AESTIMUM 59, Dicembre 2011: 123-139

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Multidimensional evaluation processes to manage creative, resilient and sustainable city

Multidimensional evaluation processes are considered as fundamental tools in managing the transition to the eco-city, toward a new ecological, urban and economic base, founded on synergies among three interdependent circuits of value creation: industrial economy, heritage economy and civil economy. The proposed approach can be a theoretical reference for next methodological and operative applications related to the port-city system, as example where the main contemporary contradictions/paradoxes come into being, and also the most suitable site where to reduce conflicts and transform them into synergies among creativity, resilience and sustainability for a human sustainable city.

Parole chiave: *resilienza, città umana sostenibile, valutazione multidimensionale, governance creativa*
Keywords: *resilience, human sustainable city, multidimensional assessment, creative governance*

1. Toward a creative, resilient and sustainable city

Today, more than ever, cities are places of contradictions, paradoxes and conflicts. In the cities the economic wealth of a region/nation is produced, and, at the same time, the ecological poverty and the social poverty are increasing (United Nations Human Settlements Programme, 2003).

Different and several urban transformation processes occur in the cities and many areas – as industrial, port or dismissed periphery areas – are more and more abandoned and in decline. Therefore the cities become places extremely complex to manage/govern: they guarantee benefits to people living/working there, but they also produce many negative effects, such as pollution, environmental degradation, unemployment, social fragmentation, and marginalization. Over the time, these negative effects can increase, destabilizing the city organization and compromising the quality of life. Indeed, the city can be considered the most relevant threat to climate destabilization and nurtures the decay of social relationships. But, at the same time, the city represents the "starting point" in order to rebuild a future which is comprehensively more desirable, to build a hope of a positive change. The city can be considered the starting point in order to regenerate economy, according to not a linear approach but a circular one: a new ecological metabolism; it is also the starting point for the regeneration of social sustainability and democracy towards a *human* sustainable perspective (Fig. 1).

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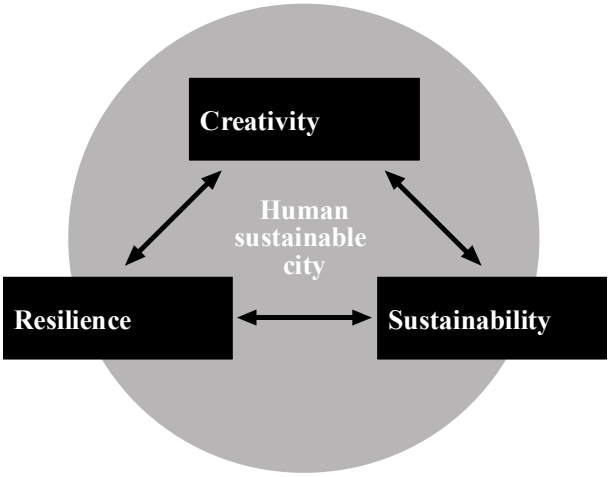
Figure 1. Creativity, resilience and sustainability for a *human sustainable city.*



The future of human beings themselves, of environment, of biosphere will be shaped in the city. The city is also the starting point for building the hope of a positive change. A better wealth and quality of life can be carried out in the city by improving the functioning of urban systems. This hope finds its foundation in the *creativity of the city.* The cities have always been crossroads of the creativity. A strong creativity is now required to overcome all these contradictions, paradoxes and conflicts, in the North and South cities, in great metropolitan areas as in medium and little towns.

Creativity as *immaterial capital* is the real "strength" of a territory/city. Without this kind of capital, the city becomes stagnant or declines. Through this creative capital – more important than the financial/infrastructural one – cities can face the increasing economic challenges, the environmental crisis, the urban marginality and the poverty, the growth of inequalities.

The creative capital of the city is an asset of all inhabitants (and not only of an *élite*) and reflects itself in their lifestyles, in the density of their relationships, in their self-organizational capacity and economic performances.

Creativity regards new financial and institutional systems, new technologies, architectural and planning re-design of the city, the reorganizations of technological systems and of energy supplying as well as new innovative networks among public, private and civic sectors.

But creativity regards also a *new way of living* the city by its inhabitants. Its regards their creative capacity in combining/integrating old values into a modern vision (the ancient and the new; tradition and modernity). Creativity can ensure the self-organizational capacity, the resilience of the city and therefore the possibility of a continuous recreation of new opportunities. A creative environment fosters people and helps them to become "entrepreneurs".

