer to e.g., case of Rotterdam [1]).

These pre-existing problems are aggravated by today's worldwide crisis. As we see many traditional planning and management models failing to give satisfactory answers, it is necessary to search for tools and models of management that could hopefully produce and direct growth in a sustainable manner.

The city of Rijeka is situated in the Kvarner gulf on the north coast of the Republic of Croatia and is the administrative center of the county of Primorsko-goranska, Croatia. The City of Rijeka has 143,800 inhabitants [2], while about 200,000 people reside in its agglomeration. During the history of the Kvarner gulf, Rijeka had the leading role, particularly from the 19th century with the development of the international port and of industry. In the last decade of the 20th century the majority of the industries were closed. After a decade of low functioning the port is again realizing growth, but with the changes in maritime traffic, the question of renewal of the port area became a necessity.

## 2. Results and Discussion

Requalification of the port area, situated in the city center, can be seen as an opportunity for creative and sustainable local development, combining conservation of heritage and opportunities for new uses with reintroduction of the waterfront in the life of the city.

The paper presents the summary of two researches that aimed to create the decision-aid tools for sustainable development.

The first research had the objective of creating a model of evaluation of spatial heritage based on multi-criteria models that could help understand the extant situation, then orient the spatial planning decisions and verify the sustainability of possible transformations. The model is briefly described and its functioning is illustrated on the port area of the City of Rijeka.

The model covers different aspects of sustainability (economics, society, ecology). Although it was created to function in most contexts it is also related to different disciplines and as such not fixed in time and space but open to adjustments. This is especially true for the definition of indicators and weights that can vary based on decision methods. The model functions best when coupled with spatial representations to specify more decisively the position of the interventions proposed. The clear statement of the assigned indicators, points and weights allows for the discussion of the exactness and representativeness of the model, making visible the possible mistakes or goals, and making the professional and public discussion more grounded in the reality of the extant situation and sustainability objectives (therefore more transparent).

This model is created to be useable, rational, logical and coherent. The model handles real data—often from different sources, of different types and of uncertain quality. The model is created as flexible, modular and able to integrate with different techniques of thematic analysis. It can be used by public administrations, investors, institutions, government and non-government agencies, scholars and others.

The second research had the objective of creating a simple and transparent, easy to understand and communicate evaluation tool for the sustainability of a possible Incubator. Upon the analysis of the

social sectors and their roles in sustainable development and possible conflicts, the main roles of the Incubator (besides the start-ups) were defined and therefore it was possible to create a checklist for the proposed structure. This tool, with some modifications, could be used for other similar public structures whose aim would be to better the social inclusion. Therefore its criteria are oriented to reflect mostly social sustainability, even when related to financial, cultural or other issues. Like the previous model, this evaluation tool can be a part of decision-aid and monitoring procedures.

Both models would gain from further adjustment from a group of experts, multiple uses and information technology support.

The first part of the paper brings an overview of some issues regarding the characteristics and problems of the contemporary city. The second part gives an overview of emerging planning tools, especially analysis evaluation tools for highlighting development opportunities.

The third part gives some basic notions of the characteristics of the county of Primorsko-goranska, the port area of Rijeka, its history, its urban-architectural characteristics and its stakeholders.

In the fourth part the characteristics, goals and factors are evaluated by the use of the specific decision-aid model that helps the creation of development scenarios. Those scenarios are formed and evaluated, indicating as well useful tools for the sustainable management of the port area.

The fifth part deals with defining the development strategies for the incubator that could function as a central connection point for different development opportunities. To be able to track the effectiveness of the proposal, goals, evaluation tools and some indicators are defined.

At the end, conclusions are given regarding the opportunities presented by the possibility of renewal of the central port area and locally based development built on the characteristics of local resources.

### **3. The Crisis of the Contemporary Model of the City**

Cities are considered a source of prosperity for their concentration of physical, financial, human and institutional resources, places where knowledge can be developed and refined, where opportunities are formed by contact with different people with different backgrounds and interests. This is even truer for port cities, known for their cosmopolitan nature and as an entrance for goods and people. The existence of the port meant the availability of materials and commerce, which brought the development of industries and services.

Today the cities are often seen as disconnected from their environment. They are instead inserted in the natural and man-made environment, and are part of global and local exchange circles. Orienting the cities almost exclusively toward external networks, the sustainability of the cities and their context is endangered. The renewal of the abandoned areas, usually based on the introduction of a mix of expensive office, commercial and residential spaces, is often carried out almost exclusively by consulting only big stakeholders. The production and commercial activities are increasingly often placed in special zones outside of the cities, for traffic and environmental reasons, making new production zones or smaller settlements in their proximity the new (at least in central and eastern European countries) poles of attraction.

The process of deindustrialization also produced an increasing impoverishment of the population due to the loss of workplaces and degradation of their quality. An increasing number of people find

themselves in difficult situations, aggravated by other characteristics of the city population (such as that of “non-typical” households [3]).

Inequalities are, during crises, also accentuated by a lack of choices. The infrastructure that makes the city efficient is also what makes the citizen exclusively dependent on top-down policies. This is probably the first worldwide crisis where the majority of the population cannot produce for their own food needs due to urban organization and compulsory energy dependence on public (or public contractor) providers. It is very difficult to find legal, technological and financial types of organization for refurbishment of high-rise multi-proprietor buildings (energy-efficiency betterment, water supply diversification, more efficient waste management, whose organization and cost at present are determined by monopolistic organizations, making it cost forming instead of turning it into material and energy production, food supply, today dependent on an oligopolistic market...). These problems are paralleled with others such as: congestion, pollution, lack of efficient public transport or its cost, lack of parking spaces and cycle paths, technological, financial and legal problems in adding renewable or small-scale energy production...

These problems make the typical city an extremely costly settlement organization, which needs enormous flows of liquidity to function. The moments of crisis show the downside of traditional planning, which sees the future in only one possible scenario—that of infinite financial growth which can fulfill all human needs by financial means.

We are witnessing today a growing number of experimentations with alternative lifestyles, especially related to savings, natural and low-cost lifestyles that have the novelty of centering on the city lifestyle. This way we encounter small houses and tiny apartment projects, urban gardening, balcony gardening, roof bee keeping... The protagonists of these different lifestyles are often highly educated professionals that incorporate these new approaches even into the organization of their workplaces: teleworking combined with office hubs, open-source, doing-with others and similar organizations of work.

Sustainability, for this new but adult value-creating generation, is not a mere phrase but rather an intelligent everyday life choice, which is rooted in necessity.

#### **4. Strategies and Tools for Sustainable Development**

It has become clear that these types of technologies cannot be implemented with the current institutional constraints (or even through compulsory implementation) and with the current lack of transparent, socially diffused information. Therefore the main question is: what are the tools and organization types that can help the betterment of the sustainability of the development?

We can trace some new or renewed economic models such as: incubator structures that help the development of new firms, different investment options, collective or geographic definitions of property rights, collaborations, cooperatives, employee-owned structures, open-source research and do-it-with-others economy (including a mix of open-source, rights definition and cooperation options), purchase groups, micro financing, citizens' self-financing (For example, frequently used financial tools in the 1980s in Rijeka were preventive savings and citizens' self-financing (auto-financing or “samodoprinos”) where the citizens renounced day wages for certain public work. The allocation of funds directed to specific works furnished a greater efficiency of means and greater speed at work than

when directed from general taxes. Today these two important instruments are no longer in use for a series of reasons: a strong centralization of the State, the lack of means, debt instead of savings as a general economy principle, low salaries, lack of willingness to plan in advance and the strong connection between the idea of self-financing, self-organization and related concepts with the idea of the previous historic period, preventive savings, membership, fund-raising, European and other international funding... These approaches find an important boost in information technologies.

Spatial planning instead developed different techniques and methods such as: operative sheets, optical cones, map-overlay, historical-spatial analysis, morphological-historical analysis, dynamism of urban morphology, analysis of urban land plots, built and green areas, analysis of urban texture, skyline analysis, typological-functional analysis of architectural complexes, structural system analysis, stratification analysis, construction phases identification and others (These techniques allow us to follow trends from past to future projections, highlighting the sustainability of the processes). These techniques are very useful when used with decision-aid tools such as evaluations and processes of public participation (The decision-aid tools are part of the participatory processes that require strong democratic institutions and the development of an active citizenry that perceives politics as a continuous evolutionary process [4]).

Public participation should begin in the initial strategic phases, when the common objectives and values are defined. These techniques may involve small groups, but also the wider population (For example: six-hats technique, future search, planning for real, choices method, partnership-led models, opinion poll, focus groups, referendum, citizen forum, citizen juries, deliberative surveys, citizen panels, e-forum and others... [5–7]). The instruments of evaluation and representation of scenarios can increase the transparency and rationality of discourse while clarifying the objectives, hidden interests and critical points, revealing the bases for new creative proposals, and helping with the definition of the strategies and equitable trade-offs. By highlighting the characteristics and problems of the extant, the evaluations facilitate the participation of various sectors, forming the basis for discussion and allowing control during the execution phase (monitoring). Therefore, evaluations permit the identification of decision opportunities, instead of searching for solutions to decision problems, in view of a value-focused thinking [8]. Evaluations can have the objective of evaluation of externalities and investment opportunities and can indicate the problems and opportunities in the territory.

In the case of territories rich with heritage, such as landscape or urban heritage, analyses are carried out on the geological, biological, morphological and landscape characteristics.

