Marco Rossitti

Francesca Torrieri

CIRCULAR ECONOMY AS 'CATALYST' FOR RESILIENCE IN INNER AREAS

Abstract
Right from their definition, Italian inner areas seem to show their dual nature of 'fragile areas' and 'reservoirs of resilience'. Thus, effective development strategies against abandonment for these areas need to move towards both dealing with their multi-dimensional fragility and triggering their "resilience resources". The application of 'Circular Economy' principles can be crucial in achieving these aims. Indeed, it is possible to point out many convergences between the Italian Strategy for Inner Areas and Circular Economy theory. In this light, after an insight into the issues of inner areas and Circular Economy and the identification of their meeting points, the paper aims to define a conceptual model for a methodology to trigger inner areas resilience in a circular and place-based perspective. Finally, its possible implementation and integration with other decision-making support tools and the opportunity of applying it to inner areas are discussed.

Keywords: Inner areas, Abandonment, Circular Economy, Place-based, Resilience

Italian inner areas: fragile areas or 'reservoir of resilience'?
In recent years socio-economic changes have led to look at marginal areas, excluded by development dynamics, not only as a problem, but also as an opportunity: they can represent the ground to struggle and overcome next decades challenges [1]. For this reason, 'marginal territories' need to be the focus of new investments and policies. In the Italian context, the Italian Strategy for Inner Areas (SNAI)[1] perfectly fits this change of view. It aims at defining effective development strategies against abandonment for italian inner areas, which are far from being 'marginal' for Italian future[2].
The necessity of innovative development strategies is suggested by the SNAI itself, which bestows a relational nature to the notion of 'inner areas', by defining them in terms of accessibility to welfare services: this means that the attribute of 'inner area' is not an inborn feature, but is the result of previous reductionist policy decisions [2].
The dialectic between vulnerability and resilience [3], if applied to a territorial scale, is a good interpretative key for the phenomena affecting these areas. Indeed, inner areas can be considered 'fragile areas', since they are affected by several shrinking dynamics [4]. However, these areas can be seen also as 'reservoirs of resilience', since "they often keep their material culture intact and are endowed with a latent territorial capability, thus offering a potential for innovation" [5]. Indeed, the gradual process of abandonment of inner areas has resulted in their squeeze in a marginalization spiral, but, at the same time, it has allowed them to be preserved by relevant 'polluting processes' [6]. This finding of inner areas dual nature requires the definition of development strategies, moving towards both dealing with their multi-dimensional fragility and triggering their 'resilience resources'.
In this light, the paper aims at proposing a conceptual model, based on Simon's decision-making theory, as reference for the definition of a methodology to trigger inlands resilience in a local development perspective. The national and international debate on the theme of sustainable development [7-8] hints the application of circular economy principles as a crucial factor for achieving this aim. In this respect, after an insight into SNAI contents and objectives, the 'circular economy' model and its convergences with SNAI are examined. Finally, the conceptual model possible implementation and integration with other decision-making support tools and the opportunity of applying it to inner areas are discussed.

The 'new paradigm' of Circular Economy
The 'new paradigm' of circular economy has attracted a growing attention in recent years. Circular economy represents a way to sustainability, by providing multiple value-creation mechanisms that "decouples growth from resource constraints" and attempt to design out or reduce negative externalities through innovation [9].
A circular model is also 'regenerative', since it aims to produce benefit for the whole society [10]. The definition of circular economy rests on three main principles [11].

- Preserving and enhancing natural capital by controlling finite stocks and balancing renewable resource flows;
- Optimizing resource yields by circulating products, components, and materials at the highest utility;
- Fostering system effectiveness.

In 2015 the European Commission draws up an 'Action Plan for the Circular Economy', as it recognizes the transition to circular economy to be crucial for a sustainable, less wasteful, and competitive economy [12].
At the international level, the New Urban Agenda defines 16+1 strategic goals: among them, the No. 11 concerns "making human settlements inclusive, safe, resilient and sustainable" and the No. 12 introduces the circular economy approach [13]. The first strategic goals highlight the importance of considering the territorial dimension in sustainable development policies; the latter stresses the key role of the transition toward circular economy. Thus, the opportunity of integrating these two strategic goals hints a possible convergence between the 'new paradigm' and territorial policies, as the SNAI.

SNAI and Circular Economy: what possible convergences?
The SNAI aims to strengthen the economic and demographic structure of local systems in inner areas. It is implemented through two different classes of actions [14]:

- Welfare services quality/quantity adjustment;
- Local development interventions in five key-sectors: active protection of the territory and local community; natural and cultural resources enhancement and sustainable tourism; agricultural and food systems; renewable energy local chains; 'know-how' and craft.

