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The circular economy in transforming a died heritage site into a living ecosystem, to be managed as a complex adaptive organism

Climate change is a consequence of our difficulty to manage the currently conflicts and contradictions. It is configured as a process that makes human life on Earth increasingly uninhabitable, making the relationship between the Earth's ecosystem and humanity increasingly difficult. A fundamental cause of the climate change is the way in which economic wealth is produced and distributed. The current economy produces also ecological and social poverty. The adaptive reuse of cultural assets is proposed in the general framework of the Green New Deal of European Union, assuming the circular economy model for re-integrating economy into ecology. The aim of the paper is to identify how to transform a died heritage site into a living system, to be managed as a complex adaptive system, discussing the ways in which adaptive reuse can be implemented as the entry point for implementing the circular city.

1. Introduction

Our time is characterized by extraordinary and accelerated changes. They determine new uncertainties, new growing turbulences, disequilibria and conflicts between, for example, few rich people and more and more poor people, between current generation and young/future generations, between the nature self -organizing ecosystems and the sustained economic/ productive man-made assets produced by the human beings.

In the industrial sector new wealth is produced "through" ecological and social poverty.

A specific disequilibrium is the one between the city and the countryside/marginal territory: between metropolitan globalized cities (the new "urban empires") (Glaeser et al., 2020) and rural villages, localized in inner or marginal areas.

A new growing kind of disequilibrium is also the one between the power of the innovative technologies and their *wise* use, oriented towards objectives that have value.

Climate change is a consequence of our difficulty to manage these conflicts/ contradictions.

Climate change, interpreted as the greatest threat of this century, is configured as a process that makes human life on Earth increasingly uninhabitable: it makes the relationship between the Earth's ecosystem and humanity increasingly insidious and difficult. If the health of the ecosystem is no longer guaranteed, the

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health and well-being of mankind of this and future generations is at risk: but also the same health of the economy becomes problematic.

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 capitalist logic, while producing economic wealth, produces also ecological poverty and social poverty (increase of marginalized people, inequalities, etc.). (IPCC, 2018; Porter and Kramer, 2011; Lovins et al., 1999).

The last Report of World Economic Forum (2020) underlines that 2020 is a critical year to face the challenge of climate change: the connected risks (till the permafrost crisis, the change in the Gulf current etc.) are recognized as the more relevant for the human kind in the short, medium and long horizon.

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

It is absolutely necessary a transition towards a condition in which, first of all, the "rhythms" of the economy of nature (i.e. of ecology) are less in conflict with the rhythms of man's economy and in general with the rhythms of current life, thus reducing the production of entropy. It is necessary to accelerate the transition towards *circular economy* model, as a *nature-based* economy.

We fight climate change by building a more ecological, greener world: characterized by renewable energy sources, by a strong conservation and regeneration of natural resources, with a drastic reduction of waste, which are recycled/regenerated as much as possible, transformed into resources (thus reducing the amount of extractions from the natural ecosystem) and making sure that the outputs return to the natural ecosystem as much as possible[1].

We can face climate change recognizing that the "good life" of human beings depends on the "good functioning" of natural eco-systems: in the implementation of the circular economy in the space/territory.

Here the proposal is to implement the circular city moving from a specific place-based resource: to reuse the cultural heritage as an entry point for the implementation of circular economy strategies in the city/territory system (Foster, 2020; Foster et al., 2020).

Surely there are other approaches such as the one focused on the productive system of companies, on the transport system or the recycling of materials, etc. The reuse of cultural heritage is configured as a perspective that intercepts and crosses all these other approaches, directly and indirectly: it is interpreted as a much "richer" perspective.

An ecological perspective is introduced into the strategy of functional reuse of cultural heritage. The reference to Patrick Geddes' (1915) thought is evident, as well as to that of Lovins (Lovins et al., 1999). The perspective is to search "nature

[1] The consumption of natural materials is growing exponentially, at twice the rate of the population. Today only a percentage not exceeding 8.6% comes from recycling.

based" solutions in the adaptive reuse, which can mimic natural circles, integrating economy into ecology (Zeleny and Hufford, 1992).

In fact, the circular economy suggests a shift of the economy towards a new ecological model., characterized by continuous processes of making, degradation and re-building. These processes are more and more local and combining with the de-globalization-relocalization new trend (Zeleny,2012).

But, at the same time, a social foundation (linked to the local community) and a cultural foundation (that is a human dimension) is introduced together with the bio-ecological approach. Therefore, the reuse no longer becomes only *green*. The above in order to better take into account all the values involved when intervening on cultural heritage, starting from the ecological ones, on the basis of a systemic perspective and therefore of an integrated approach. Water, for example, is considered as a very precious resource, that generates the life in all ecosystems. It cannot be wasted, but recycled an indefinite number of time. Water self-sufficiency should be the characteristic of every re-use. Energy self-sufficient is another key characteristic of reuse, through renewables energies from the sun, the wind or the Hearth. Another characteristic is the bio-mass investments, for sequestering pollution and particulates, regenerating clean air.

The "ideal" project of re-use is to transform a dead (in general) site into a living system, to be managed as a complex adaptive system, i.e. an organism capable of continuous learning and adaptation capacity to a changing/dynamic context, through re-organization, repair, regulation, and therefore capable of evolution and resilience.

Circular re-use is not only an issue of waste management. It makes clear the ways in which adaptive reuse can be implemented, starting from some fundamental aspects.

Figures 1 and 2 highlight the characteristics of the "traditional" functional reuse and of the adaptive reuse interpreted in the evolutionary perspective of the circular economy.

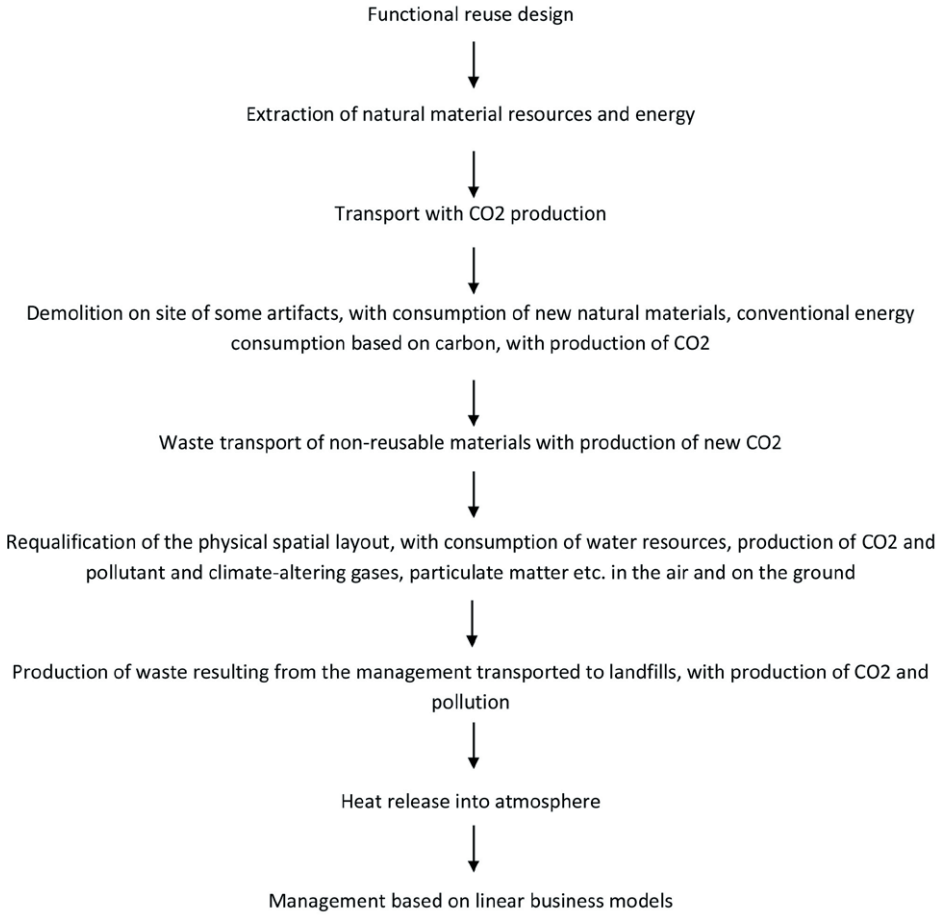
The functional reuse in the perspective of the circular economy implies differences with respect to the linear model, both in terms of design and implementation and especially in terms of management. In fact, the difference is not so much in the re-use design phase as in the management process. The attention is not only aimed at eliminating functional and technological obsolescence but also (and first of all) the positional one, due to the accessibility to material and immaterial infrastructural networks (digital connections etc.) and therefore the economic one. The energy/water self-production, the reduction of employed new materials, the business model able to light economic, social and environmental profit are example of critical steps.

At micro scale, it is possible to propose the following model (Figure 1), in which the flow of activities is linear (top-down).

The Figure 2 is characterized by continuous circular relationships.