The crises conditions force the cities to be creative in building their future. Crises are engines of creativity: some parts of the cities organization structure are de-

stroyed, some others are regenerated, opening new evolutionary trajectories and opportunities (Shumpeter, 1942).

The creative city is the one that is able to successfully face the above-mentioned problems, improving the *choices* of governance/management/planning with the result of reproducing order also in conditions of turbulent (physical, economic, social) change, preserving and improving the quality of life for its inhabitants. The quality of life improvement is the indicator of the success for undertaking creative actions.

The paper's purpose is to discuss the role of the creativity in urban governance, toward a new ecological economic base, where evaluation processes are proposed as fundamental tools in managing the transition to the *eco-city*. The proposed approach can be considered a theoretical reference for next methodological and operative applications related to the port-city system, as example where the main contemporary contradictions/paradoxes come into being, and also the most suitable sites where to reduce conflicts and transform them into synergies, provided that innovative approaches of governance, at strategic, planning and management level are introduced. They can become the entrance point for the sustainable development of the all urban system if creativity and resilience are really promoted in managing this particular complex system. In fact, port areas are the sites where a creative governance promotes the circularisation of industrial processes, in synergy with the circularisation coming from reuse/regeneration of cultural heritage and civil economy system, that is structurally characterized by circles/loops of changes.

The paper proposes a model for the new urban economic base founded on "relational principle", that is on synergies among three interdependent circuits of value creation (industrial economy, heritage economy and civil economy). In port areas "differences" among cultures, architectures, ethnic groups, etc., have always been the deepest. These differences have fostered a favourable atmosphere to openings, to creativity and innovation in different fields: artistic, scientific, management, etc. The potential of creativity, which is higher in port cities compared to other cities, is the element that can help to overcome conflicts and contradictions. The paper analyzes how and at which conditions port areas can become an opportunity for the whole city: the most suitable places to start from in order to really implement city sustainable development strategies, capable of integrating economic growth, ecological preservation and social opportunities in a win-win design (Fusco Girard, 2010).

The creative city concept is *fuzzy* and can be interpreted according to many different perspectives. Peter Hall (1998) identifies some types of creative cities in history: the technological-innovative city, the cultural-artistic city, the technological-artistic city, the organization city. For example, in the technological field, the creativity has determined the so-called "revolution", generating impacts on the city's organization. Indeed, in XVIII century the Industrial Revolution deeply transformed the city; and in the late XX century the information-technology revolution developed, globalizing economy and determining a series of impacts among which the dematerialization of the economy itself and the central role of culture and knowledge.

Nowadays the third revolution, i.e. the energetic one, is taking place: it will deeply change our cities (Droege, 2006). Cities need a new comprehensive organization and an "urban revolution" regarding many sectors is necessary: the physical/spatial organization (its form), the economic/financial one (foundations, third sector, ethical finance, social enterprise, etc.), the ecological one (its metabolism), the social one (its relationships), as well as the institutional one (management/governance, public administration).

In any cases it is necessary to promote an *innovative milieu*, in order to valorise the existent skills and talents. This innovative milieu allows cities to be creative in the accelerated change: to be *resilient from the inside*, and not only because they receive exogenous resources or adapt the best good practices developed elsewhere (Fusco Girard and You, 2006).

An essential element of this milieu is represented by knowledge. Knowledge allows thinking in a new way, thus identifying new alternatives, new solutions, and new choices, and promotes innovations. On the other side, innovation can involve a new circular metabolism (with re-use, re-cycle, and regeneration of materials) in urban ecosystems (*ecological resilience*), new economic competitiveness with the identification of original development trajectories in wealth production (*economic resilience*) and the opening up of new social bonds, community relationships (*social resilience*). The intensity of resilience depends on specific innovations that are introduced into the urban system: they improve the comprehensive city self-organization and thus sustainability.

Creativity and innovations enhance the capacity to face new risks and perturbations, i.e. the resilience of ecological, economic and social systems. In other words, creativity enhances sustainability because it guarantees more resilience capacity to urban systems.

If resilience is the capacity of a system to maintain its original organizational structure (its identity and unity) in time, absorbing shocks from outside, it is possible to identify in ecological, economic, social resilience some common elements: the notion of memory, conservation, feed-backs, stability, self-organization, connectivity, and correlations.

