

Strategic Revival of HSM

The evolutionary circular and human centered city: Towards an ecological and humanistic “re-generation” of the current city governance

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Received 6 April 2021

Accepted 18 September 2021

Abstract.

BACKGROUND: Local governments are fundamental for achieving the ecological transition of our societies/cities. Also COVID-19 has shown that many of the barriers and bottlenecks in implementing public top-down initiatives are not technical (financial, economic, administrative, etc.) but cultural. They generate a lack of consensus with the risks of reducing the effectiveness of public interventions and investments.

OBJECTIVE: The paper proposes the profile of a “circular governance” (i.e. that assumes the model of the circular economy) that is also “human centered”, capable of reducing inequalities, enhancing the processes of real participation in the construction of a desirable future for cities, through its capacity to regenerate material and no-material components/values. This perspective intersects with the cultural/educational dimension to which the new governance should devote much greater attention.

CONCLUSION: A critical test is the transformation of abandoned urban spaces into attractive places for activities, investments and people. These disused spaces, which have often become repulsive waste deposits, are especially abundant in port cities. They are most often included in areas of particularly high landscape and cultural value. The paper suggests the elaboration of prototypes of “circular heritage symbiotic ecosystems” that are able to respect some general conditions (or principles). Suitable and effective assessment tools must be available to public, private and social actors to verify the proposal consistency and then to build new win-win-win partnerships. But it is also necessary to strengthen the educational perspective in the activities of the new governance, because preferences, values and needs should not be considered as already “given”, but should be constructed, thus nourishing the critical spirit of citizens so that they can creatively combine private interests and common good, thus becoming “artist of citizenship/civic engagement”.

Keywords: Circular economy, circular city, adaptive reuse, symbiosis, circular ecosystems, self-sustainability



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1. Introduction

We are in a critical moment of the history of our civilization. This is clearly reflected in the latest documents of the European Commission. Here there is a clear perception that we have to face enormous challenges. We are in a time in which we have to make

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more and more complex choices [1]. The stake today is the *humanization* of life conditions for us and for the future generations.

Our time is characterized by extraordinary and accelerated processes of change. Some of them are modifying even the evolutionary dynamic of the natural ecosystems, as Crutzen already underlined at the beginnings of this century [2]. We say that we are all connected through digital tools in the “communication society”. But we are discovering that we are more and more socially fragmented and also dis-connected from the nature patterns of life. Many imbalances are growing [3].

The changes lead to move more and more toward a dis-connection with the bio-ecological ecosystems, altering the evolutionary nature dynamics. New uncertainties, new turbulence and conflicts are adding: for example, between a few rich elite and an increasing number of poor, between nature and the economic production by man, between the current generation and the future generations.

The pandemic due to COVID-19 is highlighting not only the limited resilience that characterizes the overall organizational structure of our society (starting with that of the economically wealthiest areas). More generally, it has shown the weak resilience of the globalized economic development model and that we are destroying through hard technologies the evolutionary dynamics of our *Hearth*. The reason is due to our reductive world-view, **to our culture**. Our way of life is disconnecting all of us from the networks of nature life. Nature has been interpreted as a resource (or a machine) to be used and not as a living dynamic organism that sustains our life and all our activities, that should be effectively conserved.

Climate change, because of its irreversible effects from a certain threshold, increases our difficulty in dealing in our choices, with the conflicts/contradictions above mentioned. Climate change should be interpreted as the greatest threat of this century [4].

It is a process that makes the Earth increasingly uninhabitable: it makes the relationship between the Earth’s ecosystem and humanity increasingly insidious and difficult. The health of the ecosystem is no longer guaranteed, and the health and well-being of humanity in this and future generations is at risk. We are more and more dis-connecting from the future generations.

Climate change and growing pollution are due to our economic system. The existing economy has been defined as devouring natural resources, socially

divisive and hostile from an environmental point of view [5].

Due to pollution and climate change, caused by a certain way of producing economic wealth, the double challenge of the social growing poverty/inequality and of the ecological crisis evokes a key issue of justice: justice between the subjects of this generation and justice between this and future generations, who may have living conditions far below those we enjoy today. Many questions arise.

Which desirable futures can we imagine? Which choices are necessary? Which knowledge to be produced, considering the systemic nature of all problems we have to face? Which economic, social, cultural environmental, institutional initiatives regarding our economy and society in our cities, to reduce the growing pressure on the natural ecosystem and growing social inequalities?

Here we are interested to the role of cities. **Cities** are the major responsible of the climate change and pollution impacts. National/regional economic wealth is produced in cities, where is concentrated the maximum level of energy consumption. Cities are the responsible of the reduction of biodiversity, with all negative consequences on human activities and wellbeing.

In our cities, greenery and natural resources have become the last vestige of nature, which has been replaced by artifice. Green areas have been eroded by concrete, asphalt and bricks. Open spaces, parks and gardens have given way under the pressure of interests linked to the real estate economy and have become a factor in the production of car parks, housing, shopping centres, service centres, etc. The ratio of green areas referred to built-up areas has been progressively reduced. We have increasingly expelled nature from our cities. The ecological crisis of our cities stems from the progressive degradation of natural ecosystem services. Urban waterways have been covered over; street trees have been cut down; biodiversity has been inexorably depleted; green areas have been covered with concrete and bricks. The result has been the loss of the provision of many ecosystem services, of the health of the natural urban ecosystem, its progressive inability to sequester CO², to filter particulate matter, to reduce the effects of air pollution and soil and water contamination on human health. In the same time, tangible and intangible poverty is growing in cities.

Here we are interested to a key urban issue: which new governance? Which governance, in particular, to transform a decay site (often characterized by

cultural/landscape values) into a living “place”? Into a development pole?

Which new governance models for re-connecting our cities, our built environment, our transportation system, industrial, agricultural, service systems with the patterns of organic life of nature? For stimulating and engaging local actors towards creativity-led transformations, congruent with Heart systems of life? Which governance approaches for reshaping current economy development strategy of cities towards an integration of the *ecological paradigm* with the *humanistic paradigm* attentive also to reduce social inequalities and poverty?

The thesis of this paper is that we need an innovative ecological and human centered governance, and that it is possible to implement it assuming the circular economy model, starting from the valorization of the city cultural landscape/heritage.

In particular, we assume that innovative governance is grounded not only on innovative (financial, economic, administrative, etc.) tools, but also **on culture** for becoming really effective: to sustain/support from bottom-up the initiatives (rules, investments, plans) coming from top-down by institutions. The governance should be able to manage particular interests to be “combined together” for achieving the general city interest, promoting a “community spirit”. It generate responsibility in people behaviors, making much more effective the public efforts and investments. The circular model not only proposes a new urban tangible metabolism. It also reflects, is grounded and promotes a new culture: a culture of cooperation/collaboration/symbiosis in the space and in the time dimensions with other subjects, with Mother nature, and with future generations. The valorization of cultural heritage reinforces and promotes on its turn the culture of collective memory in a circular process in the time dimension. Thus, they both stimulate the regeneration of values of solidarity, of integration, of inclusion. These values are not already “done”, but they have to be re-generated with the same speed of their consumption by the market capitalistic economy [6], in analogy with the functioning of natural ecosystems. In nature, if an ecosystem resource is not able to be regenerate itself, it decays, it de-generates and at the end it disappears. The same phenomenon characterizes intangible/immaterial components, as values: if they are not re-generated, they de-generate and are lost [7]. Circular economy and heritage valorization/reuse contribute to re-generate values and not only tangible/material components. New local governance

should be culture grounded, rooted on collective will inspiring a new world view for guiding city development in co-evolution with the natural ecosystems.

The new local governance here proposed assumes the cultural heritage as the entry point to implement the new approach of the circular economy model applied to cities (to implement the circular city): to recover, reuse, regenerate the city heritage assets as the memory itself of urban system, as the cultural roots of the city system for implementing the *human scale of the city development*, thus combining economic, ecological and human dimension through culture. The culture of circular model creates systemic behaviors and cooperative bonds in the space (between different subjects) and in the time (between today and yesterday; between today and tomorrow). It is not only focused to recognize existing preferences, ideas and values as “done”, but also to change them, in a cultural evolutionary perspective [8]. For facing the ecological modernization of our society, we need not only new tangible energy, but also new intangible form of energy.

This human circular centered governance is focused to transform some spaces into attractive areas, into “places”. Its general goal is to promote regenerative/self-organization capacity.

Port cities are in particular here considered. Port cities have, all over the world, the greater economic development potential because in the globalized economy the commercial exchanges are implemented through the sea- roads and not through conventional highways. But they are also the most polluted cities, and they strongly contribute to climate destabilization. Here the maximum level of energy is consumed, with all the negative impacts. Port cities have in general, and in Europe in particular, an urban landscape of high quality. But they have also today many dismissed spaces here localized, as waste areas, not used or under-used.