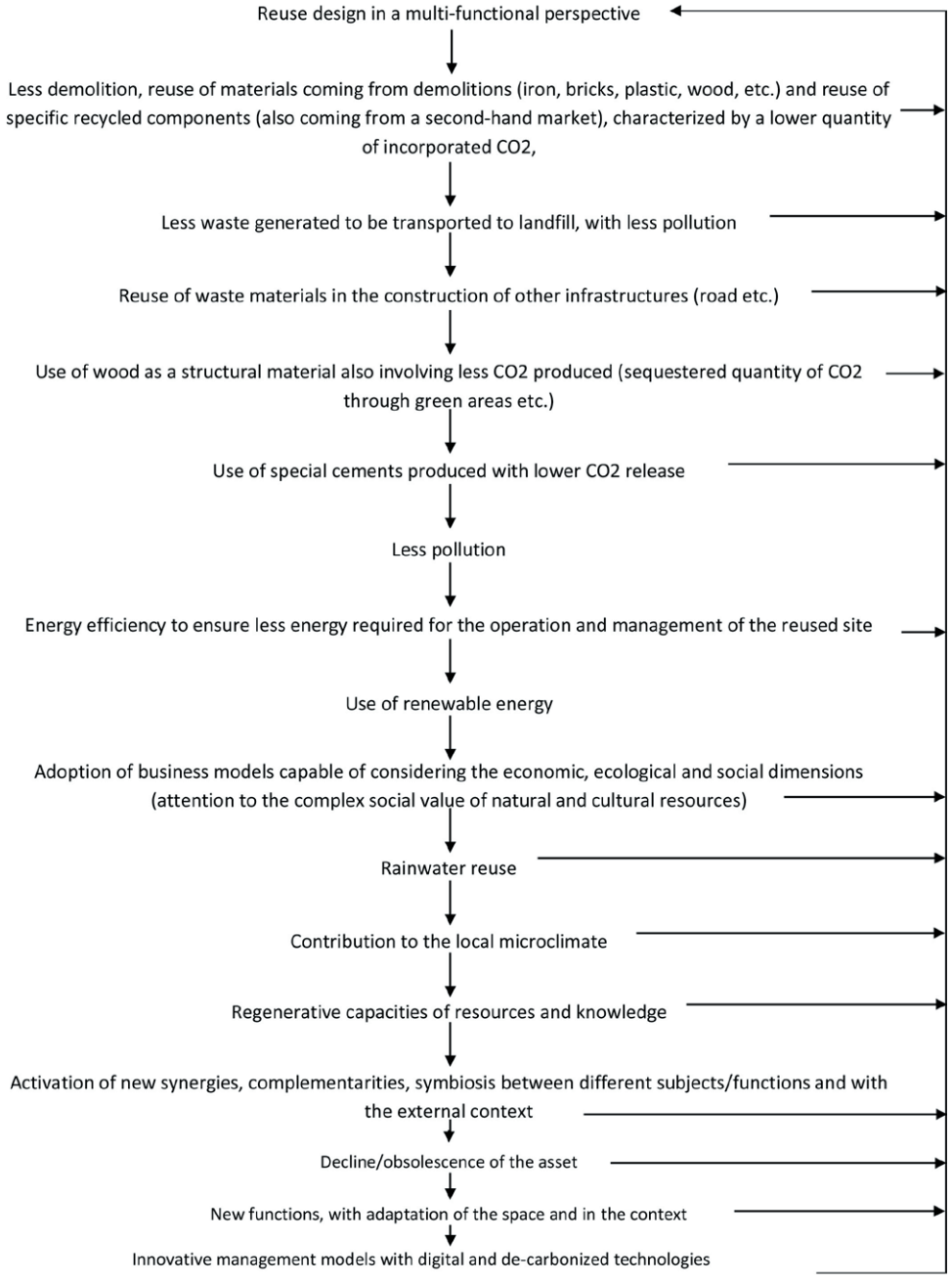
The (multiple) activities to be located in the cultural heritage re-functionalized in the perspective of the Heritage ecosystem have to be managed over time as a living complex system, i.e. following a circular organizational strategy.

Figure 1. The "traditional" functional reuse.



In other words, this means that the activities should be interdependent: each other and with the external context, first of all promoting new and more efficient metabolisms, possibly generating other autopoietic/generative/osmotic processes. For example, for productive activities, it occurs that over time new entrepreneurs add to pre-existing ones, generating new business. These tend to reorganize themselves in new networks of interdependencies, in which the relationships of complementarity are multiplied, with mutual convenience. The total productivity tends to increase, at least until the interdependencies begin to rarefy and to dissolve with the time. Then phenomena of decline emerge, which, however, can also be a source of localization of new investments, by new entrepreneurial subjects that take advantage of them and that (localizing themselves) generate new opportunities/activities, and therefore new value and employment.

Figure 2. Functional reuse process in the perspective of circular economy.



In each of the above steps an evaluation process is required, for identifying more satisfying solutions among possible alternatives. Adequate innovative technologies and business models are required in their comparison between costs and performances/benefits.

2. The General Perspective of Adaptive Reuse

For achieving the above-mentioned goal, the New Green Deal Strategy of the European Union is assumed here as the general context of reference. It turns the challenge to climate change and the resulting ecological transition into an extraordinary opportunity to trigger a new development model: the circular model.

In particular, here we assume:

- the Circular Economy as the co-evolutive integration of the men economy into the economy of nature (that is essentially circular), recognizing in particular that economic values are grounded on ecological/ ecosystem values, as already underlined by Ecological economics (Costanza et al, 2014; Serageldin, 1993). As an "impact economy" it also suggests that it is possible to do more with less, learning by the nature wisdom. Its pillar is the recycling circles;
- the auto-poietic capacity and the symbiotic capacity of the ecosystem, as the source of generative capacity and as the general principles for transforming a (in general) *died site into a living system,* to be managed as a learning/evolutionary *organism;*
- the human-centered approach: the human beings - including future generations - and their wellbeing, quality of life, health, etc. are the ends of the development, and thus guaranteeing the "human flourishing", (stressing the importance of employment as a key element of human needs/rights achievement);
- the role of social-civic sector (of social finance, of social / cooperative enterprise etc.) to be coordinated and in cooperation with for-profit enterprise and with other public institutions, attentive to long term horizon and to intrinsic values;
- the important role of intangibles values: in particular, the role of the "intrinsic value", as the soul, spirit of site/place, as driver for the human scale city development;
- the central role of new functions in the re-use (beyond tourism and/or residential functions and traditional social functions) linked to the innovative/ creative functions for promoting a self-sustainable ecosystem[2], to be managed through a circular organization and closed loops, mimicking natural processes.

In this perspective, the Green New Deal Strategy of EU is assumed here, reinterpreted and re-shaped in the human / social dimension, stressing the role of the key components for the human scale of development: the cooperative capac-

[2] The notion of ecosystem was introduced by Odun (1953) as a dynamic, complex and interactive system composed by living and not living components, connected in a set of multiple dynamic interdependences.

ity, able to stimulate synergies and symbioses through circular relationships, thus transforming the cultural assets into ecosystems of economic-socio-cultural integration: that is into self-sustainable ecosystems (characterized by a circular organization/structure) able to sustain themselves, reducing or without external supports from public, private or social institutions .

Transforming a site "lacking vitality/life" into a *living system* is here the interpretation of the adaptive reuse, recognizing the centrality that the ecological dimension today assumes. Adaptive reuse must become a producer of primarily ecological/environmental values. The site object of re-functionalization must be transformed into an ecosystem that can also contribute to the vitality of the local context, in a symbiotic relationship (for example, giving and receiving renewable energies etc.) involving other subjects and activities especially in management, possibly generating other ecosystems.

New activities in the reused cultural assets produce goods and services for the external bodies, but also they re-produce their own production processes, regenerating themselves through the production of new knowledge and innovation. An adaptive management is required, able to continuously react to internal and external forces and to generate evolution and resilience.

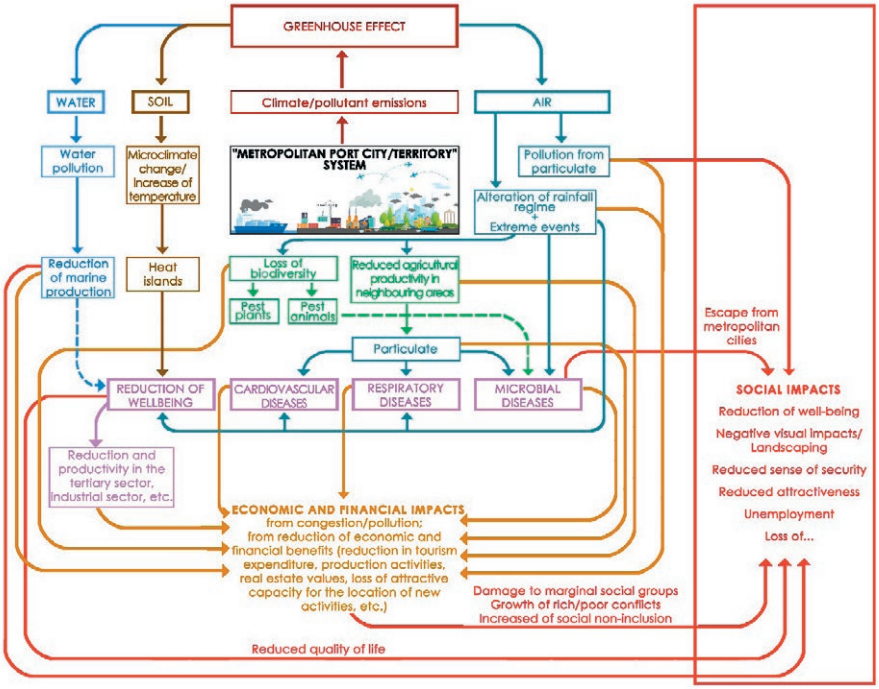
This ecosystem should be able to capture the needed energy for its functioning from the sun, and able to implement a new metabolism which mimics the one of nature. Cooperation and competition strategies are integrated in this model (Zeleny and Hufford, 1992), able to self-sustain itself from bottom up. More and more the digital technologies unable the above behaviours of the re-used assets.

Thus, the organization/management of a reused cultural asset should be interpreted in a way similar to the nature organizational structure. The example of trees is very simple: they receive the energy from the sun for their functioning, and are characterized by a perfect metabolism etc. The analogy with trees allows to imagine a functional reuse that contributes as much as possible through the renewable energy to lower pollutant and climate-changing concentrations, purifying the air even with the appropriate planting, generating oxygen, reducing carbon dioxide, dust, combustion residues, mitigating heat islands and thus helping to improve the local microclimate as well as providing fibers, fruits and wood.