In particular, *social resilience* depends on formal and informal social networks density, which is able to conserve over time a certain organizational order: it depends on the existing sense of community. *Economic resilience* is the capacity to produce wealth, business and profits, by changing and experimenting innovative production technologies, organizations and strategies. *Ecological resilience* reflects the health and robustness of the system (Costanza, 1991), i.e. the density of connections/relations among different components that allow for implementing circular processes (with a reduction of consumed materials, energies, resources, etc.).

In this perspective, the general condition of a real success in implementing sustainable development is to invest in creativity and resilience of the city. Sustainability, creativity and resilience are closely intertwined, as some best practices clearly show (Fusco Girard and You, 2006). The image itself of a creative city reflects interdependences among sustainability, resilience and creativity.

2. Creative governance: a perspective for changing

A creative and effective governance reproduces order and compatibilities, avoiding that comprehensive complexity may exceed the critical threshold of instability and ungovernability of the city system. It improves the city resilience through the construction of a creative milieu that stimulates innovative actions of urban development, and thus sustainability.

Promoting urban creative actions is interpreted here as the capability to go beyond entertainment, fashion, arts, theatres, etc.: improving the living environment in different dimensions, producing new relations, spaces of cooperation in the economic, ecological and social field, taking into account that city resilience depends on the density of existing and innovative relationships.

To face the current crisis and the unsustainable city growth, the sustainable strategy is the one which is able to minimize human/social/ecological costs, producing new values and wealth through creative actions.

The city is an evolving, in-flux and dynamic system. Sustainable strategy is characterized by the capacity to manage growing urban complexity and solve conflicts with new synthesis capacity, integrating multiple elements and components, generally considered in conflicts/contradiction, identifying new connections, synergies, and networks. It recognizes the *best practices* as positive experiences of change from which to learn. The *best practices* are examples of a governance process and concrete urban development actions which are authentically creative, able to combine opposite elements and actors in integrated win-win solutions, improving income, employment, and environment and then quality of life (Fusco Girard and You, 2006).

Indeed, a creative governance concerns different fields able to face different issues in an integrated and systemic approach:

- Restoring eco-systems and reducing climate destabilization, through new technologies at micro and macro scale, able to decouple wealth production from negative environmental impacts;
- Building a new local economy and finance;
- Eco-friendly planning (from reinventing the role of the city with a "strategic vision", to urban planning and sustainable maintenance; from regeneration of port areas and waterfronts to regeneration of degraded peripheries and brownfields) together with historical city centre regeneration (cultural/artistic/environmental heritage integrated conservation) in a systemic perspective;
- Promoting experiments in "architecture laboratories".

Nowadays the production of wealth is less and less related to investments in natural capital and man-made capital (as in the old economy) and more and more to investments in knowledge, on which the effective use of resources depends.

The New Economy is knowledge-based (Yigitcanlar *et al.*, 2008; van Oort, 2004; Hospers, 2003; Gibson and Klocker, 2005). The production of media, movies, videos, digital pictures, music, software, general and specific services, advertising, art performance, visual art, graphic art, industrial, fashion, interior design, etc. are acquiring a growing importance in urban economics in respect to traditional indus-

trial production (Kong and O'Connor, 2009; Cooke and Lazzeretti, 2008; Franke and Verhagen, 2005). An increasing level of knowledge is more and more embedded into goods and services.

The above-mentioned process has always taken place in history, but it has never been characterized by the current weight of immaterial elements rather than material ones. Continuous creative capacities become the engine of the *new economy*. Creativity allows overcoming the traditional trade-off approach. It is not (always) necessary to choose between, for example, the achievement of an objective of economic performance and the renunciation to social or ecological ones, but it is possible to achieve both simultaneously with a creative design, in a win-win perspective (Zeleny, 2005; 2010).

Productivity, competitiveness, attractiveness among cities and regions are improved through innovations (Florida, 2005). They rely on local resources: on human and social capitals. Human capital produces new ideas through knowledge and research and their regeneration. Social capital multiplies communication and relationships among different subjects, and then it stimulates the production of new ideas.

The integration of human and social capitals increases the creativity potential of an area, and it represents the starting point of sustainable endogenous development.