Some evaluations (e.g., [9]) are constructed to manage basic data (Strength, Weakness, Opportunity, Threat (SWOT) analysis, Checklists, Flag model, Economic-business model [10], Pyramid model [11], Kalman method [12], Landscape model [13], Archaeological impact model [14]...). Other methods function with very detailed data (Community Impact Evaluation (CIE) [12], Environmental Impact Assessment [EIA] [15], Strategic Environmental Assessment (SEA) [16], different methods based on geographic information system (GIS) ....). Some methods can manage both basic and detailed data (SWOT analysis, Spider model, Flag model, CIE, Network analysis....). In the analysis and preliminary evaluation some models can be useful for allowing quick orientation, definitions of problems, thematic issues and clear statements of the situation (e.g., SWOT analysis, Spider model, Flag model, Economic-business model, Pyramid model, Kalman method, Landscape model, Archaeological impact model). Verification of the proposed action is the goal of the following models: EIA, SEA, CIE,

Archaeological impact model, different GIS methods... Most models can be used both in preliminary and verification phases. CIE is a method designed specifically to highlight impacts on the different public sectors, but other methods can also be used towards this specific objective (e.g., SWOT analysis, Spider model and Flag model). EIA and SEA are also performed regarding social impacts. Easy communication can be obtained using SWOT analysis, Spider model, Flag model, Economic-business model, Pyramid model, CIE, Kalman method and Landscape model, while detailed EIA and SEA, due to the amount of data, need specific synthetic reports for easing communication.

Besides these evaluation tools, there are also many techniques for prevision of spatial transformation [17]. These are usually more complex to implement and require strong information infrastructure. The best results are obtained by combining the different types of evaluation models, depending on the phase of the decision-making process.

## **5. Tools for Identifying Opportunities and Evaluation of the Strategies for Locally Based Development**

Conservation of natural and built areas has a key role in the social, environmental and economic sustainability of planning processes. As heritage is a complex process [18], its understanding has to consider different aspects from many disciplinary fields. For this reason there is a need for a model that can be a multifunctional and versatile tool for analysis, diagnostics, creation of alternatives, and monitoring of the temporal characteristics of heritage.

Applying the evaluation model developed for analysis of development opportunities [19] it is possible to define the indications for the strategic actions, to form and evaluate development scenarios. The proposed model is created on the basis of evaluation models as a decision-aid tool for analysis and diagnosis of the spatial heritage. The model takes into account various dimensions of sustainability, multiple characteristics of heritage, spatial relations and social stratification, new modes of institutional organization, participation and diversified funding sources.

The model helps identify positive and negative traits of the heritage asset allowing for diagnosis, recommendations, creation of development scenarios in a value-focused perspective, evaluation of alternatives and monitoring of the state of the heritage. Therefore, the model combines the characteristics of the EIA approaches (multidisciplinary approach, multi-criteria evaluation of the extant and of the proposed alternatives) but specifically elaborates the heritage characteristics (considering the heritage as a complex process and multidimensional asset) and land use management.

The main feature of the model is a set of the multi-criteria matrices organized by evaluation themes (physical-geographic characteristics of the context, cultural and historical characteristics of the object, intrinsic characteristics, state of conservation, management and financial sustainability, social characteristics, threats and pressures...). The “measure” of the indicators is defined by the criteria, which are used to evaluate the heritage. Indicators and weights for the evaluations of the heritage are structured based on the analyzed themes. This part of the model could be further refined by collaboration of experts in different fields and through participatory procedures (on a smaller scale—e.g., juries, or a bigger scale—e.g., e-forums... or a combination of different participatory options). The Table 1 shows the abstract of the matrices used for the evaluation of the portal site.

**Table 1.** An abstract from the evaluation matrix for the urban site of the port area (the complete matrices are contained in [19]).

Physical-geographic characteristics of the context			Score	Indications	Weight	Weighted score	
Relationship with the context	Integration with the context	Identifies the context	+3	Monitoring	2	+6	-
Surrounding environment	Biological diversity and/or uniqueness and ecological function	Low biological diversity and ecological function	-1	Monitoring and interventions of environmental improvement of medium entity	1	+	-3
<b>Cultural and historical characteristics</b>							
Antiqueness	Notions of construction and use	15th–18th century	+2	Research and dissemination of information	3	+6	-
Representativeness of the historic period	Association with persons, events or works of art	International	+3	Research and dissemination of information	2	+6	-
<b>Intrinsic characteristic of the good - urban and architectural characteristics:</b>							
Architectural-urban representativeness	Representativeness of urban typology	Rare/excellent example	+2	Research and dissemination of information, protection and conservation	1	+2	-
	Architect/planner	Of international importance	+3	Research and dissemination of information, protection and conservation	1	+3	-
Formal architectural-urban qualities	Architectural-urban quality (spatial organization, plan, design, urban textures...)	Rare/excellent example	+2	Research and dissemination of information, protection and conservation, high attention to formal characteristics	2	+4	-
<b>State of conservation:</b>							
Degree of transformation	Recognition of urban character	Rare/excellent example	+2	Research and dissemination of information, protection and conservation, high attention to formal characteristics	3	+6	-
Physical state of the material	Degradation of the physical material of construction	Degraded state	-1	Conservative intervention on construction elements	1	+	-1

Table 1. Cont.

Fruition characteristics:			Score	Indications	Weight	Weighted score	
Fruition in cooperation	Fruition in cooperation with other patrimonial sites	Lack of network fruition	-3	Organisation and network association, coordinated management organizations, information and management services	1	+	-9
<b>Finance and management:</b>							
Management aspects	Area suitable for income-generating activities of the total area	More than 70%	+3	Monitoring	3	+9	-
	Area suitable for subsidized activities of collective interest	More than 70%	+3	Monitoring	3	+9	-
Tourism and commercial activities	Public interest	National/ Regional	+2	Information and marketing	3	+6	-
<b>Social characteristics:</b>							
Value perception	Symbol	National/Regional/ Interest groups	+2	Research and information	3	+6	-
<b>Threats and pressures:</b>							
State of the good	State of urgency	Yes	-3	Urgent interventions	3	-	-
Social environment	Presence of conflicts	Presence of local conflicts	-2	Management and solution of conflicts	2	-	-4

The first step in the process is the interdisciplinary analysis of the data (depending on the case: existing data or a new research, or a combination of both). The second step is the compilation of the matrices (assigning values for indicators on the basis of the described criteria in the matrix). Translating the disciplinary data into simple values helps to make evident the positive and negative (weak) traits of the object to different types of public—experts from other fields or general public. In this way, the model allows the simple vision of the good and critical traits of the asset and the distance of the object from the optimal situation.

The criteria that describe the indicators are also connected to the guidelines for the intervention on the heritage asset. These guidelines, which define the possible physical and managerial interventions, can be used to form strategies for the valorization of the heritage.

The scenarios can also be created in a partial option based on the defined target such as: emergency intervention, maintenance or the free-choice objective. These options are based on direct comparison of the assets' scores and the indications given in the multi-criteria matrices for that type of good and its score. These scenarios therefore comprise only those actions that are related to the predefined goal. However, it is recommended to verify the existence of urgency (existence of imminent important threat).

Besides constructing the strategies (scenarios based on guidelines in matrices), it is possible to implement an optional part of the model, the “triangle of strategies”, developed on the basis of Campeol's pyramid model [11] which allows for the definition of strategies in a comprehensive fashion. This part of the model connects the placement of the asset on the graph with the tables that describe recommended actions for the object.

The final part is the comparison of different scenarios for one or more assets. In this manner, the strategic application of the evaluation model can comprise a comparison of different sites and/or different management options for the sites in question. The different scenarios can be discussed and the optimal scenarios chosen.

The model can be integrated with other methods, be adapted to the context, is flexible, modular and easy to use allowing its' use in initial moments of planning but can also be easily modified if new facts or the participatory process requires it. The model can be integrated with contemporary information technologies, including consultation and use of data by interested parties.

The second part of the proposal described in the paper deals with the creation of the incubator for new firms. Its characteristics and modality of the creation are determined on the analysis of network relations—the relations between social sectors, their possible goals, the extant, and actions to implement to achieve desired goals; and the roles in them for different sectors are analyzed on the basis of the economic rationality, logic and coherency. Then, some indicators are given in the view of the guarantee of sustainability of the processes.

## **6. Introduction to the Port Area of Rijeka**

### *6.1. Overview of Main Characteristics*

The City of Rijeka, with its 143,800 inhabitants, is the administrative center of the county in which 305,505 people live. The area of the county extends over mountains, coastal territory (1,065 km of

coast) and to the islands, with a total of 3,582 km<sup>2</sup> [2]. The county is situated in a position of particular geographical interest, in the Kvarner gulf. To the north it borders with the Republic of Slovenia, to the west with county of Istria—the most developed region in Croatia—and to the east with the counties of Karlovac and Ličko-senjska, which still suffer the consequences of the war.

The county is strongly characterized by the double geographical typology and contact with the sea and the mountains. Through its history this mixed maritime and mountain nature was a base of development (port, fishing, naval industry, navigation, exploitation of the riches of the waters and the wooded areas...). The county presents a rich treasure in its wooded areas, fauna and water resources. There are 374 protected plant species and 121 animal species; 266 areas are part of the national ecological network (future Natura 2000) [20]. The county also presents rich widespread cultural heritage: systems of prehistoric and medieval castles, ethnological sites, urbanized centers, rural landscape, historic parks, waterfronts, industrial heritage... The coastal and island parts are characterized by the sea, tourism, traditional agricultural production and large production areas (many abandoned and some new areas), but the mountainous part is characterized by depopulation.