This interpretation of the adaptive reuse of cultural heritage in the perspective of circular economy follows the introduction of the lens of bio-ecology. The functional reuse then becomes the opportunity for the realization of a living system, characterized by a particular metabolism. Adaptive reuse is necessarily placed in a systemic perspective that connects built environment and natural environment, manufactured capital and natural capital with human and social capital in a mutual relationship.

Reuse, especially in its management phase, interpreted as the promotion of a *complex, dynamic and adaptive system*, is constantly facing the changing context, with an unstable balance that must be continuously rebuilt with an innovative management effort, taking into account the high density of interdependencies between the economic, social, ecological subsystems and the positive sum strategies that can be triggered.

Figure 3. The impacts of the greenhouse gas and pollution on the well-being (Source: Lancet Countdown Report and re-elaboration).



Such management is achieved through choices that are particularly complex because they require first of all recognition of the multiple dimensions in which the value of cultural heritage is expressed. The heritage asset has values of use and values that are independent of use, i.e. instrumental values. But it also possesses intrinsic (anthropocentric and non-anthropocentric values) that complement and counterbalance the former. It is necessary to recognize each other in the choices related to reuse.

The above implies multidimensional models for decision making, with a transdisciplinary approach, able to include many kinds of knowledge, from social to economical to ecological etc. in the evaluation processes needed in design/management (in public, private, social partnerships, in cooperation pacts, in landscape contracts, etc.).

This "reintegration" of the economy into ecology (Zeleny and Hufford, 1992) as well as the centrality of the ecological dimension that characterizes the New Green Deal (European Commission, 2019a) is totally coherent with the WHO approach (Lancet Countdown Report - Watts et al., 2019). It makes explicit the impacts of climate change and pollution of the city/territory system primarily on the health and then on people's perception of well-being.

The above Figure 3 focuses on pollutant and climate-altering impacts on the wellbeing/health: it assumes a human centered perspective. It refers to ex ante

conditions with respect to the transformation resulting from a functional regeneration/reuse of a site. The status quo implies a loss of competitive capacity of the city/territory system, due to diseconomies/negative external effects and climate-changing impacts. Circular economy model interpreted from an ecological perspective tries to avoid the above, improving first of all the health of the ecosystem and then that of the people.

With the project of intervention and circular management of adaptive regeneration/reuse resulting from the above assumptions, many other negative impacts and therefore other cost items (including economic and social as well as environmental) can be reduced, taking the form of benefits.

3. Which notion of Circular Economy?

The circular economy model is an innovation in the approaches to development: it is inspired to the *wisdom* of the nature. Circular economy has a transformative/evolutionary nature and a systemic characteristic: it is grounded on promoting systemic complementarities.

It requires specific innovations in technologies. Some technologies already exist; other are to be identified through the production of new knowledge, to enhance the innovation capacity itself and also to become more adaptive in relation to a changing, dynamic, uncertain context - offering appropriate solutions.

It is configured as a hybrid model between the economy of nature and the economy of man: between economy and ecology. But also between competition and cooperation, between market economy and social economy, etc. It is attentive to conservation of existing values but also to production of new values, between tangible created values and intangible values. It requires attention to instrumental values based on the utilitarian approach (values of use and independent from direct use), but also to intrinsic values, based on a non-utilitarian approach.

It requires, in order to be implemented, a rigorous technical evaluation, but also a participatory evaluation by the users for the comparison between the pursuit of intrinsic values and instrumental values, and therefore between intrinsic values and opportunity costs for their implementation.

3.1 Towards an "integrated" notion of circular economy

Ecological economy inspires the circular economy, underlying that economy depends on the capacity to conserve the health of ecosystems.

In nature every living organism not only consumes resources/energy but in turn, being related to other living organisms, contributes to nourishing their life, providing a flow of services to them. It's characterized by an effective metabolism, made perfect during millennia, that allows to recycle every by-product, avoiding any waste.

The notion of circular economy is characterized by many existing definitions: see 114 different definitions (Kirchherr et al., 2017).

Essentially, circular economy is the economy that mimics the nature economy in its circular processes: thus it is a *re-generative economy*.

It is, in any case, a model characterized by: closure of loops, reduction of their scale/dimensions and sped of loops, also slowing the loop processes, together with minimization/elimination of waste; self-organization/self-reproduction/self-regenerative capacity (Turner, 1993; Fusco Girard and Nijkamp, 1997; Zeleny, 1997, 2009, 2010, 2012; Costanza *et al.*, 2014). It is a co-evolutive model (Kallis and Norgaard, 2010).

More in particular some characteristics have to be here underlined:

1. It is the economy attentive not only to short, but to medium and long time, putting attention to maintenance, repair, refurbish, recover, recycle, regenerate materials, resources and goods to prolong the life circle through new use values, which adapt to new needs.
2. It de-couples the economic growth from the resource consumption and negative environmental impacts, reducing entropy (Georgescu Roegen 1971, 1976).
3. Offers a new perspective to generate values and profits, reducing production costs, natural resources consumption and greenhouse gas impacts, generating in the same time new employment.
4. It is interested to produce services to be consumed instead of good to be appropriated (through property rights), beings interested to use values more than to market values of goods.
5. It is the economy grounded on ecology and ecological values: on primary/glue values.
6. The circular economy suggests to recognize the approach to sustainability as self-sustainability. In the circular economy the notion of value is a complex and systemic one: economic, social and ecological value. Instrumental values are considered also in relation to intrinsic values Thus, the circular economy model enriches the notion of value in the perspective of a complex economic, ecologic and social value (complex Value) (Fusco Girard, 1987; Fusco Girard and Nijkamp, 1997).
7. It reduces the trade-off between economic productivity and ecological conservation (and social goals).
8. It is "attentive" to roles between state and market, between public and private: it is attentive to the civic sector (third sector). Social economy, civil economy, cooperative economy can be considered as "part" of the circular economy, being characterized by circular loops of offering, receiving and giving back.
9. It is attentive to all interdependences between economic, ecological and social dimension, so that avoiding that a solution characterized by maximization of the impacts in one dimension can generate unacceptable impacts on other dimensions.
10. It is grounded (in some experiences) on cooperation, collaboration, synergies, integration between multiple subjects and activities: on transforming differences and heterogeneity into synergies. Circular economy can be thus interpreted as a *"relationships economy"*. It is based and it requires an economy of multidimensional relationships, in which economic values co-exist and co-evolve with eco-

logical values and with social ones. Examples of relationships are the ones between different complementary enterprises in the industrial symbiosis, between industries and the city (with the exchange of specific waste with hot water /air); between the city and its territory (with the exchange of food and nutrients etc.)

11. It is attentive to avoid under-use and waste of all kinds of capital: not only of natural capital and man-made capital, but also of *human capital and social capital*. These forms of capital are important and the waste are interpreted not only in terms of natural or man-made resources, but also of human and social capital. The city often is not only characterized by a great quarry of waste or discarded elements, but also by the quarry of discarded people: unemployed, marginal / poor people etc. Circular economy should be focused to avoid also this under use/waste of the human capital: of the human beings capacity, intelligence, creativity, self-entrepreneurship. We are moving toward the time of spread innovative entrepreneurship, for facing the declining employment due to innovative technologies.
12. The concept of complementarity becomes essential in the Circular Economy. 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 CE. The essential aspect of the circular economy is the successful search of the systemic complementarity: between different functions/activities/subjects on the basis of reciprocal exchanges of benefits (the use of by-products that become productive inputs for other activities.). Thus, in the Circular Economy approach, single elements should be transformed into «components of a system». The more is the heterogeneity of the different components, the higher probably is 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 many practices of circular economy it is possible to recognize that 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: each partner receives net benefits in a reciprocal process which multiply produced values, and which could not be achieved alone, that is without cooperation.

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

The experiences of circular economy in industrial symbiosis/ecological industry etc. are characterized by the capacity to produce an economic/financial profit, but also an environmental profit and a social/cultural profit. New employment was created and also a new cooperative culture was promoted.

This interpretation of the Circular economy moves towards combining the ecological paradigm with the humanistic paradigm, integrating in this model also the contribution of the cooperative economy, social economy, Well-being economy (OECD, 2019) etc. The not-profit sector is growing all over the world. Thus the conversion of current economy should be implemented not only integrating the

economy into the ecology, but also clearly integrating the human dimension enlarged to next generations.

Circular economy is based but also "offers" a new culture, a new way of thinking, a mindset which differs from the narrow economic conventional one, because it is not based on utility maximization research but on identification of multidimensional satisfying solutions: it is characterized by a *relational rationality*, by identifying effective solutions through cooperation, agreement, pacts, partnerships.

It can also offer a regenerative culture, a culture of cooperation, against fragmentation and atomization, grounded on the reciprocal trust. For example, managing the heritage assets as common: offering a civic culture grounded on a relational dimension.

In this general context, the circular reuse approach moves towards a specific direction: "Towards an ecological and humanistic conversion of the current city development: that is towards the circular city implemented through the cultural heritage regeneration".

4. The ecological paradigm: the economic values grounded on the "intrinsic" values of natural ecosystems

4.1 The circular economy and the notion of "complex value"

The Green New Deal suggests to recover the notion of values enlightened in Ecological Economics, and in particular the notion of "primary" or "glue" value. It can play a specific role in the circular economy model achievement.

Natural ecosystems have "intrinsic" and instrumental values (economic value). They are due to the fact that the nature produces services to the industry, tourism sector, forestry, leisure, food industry, fishing, pharmaceuticals, chemistry, etc. The eco-systems services approach can enlighten the above (De Groot *et al*., 2012; National Ecosystem Assessment, 2005).

The Circular Economy is attentive to instrumental *values* together with *"intrinsic" values*. The circular economy is careful to not damage/compromise this systemic or "glue" value (Turner, 1993; De Groot *et al*., 2012, Ehrlich and Roughgarden, 1987), which reflects their functioning in the ecosystems.

Also the "intrinsic value" should be included in choices regarding the circular adaptive re-use: to understand the way in which the essential value can be conserved and valorized.