All over the world cities are investing in cultural infrastructures considered as a catalyst to sustain local development: research parks, cultural districts and hubs (Sacco and Segre, 2009). Schools, universities, research institutions are becoming the main investment to develop new knowledge, and to transform knowledge into actions (entrepreneurial capacity, self-entrepreneurial ship, etc.). They are cities' real wealth and replace the traditional urban economic industrial base (Hall and Pfeiffer, 2000). Ancient heritage can become an incubator of innovations too and strategic local planning for culture, as in the Barcelona experience (Institute of Culture Administrative Board, 2006), can be a tool to correlate all cultural initiatives into an effective network. Cultural districts, as innovative initiatives, nurture creativity and move through different steps toward innovative products and services.

Creative urban actions should promote green economy industrial clusters, in which wealth is produced conserving environmental quality by specialized and interdependent activities in the fields of energy, transport, construction, new and recycled materials production, according to the green economy principles. Green economy is characterized by clean energy, resources and water recovery systems, waste management and technological systems to reduce pollution, information communication system applied to pollution management, to purification systems, etc. (Ong and Varisa Patraporn, 2006). Green economy, rooted in development and use of products and services promoting environmental protection, stimulates innovations in urban metabolism and the "circularization" of economy.

The reduction of economic circuits at a local and regional level reinforcing the chain value creation (as in constructions and food industry, etc.) is the best-known aspect of new urban ecological economy. It is characterized by environmental high technology industries, with networks of medium and small enterprises

which produce with low environmental loads new (and traditional) goods, technologies, services, recycling and reusing materials, water, waste and energy.

The eco-industrial city imports any industrial and urban waste for recycling/regenerating and exports products after biological, chemical and mechanical processing. New added value and new jobs are created, while reducing pollution, in production/maintenance, regeneration equipments for glass, iron, steel, plastic, aluminium, paper, rubber, wood and energy. Eco-buildings and green industries, through industrial ecology approaches (Ayres and Simonis, 1994; Ayres and Ayres, 2002) minimize impact in each step of the life cycle of the product and of productive processes, reducing total waste amount as well as re-using waste and products as raw materials for new production (through mechanical, chemical and biological treatment). New products are designed to be easily recycled.

New recycling and energy technologies are the entrance points to local economic development which stimulate a distributed/small-scale, poly-centric organization and a decentralized model with new networks and strong identity that glue workers in an enterprise community. The corporate social responsibility is an important tool to link businesses with socio-ecological systems, in a co-evolutive process.

How is it possible to manage the transition toward a new city ecological economy? From which areas should the process start? Which evaluation tools can support innovative governance?

3. A new city ecological economy: port areas as 'entrance points'

3.1 The port-city system

Port areas are interesting challenge in all Mediterranean area to manage the transition from traditional to a *new urban economic base*. In Italy some example are Porto Marghera (Venice), Taranto, Napoli, Priolo, Livorno, Genova, etc.

The port and the city should be considered as a complex adaptive system (Gell-Mann, 1994), opened to the territory, characterized by mutual positive and negative interdependences, with non linear processes (Fusco Girard, 2010). A new co-operative management between the city and the port should be identified. A new dialogue among all stakeholders and inhabitants should be implemented, through innovative governance. This means "re-linking" the city to the port in a polycentric reticular pattern. Within the network, each element inter-depends with every other element. The network incorporates differences and turns them into complementarity. It moulds itself on external circumstances, in a continuous co-evolutive process. The network is an organizational structure that multiplies the relationships among sites, areas, activities, functions and in this way it increases the whole productivity. The value of every node depends on the number of connections.

The port-city system - organized by multiple networks (of private enterprises, organizations, public authorities) - becomes dynamic and vital, able to self-organize over time. Each node receives and transmits: it can be a "centre". Material and immaterial infrastructures should connect ports with other nodes: rail stations,

airports, road-rail hubs, water ways, ancient and new places, squares, industrial districts, commercial poles, cultural nodes, etc. Every node is a multiplier of new connections, as in a neural network. This internal and external (to port areas) neural model can improve existing performances and regenerate the economic, social and ecological system. It behaves as an "eco-system", rather than as a mechanism.

In the global economy - which is more and more a knowledge/cultural/intangible economy - the organization of ports should be less linked to real estate economy and much more to ecological economics.