An innovative governance is required in particular in port cities to transform these died spaces into “**heritage symbiotic circular ecosystems**”, designed, planned and managed as “vital organism”: able to re-generate themselves and to sustain other not self-sustainable components. They should become able to co-evolve with other ones, adapting to the changing context and to transform the city towards a sustainable model. Here the ecological transition (and also the digital transition) towards the neo-humanistic paradigm should start. At the same time, these disused spaces transformed into smart ecosystems should be promoters of Laboratories not only in technological

innovations (in the field of cultural industry etc.), but also of cultural activities, in the perspective of inclusion, complementarity, symbiosis, for regenerating mutual trust, reciprocal confidence between people and between people and institutions. Trust allows market, public institutions and also society to better work promoting systemic behaviors. The new governance Living Labs should become co-evaluative Laboratories and also cultural Laboratories of civic/civil consciences, grounded on critical thinking and hermeneutic capacity. A new way of thinking should be stimulated: a new mindset that differs from the narrow conventional one, characterized by a systemic way of thinking grounded, on the evaluation capacity to identify “satisfying solutions” between multiple goals.

The experiences of industrial symbiosis/ecological industry etc. are characterized by the capacity to produce an economic/financial profit, an environmental profit and also a social profit (as new employment). Also a new cooperative culture should be promoted in the proposed circular heritage ecosystems: a “cultural/civil profit” as a fourth profit able to support the top-down initiatives toward a circular metabolism, making new positive relationships with the territory.

In the above perspective, the European Green Deal Strategy [9] and the New European Bauhaus [10] with their specific goals are strongly here assumed. New governance moves towards the implementation of their goals: sustainability, inclusion and beauty in the ecological transition.

This proposal is grounded on the multidimensional benefits (economic, environmental, social) examined in many port cities circular regeneration [11, 12] and on the outcomes of two European Horizon 2020 researches: CLIC (www.clicproject.eu, about the proposal of new governance, new financial tools and new business models in heritage circular regeneration) and Be.Cultour [13], stressing the role of culture dimension.

2. The circular and human centered governance

2.1. *Towards the co-governance*

There is perhaps no word richer in meaning than the word “governance”. On the one hand, it evokes the notion of complexity, understood as attention to a plurality of economic, social and ecological objectives in the current context of social fragmentation, and of

plurality of public, private and social actors (each of them carrying different strategies, with a short time culture and responsibility).

The word “governance” evokes a notion that refers in any case to relationships and interdependencies, which in turn are the result of rules governing economic, social, ecological, political, cultural, exchanges.

Governance is the set of laws, rules, legal decisions, administrative practices that allow and support the delivery of public service [14]: as the set of rules and forms that guide decision-making processes that affect the community, and that concern groups of individuals and/or organizations involved in decision-making processes [15–22].

Governance today is associated with different adjectives: collaborative, participatory, adaptive, responsible, experimental, innovative... But it basically indicates the ability to coordinate actions/choices between many subjects, so as to promote a synergistic, cooperative, symbiotic win-win approach able to implement specific objectives. New governance should be able to make cities more safe, resilient, sustainable and inclusive through technical (financial, fiscal, administrative, etc.) tools and cultural ones: able to make cities and their (public) space as centres of new life, of emotions, of positive perceptions

This “collaborative” governance, based on experiment and creative agreed adaptations, requires specific tools. The tools to realize human centered adaptive circular governance are multiple and reflect the many interpretations of governance.

Human centered design [23, 24] is a useful co-design approach aimed at fully understanding the needs of those for whom we intend to develop design solutions, through participatory processes based on interviews, workshops, forums, arenas, brainstorming, modeling, visualization of available solutions, elaboration of prototypes, empirical experiences, evaluation of results resulting from design hypotheses [25].

These decision-making approaches and processes are geared towards achieving the highest possible level of consensus among the various stakeholders.

Recently, a tool to realize human-centered strategies that is becoming more and more widespread is represented by **Policy Labs**, represented by collaborative platforms for the production of knowledge and for the creation of effective and operational innovative solutions [26]. They replace the practices of New Public Management [22] to

recover efficiency/effectiveness in public management [27]. They are becoming Laboratories of self-organization for learning and for adapting to change.

Policy Labs assume as general objective the fight against poverty and environmental degradation, starting from the analysis of specific contexts for proposing hypotheses of transformation involving different public, private and social subjects, verifying the results. Processes of co-creation, co-planning, co-design are stimulated by exchanging skills and experiences etc. on the basis of a hybrid approach that combines deductive approaches with inductive approaches, based on good practices.

The operational instruments of different forms of governance are many, but at the end they are grounded on **Pacts, Agreements, Contracts**, etc. They are all based on the evaluation of mutual net benefits.

Here we want to emphasize that “good” (collaborative, adaptive, experimental) governance is based on an evolutionary capacity for **co-evaluation** (see §2.5 and 8). This is an important characteristic of a local governance for contributing to the implementation of the European Green Deal and of New European Bauhaus (NEB) goals: ecological transition, sustainability, inclusion and quality/beauty of the built and natural environment.

2.2. *New governance for the new city metabolism and beyond*

The new governance should become able, through specific Living Labs and Policy Labs, to transform spaces into attractive places coordinating the actions of public, private and social actors toward win-win solutions, thanks to technical supports/tools. The attention is focused on the relationship between the entry (of materials and energy) and the exit (of heat, pollution, materials) and on nature-led solutions putting people at the core. The evaluation processes are key elements for considering economic, environmental, social and also cultural impacts in a co-evolutionary evaluation exercise, towards the identification of satisfying and balanced solutions.

The new local governance characterized by the assumption of the circular model should be attentive to produce both tangible and intangible specific impacts; both the capacity to regenerate the life in a decay area, and to regenerate immaterial values as a new mindset/culture: a culture of cooperation grounded on confidence/trust, able to combine complementarities not only in the economy but also in

the social life and in the relation with nature. Thus, linking the current with the future generations in a virtuous reciprocal loop.

This circular human-centered governance should help in implementing *urban* regeneration places for making the circular economy operational into the city spatial/territorial dimension. New Living Labs and Policy Labs as Laboratories of innovation are activated to also offer a regenerative culture of cooperation, against fragmentation and atomization: offering a civic culture of rights in a relational dimension (that includes future generations) able to integrate particular and general needs/objectives in the short and long-time horizon.

New governance should thus become able to promote the transformation of an abandoned asset, characterized by a repulsive/centrifugal field force, into a living site, characterized by an attracting/centripetal field force, with virtuous regenerative processes: into a “heritage symbiotic circular ecosystem”.

Through the functional reuse, heritage symbiotic circular ecosystems revitalize a site, making it become a generator of a flow of services and of quantitative and qualitative metabolic relationships with the context more or less close and with the city. That is, it opposes a “field of attractive forces” to the “field of repulsive forces” that the abandonment of the site/asset had determined, thus combining conservation with development.

The new governance promotes continuous processes of adaptation to changes through on-going, ex post and ex ante evaluations of adjustments and readjustments over time. The new governance assumes the “culture of evaluation”, stimulating top-down and bottom-up evaluation processes in Policy Labs for combining in a satisfying way economic, ecological, social, cultural and aesthetic goals, thus becoming able to transform good singular practices into good policies.

2.3. *The new “humanistic and ecological governance”*

The ecological conversion of our society is proposed in many European and not European documents. It regards the change of current economy to take care of the rights, needs, desires also of future generations, opening a very long-term time perspective of our responsibility.

This above perspective emerges in the Next Generation EU approach, where the green and digital

transition is oriented to “people as the heart of the recovery” [28].

The new governance requires not only green toolbox but also cultural processes for becoming human and ecological centered. It is linked to the *cultural challenge*, and thus to culture as the excellence specific product of human beings, through which they shape their interpersonal relations and also their relationships with nature. Culture shapes (and re-shapes) the world vision, reality interpretation and behaviors in relation to nature and in relation to others. Culture is the most important production of the human beings. Human dimension and cultural dimension are strictly linked.

The current culture, through an exaggerated confidence in technologies, has become the engine of the alteration of the evolutionary dynamics of nature: of the decay of environment, the loss of biodiversity etc. Cultural values as cooperative, collaborative ones, are becoming more and more important in our fragmented society. **Mindset transformation** is at the heart of everything for the purpose of creating positive impacts.

Creativity, innovation capacity, self-entrepreneurship, flexibility, critical thinking, emotional intelligence are key components of the human paradigm, that innovative governance should shift also to the citizenship direction: for making inhabitants as “*artists of citizenship*” (and not only artist in entrepreneurship, in management, in fine arts), able to combine in satisfying compromise solutions particular and general interest, multiple values/needs in conflict. Thus, a new trust has to be created, that is the fundamental element for the collaboration and the organization for systemic complementarities: from trust to cooperation and thus to inclusion, to ecological and economic sustainability in a spiral virtuous process.

The human paradigm is linked to the capacity to produce and share cultural values as cooperation, reciprocity, fairness able to reduce social inequalities and fragmentations, overcoming the speed of their consumption. They are able to re-shape business, market choices, investment decisions.

The relational/community values for the construction of a human centered future are the values that generate an “attractive force field” contributing to social cohesion, reducing divisions and poverty. They can be summarized as follows: cooperation, solidarity, altruism, reciprocity, respect, compassion, integration, wisdom, sobriety, future/long-term orientation, common good, general interest, trust,

sympathy, inclusion, attention/care for the environment, social justice, social equity, intergenerational justice.