The City of Rijeka is characterized by the presence of many cultural institutions of a long tradition (universities, museums, theatres...) that have the potential to be inserted in the process of reconstruction and the production of new culture. Throughout history, the encounter of cultures has resulted in the creation of numerous cultural assets and the almost intact landscape in its hinterland that represents a rarity for biodiversity and aesthetic beauty.

Cultural assets are also a resource for cultural tourism that includes whole sites and complexes, such as cities, and not only the traditional historical monuments. Cities offer the possibility of a quick first approach to different cultures—introducing the possibility of experiencing differences, the quality of the urban and natural environment, the tangible and intangible culture of the territory. The benefits of tourism depend mostly on a connection with local enterprises [21], which is lacking.

## 6.2. History of the City of Rijeka and Its Port

The history of the inhabitation of territory can be traced back to prehistoric times, far back to the 11th century BC for Rijeka [22] and 10,000 BC for some other areas (Important traces of human presence from this period are found in the Čampari cave on the island of Cres [23]). The prehistoric settlements were located on the “amber road” that connected ancient Greek states with present-day Russian territories during the Bronze Age [24]. From this period it is possible to trace the beginnings of the port of Rijeka, at the confluence of the river Rječina.

In Roman times, the city developed on the castrum Tarsatica [25,26]. During the period from the 3rd to the 5th century, the importance of Tarsatica rises as one of the centers of the defense of the Liburnian limes and part of the *Claustra Alpium Iuliarum*. The Roman urban structure is still easily identifiable.

Late antiquity brought the invasions of the barbaric tribes, the expansion of Christianity and the arrival of the Slavic tribes in the 6th–7th century. With the Middle Ages the influence of the Byzantine Empire, Franks, Venetians and Germanic areas grew. With the beginning of the 18th century, apart from a brief French occupation, the territory and the sea were under the dominion of the Austro-Hungarian Empire, which marked an important beginning of economic growth. With the

declaration of free navigation in the Adriatic in 1717 and declaration of Trst and Rijeka as free ports in 1719, the development of roads and industries, and by gaining the *corpus separatum* status in 1868 with which Rijeka became the Hungarian exit to the sea, the city and its port experienced exceptional growth due to large government and private investments. The investments were planned through various expansion projects, some of which were presented at the world exhibitions as the model ports [27]. The major construction of the port lasted from 1872 to 1914, organized in four phases, during which the port expanded from 6 ha in 1870 to 60 ha in 1913 [28]. Although primarily important as a port for the transport of goods, in certain periods Rijeka was important as an emigration port for the Austro-Hungarian monarchy [29]. It was also one of the points for the return of migrants.

After the Second World War the port continued to expand outside the City of Rijeka. The container terminal in the eastern part of the city is also growing.

The development of the port was paralleled by the development of the infrastructure and industry. The first lazaret with the artificial basin was built in 1722, roads towards main cities of the Empire since 1728, a sugar refinery (the biggest in the Empire) in 1750, a tobacco factory in 1828, a paper factory in 1821, grain mills, wood material warehouses (later forming Port Baross, named after a Hungarian minister), quarries (used for silting of artificial terrain for the expansion of the city and the port), Stabilimento prodotti chimici in 1851, the oil refinery with its port in 1883 (Figure 8), Fonderia metalli in 1854 (later Stabilimento tecnico and Torpedo-Fabrik von Robert Whitehead and even later Torpedo, where torpedoes were invented and produced for the British government, Figure 9), several shipyards that produced ships for the British government and others (Production of rice, leather (even shoes for workmen on the Suez Canal), meat, chocolate and cacao, electrical power...).

Parallel to the development plans of the port, the City made spatial development plans [30]. The city experienced the construction of other important infrastructure. At the beginning of the 18th century the city had 3,000 inhabitants, while in 1910 the city had 60,000 inhabitants.

After the First World War the Croatian territories became mostly a part of the Kingdom of the Serbs, Croats and Slovenes while Italy occupied a great part of the territories of the county and of Rijeka. After the Second World War (since 1947) these territories became part of the Federation of Yugoslavia (later the Socialist Federal Republic of Yugoslavia) in which Rijeka became one of the principal cities and the most important port. The 1990s saw the division of the state, the war, the formation of the new state and a deep economic and social crisis.

In the Figure 1 it can be seen that, although the City of Rijeka has an ancient origin, still recognizable in the old center, it mostly developed in two major phases: industrial and port rise in the 18th and 19th century where the productive areas were mostly situated along the sea and the river coasts, and were followed by the residential development in their proximity. This first phase was interrupted by World War I, and the next major expansion was seen afterwards, with the big residential areas.

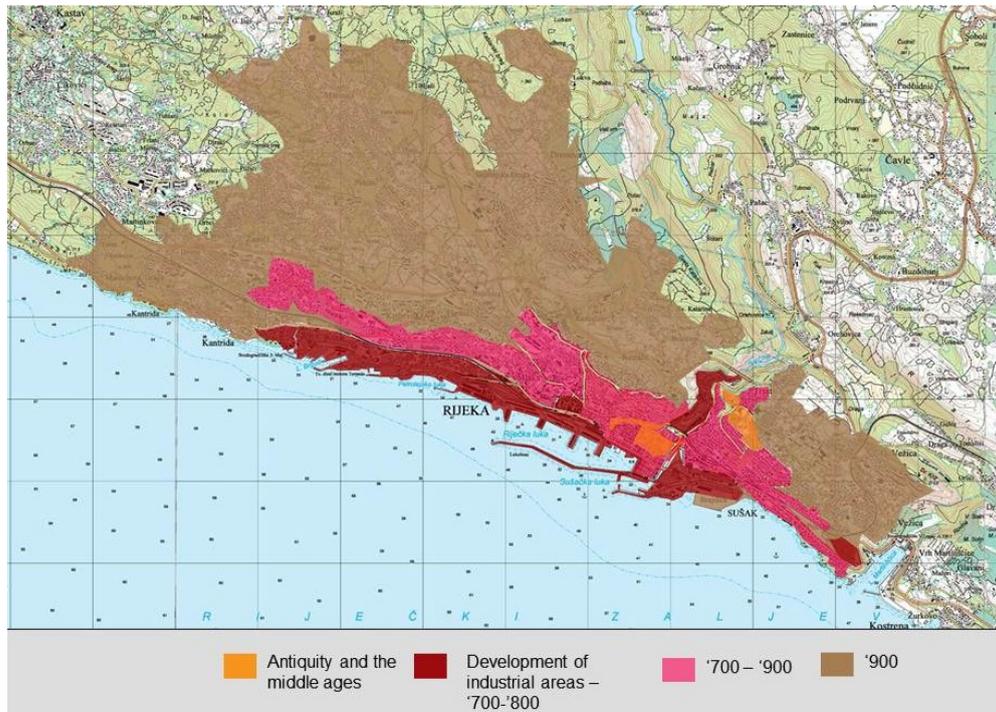
In the 1990s most of the industries closed, and those that remained resized to a fraction of their former size. Vast abandoned areas and a lack of economic opportunities brought the progressive degradation both of the urban and the cultural environment of the city. Several urban areas of degraded industrial heritage (e.g., ex-Paper factory, parts of port area, parts of ex-Torpedo factory) represent opportunities for urban renewal and investment options.

Different economic factors make the launch of activities difficult: a strong centralization, the lack of means, debt with high interest rates, non-transparent and ineffective management, the difficulty of planning in a fluctuating situation, and a narrow perspective on the types of economic organization.

A brief analysis of the characteristics of the territorial system is given in Table 2.

**Table 2.** SWOT analysis.

<p><b><u>Strengths:</u></b></p> <ul style="list-style-type: none"> <li>- presence of cultural institutions (The museum of the city, gallery of modern and contemporary art, The museum of natural sciences, The museum of Glagolitic writing, the national theatre, the theatre of the Italian minority, the experimental theatres, the central and district libraries, the libraries of the university and of the minorities...)</li> <li>- presence of rich cultural heritage,</li> <li>- natural resources (water, sea, woods, animal and herbal life),</li> <li>- presence of institutions of formative character (University with technical and humanistic faculties...)</li> <li>- positive perception of residents of the heritage</li> <li>- positive perception of residents to economic opportunities producing workplaces</li> </ul>	<p><b><u>Weaknesses:</u></b></p> <ul style="list-style-type: none"> <li>- high taxation and communal fees producing high production costs</li> <li>- high costs and high risk in starting and maintaining activity</li> <li>- a difficult start-up environment, tied to the scarcity of funds and administrative difficulties</li> <li>- very complex legal and financial framework</li> <li>- legislation that makes smaller businesses a great risk</li> <li>- administration programmes involving only big stakeholders</li> <li>- lack of connection between various institutions</li> <li>- lack of organization of weak stakeholders</li> <li>- lack of transparency and communication of decision process</li> <li>- lack of connection with the world of creation and production</li> <li>- lack of administrative and financial support for small businesses vs. bigger</li> <li>- diffuse degradation and disinterest on the part of the public and administration</li> </ul>
<p><b><u>Opportunities:</u></b></p> <ul style="list-style-type: none"> <li>- development of different types of activities and economic sectors</li> <li>- development of economy capable of accommodating businesses of all sizes</li> <li>- construction of new sustainable development model</li> <li>- bringing degraded areas to new use by the residents</li> <li>- bringing citizens together through collaboration</li> <li>- activating the potential of the single citizen and small business enterprises</li> <li>- consciousness of the necessity for sustainable development based on the territory</li> <li>- renewal and heritage as the tourist attraction and leisure point</li> <li>- using European Union funds</li> </ul>	<p><b><u>Threats:</u></b></p> <ul style="list-style-type: none"> <li>- using taxpayers' resources for creating loss and further costs</li> <li>- using taxpayers resources in a non-transparent way</li> <li>- raising state and communal taxes</li> <li>- low level of conservation for heritage</li> <li>- production of new closed areas</li> <li>- failing to create a link with the public</li> <li>- failing to build a research-production tie</li> <li>- failing to define the cultural identity—failing to get recognized</li> <li>- failing to create competitive and/or typical products</li> <li>- lack of markets and marketing channels</li> </ul>