A comparison among the Technical Document on inner areas [15], the document 'Growth within: a circular economy vision for a competitive Europe' [11], and the 'EU Action Plan' [12], points out that many SNAI actions in the eight different sectors can be conceived in a 'circular perspective'. For each SNAI 'actions category', indeed, it is possible to identify some possible actions, suggested by EU's and Ellen MacArthur Foundation's documents as effective for a transition to circular economy (Tab. 1).
Furthermore, the three documents meet in calling on innovation, as a key element towards sustainability. Right from this first analysis, the convergence between SNAI implementation and circular economy seems to be evident.
Another hint of this convergence comes from one of the main resources of Italian inlands: cultural heritage. Inner areas, indeed, are endowed with a range of cultural assets and landscapes, both expression of the historic development and the material culture of these

Tab. 1. Actions from 'EU Action Plan' and 'Growth within', divided since their compatibility with the SNAI 'action categories'.

SNAI Action categories	EU Action Plan	Growth within
Education	1. Promotion of activities towards a new awareness in natural resources management and waste	-
Healthcare	-	-
Mobility	-	1.Sharing of mobility services 2.Transition to electric vehicles 3.System integration of transport modes
Active protection of the territory and local community	1.Re-use of water resource	1.Restoration and preservation of natural capital 2. Sharing spaces to achieve flexibility and adaptability
Natural and cultural resources enhancement and sustainable tourism	-	1.Restoration and preservation of natural capital
Agricultural and food systems	1.Safe use of food waste in feedings stuff production 2.Fertilizers and nutrients re-cycle	1.Closed loops of nutrients and other materials 2.Organization of short supply chains between local farms and retailers or consumers 3.Digital supply chain to address food waste 4.Regenerative farming practices
Renewable energy local chains	1.Use of biomaterials for energy production 2. Revision of the waste management process	1. Energy generation, use and saving, by improving building efficiency
'Know-how' and craft	1.Promotion of bio-materials and 'secondary raw materials'	1. Modularity and adaptability in the building sector

places and bearers of a complex system of tangible and intangible values. The 'circular approach' has three main features: it attempts to extend the lifetime of goods; it fosters closed loops of value creation, based on the relatinonships between different actors, and it decouples economic growth from negative externalities and resource exploitation. These characteristics can be found also in the approach to cultural heritage conservation, which can be read as an application of circular economy principles [16]. With respect to cultural heritage preservation, 'circularity' becomes effective through the contrast to land consumption, the reduction of the supply of raw materials and resources, the adaptive reuse and sharing of existing assets with new 'compatible functions', which allow to enhance the assets' value; the maintenance of built heritage and landscape and energy efficiency [17-18]. Thus, the key role of cultural heritage and landscape in inner areas gives another meeting point between SNAI perspective and circular economy, as an effective means to pursuit them. Finally, this convergence from a theoretical point of view can find a practical confermation in some hands-on experiences that, in a less or more latent fashion, have developed models of socio-economic and territorial regeneration based on the circularity of processes in Italian inlands: emblematic, in this sense, can be the experience related to the creation of a training/productive district in 'Alta Irpinia' [19] and the initiatives of 'Civil Economy Organisations', which in recent years have became a quite spread realities in mountain fragile areas [20].

A 'circular' and place-based approach to local development and resilience in inner areas

The proved convergence between SNAI objectives and the transition to circular economy makes it possible to think about local development strategies for inlands, based on the 'circular' principles. The need for effective strategies calls for a 'place-based' and 'systemic' approach [21], as an essential feature of a conceptual model aimed at fostering inner areas resilience in a local development perspective. An appropriate reading key for the territorial dimension in this model is represented by the notion of cultural landscape [22], defined as a system based on the integration among material heritage, economic and social practices. This definition, indeed, seems to well fit the specific nature of Italian inlands, characterized by a strong interaction between historical urban settlements and natural environment and endowed with a rich 'intangible capital'.

The conceptual model

A conceptual model aiming at drawing out inner areas 'reservoir of resilience' must necessarily move from a clarification of what 'resilience' means. The theoretical reference, in this case, is the definition given by the Rockefeller Foundation and Arup: resilience is "the capacity of individuals, communities, institutions, businesses and systems to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience" [23]. Furthermore, seven qualities of resilient territorial systems can be defined: reflectiveness; robustness; redundancy; flexibility; resourcefulness; inclusion; integration [24].

Based on this theoretical reference, the proposed conceptual model finds its scientific foundation in Simon's decision-making model [25] (Tab. 2).