In particular, it should be emphasized that **trust** is the foundation of all relationships: of collaboration, cooperation, communication, to find solutions of mutual convenience/benefit, positive sum, and compromise solutions in a context of growing conflicts.

2.4. *New governance towards the promotion of the tangible and intangible forms of energy*

The IPCC has long stressed the causes of the increasingly accelerated climate change. A fundamental cause is the way in which economic wealth is produced and distributed. The economy organized according to the market capitalist logic, while producing economic wealth, produces ecological and social poverty (increase of marginal people, inequalities, etc.) [29, 30].

The reduction of the speed of climate change and of pollution becomes the precondition for the achievement of other social objectives, from the right to health/wellbeing to equal opportunities for all.

The climate change can be faced first of all recognizing that the “good life” of human beings depend on the “good functioning” of natural eco-systems.

The pandemic COVID19 has accelerated this perception, suggesting the necessity of a new way to produce the economic wealth [31]. The WHO Manifesto [32] underlines the need to “protect and preserve nature as the source of human health”. The WWF has linked the loss of biodiversity to the pandemic risks [33].

Governance can fight the climate change and the growing pollution by accelerating the building of more ecological, greener conditions. An *ecological transition* is characterized by a “renewable energy integrated system”, by a strong effort of conservation and regeneration of natural resources, with a drastic reduction of waste, which are recycled/regenerated as much as possible, and transformed into resources (thus reducing the amount of extractions from the natural ecosystem) and making sure that the outputs can return to the natural ecosystem as much as possible [34]. But it is not enough. It is necessary to introduce also a cultural condition for the sustainable development implementation: the need to regenerate values on which the market economy itself is grounded, at least at the same speed of its consumption. This is an immaterial key energy as the blood for functioning our systemic organizations.

2.5. Governance and evaluation

Evaluation processes, or rather evolutionary co-evaluation grounded on communicative capacity (also through images, drafts etc.) are key tools for improving governance. Citizens are stimulated as active users/actors and not as passive spectators, able to propose new ideas and hypotheses for solving specific problems. The new governance should stimulate the critical thinking to distinguish, to put in relation, to hierarchize needs and issues, to identify shared priorities based on facts and not on opinions, to stimulate creativity and future oriented mindset, to move from data to information, to knowledge, towards wisdom [35].

Indeed, over time, evaluations are taking on a central role in Policy Labs as processes to identify win-win-win solutions that improve people's lives [36].

On the other hand, the implications of the human-centered approach are relevant, in the sense that it involves not only economic but also qualitative evaluations. A non-marginal objective is to contribute to a cultural change, which is not limited to the promotion of a systemic mindset, but to the promotion of relational values and active citizenship, involving the Third Sector (between state and market).

The co-evaluation (in which multidimensional values/objectives are not reduced to a unique scale) cannot be concluded through the economic instrument of willingness to pay, but requires also other approaches, methodologies and processes. For example: specific deliberative approaches [37]. New "composite metrics" should substitute current metrics.

In this way, a process of construction of values not already "given" becomes possible. These procedures refer to the participatory processes of deliberative democracy, based on the public debate of good reasons that are opposed to other good reasons, making the strongest ones win. The result of this iterative and interactive process is characterized by the achievement of a satisfactory level of consensus.

2.6. Toward a new way to make choices

The human-centered and circular city governance re-shapes the city development project **towards a project that unites, generating and multiplying relationships and bonds between subjects**, in the space and in the time: between human beings, between people of this and future generations, but

also between people and nature (the Mother Earth). And also between people and the past, the history. The memory of the past shapes the notion of "US", thus re-shaping the notion of the "I". Certainly, the human centered approach underlines the importance to guarantee the human health conditions and its priority in relation to other objectives achievement. Certainly, the human centered development and green development are interdependent, because the health of nature is the condition, being a *global common good*.

Certainly the interpretation of the human flourishing approach [38] is not only linked to work/employment as the ground of human development. It is linked also to the capacity to orient all innovative technologies (IoT, AI, robotization, sensors, screens, new bio-materials...) not towards manipulation, or surveillance and control but towards goals that reflect the human dignity: towards relationships of cooperation, partnerships, social and environmental justice. New collaborative governance has to re-generate the current culture/way of life in a more solidaristic perspective, to face the growing social fragmentation and to orient innovative (digital etc) technologies towards a more desirable future, also for future generations. This process of production of neg-entropy can strongly modify current behaviours and choices.

3. The "regenerative economy" as the "new circular economy"

More and more it is recognized that the traditional way to produce wealth does not work, because it produces more and more environmental decay and social poverty, with increasing human costs. It is more and more criticized (and defined as "broken") [39].

Today the search of a new economy is increasingly required. The names are many. For example, a "sustainable capitalism" [40] is often evoked, to ensure economic/financial flows but also to regenerate the natural ecosystems and to improve the quality of life of all people.

Reimagining capitalism is becoming an imperative. A more inclusive and sustainable vision of capitalism, that works for every person and the planet, is going to be proposed. Our current system of creating and distributing value is "broken". "We need to be able to factor into our decision making the consequences of our actions not only for financial and physical capital, but also for human, social and natural capital" [40]. There is a growing perception that

a firm should be productive for itself, but also for society and for the natural environment [29, 41].

Considering the growing social inequalities and environmental degradation as a failure of the design itself of the conventional economy, a new “regenerative economy” is evoked. It should substitute the existing “degenerative economy” [42]. This regenerative economy is able to regenerate the enterprise, but also to reduce ecological and social poverty. It is grounded on the circular economy model, that mimics the economy of nature.

Efforts are multiplying to assess the environmental impacts in the medium-long term, so that they can be operationally integrated into decision-making processes, including also the biodiversity impacts on human wellbeing, and on the human health. Many companies are already experimenting the inclusion of these impacts (on environment, on society) in their planning and managing choices.

In this ecological and humanistic *new economy*, the new entrepreneurship capacity, more and more evoked, should be oriented considering it as linked to the future of nature and to the future of the community/society.

Many enterprises are introducing new business models for contributing to a “thriving world” [42]. The idea is to become more and more regenerative, reconnecting the production processes to the nature cycles and to the social system. The ecological conversion of existing economy means also new attention to the rights and needs of the human beings of future generations: to the human dimension enlarged to long term horizon.

3.1. *From the intrinsic value of natural ecosystems to the attention to future generations*

The new economy moves towards the co-evolution between the current economy and the ecology (the economy of nature): towards their integration. The circular economy promotes a new metabolism that minimizes all kind of underuses and waste. It is implemented through reduce, reuse, repair, remanufacture, recycle, regeneration processes. A key element is the energy: circular economy and energy challenge are interdependent. A new notion of value is emerging for natural resources.

The notion of “intrinsic value” characterizes the behaviours of *bio-eco systems*, and it is due to their self-regenerative capacity, and their capacity to sustain the life of other subjects through specific services

flow [43, 44]. There are, in the nature, different well-known processes of self-organization/regulation: self-regulation of air composition, of solar energy photosynthesis, of biomass re-production, etc. They have an intrinsic value [43].

An autopoietic system has also another role, that is to provide services and goods for supporting the life (in its various forms) for other subjects. This heteropoietic aspect is linked to the use and to instrumental values recognized by the human beings.

Thus, the autopoietic capacity of an eco-bio system highlights its ecological value, that is independent from any use. Heteropoietic capacities are linked to many possible use values and in general to instrumental economic generated values.

The intrinsic values of nature guarantee, by the autopoietic processes and effective metabolism, a slowdown in energy dispersion, a reduction of entropic degradation processes, clean air and water, temperature regulation etc, and thus the maintenance of all living species in their respective ecological “niches”. This intrinsic value reflects the essential structure of a system, as the condition for structuring other components end/or sub-systems to reduce entropy, to increase order.

In other words, the intrinsic value of a living system expresses the re-generative systemic capacity, which is the condition of the generative capacity (of external effects etc.) and also of the symbioses and of resilience.

The circular economy, inspired by the circular functioning of natural ecosystems, recognizes the co-evolution between the man economy and the nature economy. The man economy is the economy of use and market values: of instrumental values. The nature economy recognizes first of all the ecological “intrinsic” values of natural ecosystems that sustain human activities. Instrumental values are linked to generative capacity of ecosystem services. They are due to the fact that the nature produces services to the many human activities; industry, tourism sector, forestry, leisure, food industry, fishing, pharmaceuticals, chemistry, etc. [45].

The new circular economy is attentive to *instrumental values* together with “*intrinsic values*”, being careful to not damage/compromise this systemic or “glue” value [44, 46, 47] which reflects the ecosystems functioning. As said above, the enlarged conversion of the current economy into the circular economy reshapes the traditional humanistic paradigm because it includes future generation’s needs. Their wellbeing and health and quality of life

depend on existing (and future) ecological conditions: on primary or intrinsic conserved values.

Also the human centered approach recognizes intrinsic values. This humanistic paradigm is based on the search for the conditions that can guarantee the implementation of the principle of human dignity as the *supreme value* recognized in many different cultures: that is, as a value “in and for itself”. As an “intrinsic” value. This value of the dignity of the human being that represents the center of the humanistic paradigm, according to Emmanuel Kant (1784), is an intrinsic value, that is an “inner value”: is a *value in itself and for itself*, that characterizes all human beings. It is already connected in its vision to the dignity of each human person, which must be absolutely respected.