4.2 The autopoietic characteristic of the eco-bio-systems: intrinsic versus instrumental values

A *complex notion of value* is suggested in ecological economics (Costanza *et al.*, 1997): a complex of economic, social and environmental values. It combines *value in itself* (which is the value independent from use) with use values. In particular introduction of the notion of "intrinsic value" is suggested in implementing the

circular model. The adjective "intrinsic" does not matter with objectivity, quantitative, numerical assessment of a resource. It does not concern to opposite subjective /perceptive to objective evaluations or to share consensus. In this perspective, subjective is linked to ordinal assessment by people and objective is linked to expert knowledge, to the numerical assessment of experts.

The notion of intrinsic value is linked to *bio-eco systems behaviours*: to their self-regenerative capacity, and their capacity to move towards a specific "telos" for its development, thus sustaining the life of other subjects through specific services.

A bio-ecological system has a value in itself that reflects its auto-poietic, self-production and self-organization capacity (Faber *et al.*, 1995; Turner, 1993; de Groot *et al.*, 2012; Ehrlich and Roughgarden, 1987).

They 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.

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 hetero-poietic aspect is linked to the use values recognized by the human beings.

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

4.3 Intrinsic values

This intrinsic value reflects the essential structure - capacity 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 resilience.

Turner (1992) stressed the need to recognize a "primary value" to the autopoietic system (and therefore to the biotic and abiotic components linked by interdependent relationships) in terms of "glue" capacity: to the capacity to take together, to unite different elements and components in a set of dynamic reciprocal interdependencies.

This "primary value" is the condition for the system to provide useful functions and services to human beings. It is the value of the latent functions, underlying those generally observed, expressing the value of the entire system, which produces flown of services also to others.

This intrinsic value is the ground of use values and market values. There can exist intrinsic values without instrumental values. But if intrinsic value dissolves, economic values can collapse (Turner, 1992).

5. The human-centered paradigm and the city development

5.1 The human centered approach

The Human centered approach[3] is the approach that needs to be promoted in order to face the current growing social crisis that also affects future generations.

It is based on the promotion of the full capabilities of the human being (Anand and Sen, 1994), repositioned as the very purpose of development and economic relations, and not as a means, such as in the current interpretation of economic growth. 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 as such in many different cultures: that is, as a value in and for itself. As an "intrinsic" value.

Indeed, the value of the dignity of the human being represents the center of the humanistic paradigm.

According to Emmanuel Kant (1784) an intrinsic value, that is an "inner value", that is a value in itself and for itself, characterizes all human beings. It is already connected in its vision to the dignity of the human person, which must be absolutely respected.

The ecological approach and the humanistic approach have a common element: the recognition of the "intrinsic values" to natural ecosystems and to the human person.

From the above comes the necessity to avoid any reductionism, any one-dimensional vision and any individualistic/egoistic interpretation, but enhancing the relational dimension, improving the perception of the health/wellbeing/happiness of the human being, in its different dimensions.

This 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.

5.2 The humanistic approach based on the construction/regeneration of relationships

The human centered paradigm is linked to culture, and thus on *cultural challenge*. They are strictly interdependent.

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[3] Many documents of EU put the attention on the human challenge. For example, in the Action Plan for the Circular Economy is evoked the Social Economy (§5), on the base of Madrid Declaration (25/5/2017). The social economy includes Cooperatives, Associations, Social Enterprises, Ethical Banks, Foundations which concur to an inclusive economy, grounded in the society. Another EU Document is the European Pillar of Social Rights, evoked also in the European Green Deal (11/12/2019, at § 2.1) and the New Industrial Strategy for Europe (10/3/2020) which assumes the social rights for orienting the required transition. In a Report commissioned by EU (European Commission, 2019b) the human centered approach is strongly stressed.

The relational/community values for the construction of a human centered future are the values that generate an "attractive force field" and thus contribute to social cohesion. 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, attention/care for the environment, justice, social equity, intergenerational justice.

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

People and culture are at the center of the humanization paradigm.

Culture shapes the world vision, reality interpretation and behaviors in relation to nature and to other subjects.

Human centered development assumes the key role of tangible, material, economic values together with intangible, qualitative, immaterial values, such as trust and cooperation as engine of synergies and thus of development.

The humanization paradigm requires the promotion of a "new economy" for the production and distribution of wealth.

Also the form of solidaristic, social, cooperative economy are examples of interesting new perspectives.

The circular economy as the economy of co-evolution (Kallis and Norgaard, 2010) and of relationships offers interesting directions. It reflects an image of the human being which is not based on the conventional/traditional *homo aeconomicus*, but it recognizes also other dimensions: the *homo oecologicus*, the *homo socialis*, *homo reciprocans*, *homo politicus*: of the human being in relation to others and to the Hearth, putting in relation the *homo economicus*, *homo socialis*, *homo oecologicus* (Costanza,1992).

5.3 A particular component of the human centered city development strategy: the human scale

The humanization project for the *human scale* in urban development is represented also by the regeneration of the physical spatial structure of the city: by access to adequate housing, health services, clean air etc.

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

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

"Places" become central "poles" in the human centered city strategy: the human scale of the city is implemented through a multi-polar production of "plac-

es", as spaces in which a particular set of values/meanings are concentrated and recognized.

A well-known example of places are squares. They reflect the 'spirit' of cities.

Historic "squares" (the "piazza" as the heart of European cities) are the central public spaces unique in European cities which can be identified as the places of the human beings in the relational perspective, characterized by a specific beauty. Beauty opens to no-conflictual behaviours, to dialogue, to collaboration. Here the I (self) becomes integrated with the US, through the social exchange/encounter (Franklin and Kourtit, 2014)

The "square" is the unique expression of the European 'relational space': the best expression of the European 'relational space'. It is the expression of public/private interests balance. Here the implementation of human rights in a relational dimension is realized. The 'square' is the place of mixed functions: commercial (the market), civil (the Public palace), cultural (the library, the school, 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 from which regeneration can start, for re-building the sense and the meaning of 'being together' in a community.

The challenge today is to transform 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 centers and historic squares as the entry point to implementing the «human scale» of urban development. Beauty of these places "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 (Nijkamp and Voogd, 1990).

5.4 Towards the human dimension of the economy

The human-centered city development project requires an economy different from the capitalist one (founded on a maximization of profit, that produces social inequalities and is hostile to the natural ecosystem) to guarantee the human well-being-health and happiness.

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" with a "regenerative economy" (Raworth, 2017). This regenerative economy is able to regenerate the enterprise, but also to reduce ecological and social poverty.

It is increasing the search of a "sustainable capitalism" able to ensure economic/financial flows but also to regenerate the natural ecosystems and to improve the quality of life of all people. Efforts are multiplying to assess the environmental impacts also in the medium-long term, so that they can be operationally integrated

into decision-making processes, considering also the human health impacts, the bio-diversity impacts on human wellbeing etc. Many companies are already experimenting the inclusion of these impacts (on environment, on society) in their choices.

The human economy is based and requires an economy of relationships, in which economic values co-exist and co-evolve with ecological values and with social ones…. reducing the tradeoff between efficiency/profit and ecological protection, but also the trade-off between efficiency/profit and social promotion can be reduced, shifting from a "or……or" approach towards an "and….and…" approach (Zeleny, 1998; 2005a; 2005b; 2009).

The human-centered city development approach re-shapes the city project towards a project that unites, generating and multiplying relationships and bonds, in the space and in the time: between human beings, between people of this and of future generation, but also between people and nature (the Mother Earth).

The human centered approach underlines the importance to guarantee the human health conditions and its priority in relation to other objectives achievement.

This unifying perspective of the "human flourishing" (Hannis, 2015) allows to develop the human being creative capacity, as the main goal of city development.

The human centered city development needs a key role of the local community, in terms of active citizenship, pro-active participation, self-organization capacity.

Hannis (2015) proposed the human flourishing as the approach able to reconnect and to regenerate the relationships between men and nature. Weak and post-anthropocentrism are proposed to better conserve nature. But a new enlightened humanistic and non-anthropocentric vision is needed today.

This interpretation is strictly linked to the capacity to orient all innovative technologies (IoT, AI, robotization, sensors, screens, new bio-materials.) not towards surveillance and control but towards goals that reflect the human dignity.

5.5 A particular aspect of the humanization of the city: the human scale of economy

The humanization paradigm requires the promotion of a "new economy".

"Reimagining capitalism is an imperative. We need to create a more inclusive and sustainable for of capitalism, that works for every person and the planet […]. 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 physic capital, but also for human, social and natural capital" (Serafeim et al, 2020).

There is a strong interdependence between economy and culture.

Since the economic organization of the capitalist model of production and distribution of wealth is founded and in turn generates individualistic values, promoting a particular way of thinking, feeling and acting, that is, a particular culture, it is necessary to identify new economic models that respect a balance be-

tween intrinsic values and instrumental (economic) values, between particular values and community/social/environmental values.

The mainstream economics has introduced a vision of the *homo aeconomicus*, that is to say, of man in a single dimension, which is now contested by many parties (Syll, 2016).

In a new Report of EU, the mainstream economy is defined as "devouring natural resources, socially divisive and hostile from an environmental point of view" (European Commission, 2019b).

It is therefore necessary to seek and promote a *new economy* for the production and distribution of wealth.

This need combines itself with the new trend toward de-globalization-relocalization, with the renaissance of the local economies (Zeleny,2010,2012).

Also the form of solidaristic, social, cooperative economy are examples of interesting new perspectives.

The circular economy as the economy of co-evolution (Kallis and Norgaard, 2010) and of relationships offers interesting directions, because it reflects an image of the human being which is not based on the conventional/traditional *homo aeconomicus*, but it recognizes also other dimensions: of the human being in relation to others and to the Hearth.

Relationality also means systemic vision, attentive to interdependencies between economic, social and environmental dimension), to relational rationality that goes beyond the linear/instrumental rationality of the positivistic approach, also incorporating intuition and emotions, regenerating unity starting from plurality.