An ecological economic strategy planning/management is reflexive, integrated, adaptive, interactive, circular, based on a vision opened to long term, to participation, to innovative experiments, to new options; it is based on the *best practices*. It must stimulate economic development without producing, meanwhile, ecological poverty and social poverty, saving and recycling materials (Fusco Girard and Nijkamp, 2009).

A strategy/organization/management shaped by ecological economics recognizes long-term use values and no-use values, and not only hard (market) values. It stresses cooperation toward a cluster-model (De Lange, 2003) at a local level to better become competitive at higher levels. It is in conflict with the traditional engineering-enterprise management because of its attention to improve *resilience*.

3.2 The green industry

The Mediterranean Sea has been taking on a new role within both Far East and European commercial inter-exchanges, due to its geographical position. Free Exchange Zone (European Union, 1995) will allow a greater increase in goods/passengers movement from 2010 on.

This new perspective will enlarge the role of ports as economic engines, but also the necessity for a really sustainable regional development. The risk of negative environmental, social, landscape impacts and of a separation between the city and the port is growing.

The first result of the integration of activities would lead to imagine that maritime and harbour industry will take on the responsibility of reducing water, soil and air pollution, while increasing their commercial traffics.

To compete in the international markets, ports should change also into areas of waste re-use, recycle, reutilization, i.e. the place where all kinds of waste are imported, managed, regenerated and transformed into products that, in turn, are exported for their added new value.

The green industry of environmental renewal should substitute the traditional industry of ports, which is iron, steel, cement, oil refinery industries, etc.

This "green industry" should become the leading industrial activity, with the production of low environmental loads, goods and technologies (for monitoring, analysis, check of environmental impacts; equipments to recycle materials and so on).

The core of this ecological transformation of port economy is represented by green energy production. Wind turbines, photovoltaic panels, geothermal, biogas,

hydrogen production become the symbols expressing the new image and "vision" of ports, whose development is founded on the energy strategy.

Ports were realized imagining an indefinite and unlimited availability of oil: they are "dependent" on oil. The new development strategy of ports requires to be based on new energy strategies, on the opportunity of self-reproducing the energy needed within the ports to fulfil their functions, starting from transportation.

Land use should minimize movements and therefore transportation costs, promoting moving about and travelling on foot, by bicycles or electric public transports.

It is necessary to reduce systematically the use of traditional energy sources and therefore of climate change emissions, through the maximum energy efficiency and the use of renewable energy.

These energy strategies require that every existent public and private building become more efficient as to the energy perspective and that new buildings use alternative energy sources. Public and private buildings still to be built should have "zero emission". The organizational model of port activities should be the eco-industrial park, essential in order to promote a new metabolism.

3.3 The "eco-city" as model for urban creative strategies

The list of recycling activities is very rich, starting from the use of exhaust fumes from the production of electric energy that can be used to produce plaster boards, to the re-use of ICT devices (computers, cellular phones, etc.) to be put back on the market.

Mechanical, chemical and especially biological treatments, also by means of biotechnologies, can transform waste into marketable resources and into new materials; plastic, for instance, can be re-used as a source of fuel converting it into crude oil and not only recycling it into packaging or vessel; used tires can be employed as fuel in cement kiln, etc.; chemistry and biology can make waste products harmless, and help to produce new materials from slag, ash, etc.

An intensive research activity is required, which might find its best localization in port areas.

Even the localization of activities marketing "green" products within ports is coherent with the new vision, aiming at reinforcing the "green consumers community".

Waste treatment can induce further economic activities: production of machinery for polluted water filtering and recycling, for the treatment of different materials, for the re-use of the heat resulting from waste incinerating in order to produce compost, etc. Then the new development strategy of ports should be characterized by the capability to reduce negative environmental impacts, rebuilding a new economic "green base" able to produce added value, i.e. wealth and new jobs, and at the same time able to contribute to the solution of the environmental problems of wider areas.

The eco-park activates networks of interdependency among the different activities localized within it, and "cast" them also beyond the harbour area, that is toward the whole city/region. It is the starting point for the "eco-city".

The third sector and the civic economy system sustain this eco-industrial strategy from the bottom, promoting the market of eco-bio goods and services, and stimulating a virtuous circle. Nonetheless, a critical element of this strategy is the implementation of strong coordination and co-operation among public subjects, enterprises and research centres. New university departments and laboratories should characterize more and more port areas landscape. Knowledge complexes localized in abandoned areas can represent the entrance point of a creative cultural economy.