Therefore, the ecological approach and the humanistic approach have a common element: the recognition of “intrinsic values” to natural ecosystems and to the human persons. The relational dimension is a second common element between the ecological vision (that is grounded on systemic interdependences) and the humanistic vision. In fact, relationality represents the fundamental/essential dimension of humanity itself and of the ecology. The third common element is their co-evolutionary profile. The nature economy is characterized by bio-ecological evolution and thus by an effective adaptation search. The human-centered approach is characterized by the search for satisfying dynamic and changing needs through the identification of adaptive and compromise solutions between multiple, multidimensional and conflicting objectives, forces.

The humanistic approach in governance moves towards the achievement of the “good” (well-being, quality of life, happiness) for as much as possible people, also in a long time horizon. It overcomes the risks of arrogant interpretation of anthropocentrism [48] in its different (strong or weak) versions [49] which has characterized the western humanism, spearing the human being from nature.

Associations of third sector, voluntary networks, mutual-cooperative institutions are sources of the new evoked energy for the self-organization. They are the new “islands” of solidarity for the human flourishing and of neg-entropy production. They are attentive to intrinsic values, to long term horizon, to bonds re-generation. They are able to contribute to regenerate the above cultural/human values.

This is the reason of their strong engagement in new governance towards the circular model.

4. A particular aspect of the human development: The value of the “beauty”

The historical centers of cities/districts/sites are particular areas characterized by the human scale. Historic districts “contain” an extraordinary equilibrium: this is their secret and the attractiveness of their beauty. Human life needs this particular balance, that contrasts the general disorder of industrial city and of peripheral metropolitan quarters.

Ancient districts show how the particular subjective interests of individuals and the common good/general interests (the public spaces intended for social relations) have been creatively combined in a specific relationship between private (residential/commercial) spaces and public spaces.

Spaces become “places”, as central “poles” in the human centered city strategy: the human scale of the city is implemented through a multi-polar production of “places”, as spaces in which a particular set of values/meanings are concentrated, recognized and managed.

The **beauty** of built ancient landscape, of squares, palaces, public and private buildings, parks, streets is the characteristic of the European city. The “square” (for example the Italian piazza) is the expression unique of the European “relational space”: the expression of the balance between public and private interests, between single human person and the community. Here the implementation of human rights in a relational dimension have been realized. The historic “square” is the place of mixed functions: commercial (the market), civil (the Public palace), cultural (the library, the school, the University), productive (creative industries, innovative and artistic productions), religious (the Cathedral). Its attractive capacity is enhanced by the co-existence of conflictual opposites: ancient/new, man-made/natural capital, material/spiritual, etc. The square becomes thus the ideal space where urban regeneration can begin, for re-building the sense and meaning of “being together” in a community.

The challenge today is to transform many existing historic not used (or under-used) urban areas and cultural landscapes into sites of living ecosystem of social integration and entrepreneurship: embracing the new circular economy development paradigm to make historic assets and historic squares as the entry point to implementing the “human scale” of urban development. **The Beauty** of these places becomes generative of positive economic impacts, of economic development. This beauty generates

an attractive “force field” that enhances productivity and thus stimulates new jobs. But also, it “opens” to richer relationships with others and with ecosystems, towards less conflictual and more cooperative attitudes contributing to inclusion, reducing fragmentation, atomization, fostering cross-sector collaboration and enhancing skills and capacities of local community actors. And beauty contributes to the perception of the well-being /health [50], and also to become more available to reciprocal cooperation.

The New European Bauhaus invites to recognize the important role of beauty/aesthetics of the urban landscape (www.europa.eu/new-european-bauhaus/index_en). The above means that the current evaluation processes should be integrated considering not only economic, social, environmental impacts, but also emotional and visual impacts [51].

5. The interpretation of the economy through the lens of biology: The circular economy as a co-evolutionary economy

There are more than one hundred of interpretation of the circular economy [52]. Circular centered and human centered governance interprets the circular economy model as a wise model between the economy of nature and the economy of man: between economy and ecology.

It is characterized by an effective metabolism, made perfect during millennia, that allows to recycle every by-product avoiding any waste [42].

It is a model inspired by nature wisdom, imitating nature organizational structure, characterized by closure of loops; reduction of their scale/dimensions and speed of loops and slowing of loop processes are other linked characteristics, together with minimization/elimination of waste; self-organization/self-reproduction/self-regenerative capacity [53, 54].

More in particular, the interpretation of circular economy that sees the economy through the lens of the biology has some specific characteristics:

- It is the economy grounded on ecology and ecological values. It suggests the approach to sustainability as self-sustainability. Its pillar is represented by the recycling circles that guarantee the re-generative capacity, mimicking all nature processes.
- The circular economy introduces a richer notion of value: a complex and systemic one

(economic, social and ecological value). Instrumental values are considered together with intrinsic/primary/glue values [55–57] thus stimulating a systemic way of thinking.

- It is attentive to interdependences between economic, ecological and social dimensions, so that avoiding that a solution characterized by maximization of the impacts on one dimension can generate unacceptable impacts on other dimensions. The search of satisfying/compromise and adaptive solutions replaces the optimization approach.

The notions of entropy, complexity, irreversibility, symbiosis are introduced together with strong attention to the role of energy.

The concept of complementarity becomes essential. It expresses the relationship of mutual benefits between different components: the presence of an element leads to an increase in value for the benefit of other components, due to the specific interdependencies. It is not enough **to reduce, repair, recycle** for the implementation of the circular economy. The essential aspect of the circular economy is the successful search of the **systemic complementarities**: between different functions/activities/subjects on the basis of reciprocal exchanges of benefits. Thus, in the circular economy approach, single elements should be transformed into “components of a system”. To a greater heterogeneity of the different components corresponds higher probability to identify complementarity relationships. This characteristic to re-generate relationships is one of the key aspects of the circular economy, as a re-generative economy.

In this perspective, each subject receives, and in turn offers, a range of resources/services in a process of systemic reciprocity, for the benefit of all in a win-win perspective.

The overall effect of these complementarities is the vitality of the whole system, in which production and consumption are increased by symbiotic relationships, also through digital technologies and facilitated by geographical proximity.

Here we want to stress the interpretation of this model as a model attentive to promote *human capital and social capital*. These forms of intangible capital are important because the waste are interpreted in general only in terms of natural or man-made resources. The city often is not only characterized by a great amount of waste or discarded elements, but also by the amount of discarded people: unem-

ployed, marginal /poor people etc. Innovative human centered governance should be focused to avoid also this under use/waste of the human capital: of the human beings capacity, intelligence, creativity, self-organization and self-entrepreneurship.

6. The implementation of the circular economy in the space: The new governance towards the “circular city”

6.1. *The circular city model*

The spatial/territorial interpretation/implementation of the circular evolutionary economy is the **circular city**. The city is a clear example of the growing conflict between the evolutionary trajectories of natural complex systems and the evolutionary trajectories of man-made/social complex systems [3]: that is the production of economic increasing wealth, while social and ecological poverty are also increasing.

Cities are responsible of the pollution and of climate change impacts, because they are devouring fossil fuel energy. They have to be totally reshaped, assuming the image of the forest [58].

The circular city is the city that first of all assumes nature as its main infrastructure. It is able to become more and more respective of the wisdom of nature and of its evolutionary dynamics. It is oriented to imitate the behavior/functioning of the forest, taking care of all its components. Forest receives energy from the sun for their functioning, and is characterized by a perfect metabolism. In the same way, the circular city contributes as much as possible through the renewable energy of the sun to lower pollutant and climate-altering concentrations, purifying the air also with the appropriate plantings, re-generating oxygen, sequestering/reducing carbon dioxide, dust, noise, combustion residues, mitigating heat islands and thus contributing to improve the local microclimate in addition to providing fibers, fruits and wood. Water, as a valuable resource, is managed with care. Circular evolutionary city contributes to the necessary transition towards a de-carbonized (local) economy, multiplying the number of green areas and green corridors, using biomaterials, natural ventilation, etc.

It is able of continuous adaptations to a changing context, because it uses a co-evolutionary approach in governance, management and planning.

The circular city is the “adaptive and flexible city” able to organize and re-organize **systemic complementarities**, increasing cooperation and integrations between public, private and social subjects, through synergies, symbioses, using innovative technologies: digital, energy, bio and nano technologies [59]. Artificial intelligence, IoT, automatization, robotization, big data management. They are used in services, productive/industrial sectors, agriculture, etc. for enhancing urban comprehensive productivity, but also to reduce social disparities, poverty, marginality, exclusions. All forms of capital (natural, man-made, human, social) are coordinated together to co-evolve without any waste. Decentralization and community participation are other characteristics.

The circular evolutionary city connects economic and environmental goals with social justice, thus implementing the human-centered paradigm together with the ecological paradigm. A new co-evolutionary equilibrium between the human systems and natural systems is thus pursued.

As it emerges from the international good practices of circularization of city processes [60, 61], the circular economy offers a great opportunity to increase urban productivity: both economic, environmental and social, towards a **human sustainable integrated development**.