Tab. 2. Simon's model of decision making.

Decision-making model steps
INTELLIGENCE Finding, identifying, and formulating the problem or situation that calls for a decision
DESIGN Develop alternatives
CHOICE Evaluate alternatives and choose

The adaptation of Simon's model to the need for a place-based and systemic approach gives rise to a conceptual model structured around three main sections, as stages of a 'circular process' (Fig. 1):

1. Intelligence. This section is devoted to a deep understanding of the territorial context. A key role must be played by community engagement, which has proved to be fundamental for a better comprehension of cultural landscape and its peculiarities. Indeed, the focus on communities can provide with important elements for local development and for creating a new relationship of trust

between institutions, 'technicians' and communities [26]. The section must be based on a strong integration between 'technical' and 'local' knowledge: the latter can be achieved through the implementation of participatory tools, as questionnaires, meetings, workshops, and community mapping.

2. Co-design. This section is aimed at overcoming the leading approach in community-based projects, tending "to involve things that are done for communities, rather than with them" [27]. The goal can be achieved through participatory design: in this stage participatory tools can be used to collect shared ideas and priority actions towards welfare enhancement and sustainable development [28]. Co-design must be intended as dialectic between endogenous and exogenous energies, as a key-factor for innovation. Furthermore, this kind of approach can strengthen territorial resilience with refer-ence to community, by fostering their skills, resources and organizational capaci-ty and structures [29].
3. Choice. This section is based on a multi-criteria evaluation of projects through the definition of a multi-dimensional scheme. The evaluation process, indeed, can support inner areas decision-makers in selecting or prioritizing projects, according to their degree of circularization. The inclusion of the 'choice section' in the conceptual model finds it reason in the necessity to adopt a multi-disciplinary approach for local development. Furthermore, the multi-criteria approach perfectly fits the multi-dimensional nature of inner areas fragility and, thus, of effective development strategies. In this light, the evaluation is based on four different dimensions, corresponding to the three traditional pillars of sustainable development (social, economic, envi-ronmental) and to a fourth one (cultural), which is gaining prominence in the debate on sustainability [30]. For each dimension, the contact with the territorial scope will provide a set of indicators, aiming at expressing the fulfilment of 'circular' principles. In addition, the aim of triggering resilience will be considered by linking each indicator to one or more resilience qualities, proposed by Rockefeller Foundation and Arup (Fig02).

Conclusions

The paper proposes a 'circular' model, aimed at triggering inner area their resilience in a local development perspective against abandonment. The proposed model meets the requirements of a 'place-based' and 'circular and systemic' approach: the 'place based' approach is encouraged by community engagement and innovation contributions; the 'circular and systemic' approach is guaranteed by knowledge integration, co-design, and the multi-dimensional scheme for projects evaluation.

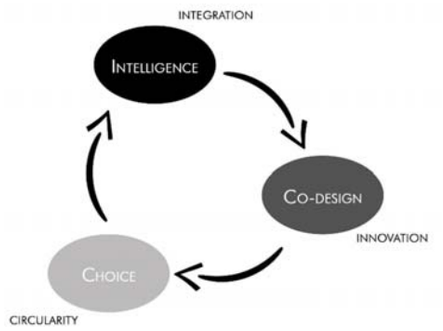

Fig. 1. The conceptual model (source: authors' elaboration).

Fig. 2. Multi-dimensional evaluation scheme (source: authors' elaboration).

Indeed, The multi-criteria evaluation, based on heterogeneous values of indicators, referred to the four different dimensions of sustainability, can provide a comprehensive as-sessment of the degree of 'circularization' of local development projects [31]: in particular, the multi-criteria tool, on the basis of the set of weights of indicators and the set of scores of each projects proposal, can support Decision Makers (DMs) in prioritizing or selecting effective local projects towards resilience. Moreover, the interaction with stakeholders, expression of the local community's different inter-ests, can be included even in this phase, through the definition of weights or the implementation of equity analysis, which allows to understand communities' prefer-ences and to investigate possible alliances or conflict among stakeholders [32].