This strategy can integrate hard and soft values and objectives - both economic and social/environmental - in a win-win game. It can contribute to the city resilience that is the capacity of the city to react to change, maintaining its comprehensive organization and structure (Fusco Girard, 2010).

Clearly, it is not based on real estate economics (as it often happens for ports areas) but on ecological economics: on use and no-use values, with a long-term perspective, with the aim of realizing a circular metabolism in the port areas and spreading it to the whole urban system.

It can be considered a "creative" strategy because it integrates the economic wealth production with ecological preservation and social promotion starting from the ancient historic roots, in a win-win game. It transforms a problem into an opportunity, "integrating" industrial, commercial, tertiary activities with the ones relating culture and knowledge and then it improves the "atmosphere", the character, the identity: in a word, the *image* of ports areas.

4. Evaluation for innovative governance: the *Environmental and Territorial Assessment*

New governance is a process of value creation in a multidimensional space, characterized by a decentralized, participative and constructivist approach, oriented to a win-win perspective.

New governance is required at strategic, tactical and operational level to stimulate innovations. A characteristic of innovative governance is the importance recognized, in particular at operational level, to experiments, to pilot-project, to specific catalyst actions, that are to be carefully assessed in their short, medium and long time impacts, to produce new knowledge and to improve choices.

Governance is based first of all on a "good" evaluation capacity (Gibson and Klocker, 2005). Creative initiatives are promoted through an evaluation process that selects among alternatives.

Therefore, new evaluation approaches are required, because a creative city promotes the culture of evaluation (Landry, 2000), as a general rule to deduce priorities in its actions/choices. Evaluation Offices and evaluation pools are introduced into its organizational structure to stimulate a creative approach, able to assume high risks and uncertainties, less formal and more able to go deeply into the matter. At the same time, the creative city stimulates evaluations by all actors on the urban scene to understand the *ex ante* and *ex post* comprehensive impacts

of actions, projects or plans (Plaza, 2000): evaluation as the expression not only of expert knowledge but also as interpretation by people. Democracy requires critical evaluations to participate to public debates, construct choices and control power. City cultural resilience is enhanced with a diffused evaluation capacity by all citizens. Evaluation is a fundamental process for an innovative governance. The achievement of economic, ecological and social values in a win-win perspective requires a complex value theory (Fusco Girard, 1987) that goes beyond traditional economic approach. It requires also new tools as multicriteria evaluation processes that go beyond economic and financial goals and able to grasp all the concerned hard and soft values (like landscape, symbolic, environmental values, etc.) and the distribution of net benefits among all agents and groups.

Ex-ante, on-going and ex-post evaluations should be proposed in order to overcome traditional trade-offs and identify creative solutions, and to promote participation of all the stakeholders (Fusco Girard and Nijkamp, 1997). Their participation within new networks and their cooperation attitude are founded on trust. Trust depends on - inter alia – "good" (impartial, rigorous, critical) evaluations by public institutions, and not on formal ones.

A complex of values exists in port areas: instrumental values, use values, no-use values, and "intrinsic" values. These values, that can be increased (or not) through new actions/projects of transformations and management, are to be assessed. We can distinguish different levels of the evaluation process: strategic, tactical and management level (Fusco Girard and Nijkamp, 1997). Here we are interested to the strategic level. "Net" benefits are considered in relation to economic, social and environmental criteria. A Strategic Environmental Assessment should consider not only environmental but also economic and social criteria (Dublin Docklands Development Authority, 2003; ODPM (2006); Liverpool City Council, 2006). Alternative options should be assessed in relation to "do nothing", using multicriteria decision support systems (Nijkamp, 1979; Jansenn, 1992; Munda, 2005, 2008; Nijkamp and Vreeker, 2000) in order to identify solution that might improve economic competitive capacity of port areas, reducing negative environmental and social impacts, moving towards new ecological urban economy. The approach of "Environmental and Territorial Assessment", according to the *ESDP-European Spatial Development Perspective* (European Commission – Committee on Spatial Development, 1999) which is especially required in the transport sector (Fusco Girard and Nijkamp, 2004), can be useful in order to identify and select the multidimensional impacts of transformation alternatives. Indeed, territorial impacts are not only related to natural and man-made capital, but also to all the activities that take place on the territory system.