The circular city introduces the circular economy model in its industrial system, in its infrastructure functioning and in its organization.

These circular cities recognize the importance of organizing the city system in analogy with natural systems and are undertaking a series of strategic actions aimed at transforming the processes that characterize cities from linear to circular. These actions involve several sectors. The most involved are the construction, food, textiles and transportation sectors. However, there are some other circular processes, such as those between the city and rural areas, between the city and the little towns/villages that should be better valorized and promoted in the circular city strategy.

But the model of the circular economy and city in turn is based on and requires coping with the energy issue. The circular economy and the circular city, accelerated in their implementation by innovations in the field of digital technologies [62], require the adoption of renewable energy sources, for the energy transition. Renewable energy sources and digital technologies require, in turn, the use of rare raw materials.

In fact, different forms of symbioses [63] should be considered for implementing the circular evolutionary city:

- the symbiosis between the industrial districts;
- the symbiosis between the industrial district and the city;
- the symbiosis between the industrial district and the port;
- the symbiosis between the city and the port;
- the symbiosis between the city and the non-urban territory (agricultural/forestry.....);
- the symbiosis between the great city and the little towns in the countryside.

The “ideal” [64] circular city is able to implement all these forms of symbioses. For example, in the symbiosis between the industrial district and the city, the waste heat from industrial processes is not discharged in the atmosphere but it is reused in residential or tertiary areas (or in wastewater treatment plants). Urban waste is transformed in new reusable resources in the industrial district.

The symbiosis between the city and the non-urban territory has been already proposed by Bata in an industrial city in the Czech Republic and in Olivetti model in Italy. Complementarities are identified between different plans and across different sectors in industrial symbiosis (in eco-industrial parks or in eco-towns in Japan and in other countries).

The fossil energy that powers activities in the city and territory produces three-quarters of global emissions and pollution. Decarbonizing all this energy is the challenge of the circular city. To that end, a total transformation of our energy infrastructure is needed. It means increasing the number of electric cars on the road; disseminating all possible forms of renewable energy. The circular city is the city that reorganizes its overall structure starting from the issue of energy. From this follows the absolute necessity of recovery of critical materials and minerals (such as copper, nickel, cobalt, rare earth metals etc.). Many of these materials are precisely those that go to landfill. Instead, more than 50% of some metals such as iron, zinc or platinum are recyclable. For others, especially those needed in renewable energy technologies or digital and high-tech applications (such as rare earths, gallium or indium), secondary production makes a less significant contribution.

In any case, reuse, recycling, regeneration become essential to decrease the same pressures on the environmental ecosystem as well as dependence on foreign countries. The underlying problem must be

addressed by reducing, reusing and recycling materials. The circular city is critical for decoupling economic growth from further resource extraction and thus keeping resource use within the ecological limits of our planet [42].

Symbiotic/circular territorial ecosystem, as Hub of integrated regenerations and synergies, should become the entrance points to implement the circular city.

The profile of the “ideal circular city” is shaped by the capacity to re-connect itself with natural ecosystems and thus with future generations. More in particular, some characteristics of the circular co-evolutionary city are:

- city that imitates the functioning of the economy of nature, with a circular metabolism, without waste;
- city of the six symbioses;
- city of nature (rich of green spaces, urban forestation, urban agriculture);
- city based on reuse, recycling, regeneration of materials;
- city founded on the regeneration of ecosystem services;
- city that reuses waste, transforming it into resources (city as a mine of rare raw materials);
- city that becomes self-sufficient in energy (self-producing energy);
- city self-sufficient in economic terms;
- city as hub of innovations;
- city founded on regeneration of community;
- city characterized by a lively role of the third sector (associations, voluntary work, etc.);
- city based on cooperative networks of trust;
- inclusive city, capable of reducing social inequalities;
- city characterized by a culture of rights and duties;
- city where processes of deliberative democracy are activated;
- city based on systemic management of interdependencies and complementarities;
- city characterized by dense systemic interconnections, interdependencies, complementarities;
- city capable of ensuring widespread well-being for all (happiness);
- city that promotes human flourishing;
- city capable of making choices for the common good.

A general outcome of the “ideal” circular city is a particular urban landscape characterized by high quality: by the urban beauty which reflects the harmony perceived in front of all the above circular processes. The comprehensive circular organization of the city, avoiding every form of waste and under-use of the four kind of capitals, contributes to the *urban beauty*. On its turn, this urban quality/beauty reinforces the economic production, also with positive social impacts in virtuous spiral loops that can regenerate themselves during the time.

6.2. *The circular port city*

There are today **several practices regarding cities** that are moving in this direction related to the circular economy as urban development model: London, Amsterdam, Rotterdam, Brussels, Antwerp, Glasgow are only a few examples in the European Union. But they are implementing only some aspects of the above symbioses. Many examples have been also realized in Japan. They are in general port cities.

Port cities are, in particular, the site where industrial symbiosis practices emerged. Port cities are also the sites/spaces interested by a relevant de-industrialization process, losing their employment and entrepreneurial skills and talents, with growing unemployment and decay of port areas/sites and heritage assets (ancient waterfront etc). Many port cities are also touristic ports. The transition to a new touristic economy involved many port cities in last years, with new receptive activities, integrated to commercial/tertiary ones (with low level new jobs). A circular tourism economy can organize new specific symbioses with the little towns near to greater port cities.

Port cities are particular points for imports and exports trade in the globalized economy through the sea/maritime roads, between the different world regions/continents: a space of localization for many industries and services, and also - sometimes - attractive areas for tourism and cultural exchange.

Ports are the nodal points connecting Europe, with Asia, Australia and America in mutual cooperative and competitive processes, aimed at improving the benefits of their strategic localization. In fact, ports are a driving force of economic wealth, because commercial, industrial, logistic, tourist and fishing activities are localized here. They are a “magnet” for induced activities and, in turn, can also be an “incubator” for new services/activities.

The presence of a particular landscape is a key characteristic of European port areas. This landscape

is recognized by the European Union as an important economic resource in the global competition. Many of the most beautiful urban landscapes in Europe are port areas: Amalfi, Amsterdam, Venice, Genoa, Naples, Syracuse, Malta, Liverpool, Bergen, Istanbul, Oporto, etc. In these cities, the historical centre often reaches out to the seaport. Ancient city boundaries often coincide with port areas, where old warehouses, silos, wharfs, industrial archaeology heritage and lighthouses are situated and contribute to building a particular character, image and landscape. Historic port areas contribute to the particular beauty of the landscape, which expresses the combination of human and natural creativity and characterizes the true identity of a city: its unique image, but also its lifestyle and culture. The beauty of port area landscapes is connected to its architectures, shapes, historic values, local materials, colours, microclimate, light and life. It builds the real image of a city, its soul.

Indeed, many paradoxes characterize nowadays port cities/areas. Environmental deterioration, contamination and pollution processes often affect them. The production of their economic wealth implies high ecological, and also social and cultural costs. Many derelict areas/sites characterize today port areas. Many empty industrial old architectures are here localized. But they have a high economic and real estate potential because of their particular and central position.

The valorisation of the heritage city landscape is proposed here as the entry point to implement the circular city model and to reduce the conflicts between economy and ecology. Some conflicts are generated by negative environmental impacts, due to the high level of energy consumption, air and water pollution, or natural resource consumption (soil, etc). Other conflicts are generated by the effort to conserve a specific cultural landscape and to meet the needs of economic development.

The circular city model reduces the conflicts between port areas and cities. Port areas can be considered as one departure point for a new economic city/territory organization that reduces material inputs, waste, energy consumption and carbon emissions, connecting port areas to the whole city system and stimulating pilot experiments in businesses as well as in architecture/planning, based on a “circular” design.

The symbiosis of circular port city is linked (for example in Japanese experience) to the import, through harbour infrastructures, of all kinds of waste

from outside; they are processed through innovative green technologies and thus treated materials (iron, copper, paper, aluminium, plastics, etc.) are exported outside. But it is linked, first of all, to the use of new renewable energies [65] being the integrated circular energy system the key characteristic of the circular city.

The circular model requires also the immaterial/intangible exchanges and metabolism, as already underlined. Cultural creative industries clusters should be promoted in these old industrial heritage assets by the new governance. The literature and experiences of cultural creative industries clusters are well known [66]. They are characterized by the ability of continuous innovations, with continuous feedbacks, learning from the results, and thus continuously re-design and re-organize and adjust to the contexts. Many of them prefer to localize themselves into not used heritage assets. Cultural creative heritage clusters in port areas have a strong transformation potential for the whole city towards its sustainable circular model.

6.3. *The benefits of the circular city*

Many good practices are producing the empirical evidence about multidimensional benefits coming from implementing circular model: economic (saved costs etc.), social (number of new employed persons etc.) and environmental benefits (CO₂ reduction in emissions etc.) [60, 61, 65]. They should be proposed and critically discussed/assessed in Policy Labs, Living Labs, etc. in their circular relationships and interdependence.