The third sector, between state and market (Associations, voluntary organizations etc.), is the bearer of relational values and plays an increasingly important role in the search for the human scale of the economy.

6. The circular human- centred adaptive re-use of cultural heritage

6.1 Toward a de-carbonized economy

The circular human - centered adaptive re-use of the heritage asset is proposed here to *transform dead assets into living systems, to be managed as living organism,* able to continuously adapt themselves to changing contexts and to external conditions.

Combining the characteristics examined in the above paragraphs it moves towards the re-generation of the different forms of capital: not only man-made and natural capitals, but also human and social capitals. The *circular re-use* - through the choice of appropriate multiple functions/uses and the continuous re-integration, repair, maintenance, refurbishment, recycle actions and management grounded on synergies and systemic complementarities - is able to contribute in promoting the evolution and the resilience of the site as long as possible in the time.

The *circular re-use* is ecologically regenerative: a re-use that contributes first of all to implement the transition towards a de-carbonized local economy; towards

an ecological economy, thus facing the more important issue of our time, that is the climate change. Circular adaptive re-use of the heritage asset becomes an important entry point and a way to face the warming of temperature/climate[4].

Circular re-use is organized assuming the natural system functioning through circular processes as its perspective. Thus, as already underlined, it minimizes waste and negative environmental impacts and ecological footprint; reuses/recycles waste are transformed into resources (for example as fertilizer, etc.). Circular reuse extracts most of its resources, materials, energy from the (surrounding) territory; it re-uses existing natural materials, meteoric and gray water; it uses as far as possible renewable energy, thus reducing the conventional energy consumption and carbon emissions, and exchanging with the context the surplus of energy. It valorizes the natural lighting and ventilation. It promotes the use of green surfaces (walls, vertical gardens, roofs, urban areas for agriculture, urban forests etc.) for contributing to local micro-climate, together with water management. It recovers the heat coming from specific activities, avoiding the loss in the atmosphere (See § 1).

In this way it contributes to transform the linear metabolism of a site, settlement, asset into a circular one, imitating the wisdom of nature and thus it contributes to conserve /regenerate the ecosystems services on which the human activities and the wellbeing of people depend.

The health of natural ecosystem guarantees the quality of the landscape, together with the health and wellbeing of people, through the improvement of air quality, of micro-climate etc.

This is the first important contribution of the circular adaptive re-use to the human scale of development.

6.2 Toward new employment

Circular *human centered* reuse integrates these characteristics/performances with other ones, linked to social and cultural dimension.

The circular re-use is the re-use able to regenerate the financial resource for functioning during the time. Thus, the circular reuse is able to generate economic impacts in terms of attractiveness of new activities localization, new specialized skills, new revenues etc., generating also new direct, indirect, induced jobs.

The capacity to generate employment is a key characteristic and a second contribution of the *circular human centered* reuse of cultural place-led assets, coming from closing the loops.

On its turn, some of above externalities come back to heritage, contributing to sustaining it and producing new works.

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[4] IPCC considers that the climate crisis is accelerating faster than expected generating chains reactions which can create damages to ecosystems, society and economy. Also the NASA Laboratory, the WHO, the Lancet-Countdown etc. are monitoring through specific indicators the growing sped of climate change all over the world, with their impacts on health, wellbeing.

Work represents the instrument through which a subject enters into a relationship with society and the world. Work is the bridge between Us and I, between the self and the Others. From work comes the recognition of the dignity of the human person.

Certainly, the construction sector continues to be characterized by a high capacity for employment . In particular, the recovery of the existing building heritage is able to ensure the greatest capacity for employment. But it is a short-term job and must be integrated with induced work and with management.

Being the work a critical element/condition for the human centered strategy, the re-use of the heritage contributes to employment in particular if the new functions are oriented towards innovative and creative activities and industries, stimulating private and social entrepreneurship and self-entrepreneurship[5].

6.3 Toward a new local community

As already just underlined, the local *community generation* is another (but hidden) key characteristic of the circular and of the human scale city regeneration.

This characteristic reflects and nourish the social capital. Cooperation becomes the secret engine of adaptive reuse practices, because it multiplies synergies, and thus the social capital.

The circular human centered re-use is characterized by the capacity to generate a local "*heritage community*", which on its turn, takes care of the heritage, in a virtuous circular process. People should perceive an emotional sense of connection with a place, a sense of belonging /attachment to a specific area creating a "meaning relationship".

In conclusion, the circular reuse of the cultural heritage should be interpreted and managed in ecological terms, in the perspective of the Green New Deal of European Union and the climate challenge. But also as a way to be connected with the perspective of a new localized economy and also to improve the immaterial social connective infrastructure of the city, generating micro-communities through the management itself of the heritage as a common, characterized by a specific value, (an "intrinsic value", that reflects the value that has been connoting over centuries and millennia). A living heritage reflects the existence of a living voluntary community, which identifies the rules to conserve, valorize and manage the common resources. In this way, the re-use becomes able to stimulate co-operation, co-fruition/ inclusion, multiplying relationships.

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[5] For the first time in human history, it is not clear today which sector will guarantee work in the future. In the course of human history, in fact, employment has "slipped" from agriculture to industry (with the industrial revolution), and then from industry to services (with the post-industrial era). But in the age of robotization, of the ego, it is not very clear which sector can absorb work in the future. It is necessary to promote functions that can stimulate self-entrepreneurship, do it by yourself and so on (Zeleny, 2005).

7. The three principles for the circular re-generation of cultural assets for implementing the city circular human centered development

7.1 Toward a de-carbonized economy

The general conditions for the success of the *circular-human centered adaptive re-use* can be summarized into the re-generative capacity, the symbiotic capacity, and the generative capacity. They determine the *transformation of a dead asset into a living system: into a "place" to be managed, in its turn, as a complex evolving organism.*

The re-generative capacity of different values is interpreted in ecology and in *ecological economy* as the auto-poietic capacity (Turner, 1993; Zeleny e Hufford, 1992; Maturana e Varela, 2001; Costanza, 1992; Costanza et al., 2014; Faber et al., 1995). It reflects the capacity to maintain the organizational structure of a system during the time: its identity and profile, characterized by a perfect circular metabolism, made more and more effective during the millennia.

The symbiotic capacity guarantees integration, adaptation and thus the durability of the re-use during the (long) time. It is linked to the material and immaterial relations between the heritage asset and the context: it guarantees the dynamic coevolution of a site with its surrounding spaces, as in the natural eco-systems, where relationships are source of life. Thus, the re-use of heritage assets in-forms, shapes, re-shapes its surrounding environment (which is in its turn re-shaped and deformed).

When relationships decay during the time, the vitality itself is compromised. As in nature, symbiosis guarantees resilience and co-evolution. It requires and stimulates complementarity and thus integrations, inter-actions and co-operations.

This re-generative and symbiotic capacity generates also the capacity to produce multiple values: the generative capacity.

The generative capacity depends on the self-generative system to sustain also other subjects or components.

A simple example in nature is the tree, (or woods) which through its circular processes is able to sequester CO2 and particulate, producing O2, fruits, fiber, shadow for people etc. It depends also on the symbiotic capacity.

Generative capacity is the multidimensional utility which an eco-l system "offers" to its context, multiplying its relationships. Positive externalities are the outcome of this generative capacity. For example, through the adaptive re-use, emission of greenhouse gas can be reduced in coherence with the priority of this goal recognized by European Union. Also the soil consumption is avoided, while the production of material waste is reduced etc.

But another important impact can be generated, linked to employment and to community generation, through the heritage ecosystem.

The *heritage ecosystem* should be the outcome of the reuse of cultural assets, in which common spaces for sharing experiences, ideas, knowledge are proposed, also for testing new solutions, thus attracting new skills, researchers, entrepreneurs, investments: *The Hub of heritage-led circular regeneration* should be the

reference general image. The reused asset is organized and managed as a living eco-system, thus becoming able to re-organize itself, in relation with the changing conditions of the context. The realization of this Heritage ecosystem also as a platform that facilitates the meeting between supply and demand, allows processes of continuous regeneration, generation and symbiotic exchange in the context. Material and immaterial infrastructures determine the accessibility/connections of the heritage to its comprehensive environment.

That is, it allows to consider the adaptive reuse more and more in the ecological perspective that characterizes every living organism.

7.2 *The autopoietic, symbiotic and generative capacity*

In the above perspective, the *circular human-centered reuse of heritage assets* becomes a multiplier of multidimensional values, in analogy/imitation of natural systems, where every living organism not only consumes resources/energy for its life and development, but in turn, being related to other living organisms, contributes to nourishing their life, providing a flow of services. The circular reuse and all its ecological impacts become re-shaped and grounded in human /social dimension and on culture.

Figure 4. The tripod model.