5. Multidimensional evaluation processes: creativity and values

Evaluating means interpreting a general context, foreseeing impacts of new ideas before using resources, land, spaces, etc., and comparing alternatives with some anchor elements. By evaluating approaches it is possible to deduce priori-

ties, alternatives, and consider multiple, multidimensional and conflicting criteria/objectives. Evaluation is necessary for decision-making processes in a time of crisis, with more and more scarcity of resources and energies to improve governance, urban planning, design and management.

Evaluation processes are fundamental tools for new governance towards sustainability, for checking creative and resilient initiatives. New governance is based on experiences and best practices interpretation and comparison by experts and also by the general public. Creative cities have to invest more and more in assessment as support for decision-making.

The evaluation of the creative potential of a city is more and more required for city/region development so that the areas of strength and the ones of weakness can be properly selected.

Evaluation processes help make decisions on "what","where","when" and "with whom" to implement creative initiatives and when to stop them. Evaluations are necessary tools in different pacts, agreements, city contracts, in participation processes, in finance and microcredit, in taxation, in sustainability focus groups, in auditing, in choices at a strategic, tactical and management level and in general for investigations.

Evaluation is a fundamental tool for selecting innovative alternatives and for building choices in urban planning and design which can synthesize many values, and produce multiple benefits for many agents, in a win-win perspective. They are to be evaluated in their quantitative and qualitative, direct, indirect and induced impacts, in the short, medium and long term, beyond any bureaucratic or strictly economic approach.

Innovative alternatives are characterized by high uncertainty, costs and risks. Lack of knowledge is the common element in all creative choices/actions. Therefore, they require experimental and testing approaches in order to learn from their successes or failures and about the specific characteristics of the dynamic urban system in supporting uncertain and/or irreversible effects (critical capacity thresholds). Evaluations may suggest how to improve experiences, whether to transfer them into ordinary practices or totally change them.

An integrated assessment process does not only help to compare given and defined alternatives but it also stimulates to identify and explore alternative *new* solutions. So the evaluation process can become the *engine of city creativity.*

An iterative decision-making process is activated through continuous feedbacks and improvements in the level of achievement of objectives.

The creative city systematically collects data and information to improve knowledge for a critical judgment/assessment required in urban planning. Data, information, knowledge are to be structured in a systemic way so as to allow for comprehensive evaluations and comparisons with new ideas and their implementation and performance in satisfying needs in the material and immaterial space.

Considering that creativity is interpreted here in relation to promotion of economic, social and ecological resilience, specific indicators about density of relationships in different dimensions are required. People's involvement in reaching the common good, social inclusion, community sense, collective identity becomes

relevant to reflect benefits of relations. Some examples of indicators that consider the three main dimensions of resilience as criteria and are focused on the different kind of relationships are presented in Table 1.

The above criteria and indicators (Bell and Morse, 2008) allow for communication between public institutions and people in selecting alternatives, in sustaining selected choices, (for example, in Strategic Environmental Assessment, in planning and in environmental-territorial assessment, etc.) (Fusco Girard and Nijkamp, 2004). They can be used in assessing pilot or demonstrative projects/experiments through which subsidisarity principle is implemented.

Table 1. Evaluation criteria and indicators.

Criteria	Indicators	Scale
Economic resilience	Funding from local foundations and banks/year	Quantitative
	Innovative public procurement supporting local industries	Qualitative
	Regeneration capacity of economic activities (variations over time of innovative activities in the area/total number of activities)	Quantitative
	Localization of new creative, flexible and adaptive activities	Qualitative
	Density of networks among companies	Quantitative
	Variation of informal sector economy	Quantitative
	Industrial production activities integrated in spatial and social context/Total of industrial production activities	Quantitative
	Innovative research activities/Total of research activities	Quantitative
	Number of university spin-off/year	Quantitative
	Incubators of new clean activities (recycle and regeneration of materials)	Quantitative
	Number of design patents/year	Quantitative
	Number of cooperatives enterprises/Total number of enterprises	Quantitative
	Number of micro-businesses/Total number of enterprises	Quantitative
	Density of networks among public authorities, enterprises and research centres	Quantitative
Social resilience	Increase of social cohesion sense as reflection of circular economic-ecological processes	Qualitative
	Percentage of reduction of unemployed people living in the area	Quantitative
	Experiences of self-organization capacity in neighbourhoods	Qualitative
	Implementation and upgrading of existing "public spaces" (number of squares closed to traffic)	Quantitative
	Conservation of elements expressing the area's cultural identity and memory	Qualitative
	Number of events, festivities, ceremonies, as expression of collective/social memory, in the year	Quantitative