The examined practices [11, 60] allow us to identify a set of economic, environmental, social and cultural benefits coming from the assumption of the circular model. Some production, construction, transportation costs and management costs are reduced, as in the industrial symbioses' experiences. Other benefits are due to the reduction of not-use of specific resources (land, public spaces etc). New jobs in urban agriculture, in green parks, in the conservation of cultural heritage have been created. A better functioning of natural ecosystems is achieved, increasing the biodiversity, avoiding the consumption of conventional fuels, waste or under-use etc. Some real estate plus values can be generated by these reuses

Naturally the entry points for implementing the circular economy benefits are different. For example, in Amsterdam and in London the entrance point has been the built environment, in Rotterdam the

energy system, in Paris the mobility and transport, in Glasgow the waste management. In some other cities the water or the food sectors have been interpreted as the entry points. But the cultural heritage reuse/renovation/regeneration interpreted as starting point for circularity has been never considered in literature and in the practical experiences. The valorisation of cultural heritage allows reduced costs as a measure of benefits, new (specialized) jobs and inclusion, the improvement of the quality of the landscape etc. Innovative technologies (IoT, AI, nanotechnologies, etc.) increase these kinds of benefits.

But these are only the **tangible** aspects. Other **intangible** impacts are on the cultural dimension: increase of people awareness of the value of their cultural heritage, of the intrinsic value of the heritage assets [12, 67] the sense of belonging to a community, the sense of community opened to collaboration/cooperation/synergies, to capacity to self-organize/self-management, the re-connection of community/society to nature.

The new local governance should move in this direction. It should be able to stress these intangible aspects, that contribute to the **soul of the places** and of the city and thus to become able (on their turn) to reinforce the economic, environmental, social benefits. At the same time, they become key elements for improving from bottom-up the effectiveness of public initiatives (rules, investments etc.).

7. **The general conditions for the success of transforming spaces into “places”**

The new governance should promote a “connective tangible and intangible infrastructure” for re-connecting the built environment with the nature evolutionary pattern of life and also the built asset linked with the today and future community, without ignoring the need to re-generate also the cultural/civic mindset (that is needed today to promote the consensus to all public initiatives).

Circular territorial ecosystems in port cities, as Hubs of integrated regenerations and symbiosis, are here considered as the entrance points to implement the circular city/territory model. They have a strong transformative potential towards the circular sustainable city organization.

Which principles in collaborative, co-evolutionary, co-creative governance are required for transforming successfully the “dead” sites in port areas into “living adaptive eco-systems”, to be managed as living organism?

These general principles (coming from the outcomes of the Horizon research CLIC and the collection of a database of good practices) can be summarized into: **the re-generative capacity, the symbiotic capacity, the generative capacity** (Fig. 1).

Figure 2 underlines the ecosystem organization of the symbiotic/circular city ecosystem prototype, with externalities and the relevance of symbiotic processes in the comprehensive context. It suggests that for the reuse of the heritage assets localized in port areas, the functions should be chosen so that some

of them can sustain themselves and also can support some other activities. For example, in the reuse of a dismissed industrial site, some residential and commercial functions are justified for supporting social, cultural, educational, research, civic ones (not able to self-sustain themselves) coherent with the intrinsic value of the asset.

The diagram distinguishes between different multidimensional impacts, characterized by feedback loops, reciprocal integrations, systemic interdependences which can transform vicious processes into virtuous ones, starting from a specific threshold.

The **re-generative capacity** is interpreted (in ecology and in ecological economy) as the auto-poietic capacity [47, 68]; It reflects the capacity to maintain the organizational structure of a living system during the time: its identity and profile (characterized by a circular metabolism), with continuous activities of making adjustments because of degradation/decay and re-making processes [69].

The available tangible and intangible energy is a key element and condition for this auto-poietic capacity.

The ideal tangible circular energy system is grounded on the use of renewable energies, because the system could behavior as a circular one. Other indicator is the capacity to self-sustain in the financial/economic dimension.

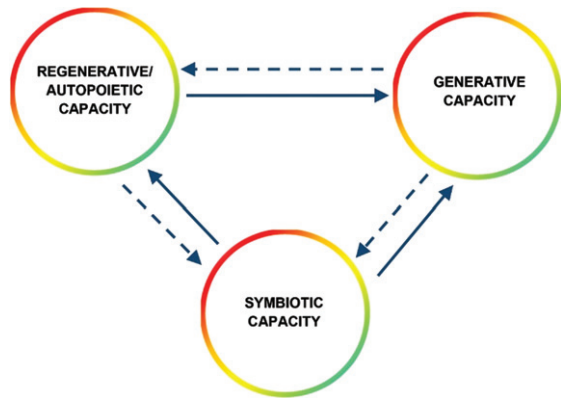


Fig. 1. The three principles for organizing systemic complementarities in the symbiotic heritage circular ecosystems.

THE CIRCULAR TERRITORIAL CLUSTER: REGENERATIVE, GENERATIVE AND SYMBIOTIC CAPACITY

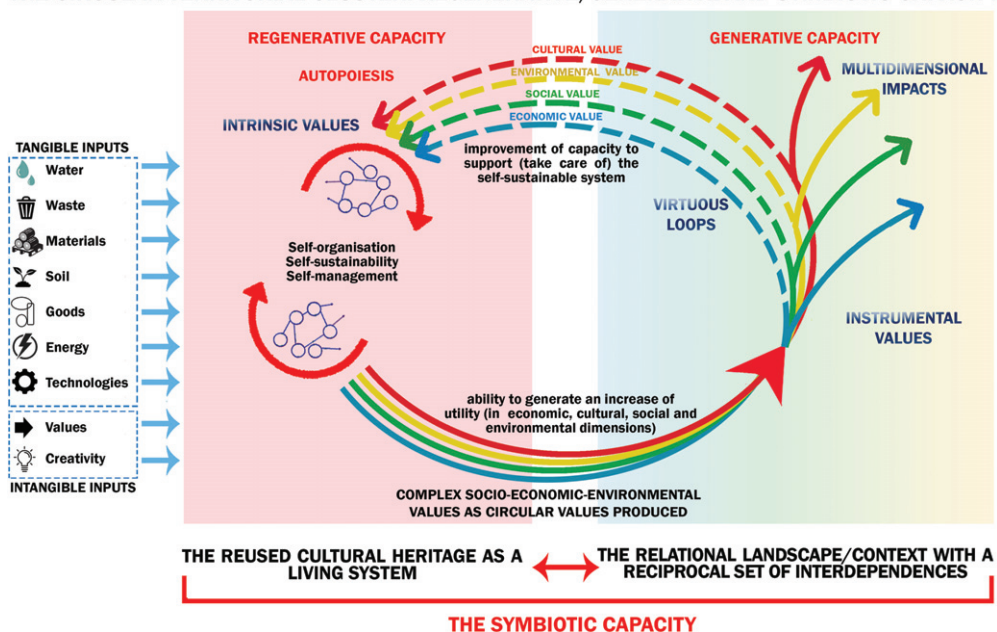


Fig. 2. The circular territorial cluster flow of values.

The **symbiotic capacity** expresses the interdependence relationships with all elements of the dynamic external context, that require continuous evolutive adaptations. It guarantees integration and thus the durability of the re-use during the (long) time. It is linked to the material and immaterial relations between the physical asset and the context: it guarantees the dynamic contextualization of a site to its surrounding spaces, as in the natural eco-systems, where relationships are source of life/survival. Thus, the re-use of these particular (heritage) assets informs, shapes, re-shapes its surrounding environment (which is in its turn re-shaped and deformed).

The re-generative and symbiotic capacity also generates the capacity to produce multiple tangible and intangible impacts: the **generative capacity**.

Generative capacity is the multidimensional utility which an eco-system “offers” to its context (as instrumental values), multiplying its relationships. Positive tangible externalities are, for example, reduction in emission of greenhouse gas, in coherence with the priority of this goal recognized by European Union. Also, the soil consumption is avoided, while the production of waste material is reduced etc.

This circular model of reused territorial heritage asset is able to produce external effects that partially impact on the context and partially are able, in turn (in a circular perspective), to “come back” (from the context) to the cultural heritage ecosystem. Some of them are economic impacts on the context that, in turn, become input again for cultural circular heritage ecosystem. These economic values, in fact, can be “re-used” to support the activities included in the space/place.

Symbiotic/circular territorial ecosystem is able to produce also social impacts/values. They are referred, in particular, to the production of jobs (in energy and digital technologies, in social welfare, in education, entertainment, innovative start-ups etc). The circular ecosystem improves wellbeing and quality of life of the community that, in turn, become inputs for a better productivity.

Cultural circular heritage ecosystem produces also environmental values, in particular in terms of avoided costs (reduction of energy consumption, waste reduction, reduced climate change impacts etc.). It produces benefits such as land-saving use due to building reuse (rather than demolished) and the reduction in CO₂ emissions thanks to restoration of a physical asset rather than reconstructing it. Thereby, cultural heritage reuse can help to face the climate change challenge, for example, “through

the protection and revitalization of the huge embedded energy in the historic building stock” [70]. This environmental value of cultural heritage can be interpreted as economic value: as avoided costs. But new governance requires also the promotion of new shared mindset. On its turn, this new mindset stimulates the localization of new circular hubs, characterized by new tangible and intangible metabolism with the city/territory. Cultural values produced through territorial circular ecosystems are linked to the capacity to generate and regenerate relationships and the sense of community. Part of these relationships impacts on the context and part of them become input for activities in cultural heritage ecosystem.

