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### **RE-USE OF BUILDINGS AND SPACES IN A CIRCULAR ECONOMY: INNOVATIVE URBAN POLICIES AND TOOLS**

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Nell'attuale scenario economico e sociale si è affermata l'esigenza di orientare i sistemi di produzione e gli stili di consumo verso nuovi modelli virtuosi di gestione in cui l'innovazione, la qualità e la sostenibilità rappresentano elementi fondanti per la creazione di strategie sapienti e lungimiranti capaci di creare un valore "sostenibile" per tutti gli attori della "rete della vita".

Tale sfida rappresenta un tema ampiamente dibattuto nell'ambito delle Scienze Merceologiche e, in particolare, durante il XXIX Congresso Nazionale di Scienze Merceologiche dove sono stati coniugati contributi teorici con esperienze pratiche in un'ottica di valorizzazione delle conoscenze.

Il congresso ha rappresentato un'occasione di confronto, di condivisione e di approfondimento di percorsi di sviluppo su tematiche fortemente focalizzate sui seguenti aspetti:

- Industria 4.0, analizzata attraverso i binomi di innovazione e imprenditorialità, innovazione, start-up e spin-off, tecnologia e innovazione gestionale, ricerca e trasferimento tecnologico;
- Qualità 4.0, intesa come qualità di sistema e di prodotto e sistemi di gestione per la qualità;
- Sostenibilità e Corporate Social Responsibility, che prende in esame l'analisi del ciclo di vita, i sistemi di gestione per l'ambiente, i metodi e gli strumenti di ecologia industriale, fino al concetto di economia circolare.

**Benedetta Esposito** è borsista di ricerca presso il Dipartimento di Scienze Aziendali Management and Innovation Systems dell'Università degli Studi di Salerno e cultore della materia in Scienze Merceologiche. I suoi interessi di ricerca sono nell'ambito della Corporate Social Responsibility e della Circular Economy nel settore agroalimentare.

**Ornella Malandrino**, professore ordinario di Scienze Merceologiche, Direttrice dell'Osservatorio Interdipartimentale per gli Studi di Genere e le Pari Opportunità dell'Università degli Studi di Salerno e Delegata del Rettore all'Orientamento. La sua attività scientifica si focalizza prevalentemente sulla CSR e sulla relazione tra i vari sistemi e strumenti di gestione delle differenti dimensioni della qualità.

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I suoi principali interessi di ricerca sono: sviluppo di sistemi di gestione della qualità e dell'ambiente, responsabilità sociale delle imprese, strumenti di valutazione ambientale e certificazione delle competenze.

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**LE SCIENZE MERCEOLOGICHE NELL'ERA 4.0**



# Le scienze merceologiche nell'era 4.0

a cura di

Benedetta Esposito, Ornella Malandrino,  
Maria Rosaria Sessa, Daniela Sica

**XXIX CONGRESSO NAZIONALE DI  
SCIENZE MERCEOLOGICHE 2020**

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# RE-USE OF BUILDINGS AND SPACES IN A CIRCULAR ECONOMY: INNOVATIVE URBAN POLICIES AND TOOLS

di

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## **Abstract (in inglese)**

Cities are increasingly moving to actions aimed at reconsidering settlement models and preferring solutions based on the re-use, the recycle and the development of innovative and creative communities. The challenge is the re-use and the transformation of existing unused buildings and spaces, with the logic to create new economic and social opportunities, without consuming new land (following the paradigm of the no net land take); to improve the environmental performance of buildings in their entire life cycle; to propose new urban scenarios. The aim of this paper is to describe the early concept of the new designed Index of Re-usability of buildings and the best practices carried out by the Municipality of Prato in its urban planning. At present, the Municipality of Prato is the Italian representative in the EU's "Urban Agenda: Circular Economy Partnership" initiative. Within the Partnership, the Municipality of Prato leads the debates regarding wastewater reuse and the one on sustainable buildings. Therefore, circular economy in Prato also means the reuse and the transformation of existing building, in particular the dismissed ones situated in former industrial areas.

**Keywords:** Urban regeneration, Circular Economy, Sustainable cities.

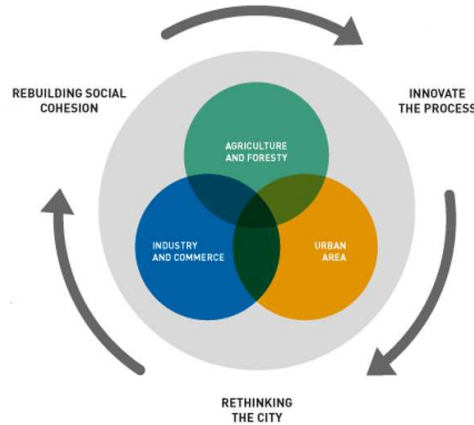
## **Introduction**

Urban regeneration process passes through changes in society and the built area, being able to respond effectively to changes and the emerging needs of cities, with tailored solutions. Rapid and uncontrolled urbanization experienced in past decades, has often created fragmentation and deterioration of the quality of the urban environment. Cities are increasingly moving to actions aimed at reconsidering settlement models and promoting re-use practices will help to ensure more sustainable urbanisation, with multiple benefits not only for managing authorities, but with also all citizens.