Criteria	Indicators	Scale
	Percentage of people involved in forums and participative processes/year	Quantitative
	Involvement of the III sector in specific programs/projects/ activities (housing cooperative networks, social housing associations, etc.)	Qualitative
	Density of cooperative and partnership networks	Quantitative
	Involvement of local people in urban planning	Qualitative
	Capacity of learning from explorative experiences	Qualitative
	Openness of people to differences and diversities	Qualitative
	Level of interpersonal trust	Qualitative
	Perception of belonging to a specific community	Qualitative
	Number of donors/10.000 inhabitants	Quantitative
Environmental resilience	Reduction of vulnerability and risks levels	Qualitative
	Conservation and increase of green areas (tree planting and maintenance, promotion of green roof and green façade)	Quantitative
	Percentage of local materials used in productive processes	Quantitative
	Conservation and improvement of landscape quality	Qualitative
	Reduced car travel demand	Quantitative
	Reduction of motor traffic	Quantitative
	Air pollution reduction	Quantitative
	Water pollution reduction	Quantitative
	Recovery/recycling/regeneration of waste material (percentage of plastic, metals, tires, slag, cans, glass, paper reused, recycled and regenerated)	Quantitative
	Water recycling (rain water percentage recovered)	Quantitative
	Waste management (self-organized waste management)	Quantitative
	Percentage of local renewable sources (new electric power plants localization, based on energy innovation) used in productive processes	Quantitative
	Organic waste recycled percentage (local composting production/year)	Quantitative
	Percentage of activities included in a smart energy grid (to use a variety of fluctuating energy sources)	Quantitative
	Localization of new industries with a low environmental load (ISO and Emas certified)	Quantitative
	Number of modern eco-compatible buildings/Total number of buildings	Quantitative

7. Conclusions

Sustainable development of port areas can become the entrance point to urban regeneration process, founded on a new city metabolism, if a complex dynamic systems approach is adopted. A sustainable development can start from their new circular metabolism that should be extended to the whole city/region, thus modifying the land and space use. It contributes to city ecological resilience. Port areas will become more and more new spaces where creativity is and can be practiced, toward a new urban ecological economy.

This transition is relevant in particular for Mezzogiorno cities/regions. Here it is necessary to transform the environmental crisis (as in Napoli, Taranto, Priolo, etc.) in new opportunities, to produce new wealth, through reconstruction of a new industrial economy, based on environment conservation, reduction of pollution and contamination. New employment is thus created.

Creative and resilient solutions are to be identified at a strategic, planning, design and management level to implement sustainability.

Creative governance multiplies alternatives and produced values. A characteristic of creativity is its ability to synthesize different (and often opposite) elements producing new values in a multidimensional space.

Evaluation and creativity are closely intertwined. Evaluation stimulates the production of new solutions aimed at improving the original alternatives. Evaluation allows assessing economic, social and environmental feasibility by interpreting, forecasting and comparing different impacts. Evaluations promote new partnerships, new management and competitive capacity. Through an integrated evaluation it is possible to identify a ranking of various alternatives considering multiple, multidimensional and conflicting criteria. A fundamental element to stimulate creativity is the availability of adequate knowledge about port areas: not only data, information, GIS, etc., but critical knowledge (Zeleny, 2005) deduced from concrete experiments and generalized.

The evaluation of the best (and the worst) practices is fundamental for a better knowledge in order to elaborate a vital and innovative project which aims at transforming port areas into new "places".

Criteria and indicators of economic, ecological and social resilience are required to adopt new evaluation approaches, as proposed by *ESDP-European Spatial Development Perspective* (European Commission – Committee on Spatial Development, 1999). They should be chosen also with people involved by plans/programs or projects through bottom-up and adaptive evaluative processes, able to interpret the complex characteristics of city-port systems and to propose new plans, projects and management programs for a local creative, resilient and sustainable development.

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