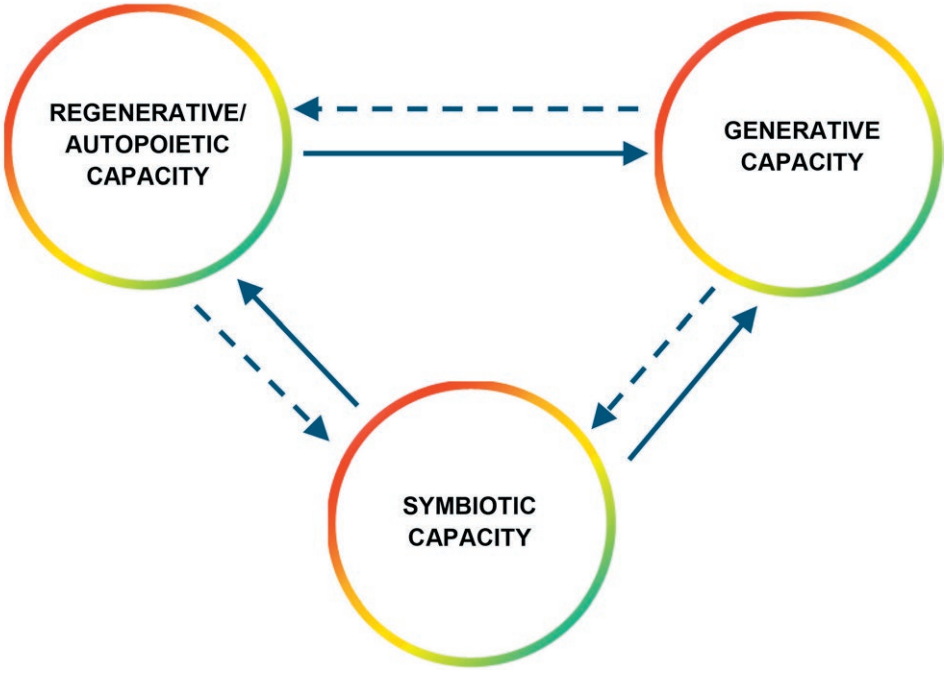
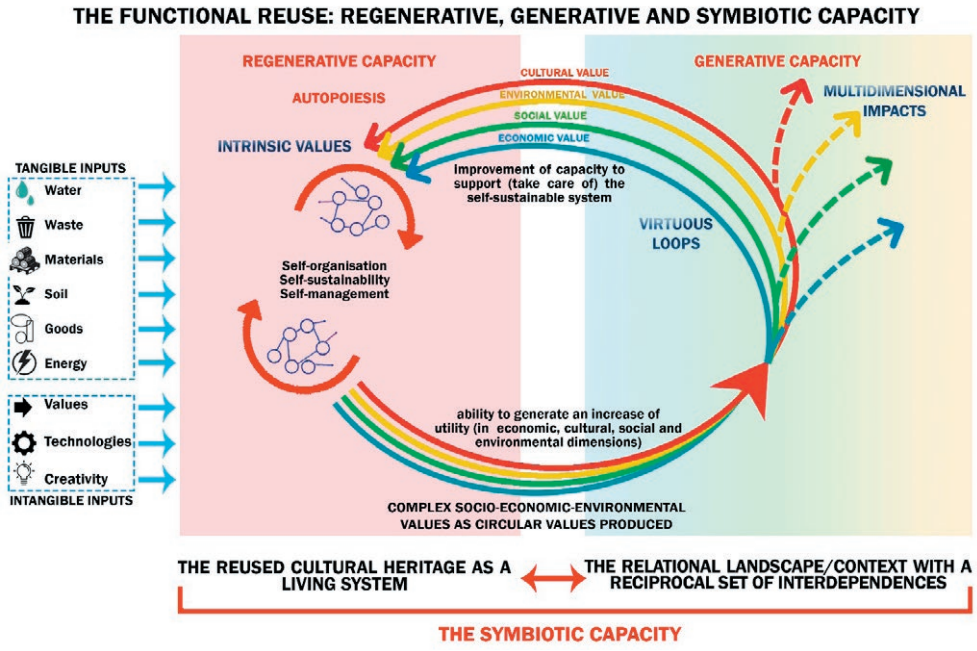


Figure 5: The analytic tripod model.



In conclusion, in the *human centered Circular-reuse*, each activity becoming integrated into a systemic perspective with other activities, (as already underlined through the symbiotic principle) should transform the site into a living system, which contributes to human flourishing.

Best practices of circular centered reuse are the ones in which these general principles are implemented at a high level.

More in particular, the above diagram in Figure 4 can be re-shaped as in the diagram in Figure 5.

The diagram in Figure 5 distinguishes intrinsic values (in the self-organization, in the right side) and multidimensional generated impacts (in the left side), some of which can come back to the ecosystem for reinforcing it, through virtuous circular loops.

This diagram underlines the ecosystem organization of the heritage asset, with externalities and the relevance of symbiotic processes in the comprehensive ecosystem and out the ecosystem (the externalities on the landscape etc.). It suggests that 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 an historic industrial site, residential and commercial functions are justified if they support social, cultural, civic ones, coherent with the intrinsic value of the asset.

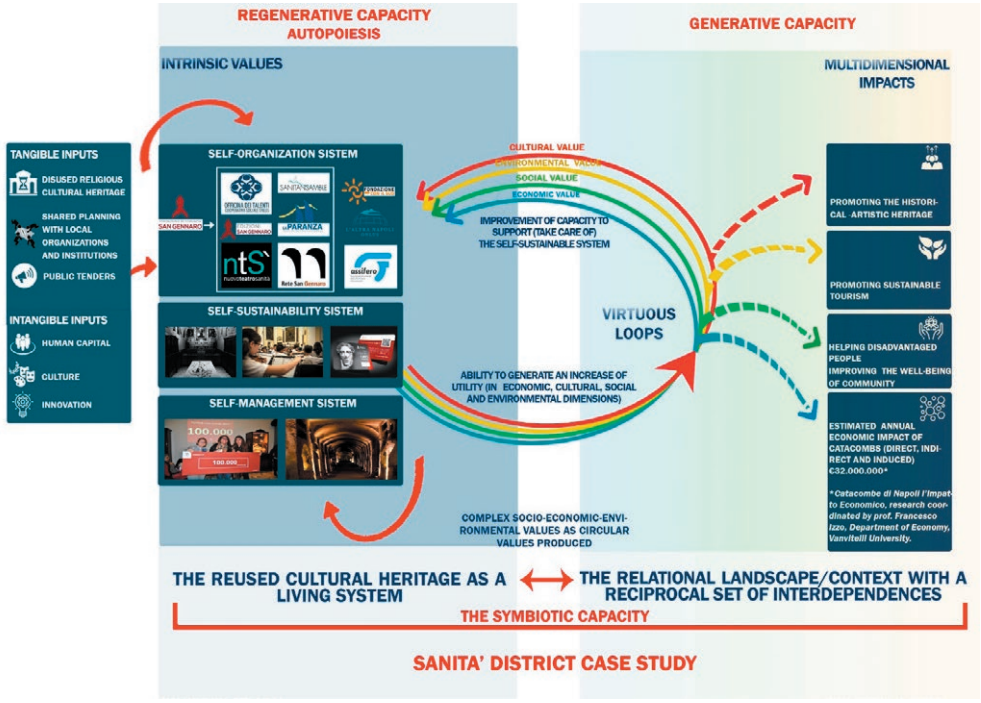
The diagram distinguishes between linear impacts and nonlinear impacts, characterized by feedback loops, reciprocal integration, systemic interdependences

which can transform virtuous processes into vicious ones, starting from a specific threshold.

Among these, for example, it is necessary to consider also the intangible/intrinsic/ecosystemic values (the spirit of places, the sense of belonging, of attachment of a community to a certain space, etc., (which are reflected in the notion of "complex social value") and which determine the "attractiveness" of a space. The evaluation of the attractiveness (as well as of adaptive capacity) of a site with respect to external investments, new functions, visitors, etc. and the evaluation of the "repulsive capacity" of a site in conditions of degradation, unused, decaying, etc., represents concrete questions in terms of evaluation. They find a solution with participatory evaluation procedures, also based on dashboards and visual models/versions.

The diagram in Figure 6 shows a concrete example of heritage asset reuse in the Sanità District, in Naples (Giammetti, 2019). The self-organizing system is the archeological site of Catacombe San Gennaro. It is managed so that it can generate a flow of tangible and intangible services in the District, in terms of financial revenues, new jobs, reduction of illegal behaviours, sense of pride to belong to this part of the city, help for disadvantaged people, improvement of the well-being, of the quality of the district landscape, less social and environmental costs.

Figure 6. The Sanità District in Naples and the new self-sustainable ecosystem.



"Circular human centered city" regards also the territory and the rural areas. In inner areas a specific "place based" resource is the cultural and natural heritage. They can become also very important connective infrastructure of our society against the grooving fragmentation /atomization of our society.

For the cultural and natural heritage *circular* reuse in areas localized out of the city, in the countryside, in marginal and inner areas it is necessary first of all to organize an ecosystem: a self-sustainable/auto-poietic system, identifying and organizing the systemic complementarities.

This autopoietic system can sustain also other components/elements/subjects of the local economy through its generative capacity, in a reciprocal symbiotic relationship with the context.

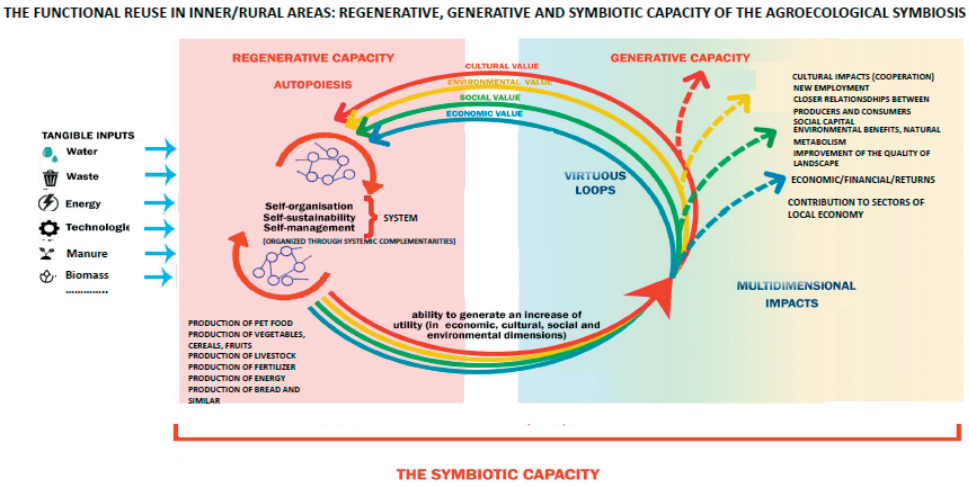
In this self-sustainable system, each component is integrated to the others in a flow of natural exchanges, implementing a circular metabolism like the nature systems' one.