**Figure 1.** Analysis of the development of the City of Rijeka.

### 6.3. Urban and Architectural Characteristics of the Port Area

The port area is located in the city center, surrounded by business and residential blocks mostly from the 19th century (built on artificial terrain) and in the western part by the production area (oil refinery and ex-Torpedo factory area). Only one part, near the center and breakwater, is accessible to the public, while other parts are closed off either by the Port Authority or by the physical position of the railway. The most important port buildings are port warehouses through which it is possible to trace various phases of architectural styles (Historicism, secession, proto-rationalism, rationalism and modern architecture), and even more important, all the early phases of implementation of reinforced concrete (Combined use of iron and concrete, reinforced concrete slabs, integral reinforced concrete structures, reinforced concrete building with brick perimeter walls, frame structure, mushroom ceilings) [27]. The concrete was also used in an advanced manner in the construction of the docks and piers [28].

Warehouse 4 is of national uniqueness because it's the first case of combined use of iron and concrete; warehouses 12 and 13 are the only buildings from the 19th century with reinforced concrete Monier ceilings in Croatia; warehouse 17 is a very early reinforced concrete building; and warehouses 18, 19, 20, 21 and 22 ("Metropolis", shown on Figure 2) are of a unique style in the international domain and are the biggest complex built in the region (Warehouse 17 was designed in 1906, six years before the similar building in Trst's port and two years before Edison's housing in reinforced concrete in Union City (New Jersey) [31,32]). Only warehouses 12 and 17 (shown on Figure 3.) are temporarily bounded but the Port Authority's plans are for demolition. The main characteristics of the current land use are synthetically represented in Figure 4.

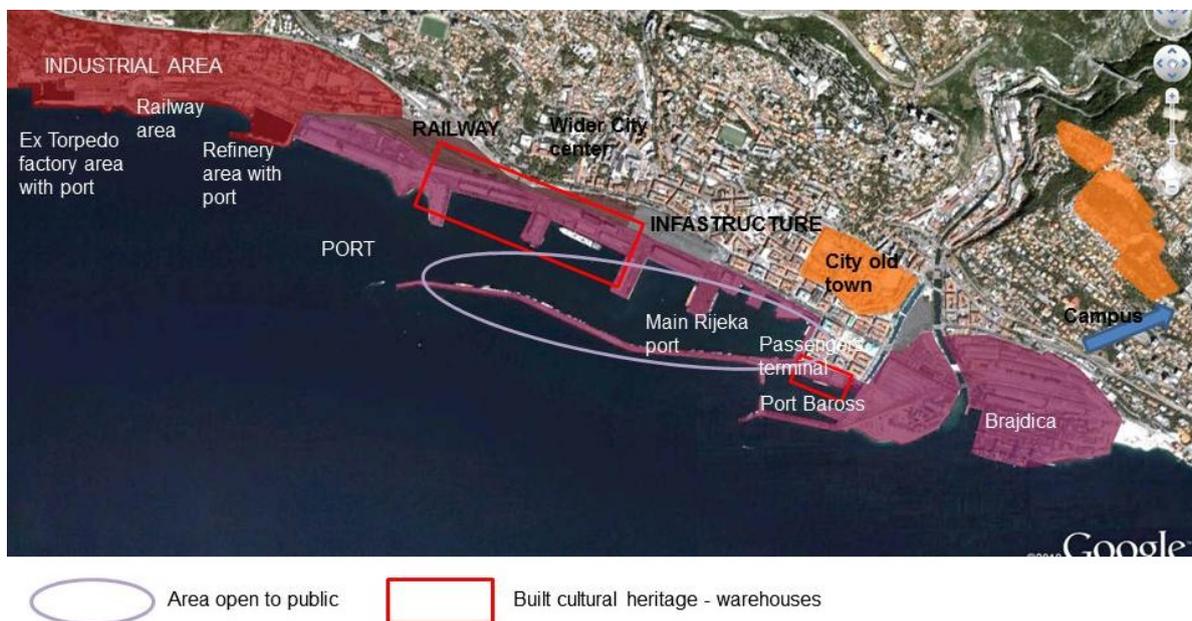
**Figure 2.** The “Metropolis” complex of warehouses—the biggest complex built in the region, and warehouse 17, a very early reinforced concrete building.



**Figure 3.** Warehouses 17 and 12 (a historic building with the ceilings in reinforced concrete) on the right. Behind them, silos for grains from the middle of the 20th century.



**Figure 4.** The main features of the portal area and its surroundings (Elaboration of map from Google Earth, August 2012).



## 7. Identifying the Opportunities and Facilitating the Growth—Renewal of the Port Area

### 7.1. Overview of Stakeholders

Even if the port as the company shows new growth after a long period of downsizing, the changes in the maritime traffic make the central port area unsuitable for the present type of transport of goods. The Port Authority plans to demolish most of the existing warehouses, even the protected ones; an action that would not resolve the problems related to other factors.

The warehouses represent an important cultural heritage situated in an extremely interesting area, in contact with the sea and the city center, which contains major public and economic institutions. This makes this area interesting for many different social groups.

Rijeka has in recent years seen significant interest from both interest groups and the general public for the preservation of its heritage, especially of the industrial type. The very important work of studying and disseminating information is carried out by some of the organizations, institutions and professionals (The Pro Torpedo organization is dedicated to research and promotion of industrial heritage; the Faculty of civil engineering has dedicated some of its courses to the industrial heritage of Rijeka and to the issue of the valorization of heritage; the City of Rijeka and Association of Architects have organized several international workshops on the issue of revitalizing the industrial areas of the city).

The City administration was working on the proposals for integrating the port buildings in the city as administrative and university buildings, as well as hotels and commercial functions. With the transfer of the university to a new location in the eastern part of the city (about 2 km to the east), the City is gaining a second development center that creates a new pole of attraction, where the majority of universities and a small technological center will be situated. One small city subsidies office hub for new firms, however, is situated in the area of the ex-Torpedo factory in the west of the port area.

The Spatial plan of the county is currently in the process of definition (November 2012). According to the working material [33], the port areas outside Rijeka would continue to develop with their present function. The Brajdica area in the eastern part of Rijeka will remain a container port for the remainder of its 30-year contract, after which it will be used as a City development area. The western part (Zagreb docks and Oil refinery) would, in the first phase, host the container area (requiring important infrastructure works inside the city). After this phase the docks would have the function of a passenger port and the port area would be integrated into the life of the city. The present (recently built) passenger terminal on the breakwater would have to change its function. The new bus station is also planned for construction in the proximity.

Parallel to the passenger function of the port, an anchorage area for cruisers, four nautical ports of national and two of county interest and a fishing port of national interest are planned, while a port for residence is not prearranged. (Other counties' settlements on the coast are planned to have residential ports with a capacity for 10%–15% of the population [33].)

The location of the port in the center of the City, together with other infrastructural uses of the waterfront (parking and railway infrastructure), interrupts the connection of the city and the sea. Therefore the possible renewal of the port area could be an opportunity for organizing the waterfront,

everyday economic functions, leisure opportunities for residents and tourists, and the resurgence of the local community port as it existed until the 1970s at the confluence of the Rječina.

### 7.2. Evaluation of the Port Area and Development Scenarios

The evaluation of the extant is effectuated by the application of the model for analysis, diagnosis and evaluation. The modularity of the model allows the insertion of evaluations from the specific disciplines based on the evaluated context.

First, the evaluation of the present situation is done by compiling the evaluation matrices (if necessary including the use of different analysis techniques), then the scenario is formed for the strategic actions. An abstract from the evaluation matrix for the site in question can be seen in Table 1. The port area is evaluated using the matrix for urban sites. The matrix is organized in different evaluation themes with indicators, criteria, weights and guidelines. After the compilation of the matrix the positive and negative characteristics are evident in terms that allow simple communication for different types of public. The synthesis of the results can be seen in the first two columns of the Table 4, in columns of the qualities of the extant and of negative traits of the extant (Extant/Qual, Extant/Degrad). It can be seen that the most important positive traits of the site are the Historical-cultural characteristics and Intrinsic characteristics, but also the Characteristics of the context, while Fruition and Threats and pressures are highly negative.

From the matrices, the guidelines for the strategies can be extracted. It is possible to form the scenarios based only on the chosen goal (e.g., negative characteristics such as Fruition which would give guidelines on: creation of fruition-related services and specialized management organizations; organization and network associations; coordinated management organizations; information and management services; monitoring). Therefore it would be possible to maintain the present function and still better the Fruition characteristics. Because the site also presents other problems (impossibility of maintaining the present function due to other plans of the Port Authority) it was chosen to implement the optional part of the model, the “triangle of the strategies”, for the definition of the comprehensive strategies which is connected to the tables with the indication for the valorization of the site.