The conceptual model can be applied to the definition of effective local development strategies for inlands, starting from the comprehension of their territorial potentialities. In the light of inner areas peculiarities, the model implementation must be shaped with reference to them: thus, participatory tools must consider community's maturity and response to its involvement and co-design activities must stem from an innovative and creative interpretation of territorial capital. As concern the criteria making up the evaluation scheme, they must be defined starting from a literature review, aimed at identifyfing the most effective for evaluating territorial strategies, according to the different dimension of sustainability. Secondly, they must be selected according to the 'circular' perspective and the territorial specificities. Finally, the proposed model is suitable to be integrated with others decision-making support tools. In this respect, the use of the notion of 'cultural landscape', as reading key for inner areas, suggests the opportunity for an integration with the ICOMOS Heritage Impact Assessment (HIA) [33]. Indeed, the HIA Guidance provides a framework for the assessment of the impacts of territorial transformation on the cultural values of properties: thus, the inclusion of this assessment in the process allows to select projects proposals aiming both at fostering development and preserving or enhancing cultural heritage value. Another hint of possible integration comes from considering resilience, not as an attribute of territorial systems, but as an approach to the theme of cultural landscape [34]. In this light, by linking each indicator for the evaluation with one of the seven pre-mentioned resilience qualities, it became possible to integrate the conceptual model with the one proposed for the Historic Urban Landscape (HUL) of Torre Annunziata [35]: this tool, indeed, defines values expressing Torre Annunziata HUL performance for each resilience quality. If applied to Italian inner areas, indeed, this tool can allow to understand their 'resilience endowment' with reference to each resilience quality and to select projects geared towards enhancing one or more of these qualities: this latter aim can be pursued by giving a greater weight, in the multi-criteria evalu-ation, to those indicators linked to the territorial resilience qualities, that DMs aspire to enhancing.

REFERENCES

[1] A. De Rossi, "Introduzione. L'inversione dello sguardo. Per una nuova rappresentazione territoriale del paese Italia", in A. De Rossi (Eds.), *Riabitare l'Italia. Le aree interne tra abbandoni e riconquiste*. Roma: Donzelli Editore, 2018, pp. 3-17.

[2] C. Calvaresi, "Le aree interne. Un problema di policy", In *Territorio*, 74 (3), 2015, pp. 87-90. Doi: 10.3280/TR2015-074015

[3] F. Miller et al., "Resilience and vulnerability: complementary or conflicting concepts?", in *Ecology and Society*, 15 (3), 2010. Doi: https://doi.org/10.5751/ES-03378-150311.

[4] A. Lanzani, F. Curci, "Le Italie in contrazione, tra crisi e opportunità", in A. De Rossi (Eds.), *Riabitare l'Italia. Le aree interne tra abbandoni e riconquiste*. Roma: Donzelli Editore, 2018, pp. 79-107.

[5] K. Fabbricatti, M. Petroni, V. Tenore, "Riattivazione di paesi abbandonati e in via di abbandono: Il Borgo di Carbonara nel Comune di Aquilonia (AV)", in *Scienze del Territorio*, (4), 2016, pp. 180-186. Doi: 10.13128/Scienze_Territorio-19404

[6] F. Corrado, "Tornare ad abitare le terre alte: Nuovi progetti di territorio e forme alternative di sviluppo", in *Territorio*, 74 (3), 2015, pp. 128-133. Doi: 10.3280/TR2015-074022

[7] A. Berg et al., *Circular Economy for Sustainable Development. Report od the Finnish Environment Institute,* 26, 2018. https://helda.helsinki.fi/bitstream/handle/10138/251516/SYKEre_26_2018.pdf

[8] F. Di Maria, "Circular Economy in Italy", in S.K. Gosh (Ed.), *Circular economy: Global Perspective*, 2019, pp. 201-221.

[9] Ellen MacArthur Foundation, *Towards the circular economy. Accelerating the scale-up across global supply chains*, 2014. www.ellenmacarthurfoundation.org