We stress here the cultural value of existing heritage because of its potential as a “**connective infrastructure**” [71]: that is as an infrastructure “keeping society more cohesive” (now highly fragmented especially in big cities), creating and regenerating bonds and relationships. Regenerating cultural heritage contributes to regenerating the “connective infrastructure”, which in turn feeds the productivity of the activities within cultural heritage. Thus, a new community is promoted. But more in general it is promoted a co-evolutionary process with nature dynamic.

The innovative governance should reinforce this circular connective infrastructure to become able to re-connect not only people to their places, but also the places themselves and the people to nature: to the natural ecosystem from which we have been progressively dis-connected, with the result not of promoting the flourishing of life but exactly the opposite. The multidimensional benefits coming from the circular organization are key elements to be evaluated (from top-down and from bottom-up). The capacity to integrate the assessment of instrumental values with the assessment of intrinsic values is required [56], if we want that the innovative governance can sustain the creativity of all involved stakeholder under the pressure of evolutionary forces [72].

7.1. Testing of circular heritage symbiotic ecosystems prototype in port cities

Being localized in port areas, these are sites in which to experiment first of all the circular energy system. Here local and re-localized productions are going to be supported by massive flow of digital information carried out at the closest proximity to costumers and consumers [3]. The digital heritage sites (characterized by all innovative technologies)

become “places” that make the difference with current “smart sites” because they have a specific soul. In the same time, they become able to sustain also other “solidarity functions” that are not financially viable.

The *circular regenerative re-use* of the port areas heritage assets (through the choice of appropriate multiple functions/uses (see §7) and the continuous re-integration, repair, maintenance, refurbishment, recycle actions and management grounded on synergies and complementarities) is ecologically regenerative: a re-use that contributes first of all to implement the transition towards a de-carbonized local economy.

In port cities there is, in general, the highest economic pollution of air, water and contamination of soil. Rare materials are incorporated in soil and in water pollution areas. Innovative technology should be here proposed and tested. In other words, the circular regeneration/reuse of the cultural heritage should be interpreted and managed in ecological terms, in the perspective of the Green Deal of European Union and the climate challenge and of New European Bauhaus. But also as a way to improve the immaterial social infrastructure of the city, generating micro-communities through the management itself of the old industrial heritage as a common, characterized by a specific value (an “intrinsic value”, that reflects the value that has been connoting over centuries and millennia) [57, 73].

The localization of circular symbiotic *ecosystem localized in the heritage assets in port areas* should be the outcome of the regeneration/reuse of old industrial (cultural) assets, in which common spaces for sharing experiences, ideas, knowledge are multiplied, for testing new solutions, thus attracting new skills, researchers, entrepreneurs, investments. *The cluster of heritage-led circular regeneration* should be the reference general image for multiplying new places network in the whole city.

The adaptive regeneration/reuse of degraded spaces in the city should be integrated more and more in the ecological perspective (that characterizes every living organism), to reconnect the built assets with the bio-ecological systems, in coherence with the evolutionary dynamics of nature. This means to become able to continuously re-shape circular city/territorial ecosystem in an integrated perspective, with nature-led solutions, able to contribute to regenerate ecosystem services (as happens in nature).

The ideal symbiotic/circular adaptive ecosystem assumes nature and biodiversity as the main infrastructure for the economic development [74]. Its management/planning is able to become more and

more respectful of the wisdom/behaviour of nature: of its creativity, of its exploratory and learning approach, through series of adjustments and adaptations to context, in coherence with its memory. At the same time, the nature-led solutions also regard the beauty of the natural landscape: this should be effectively stressed [10].

The implementation of circular city territorial ecosystems starts from the reuse of dismissed industrial heritage assets, that are localized in port areas/cities, reusing heritage assets/landscape which characterize in Europe all port areas/cities. Many sectors are involved, from logistics to circular tourism, to industry, to cultural/creative industries, to services, water management, physical assets planning, energy. They become the “integrated productive environments” [3]: creative places as “condensation nuclei of development” [3].

The circular territorial cluster thus can connect environmental goal with social justice, while implementing the human-centred paradigm together with the ecological paradigm and with economic sustainability.

8. Planning and managing the symbiotic/circular territorial ecosystem through the landscape evolutionary approach: The co-evolutionary evaluation process

Landscape is an effective entry point for implementing the “circular symbiotic heritage cluster”. In particular, the 2011 Historic Urban Landscape (HUL) proposed by UNESCO [75] recognizes this unifying/holistic perspective. The issue of climate change is “incorporated” into the preamble and some paragraphs of HUL.

The HUL approach integrates different activities and actions in the “management of change” (§24): in the adaptation between “old and new”, between conservation and transformation (§12, 17, 19, 22, 25). Choices between conservation and transformation are to be done, combining in a *satisfactory compromise solution* [76] the logic of change and the logic of permanence. This means the capacity to distinguish the accessory and the essential elements. The evaluation capacity is repeated in many paragraphs (§10, 23, 24) as a key process in selecting and combining the creativity (and the beauty) of ancient generations and the creativity (and the beauty) produced by current generation: in the adaptation processes and in “integrating natural and cultural heritage” (§19).

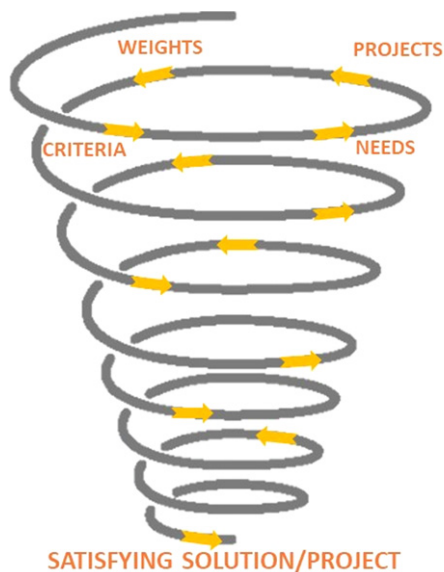


Fig. 3. Dynamic evaluation process. Source: Zeleny [64] and adaptation.

Specific evaluations are required in this landscape planning perspective [67]. They require effective DMSS (Decision Making Support Systems), linked to the different scale of the choices and to multiple dimensions.

Multicriteria evaluation approaches are useful to help in the above adaptation evolutionary trajectories [3, 55, 65, 72].

Indeed, over time, evaluations are taking on a central role in Policy Labs as a tool to help identify solutions that deserve to be funded because they improve people's lives.

From this dynamic approach in the perspective of the circular economy should follow coherent evaluation processes. This dynamic approach in turn leads to an approach in which criteria, weights and alternatives proposed by many different actors change in an evolutionary dynamic.

The Fig. 3 shows that in a first step only few items are quantitative (assessed in a cardinal scale). Some other items are assessed on an interval scale; many other items are only qualitative, using ordinal scale. The above means that it is necessary to use in the first step the ordinal scale, introducing only some quantitative information about costs etc. During the evaluation process, some other items can be converted into interval and cardinal scale. Qualitative multicriteria evaluation approaches are particularly useful during the first steps [55, 56]. These bottom-up evaluations are grounded on existing local

knowledge. Top-down evaluation are grounded on rigorous evidence-based knowledge.

It is not possible to use only a cost-benefit approach because it is not possible to reduce evaluation into a unique scale. Approaches grounded on MAUT (Multi Attribute Utility Theory) are necessary. Some evaluation methods as AHP, ELECTRE, REGIME, EVAMIX, NAIADE, CIE [55] allow to compare alternatives, in their capacity to fit into specific contexts, deducing a priority between alternatives and producing new ones. These tools allow to identify areas of competitive advantages, to make pilot experiments, etc. in a continuous learning process. Projects themselves evolve in the time and feedbacks are necessary to design new adaptive changes and mutations. New complementarities, new symbioses, new co-evolutionary relationships and thus new project solutions can be identified through evaluations.

The evaluation in the perspective of the circular economy has implications on the evaluation processes first of all because it recalls the centrality of specific environmental/ecological indicators, (for example related to savings in energy consumption, natural resources, able of sequestering CO₂ reduction of climate-altering impacts) in addition to the economic ones that are generally introduced, that are useful to understand the change and its intensity in relation to the status quo [65]. The evaluation, in this context of circular economy, necessarily requires a long-term approach; it requires to consider costs and benefits not only economic-financial. The evaluation of externalities (positive, negative, direct, indirect, induced, in the short, medium and long term) becomes central. Of course, the reference scale (building, neighborhood, city, territory) determines different needs for data/ indicators [65]. The evaluation consistent with the human centered approach requires in turn to consider the availability also of other specific types of data and indicators. It requires assessments of the different impacts in term of variation in wellbeing as perceived by the various subjects/social groups: in terms of change of their perceived quality of life. It is important to understand not only the intensity of impacts, but also their distribution between people and between areas.