### 7.3. Scenario Proposal—Renewal of the Port Area

After the analysis of the site, several scenarios are formed.

Scenario 1 is “do nothing” (or “continue as usual”): port area maintains the same function; Zagreb and Prague docks develop as container ports (warehouses are demolished, as planned). This scenario represents the continuation of the present activities and plans for the port area.

Scenario 2 is based on the working proposal for the county plan with the definition of passenger and nautical port areas and Zagreb docks area for new development consisting of commercial and administrative uses. At this point the county plan doesn't clearly state whether the warehouses will be demolished or not, but leaves the area to the Port Authority which has plans to demolish them. The access to the public is still highly restricted. Scenario 2 is illustrated in Figure 5.

Scenario 3 is based on the application of the evaluation model. It was chosen to implement the tables of the “triangle of the strategies” for the definition of the comprehensive strategies (illustrated in Table 3) which allow the quick definition of actions for the valorization of the heritage. The

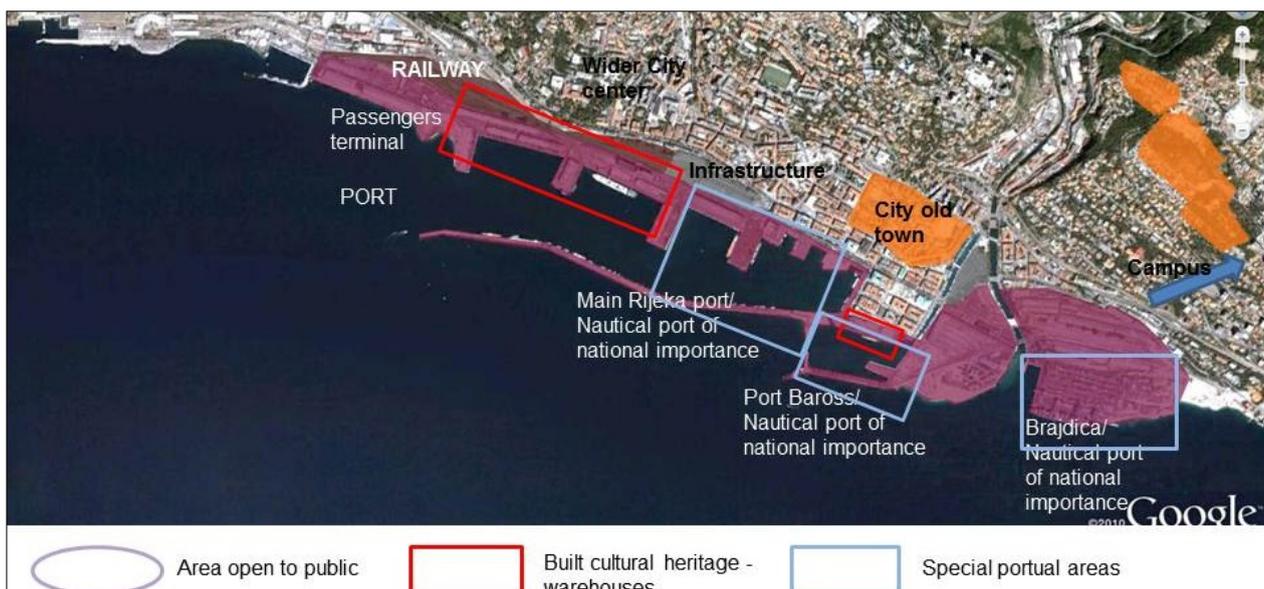
indications concern actions of different types: physical interventions on the urban unit and its context (environmental conservation and maintenance of built elements, creation and positioning of information presentation and valorization services, definition of routes and connections to adjacent areas, organization and improvement of parking spaces, redefinition of boundaries, definition of views to and from the good, improvement of public transport and public infrastructures, environmental improvement...) and the management actions (definition of the legal framework for the protection, research and diffusion of information related to historical-cultural aspect and architectural-urban characteristics, construction of management projects, organization of valorization activities oriented to different publics—exhibitions, festivals, publications..., fruition in network with similar sites, collaboration on open competitions, public contracts and planning agreements, activation of financial tools, definition of property rights including public participation...).

**Table 3.** An abstract of the comprehensive strategies according to the evaluation model (The complete table is contained in the doctorate thesis of the author [19]).

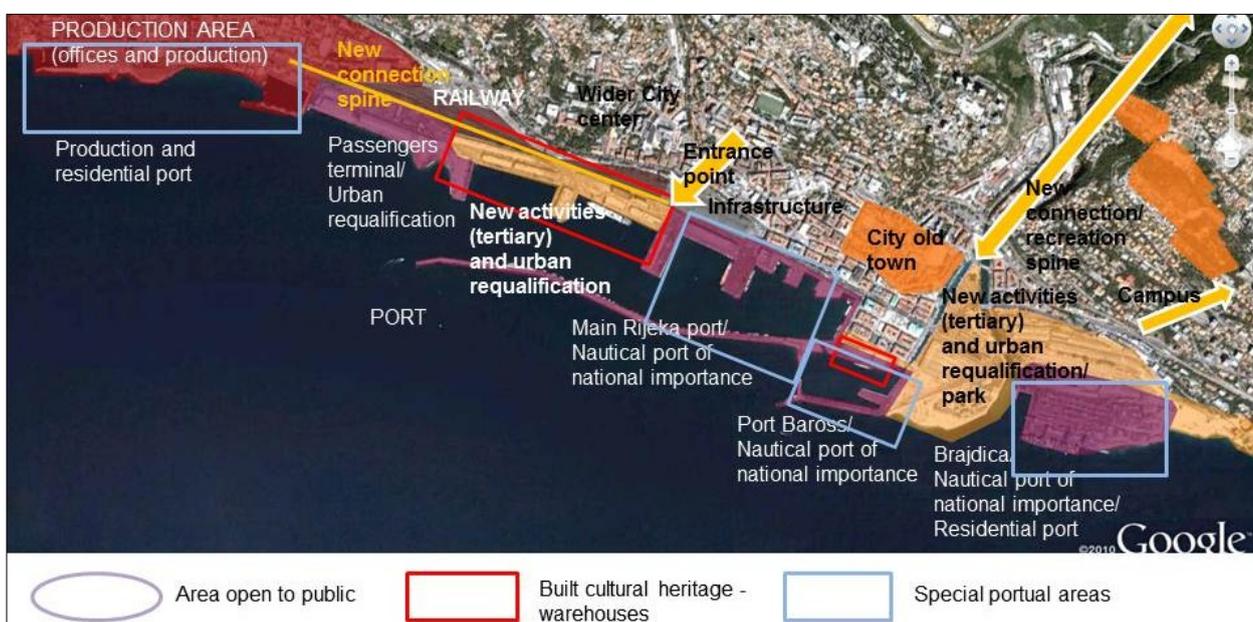
<b>Comprehensive strategies for urban sites</b>		<b>Priority</b>
	Field 2—average quality, low decay	
Actions of physical interventions on the good (conservation, adaption, reconstruction, valorization, fruition...):	- environmental conservation and maintenance of built elements	high
	- conservation of urban character, textures and spatial hierarchies, open public spaces and their constitutional elements	high
	- creation and positioning of information presentation and valorisation services	medium
	- creation and positioning of information in strategic positions	medium
	- interventions of creation of leisure opportunities suitable for the character of the urban site	medium
	- improvement of fruition - definition of routes and connections to adjacent areas	medium
	- improvement of fruition - definition of route types - pedestrian, cycle, driveways, mixed	medium
	- organization and improvement of parking spaces	medium
	- conservation of biodiversity and ecological function	medium
Actions of physical interventions on the context of the good:	- redefinition of boundaries—organization of boundaries, entrances, information systems	medium
	- definition of views to and from the good—creation of visual barriers	medium
	- improvement of public transport and public infrastructures	medium
	- environmental improvement	medium
	- interventions to ensure reduction of air, water and soil pollution	medium
Management aspects related to the good (financial aspects, network organization, public participation...):	- definition of the protection—legal framework	high
	- research and diffusion of information related to historical-cultural and to architectural-urban aspects of the urban site	high
	- construction of management projects	high
	- organization of valorization activities oriented to different publics—exhibitions, festivals, publications...	high
	- creation and management of information and fruition services	high
	- improvement of fruition in network with similar sites	high
	- collaboration with bodies interested in activities of valorisation and regulated use of the good and with project proposals	high
	- collaboration on open competitions, public contracts and planning agreements	high
	- activation of financial tools oriented to improvement of management action—fund-raising, taxation, awards...	high
	- definition of property rights including public participation	high

Therefore Scenario 3 can be summarized as proceeding with the following actions: the passenger port is maintained as in the County Plan proposal, as well as nautical ports with the definition of two small port areas for residents and fishermen. The warehouses are maintained with new functions according to typological and structural analysis for the placement of the Incubator, productive areas (production and offices), hotel, shopping mall, city and university libraries, conference hall and smaller multifunctional spaces with definition of connections with the surrounding area. The renewal would also concern connections (entry points), transports (vehicular, pedestrian, cycling, public transport) and the energy network. Scenario 3 is illustrated in Figure 6.