[10] A. Wijkman, K. Skånberg, "The Circular Economy and Benefits for Society: Jobs and Climate Clear Winners in an Economy Based on Renewable Energy and Resource Efficiency", in *The Club of Rome*, 59, 2015. www.clubofrome.org
[11] Ellen MacArthur Foundation, *Growth within: A circular economy vision for a competitive Europe*, 2015. www.ellenmacarthurfoundation.org
[12] European Commission, *Closing the loop – An EU action plan for the circular economy*, 2015. www.eur-lex.europa.eu
[13] United Nations, *New Urban Agenda*, 2017. www.habitat3.org/
[14] S. Lucatelli, "La strategia nazionale, il riconoscimento delle aree interne" in *Territorio*, 74 (3), 2015, pp. 80-86. Doi: 10.3280/TR2015-074014
[15] DPS, *Strategia nazionale per le Aree Interne: definizione, obiettivi, strumenti e governance. Documento tecnico allegato alla bozza di Accordo di Partenariato trasmessa alle CE il 9 dicembre 2013*,http://territori.formez.it/content/strategia-nazionale-aree-interne-definizione-obiettivi-strumenti-e-governance
[16] L. Fusco Girard, A. Gravagnuolo, "Circular Economy and Cultural Heritage/Landscape Regeneration. Circular Business, Financing and Governance Model for a Competitive Europe", in *Bollettino del Centro Calza Bini*, 17 (1), 2017, pp. 35-52. Doi: https://doi.org/10.6092/2284-4732/5472
[17] M. Bottero, C. D'Alpaos, A. Oppio, "Ranking of Adaptive Reuse Strategies for Abandoned Industrial Heritage in Vulnerable Contexts: A Multiple Criteria Decision Aiding Approach", in *Sustainability*, 11, 785, 2019. Doi:10.3390/su11030785
[18] Francesca Torrieri, Marina Fumo, Michele Sarnataro, Gigliola Ausiello, "An Integrated Decision Support System for the Sustainable Reuse of the former monastery of Ritiro del Carmine" in Campania Region", in *Sustainability*, 2019, 11(19), 5244. Doi: 10.3390/su11195244
[19] K. Fabbricatti, "Interazioni creative tra luoghi e comunità: esperienze di riattivazione delle aree interne", in *TECHNE*, 14, 2017, pp. 227-234.
[20] G. Carrosio, "Economia civile e gestione delle risorse ambientali nelle aree interne", in *Territorio*, 74 (3), 2015, pp. 115-121.
[21] F. Barca, "Alternative Approaches to Development Policy: Intersections and Divergencies" in *OECD Regional Outlook,* 2011, pp. 215-225.
Doi: https://doi.org/10.1787/9789264120983-en
[22] Council of Europe, *European Landscape Convention (Florence Convention)*. Strasburg: European Treaty Series 176, 2000.
[23] The Rockefeller Foundation and Arup, *100 Resilient Cities*, 2014.
https://www.100resilientcities.org
[24] The Rockefeller Foundation and Arup, *City Resilience Framework,* 2015.
https://www.rockefellerfoundation.org/report/city-resilience-framework
[25] H. Simon, *The Sciences of Artificial, 1st edition*. Cambridge: MIT Press, 1969.
[26] A. Colecchia, "Community heritage and heritage community. Participatory models of cultural and natural heritage management in some inner areas of the Abruzzo Region (Italy)", in *Il capitale culturale*, 19, 2019, pp. 124-164. Doi: 10.13138/2039-2362/1970
[27] E. Waterton, L. Smith, " The recognition of community heritage" in E. Waterton, S. Watson (Eds.), *Heritage and Community Engagement. Collaboration or Contestation?* London and New York: Routledge, 2013, pp.12-23.
[28] L. Saija, *Comunità e progetto nella Valle del Simeto. La mappa partecipata come pratica per lo sviluppo locale*. Adrano: Didasko, 2011.
[29] E. Coles, P. Buckle, "Developing Community Resilience as a Foundation for Effective Disaster Recovery", in *Australian Journal of Emergency Management,* 19 (4), 2004, pp. 6-15.
[30] CHCfE Consortium, *Cultural Heritage Counts for Europe*, 2015. www.blogs.encatc.org/culturalheritagecountsforeurope/outcomes/
[31] L. Fusco Girard, A. Gravagnuolo, F. Nocca, M. Angrisano, M. Bosone, "Towards an economic impact assessment framework for Historic Urban Landscape conservation and regeneration projects" in *BDC. Bollettino Del Centro Calza Bini*, 15 (2), 2015, pp. 1- 29. Doi: https://doi.org/10.6092/2284-4732/4061
[32] M. Stanganelli, F. Torrieri, C. Gerundo, M. Rossitti, "An integrated strategic-performative planning methodology towards enhancing the sustainable decisional regeneration of fragile territories", Sustainable Cities and Society, 53, 2020. Doi: 10.1016/j.scs.2019.101920
[33] ICOMOS, *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties*, 2011. https://www.icomos.org/world_heritage/HIA_20110201.pdf
[34] C. Folke: *Resilience*. Oxford: Oxford Research Encyclopedia of Environmental Science, 2016.
[35] K. Fabbricatti, P.F. Biancaman, "Circular Economy and Resilience Thinking for Historic Urban Landscape Regeneration The Case of Torre Annunziata, Naples", in *Sustainability*, 11 (12), 2019. DOI: 10.3390/su11123391.

NOTES

1. The SNAI is a public policy, aiming at tackling the negative demographic trend in some Italian inner areas. This policy finds its grounding in the willingness to provide all Italians with the 'citizenship' right, established by the article n.3 of the Constitution.
2. Italian inner areas host the 22% of the national population and take up the 60% of the national territorial surface, corresponding to the 52% of Italian municipalities.