The transition towards a human centered approach in governance requires, in particular, new evaluation composite metrics, to test prototypes and to compare reciprocal and circular net benefits coming from them. Economic approach can offer the notion of Total Economic Value. But this is an approach based on the Willingness To Pay (WTP) that is not opened

to participation of people (and, in particular, of poor people and of future generations). It recognizes only instrumental values and not also intrinsic values. Also intrinsic values should be integrated in the participated evaluation process, with another kind of metric, through a constructivist and not positivistic approach, able to reflect cultural, emotional, aesthetic impacts.

The above evaluation tools can be used also to produce not only the heritage conservation/development assets, localized in port areas, but also to localize in the city/territorial system new “places” as development poles. And also to promote a new culture, essential to improve the human centered and ecological paradigm. The goal is not only to conserve sites and stones but also to valorize the culture that is reflected and incorporated into the sites and stones, and to stimulate a critical systemic thinking. Creativity is the fundamental ingredient for implementing the circular symbiotic heritage ecosystems. It is not related to the reuse architectural project, but it is especially related to the management project: it is the creativity of the entrepreneur/manager. The entrepreneur decides to take on a certain investment and to run the relative risks by creating a new organization, through new solutions that transform the cultural resource into a complex of complementary systemic relations. This takes place by adapting the cultural manmade capital, elaborating a new order, a new organization, also through subsequent experimentation and thus “learning” from successes and possible failures, in the search for ever more performing solutions, through new combinations.

An interactive and systemic user-friendly decision support scorecard should be arranged and available for participant people in order to co-decide. A specific dashboard helps in monitoring. The evaluation tools available for public, private and social actors allow to test the performances of the prototypes proposed in coherence with the above general principles.

9. Conclusions: Towards integrated local action plans

All our time problems are reflected and concentrated in the city system. Here the economic wealth is produced and consumed, and here the negative ecological and human/social impacts are more intensive. Many new neighbourhoods were born out of nothing, without social bonds, without a soul: without “places”. Many metropolitan scale economies are

transforming into growing dis-economies, with growing ecological negative impacts.

A new local connective, co-creative, adaptive governance is required. It should be able to orient the city organization and development towards the circular model, to reduce the dis-economies and, more in general, to re-connect the city system to nature organic patterns of life, enabling nature and human beings to flourish.

New governance should be able to **regenerate self-organization and thus the trust**. Adaptive reuse of dismissed heritage assets should be proposed in a dynamic evolutionary perspective, being the regenerative capacity grounded on creativity.

Port cities seem the most suitable cities to be transformed into circular cities. They are strongly characterized by pollution and negative climate change impacts. And also by not used or underused or dismissed sites with cultural, architectural, landscape values (as the old industrial assets, etc.). The proposal here is to trigger the implementation of the circular city starting from these areas, transforming them into circular ecosystems: into **productive circular heritage ecosystems**, as the new development poles. They have a significant transformative potential in relation to the whole city system. The adaptive reuse of these areas can reduce material and immaterial forms of poverty, thus contributing to the human centred development and city humanization. The subsidiarity principle incorporated in the European Constitution (art. 5) is the normative ground for different forms of tools to manage a public resource as a common: for new Pacts, Agreements, Contracts able to promote communities. They should be supported by an effective new governance, through specific Local Action Plans as operational tools for innovative/regenerative governance. If we assume here that the real challenge is “inside” people, in the way of thinking that should be enriched, a more desirable future depends not only in the innovation in economic, financial, institutional, technological fields, but also on redefining the system of priorities that guides choices and behaviors. It is necessary to build and spread a new “culture” in Local Action Plans, characterized by a long-term horizon, by the recognition of intrinsic and not only instrumental values, by critical knowledge and evaluation capacity as the foundation of the culture of coevolution. The “horizon of the city” and in particular of the “circular city” promotes the overcoming of forms of radical hyper-individualism, which transforms legitimate rights into particular-

istic selfishness. The new governance should focus on culture as the generative place of choices, of concrete actions and behaviors: as the space of research and critical discernment, even in a communitarian sense. It is the “place” where to cultivate the evaluation capacity to distinguish the real from the fake, the good from the bad, the just from its contrary.

New qualitative and quantitative evaluation evolutionary tools should be identified for implementing the proposals able to manage qualitative/intangibles and quantitative/tangible values in selecting between permanence and transformation/change in the public arenas: in identifying in Local Action Plans new balanced solutions.

This evaluative capacity is important in order to build (and preserve over time) a “desirable city” for this and for future generations, moving towards productions of connectiveness, availability to continuous change and co-creative capacity.

The challenge becomes to review the city governance to make the city development as much as possible congruent with the patterns of nature life. The nature shows us that a resource that is not able to re-generate itself is condemned to de-generate: self-organization/self-regeneration is the key element of the life of all systems. This is replicable also for intangible resources. If a cultural value is not regenerate it will disappear.

In conclusion, the *circular ecological and human centered governance* is a governance linked not only to the choices of promoting new development strategies to de-carbonize our economy/cities. But also to regenerate cultural values. We have certainly to know all metabolic tangible flows. We have to consider, at the same time, also intangible flows and the metabolism of intangible components/values. We have to promote a richer culture of cooperation and not only of competition (as the nature show us). The new governance is required to enlarge the current reductive worldview that is determining the growing dis-connection with the nature evolutionary system of life. And also the social fragmentation. This is the real meaning and goals of the New Green Deal and of the NEB. If the new governance is not able to re-generate also values as inclusion, solidarity, responsibility, capacity to take care of others and of nature, of beauty, etc. no ecological transition or no Next Generation Plan will be implemented in an effective way. New governance should assume that the challenge of our time is to re-connect our cities to nature,

being recognized as the most important city infrastructure: for satisfying the activities and needs of this generation (also of marginal social groups) and of future generations and also to reduce social dis-connection.

Our existing built assets, our infrastructure, industrial plants, agricultural organizations etc. have to be all re-shaped in this perspective if we really want to construct a desirable future, avoiding a systemic collapse.

The outcome of this systemic approach is not only the integration between multiple heterogeneous components: it is the conservation and valorisation also of the beauty of the landscape, that reflects the harmony of the whole systems [3, 77].

Circular symbiotic heritage ecosystems have been here proposed as the entry point for becoming new entrepreneurship and also new cultural Laboratories.

The circular economy model is here proposed not only for the many economic, ecological, social benefits but also as bearer of a new culture: a cooperative/inclusive culture. It is “reinforced” reusing the cultural heritage (that stresses the inclusive values in the time dimension and not only in the space dimension).

Thus, the *circular human centered governance* has to recognize a particular attention to the *cultural dimension*, as a key dimension for implementing sustainability. Cultural dimension is not only interpreted as the material cultural heritage valorization, but also in terms of change the current worldview, mindset, way of life.

The circular symbiotic ecosystems are here proposed as an example of initiatives of the new governance grounded on a “culture-led strategy”: to regenerate not only physical scene but also the link between man and man, between man and nature/ecosystems: to re-think behaviors, lifestyles and choices. A “relational rationality” is structurally promoted by the circular economy model, because it is attentive to interdependencies, feedback, connections for cooperation, synergies, symbioses substituting the traditional linear economic rationality.

The circular economy/city model stimulates and offers a new way of thinking, a new culture. It remembers us that every natural system is characterized by a dynamic evolution grounded on its memory. Memory generates adaptation, evolution, future. This is also in human systems, for generating future and hope, combining permanence with transformation. A society is resilient if it recognizes the role of the past, of its memory: if it is characterized by the cul-

ture of the memory besides the culture of critical thinking. Every culture shapes relationships: it makes connections, it is a connective infrastructure (that links/bonds each subject with the others and with nature) in the social space. But also in the time. It links today with yesterday through memory/history. It is necessary for making a desirable future for our cities to avoid the leveling on the “hic et nunc”, in the time we live characterized by the amnesia of the memory: to make resistance to our current condition as Adorno and Marcuse [78, 79], already recognized many years ago. We need to integrate in a circular systemic way of thinking past, present and future. Memory can re-generate sense of belonging, care, community, self-awareness introducing the formative energy to face the future: to make resistance to the amnesia of memory of our time.

A possible entry point in the above direction to re-generate the bonds with the past is the recovery/reuse of our cultural heritage interpreted in the circular model. It offers the spatial framework from which to re-generate also the collective/social memory.

The regeneration/re-use of cultural assets, because of its multiple cross-section dimensions, has been proposed here as the entry point for implementing the circular city governance.

But the new governance to become effective has to regenerate also trust/confidence. The words of Antonio Genovesi cannot but be remembered here: “Trust binds, unites, creates a bond in society...Trust is what is the force of cohesion and mutual attention of natural bodies...without which one cannot have any firm and durable mass, but everything becomes dust and sand that dissolves at the first shock...” [80]. Trust as the foundation of the community, confers resilience, but also it contributes to **humanity**: “if there is no mutual trust there can be no humanity...because each one concerns the other suspicious and the enemy” [80].

Regenerating trust, the new governance strongly contributes to regenerate communities and thus to implement the **humanization** of life conditions for us and for future generations.

Acknowledgments

This paper reflects some outcomes of the Horizon 2020 European research CLIC “Innovative, financing, business and governance models for adaptive reuse of cultural heritage” (www.clicproject.eu) financed by the European Commission. Also some

outcomes of a National Interest Research Project (PRIN) about “Port metropolitan city and circular economy in Italy” are reflected.

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