**Figure 5.** Scenario 2 (Proposal elaborated on map from Google Earth, August 2012).



**Figure 6.** Scenario 3 (Proposal elaborated on map from Google Earth, August 2012).



#### 7.4. The Evaluation of the Proposals

The three proposals can be evaluated by one or more evaluation methods (e.g., Kalman method, landscape evaluations, Environmental Impact Assessment, Strategic Environmental Assessments, Community Impact Evaluation by Lichfield and others). For example, the same multi-criteria matrices can be applied to scenarios as well as to the extant. It can be seen (Table 4) that the extant is seen as having +173/315 and −90/309 positive and negative values, scenario 1: +105/315 and −145/309 positive and negative values, scenario 2: +128/315 and −70/309 positive and negative values and scenario 3: +220/315 and −17/48 positive and negative values.

Scenario 1 negatively influences all the categories except the Characteristics of the context; scenario 2 betters different characteristics but not those of heritage preservation (Intrinsic characteristics and Conservation) and Social characteristics, due to the lack of activities related to public participation; scenario 3 brings higher betterment of all the characteristics, especially those related to heritage, Finance and management aspects due to the diversification of investment opportunities for different sectors, and Social characteristics due to the planned involvement of different social sectors with multiple opportunities.

**Table 4.** Evaluation of extant and different development scenarios.

Thematic category	Extant/ Qual	Extant/ Degrad	Sc1/ Qual	Sc1/ Degrad	Sc/ Qual	Sc/ Degrad	Sc3/ Qual	Sc3/ Degrad
<b>Characteristics of the context</b>	+28/33	−3/33	+24/33	−3/33	+28/33	−3/33	+31/33	−/33
<b>Historical-cultural characteristics</b>	+30/39	/12	+22/39	−/12	+24/39	−/12	+32/39	−/12
<b>Intrinsic characteristics (urban and architectural)</b>	+35/57	−/30	+10/57	−8/30	+17/57	−/30	+35/57	−/30
<b>Conservation</b>	+12/27	−1/27	+/27	−27/27	+/27	−9/27	+15/27	−/27
<b>Fruition</b>	+10/27	−18/27	+9/27	−18/27	+10/27	−12/27	+24/27	−/27
<b>Finance and management</b>	+40/99	−33/99	+34/99	−48/99	+43/99	−11/99	+77/99	−/99
<b>Social characteristics</b>	+18/33	−9/33	+6/33	−13/33	+6/33	−9/33	+30/33	−/33
<b>Threats and pressures</b>	/	−26/48	−/−	−28/48	−/−	−26/48	−/−	−17/48
<b>Score</b>	+173/ 315	−90/ 309	+105/ 315	−145/ 309	+128/ 315	−70/ 309	+220/ 315	−17/ 309

## 8. Identifying the Opportunities and Facilitating Growth—the Proposal of the Incubator

### 8.1. Overview of Stakeholders

The stakeholders can be defined as the following main groups: residents (including interest groups, special groups such as children, elders, minorities...), private sector (including tourism, fishing, agriculture...) and public sector (which represents citizens but whose analysis showed it to also have its specific interests). An abstract of a detailed analysis of the social sectors is given in Table 5.

**Table 5.** Sustainability goals analysis for different sectors.

Sectors/sust. goals	Social	Economy	Ecology
Residents (including specially organized groups such as women and minorities)	<p>More free time for family and friends, for education and hobbies, travelling</p> <p>Lifestyle in correspondence with perception of self</p> <p>Good education system and services</p> <p>Good health-care system</p> <p>Opening of cultural and natural assets to public</p>	<p>Entrances</p> <p>Possibility of earning through jobs, tourism and side jobs</p> <p>Savings through efficient technologies (energy, buildings, cars...)</p> <p>Efficient transport system (public, cars, parking spaces)</p> <p>Savings through control of use (fixed prices)</p>	<p>Green technologies that allow savings and better living standard</p> <p>Preservation of natural resources allowing moderate utilization</p> <p>Supply of quality water</p> <p>Use of rainwater to preserve water resources</p> <p>Efficient waste treatment on small and bigger scale</p> <p>Less pollution</p>
Private sector (agriculture, pharmaceutical, medicine, IT, technologies, fishing, port, tourism...)	<p>Positive perception</p> <p>Well-known products and firms</p> <p>Image related to the best characteristics of landscape</p>	<p>Easier start-up</p> <p>Transparent and easy administrative procedures</p> <p>Diversified financial tools</p> <p>Diversified requirements to meet for financial tools/all categories can find adequate tools</p> <p>Recognisable products</p> <p>Marketing channels for local and global market</p> <p>Stability of local market and strength of it</p>	<p>Using natural resources for research and production (prospecting, water, sea...)</p> <p>Using sea for ecological mariculture</p> <p>Using land for recognisable production (biological)</p> <p>More efficient use of woods</p> <p>Green technologies that allow savings and better living standard</p>
Interest groups (heritage, consumers, sports and health organization...)	<p>Preservation of cultural and natural heritage</p> <p>Development of the local resources</p> <p>More free time</p> <p>Structures that aid organization of events and networking</p> <p>Good education system and services</p> <p>Good health-care system</p> <p>Opening of cultural and natural assets to public</p>	<p>Good income to pursue lifestyle</p> <p>Use of natural and cultural heritage in leisure and production compatible with their characteristics</p> <p>Opening of cultural and natural assets to public</p>	<p>Green technologies that allow savings and better living standard</p> <p>Preservation of natural resources allowing moderate utilization</p> <p>Preservation of resources</p>
Public sector (this sector should represent the goals of all other sectors, but it has its different base goals)	<p>Standard of living of citizens that lessens the crime rate and costs of health care and services</p>	<p>Firms that produce income and pay taxes</p> <p>Citizens that produce income and pay taxes</p>	<p>Preservation and efficient use of resources</p>

Sustainability goals for residents (Table 5) include, for example (simulated data based on small sample): more free time for family and friends, for education and hobbies, traveling, good education system and services, good health-care system, opening of cultural and natural assets to the public,

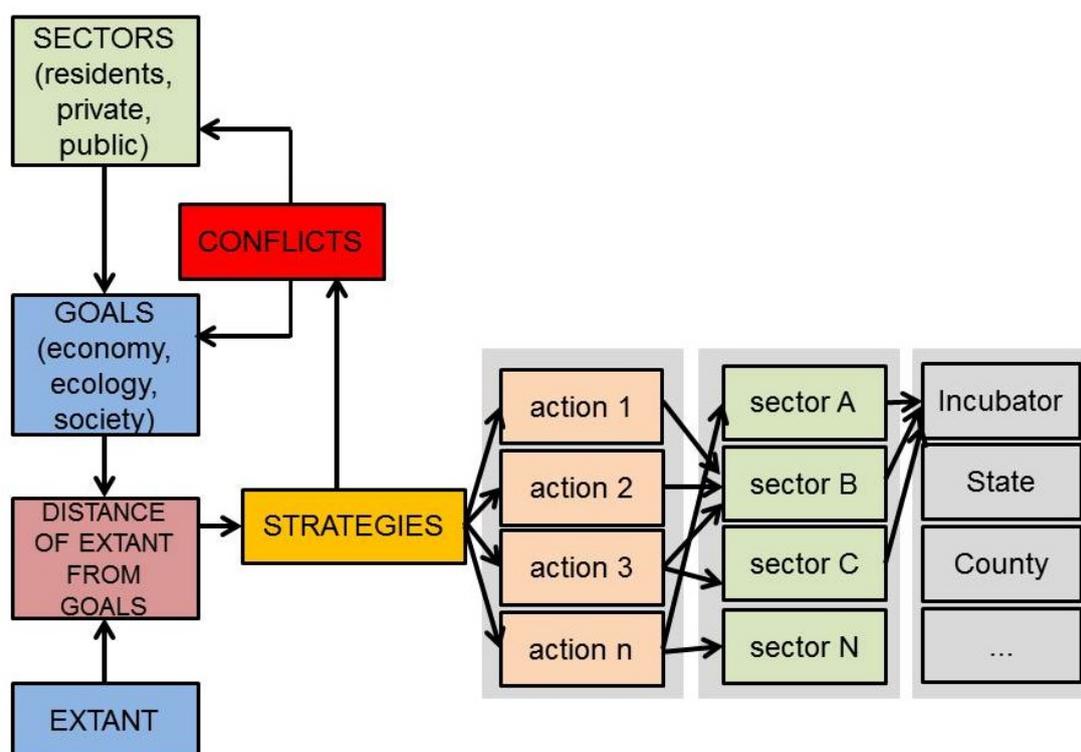
generating income, savings through efficient technologies (energy, buildings, cars...), preservation of natural resources allowing moderate utilization...

Sustainability goals for private sectors (Table 5) include, for example (simulated data based on small sample): positive perception, easier start-up for every type of firm, transparent and easy administrative procedures, diversified financial tools, diversified requirements for financial tools so that all categories can find adequate financial tools, using natural resources for research and production (prospecting, water, sea, ecological mariculture, special botanic cultivating, wood-related industry...), tourism, information technology development...

Sustainability goals for public sectors (Table 5) include, for example (simulated data due to lack of data from public sector): standard of living of citizens that lowers the crime rate and the costs of health care and services, firms that produce income and pay taxes, citizens that produce income and pay taxes, preservation and efficient use of resources.