The essential characteristic of this organization of the systemic complementarities (that produces a new self-sustainable system) is the integration of many different functions/activities: for example, the production of food, of food for animals, of energy, of water, of fertilizers, of livestock, of nutrients (Figure 7).

Some outcomes of this agro-ecological symbiosis are:

- economic outcomes (less costs for the energy, for fertilization…), the sale of the plus production of energy to external subjects; the capacity to contribute to the local development etc.
- social, as new jobs, closer relationships between producers and costumers, social capital etc.
- environmental, as the improvement of the quality of landscape etc.

Figure 7. The agro-ecological symbiosis.



8. Which values for the human centred circular management for transforming a dead site into a living system?

The circular economy model is implemented in cities, where is localized the economic wealth production of a region/country. Historic districts and cultural sites are the spaces considered here as the entry points for implementing the adaptive reuse.

Cultural heritage links past, present and future generations, instrumental values and intrinsic values, short time and long time. It can stimulate a local micro community if it is managed as a common good (Fusco Girard and Gravagnuolo, 2018). The adoption of the circular model helps to overcome the paradox, the contradiction: on one side, it is well known that we live in the time in which all is transitory, transient, time-finished. On the other side, we would guarantee a long/indefinite time life to our cultural heritage. But we have to recognize *all* the values involved in the choices: instrumental values and intrinsic values. They should overcome the costs of valorization/regeneration.

8.1 The complex value of the manmade/cultural heritage: towards the "intrinsic value" of the cultural heritage/landscape

Can we recognize a particular re-generative capacity to heritage assets, to better organize the re-use of a site? To help not only to identify a coherent (with its history) functional reuse for certain cultural heritage/site, but above all to orient local development, both in its tangible and intangible components, thus combining the conservation of roots with a dynamic/evolutive and innovative perspective?

In the case of cultural/monumental heritage, it is not possible to consider strictly an "intrinsic value" as in the bio-ecological vitality of the natural ecosystem, that is related to the capacity to maintain its stability, its resilience over time, its autopoietic circular capacity.

But the notion of the intrinsic value can be extended - within certain limits - also to cultural/monumental resources/heritage, for which the instrumental values are able to express only some components of value (and not all values). In particular, the "intrinsic" value for cultural heritage can be justified considering specific argumentations, also if the cultural assets have not the bio-ecological vitality in the strict sense.

8.2 The intrinsic value in history

Historically, the intrinsic value of the cultural heritage can be traced back to the sense/meaning that the culture of sacred/religious places in particular recognizes to certain sites (architectural artifacts can also be localized).

For example, the Hindu religion is associated with a spirit of places that "lives" in nature, and which represents the foundation of its intrinsic value. (Framarin, 2012).

In Buddhism there is a reference to the intrinsic value of nature (James, 2003).

In Taoism it is recognized that the economy of man is but one aspect of the more general economy of nature.

In the Shintoist tradition nature is associated with a value in and for itself (SaTO, 2017).

The notion of "intrinsic value" had been proposed by Ruskin to the artistic/cultural/monumental heritage (Ruskin, 1860). Riegl proposed a notion of "essential meaning" (Riegl, 1903).

More recently in the literature it has been (Hargrove, 2003) recognized for natural resources both a non-anthropocentric intrinsic value (i.e. a value that a natural resource possesses independently from the evaluation of an evaluating subject) and an anthropocentric intrinsic value, identified by man/community.

The "intrinsic value" is linked to the memory, to the individual and collective memory, and also to emotions. Reflecting the specific, unique, irreproducible character and meanings/significance/identity and beauty of a place, it determines a sense of "connection" between a place and a subject, and often also between different subjects and between the community. There is a "circular" relationship among them: a "circular value".

The intrinsic value referred to the cultural heritage comes from an evolutionary process over a long period of time, similar to what happens in ecosystems: it refers to what has been preserved as a permanence in the continuous dynamics of the city / territory as the result of the recognition of a specific value (over a long time) by the people (Fusco Girard and Vecco, 2020).

Heritage assets are *order structures* for the city development, which were able in history to orient the city growth towards a specific direction.

But this is an intrinsic value that differs from that of natural ecosystems because it has been produced/created/recognized by people over a (very long) history.

In a certain sense we can speak of "subjective" intrinsic value (Callicott, 1985; Elliot, 1992) and not objective, because it is a value recognized or created by certain subjects through their perception and their capacity for critical perception/interpretation. So, it does not exist in itself, that is, independently of the subjects who have recognized it as such, because of its uniqueness, specificity, irreproducibility, beauty, meaning (even spiritual).

Well, this subjective intrinsic value does not require a bio-centric or eco-centric vision/approach. It remains anchored to the anthropocentric approach. Therefore, the useless dichotomy between anthropocentric values and eco-bio-centric values can be eliminated. The intrinsic value is compatible with a relational approach (i.e. interpersonal) because it is recognized from the community and perhaps from one generation to other generations.

While the instrumental value is compensable in some way so that a loss does not occur in the end, the intrinsic value is not subrogable or replaceable or compensable (Callicott, 2006). From the irreproducibility that is connected to the non-substitutability and in turn to the authenticity/integrity and the exceptionality, that are recognized in particular to the artistic production, derives thus

a particular value assimilable to a value independent from use. This is a value that also future generations can recognize during future time as time-less/eternal. Certainly, values are socially constructed. They are dynamic in time and in space. But for the art heritage it can be recognized a value that tends, at limit, to be recognized during the long (or without end) time, from one generation to other generations.

Future generations are not interested to existing market values or cost values. They have the right to dispose of this cultural capital, even if at the present time it is absolutely devoid of any demand for use (that is even if the use value is currently nil). It is this "essential" value, that is independent from any use, that characterizes and differentiates this cultural manmade capital from other man-made assets, capable of generating a similar activity (economic/ financial flows, as a supermarket etc.).

8.3 The intrinsic value of the heritage asset

The "intrinsic value" can be understood/interpreted in a general sense, more directly linked to the autopoietic approach. The vitality of the heritage asset is represented by the way in which its presence and use influences the context and the its stability and resilience. In fact, they interact with the living components of the socio-economic-urban ecosystem, that is, with the past and the present community. The intrinsic value is the essential significance/capacity of an asset/space/site which was (and should be) able to remain in the urban system as a permanence in the continuous dynamic changing context: which is recognized from one generation to another one. But also had the energy to give a direction to the site development, as the telos of the living systems (Faber *et al.*, 1995).

In short, just as every organism has its own *tèlos*, that is, a fundamental purpose that characterizes it, and that orients it in a certain direction instead of another, some components of urban cultural heritage have offered a direction of development throughout history. This capacity contributes to the intrinsic value of cultural heritage. The vitality of the heritage assets depends on their ability to adapt themselves to the often tumultuous change, due to external pressures, and at the same time to maintain the permanence of some elements that characterize its specific identity.

Cultural heritage is the element in which a community can recognize itself today and in the future. They are a source of local identity, integration, cohesion, community awareness, shared common values, specificity towards a homologating culture conveyed by mass-media technologies. Cultural heritage "tells us" where we come from; it gives us a homeland without which we would be lost stateless persons; it helps us to recognize our roots, our identity. Cultural heritage is a relational element of reference, an "anchor" in a period of rapid transformation, in which the identity of a community, its memory, its genetic heritage, are expressed as well as representing the instrument with which each generation communicates with all the others.

This intrinsic value can be interpreted as the essential significance/meaning, able to conserve itself in a continuous regenerative process. In the same time, it can generate other (use) values, in a changing and dynamic context.

8.4 The intrinsic value recognized to religious heritage

For example, the role of some religious monuments, around which a specific and unrepeatable identity is built, a common feeling that cannot be confused with the social and/or environmental or economic value of touristic fruition. The "intrinsic value" is the essential meaning of heritage assets, the spiritual value which connects a site to a person, establishing circular bonds. Here we are interested to this value recognized by a community. It can represent the ground for other values, which has shaped the built asset/spaces and regenerate them together with other social, cultural, symbolic, art ones etc. This "intrinsic value" attributes to the cultural heritage its authentic vitality during the time and also its capacity to promote the accumulation of multiple relationships. The heritage assets express a *unitive capacity* for activities and persons: a complementarity and reciprocity structure, as it happens in the natural ecosystems, where there is a specific attractive capacity which involves different components. They contribute to attract people and thus to generate / re-generate a local heritage community.

In this perspective, its capacity is assonant to the intrinsic value of the natural ecosystems: they have a unitive capacity, a "glue" capacity, able to stimulate reciprocity and complementarity in the behaviours/actions.

Thus, it is possible to transfer the notion of intrinsic value from ecosystem heritage also to cultural heritage: to "places". The intrinsic value becomes the "spirit of places" (Norberg-Schulz, 1980), being connected to the permanence of tangible and intangible elements over the long time, that is able to generate an attractive field.

The set of instrumental anthropocentric and intrinsic values represents the overall systemic value of a cultural site or of historic urban landscape.

8.5 The intrinsic value recognized to religious heritage

The intrinsic value proposal seems justified because it is consistent both with the human centered paradigm and with the ecological approach.

The intrinsic value becomes a further tool/argument for its preservation in economic development plans, in urban planning projects, in urban/territorial regeneration and management strategies, because it becomes something inherent to places, to their "statute", to the landscape and as such it deserves respect, care, attention and enhancement.

In essence, recognizing to certain assets/resources an instrumental and intrinsic value, it is possible to better justify the conservation/care than using only an economic/instrumental approach, or only an historical/cultural/aesthetic one.

There may be situations in which intrinsic and instrumental values differ dramatically. For example, a very marginal ecosystem from a territorial and economic

point of view can have only an intrinsic value, but no instrumental value. And vice versa.

It may happen that the instrumental value and the intrinsic value are compared with each other. The intrinsic value can then be sacrificed compared to the instrumental value, or vice versa. This is not a technical decision, but it reflects the culture, the worldview, the priorities of a community/society. It may consider certain costs intolerable/unacceptable from a certain threshold onwards.