These sustainability goals can be further analyzed by identifying the network of relations between goals and actions, and in terms of overlapping interests and contrasts, identifying the possible frictions (Figure 7). The current state is defined, and therefore it is possible to define the actions necessary to go from the current state towards the desired state. By defining the necessary actions, the roles of different sectors are determined and therefore define the role of the Incubator.

Figure 7. Layout of the analysis of relations between sectors, goals, strategies and roles.



An abstract of a detailed analysis is given in Tables 6–8. The analysis was divided into dimensions of sustainability—ecology, economy and social dimension. The first column identifies the sustainability goals, the second the sectors interested in those goals. This helps to identify the possible contrasts of the sectors where the sectors can have a different attitude towards the sustainability goals or be indifferent towards them. The possible conflicts are stated in the third column. In the fourth

column, the current state related to the specified goal is defined, e.g., inefficiency in considering the given goal. Based on the comparison of the current state and the goal, possible actions/tools for achieving that goal are listed in the fifth column—“Tools”. The actors responsible for those actions are defined in the column “Who”. As some of those actions and tools can only be performed by a legislator, local government, private sector or the residents, the possible “Role of the incubator” is extracted in the last column.

**Table 6.** An abstract of the relation between the sustainability goals and the role of social sectors and incubator—Ecology.

Goals/activity	Sector interested	Contrast with activity/sector	Current state	Tools	Who	Role of the incubator
Green technologies that allow savings and better standard - solar collectors, photovoltaic, efficient engines, food production...	Residents (all groups) Private—related to efficiency	Private/public—that produce goods and manage resources	Low efficiency Big costs Impossibility of cost and efficiency control on the part of the user Impossibility of choosing type of technology on the part of the user	Legislations permitting technological adaptation and behavioural patterns Planning—permitting typologies that allow easy and efficient functioning, partially off-grid Investments/subsidies in technology Investments/subsidies in conversion and adaptation	Public Residents	Feedback on legislation effects and possible betterment Education of citizens in various needed fields (contact with residents) Feedback to local government about territory opportunities and problems Identifying investment and research opportunities, help in this process and formation/(help in) of financial tools, Aid in contacts needed for adaptation
Preservation of natural resources allowing moderate utilization	Residents (all groups) Private (tourism, fishing...)	Private (at the high consumption level)	Moderate utilization due to low economy	Legislation oriented towards preservation of resources	Public	Feedback from firms, residents and researchers, Feedback on legislation
Using natural resources for the research and production (prospecting, water, sea, woods...)	Private Public Residents (in smaller quantity)	Residents (if in very high quantity)	Sea over utilised, Other components—little utilization due to low economy	Legislation regulating the use Easier administration procedure Investments in technology and production	Public Private Residents	Feedback on effects of legislation Aid with administration process Identifying investment and research opportunities, help in this process and formation/(help in) of financial tools

Table 6. Cont.

Goals/activity	Sector interested	Contrast with activity/sector	Current state	Tools	Who	Role of the incubator
Using sea for mariculture	Private Residents	Private (some sectors) Residents (if in very high quantity)	Little use	Legislation regulating the use Easier administration procedure Investments in technology and production	Public Private	Feedback on effects of legislation Aid with administration process Identifying investment and research opportunities, help in this process and formation/(help in) of financial tools
Supply of quality water Use of rain water to preserve water resources	Residents (all groups) Private	Private/public—that produce goods and manage resources Public—generating tax from water consumption	Moderate utilization due to low economy High supply but loss in quantity Chemical treatment producing strange odour and taste	Legislations permitting technological adaptation and behavioural patterns Planning—permitting typologies that allow easy and efficient functioning, partially off-grid Investments/subsidies in technology Investments/subsidies in conversion and adaptation	Public Residents Private	Feedback on effects of legislation Feedback to local government about territory opportunities and problems Identifying investment and research opportunities, help in this process and formation/(help in) of financial tools Aid in contacts needed for adaptation

Table 7. An abstract of the relation between the sustainability goals and the role of social sectors and incubator—Economy.

Goals/activity	Sector interested	Contrast with activity/sector	Current state	Tools	Who	Role of the incubator
Easier start-up	Private Residents Public	Private (competition)	Very difficult	Easier administration procedure Identifying opportunities for growth Investments/subsidies in technology Investments/subsidies in conversion and adaptation	Private Public	Feedback on effects of legislation Aid with administration process Identifying investment and research opportunities, help in this process and formation/(help in) of financial tools

Table 7. Cont.

Goals/activity	Sector interested	Contrast with activity/sector	Current state	Tools	Who	Role of the incubator
Savings through efficient technologies (energy, buildings, cars...)	Residents Private	Private/ public - that produce goods and manage resources Public—generating tax from consumption	Little	Legislations permitting technological adaptation and behavioural patterns Planning—permitting typologies that allow easy and efficient functioning Investments/subsidies in technology Investments/subsidies in conversion and adaptation	Residents Public	Feedback on effects of legislation Feedback to local government Identifying investment and research opportunities, help in this process and formation/(help in) of financial tools Education of citizens in various needed fields (contact with residents) Aid with administration process Aid in contacts needed for adaptation
Efficient transport system (public, cars, parking spaces)	Residents Private	Private/ public—that produce goods and manage resources Public—generating tax from consumption	Medium	Planning—permitting typologies that allow easy and efficient functioning Investments/subsidies in technology Investments/subsidies in conversion and adaptation	Public	Feedback on effects of legislation Feedback to local government Identifying investment and research opportunities, help in this process and formation/(help in) of financial tools
Savings through control of use (fixed prices)	Residents Private	Private/ public—that produce goods and manage resources Public—generating tax from consumption	Little	Legislations permitting technological adaptation and behavioural patterns Planning—permitting typologies that allow easy and efficient functioning Investments/subsidies in technology Investments/subsidies in conversion and adaptation	Public Residents Private	Feedback on effects of legislation Feedback to local government Identifying investment and research opportunities, help in this process and formation/(help in) of financial tools Education of citizens in various needed fields (contact with residents) Aid with administration process Aid in contacts needed for adaptation
Transparent and easy administrative procedures	Private Residents Public	Public Private (some groups—entry barrier)	Very difficult, lengthy and non always transparent	Easier administration procedure	Public	Feedback on effects of legislation Feedback to local government Aid with administration process
Diversified financial tools	Private Residents Public	Private (traditional banking system)	Small amount of financial tools	Legislation allowing different financial tools Formation of different financial tools	Public	Feedback on effects of legislation Aid with administration process Formation/(help in) of financial tools

**Table 8.** An abstract of the relation between the sustainability goals and the role of social sectors and incubator—Social dimension.

Goals/ activity	Sector interested	Contrast with activity/ sector	Current state	Tools	Who	Role of the incubator
Standard of living of citizens that lessens the crime rate and costs of health care and services	Residents Private Public		Medium	Helping firms Welfare Administrative and financial aid	Public	Feedback on effects of legislation Aid with administration process Identifying investment and research opportunities, help in this process and formation/(help in) of financial tools Education of citizens in various needed fields (contact with residents) Network cooperation Tool bank
Good income to pursue lifestyle	Residents Private Public	Private (some sectors)	Little	Creating opportunities Identifying opportunities for growth Easier administration procedure Investments in technology and production	Private Public Residents	Feedback on effects of legislation Aid with administration process Identifying investment and research opportunities, help in this process and formation/(help in) of financial tools Education of citizens in various needed fields (contact with residents) Network cooperation Tool bank
More free time	Residents	Private	Medium	Developing productiveness and efficiency Control of legality on workplaces	Private Public	Feedback on effects of legislation
Opening of cultural and natural assets to public	Residents Private	Private (some groups) Public (cost of maintenance)	Low frequentation	Planning—permitting typologies that allow easy and efficient functioning Formation of special organizations Defining simpler legal framework Easier administration procedure	Public	Feedback on effects of legislation Feedback to local government Education of citizens in various needed fields (contact with residents) Network cooperation
Good education system and services	Residents Public (some groups)	Private (some groups) Residents (costs) Public (costs)	Medium level	Legal framework permitting different types of learning Financial tools that help studying Different categories application	Public Residents	Feedback on effects of legislation Education of citizens in various needed fields (contact with residents) Network cooperation
Good health-care system	Residents Private Public	Private (some groups) Public (costs)	Low level	Easier administration procedure Investment	Public	Feedback on effects of legislation Education of citizens in various needed fields (contact with residents)

One surprising finding is that, besides the conventional understanding of the public sector (a structure that represents and serves citizens), when analyzed on its own, the public sector has very little (or no) interest in allowing and aiding sustainability and growth for citizens or firms, especially in the case where all traditional infrastructure is managed by public bodies or privatized on the basis of an oligopoly, with the same authority as that of the public sector. This can be explained by the fact that those who legislate also hold monopolies on services required by legislation (with private contractors as an extension of authority).

### 8.2. *The Proposal—the Scientific-Cultural Center (Incubator)*

A particularity of the territory of Rijeka is a strong scientific, technological and artistic tradition (Miniature painter of the XVI century, Juraj Klović (Julio Clovio) (1498–1578), neoplatonic philosopher Franjo Petris (1529–1597), archbishop, mathematician, philosopher, theologian and naturalist Marko Antun Dominis (Markantun de Dominis) (1560–1624), painter and cartographer Ivan Klobučarić Fluminensis (1545–1605 or 1606), physician and botanist Josip Pančić (1814–1888), composer and orchestra director Ivan pl. Zajc (1832–1914), seismologist and geophysical scientist Andrija Mohorovičić (1857–1936) *etc.*). For this, the true point of strength is found in the development of a scientific culture, creative industry and green and sustainable technologies including primary and secondary sectors.

As the innovation requires a collaboration of multiple actors, where roles of various institutions and markets complement each other, it therefore depends on contextual conditions and spatial-industrial organization, on both codified and tacit knowledge, production and communication for transfer of knowledge between industry and research centers [34] which can be eased by the creation of Regional Innovation Systems (RIS) formed of various institutions on the territory, from academic and research to productive organizations.

The incubator center could therefore serve as a starting point for local development that could continue with other programs of urban renewal, transport and energy network improvement. The center should function as the driving force, offering innovative services to the city, conducting research and proposing the proper policies for intervention, positioning itself as an example of sustainable development planning.

The incubator of the City of Rijeka could be a central node of a net of similar development centers situated in the county. Particularly important could be the centers in the neighboring towns where the research structures could be related to geology, biology, ecological systems and renewable energy, which require more space than can be found inside the perimeter of the urbanized areas. The cultural centers would be inserted as much as possible in the structures of the cultural heritage currently in disuse, according to the criterion of respect between the new function and the character of the cultural asset. This model is proposed because it is considered that a centralized structure would not be suitable for the present territorial and economic situation. One large structure would increase the risk of vested interests blocking real progress, and would be difficult to manage, especially from the financial point of view.

These centers would constitute an opportunity for experimentation, integration and promotion of new environmental technologies, especially in connection with the institution of higher education. The

centers, apart from competencies in the specific fields, would offer support in administrative and financial procedures in the formation of activities or new products. In particular, they could act as a basis for a cooperative structure of various individuals and privately owned enterprises, particularly those too small to face the competitiveness of the globalized world, especially at start-up. The openness to all members of society through various services is crucial to activate the process of social inclusion and to create the necessary competencies to activate economic growth.

The center should be able to offer to the collectivity and to enterprises competencies and tool banks with knowledge based on the territory, on research and the possibility of the use of specific, rare or expensive tools. Through the network of similar centers the competencies lacking in one center could be lent by another center. Importance is given in fact to collaboration among the various structures of the center and among the various centers.

The financial structure is very important, instead of creating another element to weigh on the public budget; the center should be able to work through the registration of partners, of supporting members, fund-raising in the territory, the funds of connected enterprises and from the actual production of knowledge and services.

It can be seen that from the analysis of goals, actions and actors (Tables 6–8), the function of the Incubator (or the network) could mainly be: feedback on legislation effects and possible betterment, education of citizens in various needed fields (contact with residents), feedback to local government about territory opportunities and problems, identifying investment and research opportunities, help in this process and (help in) formation of financial tools, aid in contacts for adaptation, feedback from firms, residents and researchers, aid with administration processes, network cooperation, aiding contact between different categories of incubator users, tool bank and competencies bank.

Especially important are contact with the public (incubator members, potential members and residents in need of information and assistance in administrative processes), financial tools, tool bank, competencies bank and networking. This would allow different organization and financial opportunities, such as collaboration, investment options, definition of property rights, open-source, do-it-with-others as well as aiding more standard options. Based on this required goals, a simple evaluation method for sustainability of the incubator center, in the form of the checklist (Table 9) can be proposed. In this case, the criteria and indicators can also be modified based on public participation and decision-making process.

## 9. Conclusions

The contemporary city faces many problems, from high competitiveness to world crises. Deindustrialization has reduced classical workplaces and opened those in services that tend to be related to the public sector and produce an increasing bureaucratization of processes, overproduction of often *ad hoc* (and therefore non-transparent) legislation, and public debt. All these problems have existed for several decades and are accentuated by the world economic crisis. The cities that are the engine of progress and growth face the problems of unsustainability due to housing typologies and a production pattern that requires enormous material and liquidity input. In this process many behavioral patterns emerge, especially those related to types of “green” technologies, but mostly when they are truly budget-conscious technologies related to basic needs.

It is seen that some disciplinary fields are trying to incorporate the public in decision-making, in order to allow a more democratic spatial management. Especially important are public participation and decision-aid tools that can help identify main characteristics and conflicts and help define the direction of sustainable development. The proposed decision-aid evaluation model can be used to cover different aspects—from spatial and visual analysis tools to financial tools and public participation enablers. For private investors and the general public it could be useful to have the opportunity to consult an online database with evaluated elements, with all relevant data for the first business analysis. By making the possibility of investment a transparent process, different possibilities for investing groups could be formed with almost spontaneous involvement and by offering participation (stocks) in the newly formed investments, including that of the Incubator or single projects. In the same way, investment opportunities could be organized for the development of new products and research, bringing together investors of different “size” and newly formed companies.

**Figure 8.** Oil refinery (planned to be moved), slaughterhouse building near river Rječina, river Rječina, port of Rijeka.



**Figure 9.** Area of ex-Torpedo factory.



It was found that, although the residents and private sector have to be more dynamic, most of the work has to be done by the public sector, not through subsidies, but by creating transparent legislation that produces simpler procedures and allows more diversified actions for diversified types of actors. Even if the public sector is considered as representative of citizens and as a services supplier, when analyzed on its own, it might not have a goal of sustainability—especially when it can have the necessary financial means via collective debt. It is especially visible in the monopolistic management of common resources and services (including oligopolistic private contracts).

With a public sector truly acting in good faith, it would be possible to form a network of structures that could function as a starting point for different development opportunities. The proposal is based on analysis of the extant, definition of sectorial goals and definition of actions and actors. In order to be able to track the effectiveness of the proposal a simple evaluation tool is defined. This proposal should still be verified on the practical case (in different phases), but the first results would be obtainable, phase-by-phase, starting from the first structure.

**Table 9.** A simple evaluation method for sustainability of the incubator center—a checklist and main indicators.

Field	Question	Answer	Specification/proposal
Context	Does the formation of the incubator help the renewal of the area?	Yes/no	
	Does the formation of the incubator help the connection between surrounding areas?	Yes/no	
	Is the structure easily approachable and indicated?	Yes/no	
	Is the construction clearly identifiable?	Yes/no	
	Does the formation of the incubator aid the natural characteristics of the surrounding area?	Yes/no	
	Does the formation of the incubator aid the urban characteristics of the surrounding area?	Yes/no	
	Does the formation of the incubator open the panoramas on the surrounding area or offer interesting panoramas?	Yes/no	
	Does the formation of the incubator boost the new activities in the surrounding area?	Yes/no	
Cultural characteristics	Does the formation of the incubator aid the preservation or formation of new cultural heritage?	Yes/no	
	Is the work of the incubator related to material and immaterial local culture?	Yes/no	
	Is the work of the incubator related to biological production?	Yes/no	
	Is the work of the incubator related to information technologies?	Yes/no	
	Is the work of the incubator related to green technologies?	Yes/no	
Financial	Does the number of firms and residents that proceed with the proposed investment option/number of requests exceed 80%?	Yes/no	
	Does the number of firms and residents that proceed with the proposed research option/number of requests exceed 80%?	Yes/no	
	Does the number of firms and residents that found collaboration partners/number of requests exceed 80%?	Yes/no	
	Does the number of firms and residents that used bank tools/number of requests exceed 80%?	Yes/no	

Table 9. Cont.

Field	Question	Answer	Specification/proposal
Financial	Is the use of a tool bank and competencies bank judged as positive by users?	Yes/no	
	Do the majority of the firms and free lancers have their own positive income after a year?	Yes/no	
	Is that number bigger than that of general statistics for the local area?	Yes/no	
	Is the structure involved in international funding in more than 80% of the cases in the incubator?	Yes/no	
	Is the structure involved in private funding (different to proponent) in more than 80% of the cases in the incubator?	Yes/no	
	Is the structure involved in public funding in more than 80% of the cases in the incubator?	Yes/no	
	Is the structure involved in tourism projects?	Yes/no	
	Is the judgement of the tourist sector positive?	Yes/no	
	Is the judgement of the private sector and users positive?	Yes/no	
Network cooperation	Is the structure part of the network?	Yes/no	
	Is network used to put proponents and other actors in contact?	Yes/no	
	Is the network used for the tool bank?	Yes/no	
	Is the network used for the competency bank?	Yes/no	
	Does the number of satisfactory contacts/number of requests exceed 80%?	Yes/no	
Social	Is the structure a positive symbol of local identity?	Yes/no	
	Is the perception of territory and self-perception of population positive?	Yes/no	
	Does the number of satisfactory information/number of requests exceed 80%?	Yes/no	
	Does the structure always use an anonymous survey after the consultation with the user?	Yes/no	
	Does the number of cases of aid through the administration process with positive results/number of requests exceed 80%?	Yes/no	
	Is the number of feedbacks to government bodies equal to or higher than the number of problems reported by users?	Yes/no	
	Does the structure organize information/education courses on the basis of residents' demand?	Yes/no	
	Does the structure organize information/education courses on its own initiative?	Yes/no	
	Do the classes have a representation of all different sectors?	Yes/no	
	Do classes include material demonstrations?	Yes/no	
	Is the share of special groups representative of the area?	Yes/no	
	Is the judgement of the users positive?	Yes/no	
	Is the judgement of the residents positive?	Yes/no	
Is there a structure where complaints and suggestions can be filed at any moment and/or online?	Yes/no		

## Conflicts of Interest

The author declares no conflict of interest.

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