8.6 Circular business models in managing the heritage ecosystem as a living organism

The new business models for managing heritage assets as complex adaptive and learning system should be grounded on multidimensional values, incorporating both *instrumental and intrinsic values*, for making better choices .

It is well known that the business model serves to highlight the way in which value is created, distributed and recovered, in particular identifying:

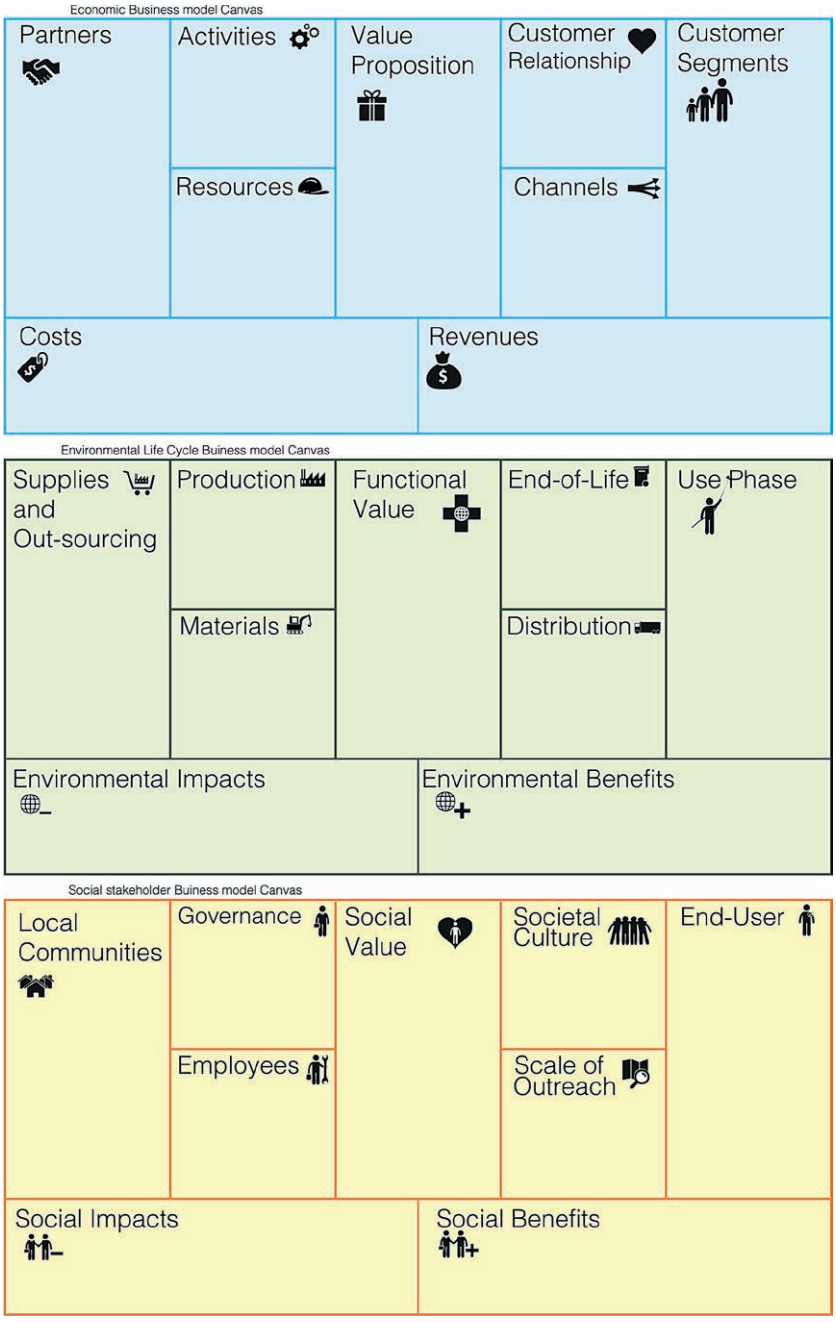
- the key partners, i.e. *with whom* to produce, through which networks
- *how* to produce (key activities-key resources, technologies)
- *which values* to create (Value proposition)
- with *which relationships* to connect production and fruition (consumer/users relationships, and thus establishing new alliances between firms, public institutions, social bodies)
- *for whom* to produce(costumers/users)
- *with which outcomes/impacts*

New business models are becoming more and more positive-nature oriented, destroying the "business as usual" approach (Ost and Saleh, 2020). They pose the key question of the role of nature in its interdependences with business. The decay of natural resources is a growing risk also for business. Nature is going to be considered as central in every decision, because it is recognized a "nature emergence" (in terms of biodiversity loss, nonlinear growing impacts etc.). New business models are required, opened to "new nature economy". Nature needs to be conserved through specific nature-based initiatives, able first of all to multiple nature surfaces. This means to become able to assess not only the financial/economic health of the firm/activities but also the profit for the society and for the natural ecosystems.

A canvas (Joyce and Pasquin, 2016) which reflects the circular model should refer to the notion of complex value, (i.e. complex social value). It considers the long term, the future generations, the impacts on environment and on society, the capacity to generate services/fruition experiences (which can remain fixed in the memory of the users, generating on their turn new demand); the health of those subjects involved; the cooperative/collaborative capacity of stakeholders; the transition towards a decarbonized economy. It should be able to assume the dematerialization of products as the future new demand (instead of the property). The digital connections should be considered absolutely strategic for the success. All tangible and intangible values, produced and lost/destroyed should be incorporated in the canvas.

Figure 8. Triple layered business model canvas (TLBMC).

Source: Joyce and Paquin, 2016



This means referring to the new canvases, for example the Triple Layered Canvas (Joyce and Pasquin, 2016). This makes explicit the socio-ecological conversion of business models, with explicit references to the creation of economic, ecological and social value, and how these values are combined/defined (Gravagnuolo and al., 2017; Fusco Girard and Gravagnuolo, 2017). This canvas stimulates a more "value oriented" approach for managers/entrepreneurs and also for a better involvement of stakeholders and users/costumers (Figure 8).

The "value of Nature" as the source of the human health/well-being (WHO, 2020) is incorporated or not in the value proposition? In which way? The intrinsic values of existing ecosystems are conserved or damaged with the introduction of new use values and transformations? The intrinsic value of cultural/natural heritage is promoted or reduced or compromised? The dignity (as the intrinsic value) of the human beings (employed, etc.) are included? The value for the community is increased or not with the new management?

The valid purpose is based on the creation of value not only economically, but also socially and ecologically. This means attention to the limits of ecological thresholds, and to intrinsic/ecosystemic values. In fact, the above attention was already present in the sustainability oriented business models (Schaltegger et al., 2016; Antikainen and Vzlkokari, 2016).

9. Conclusions

The "ideal" project of an adaptive re-use in the circular ecological and human centered perspective is an issue first of all linked to the choices of new use values, so that they can be combined to become integrated, in coherence with the intrinsic values, thus not requiring external supports. The social enterprise is particularly attentive to new environmental, social economic indicators in management. This is a management issue that requires new circular business models. All choices should be characterized by some specific elements, overcoming the narrow point of view of the traditional designer, planner, entrepreneur/manager, becoming able to transform ecological/social variables and impacts into financial/economic ones.

Probably a *cooperative management* could be the more effective entry point for implementing the circular human centered adaptive reuse.

Evaluation plays a key role if it is interpreted in a comprehensive way: as a technical and participative process, able to manage instrumental as well as intrinsic values.

Instrumental values (market, use, independent of use values) are assessed through many tools based on the willingness to pay. But they do not consider the needs of future generations and of poor people. They undervalue the resources/impacts. The evaluation of intrinsic values is complementary: it is necessary but not sufficient. They both are required in the in choices of adaptive reuse of heritage assets, in coherence with the conversion of the current economy. Multi-criteria evaluation methods are required (Gravagnuolo and al.2017).

The adaptive re-use of cultural assets (because of its multiple cross-section dimensions) is proposed here as the entry point for implementing the circular city, that is the specific spatial/territorial aspect of the circular economy. Thus, the circular re-use contributes to implement the "*city of the human being and of nature*", in which *nature is considered the most important infrastructure*: for satisfying the needs of this generation (also of marginal social groups) and of future generations. It offers also the occasion to introduce a "reset" to the relationships between people, nature and ecosystems.

In the bio-ecological perspective, the adaptive re-use is oriented towards nature-based solutions, for contributing to air quality, landscape, temperature regulation, water conservation, energy self-production, land saving, thus reducing the environmental/territorial fragility.

In the humanistic perspective the re-use is attentive to new employment: in repair, recycle, regeneration activities and new productive activities and services. This is important in the perspective of declining jobs because of new technologies. And, also, the circular re-use can contribute to reduce the cultural fragility.

It is necessary to recognize the cultural horizon of the circular economy model, and not only its specific economic, environmental, social aspects. The circular economy is grounded on the culture of cooperation, and thus on the reciprocal trust. The culture of cooperation, synergies, symbioses is the culture of reciprocal relationships: of the regeneration of interpersonal relationships, because any form of poverty, at the end, is a poverty of interpersonal or intergenerational or ecological relationships.

This culture stimulates/promotes a systemic vision, that is a unitary circular vison. It introduces in the economy a humanistic dimension. The "new economy" is a fair and human economy.

The human centered approach gives a particular attention to the cultural dimension. In particular, to the fundamental value of trust as an "attractive force to ensure social cohesion".

In conclusion, the words of Antonio Genovesi can be remembered here: "Trust binds, unites, creates a bond in the 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." (Genovesi, 1765). Trust as the foundation of the community, which confers resilience, is more than clear. But also the relationship between trust and humanity: "if there is no mutual trust there can be no humanity [...] because each one concerns the other suspicious and the enemy" (Genovesi, 1765).

The above becomes even more true when referring to material culture, to cultural heritage.

Moreover, we have to include today the bonds with the future generations in this ancient human centered perspective.

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