Regarding the transition to circular economy, cities play an essential role. They act in fact as enablers of potential measures by which they can influence both the consumers and the businesses (Kirchherr, J., et al., 2017). At European level, within the Urban Agenda for EU, the partnership on Circular economy and the partnership on Sustainable use of land and nature-based solutions decided to work together thinking feasible solutions on re-use of empty buildings through the proposal of a specific action. The partnership consists of six urban authorities, namely the City of Oslo, The Hague, Prato, Porto, Kaunas and Flanders region. The Member States are Finland, Poland, Slovenia and Greece. The European Commission, the Council of European Municipalities and Regions, Eurocities, Urbact, the European Investment Bank and the Association of Cities and Regions for sustainable Resource management are also partners. Within the Partnership, the Municipality of Prato leads the debates regarding wastewater reuse and the one on sustainable buildings.

The urban regeneration process passes through changes in society and the production sectors, being able to respond coherently and effectively to changing needs, like a tailored suit. Circular re-use opens up scenarios and challenges of regeneration that need to be managed in an integrated manner by administrators, companies, associations, and citizens. At European level, there are many positive experiences of temporary or permanent use of certain previously abandoned or unused places, enabled through participation and active citizenship. The application of the circular approach within a territory (e.g. urban area) involves municipalities, production activities, relevant stakeholders and citizens, in order to create opportunities lowering the depletion of new resources. The model for circular city, proposed in figure 1, aims to describe a holistic and systematic governance, bringing together public authorities, universities, enterprises, NGOs and citizens. The system includes the three tradition urban areas: residential, industrial, and agricultural land and forestry, in connection.

Fig. 1 – Circular city model (Source: authors)



The model may enhance initiatives of research and innovation within circular approach as well as the engagement of citizens and NGOs in the development of start-up ideas for new business activities (profit and no profit). For enterprises, transition to circular economy requires innovation in order to adequate technologies and processes (“Innovate the process”).

Therefore, a new challenge is the re-use and the transformation of existing buildings, in particular the unused ones (“Rethinking the city”), with the logic to: create new economic and social opportunities without consuming new land (following the paradigm of the no net land take); improve the environmental performance of buildings and infrastructures in their entire life cycle; and propose new urban scenarios. (Borsacchi et al., 2019).

Beyond the environmental aspect, the challenge of the circular city entails as well economic and social facets. New policies have to take into consideration, involving both citizens and entrepreneurs, in order to reduce the gap within potential bad waste management and to help in a general rebuild of the social cohesion. In particular, one of the main goal of the adoption of this approach is to strengthen the social cohesion at urban level (“Rebuild Social Cohesion”) through the construction of an inclusive and supportive community, based on the principle of sharing and creative re-use as a mean to stimulate innovative driving forces for business activities, also considering social purposes and charity, within the paradigm of the sharing economy (Borsacchi, et al., 2018).

## **1. Materials and methods**

This paper is the result of the involvement of the authors within the EU Partnership on Circular Economy. Main activities carried out:

- a) Desk-based analysis of reports and publications on CE as well as on best practices of buildings reuse at European level.
- b) Open consultation within the Partnership on the topic of valorisation of empty buildings and under-used or unused spaces;
- c) Participation at all debates and meeting within the Partnership.

These methods has allowed diversifying the sources of information, in order to contribute at the debate, at European level, about proposal of urban regeneration solutions and tools.

## **2. Results and discussion**

Rapid and uncontrolled urbanization experienced in past decades, has often created fragmentation and deterioration of the quality of the urban environment. Cities are increasingly moving to actions aimed at reconsidering settlement models based above all on the re-use, recycling and development of creative economies.

European cities started to develop a number of policies to facilitate the circular re-use of vacant properties, to develop new uses and functions for vacant and underused areas, as well as to give visibility to development projects. In the past decade, the re-use of vacant properties has become an important topic in the regeneration and development of European cities. In 2010, when the impact of the economic crisis on European cities became evident, many civic, professional and public initiatives followed suit in establishing new means and methods for the circular re-use of vacant spaces. Mainly in Southern European cities, the long-term perspective in the re-use of vacant spaces has relied on experiences of self-organisation (Cellamare et al., 2014) supported by the newly discovered theory of the commons (Mattei, 2014). In Northwest and Central European cities, on the other hand, there has been a growing movement of developing innovative financial and legal instruments, ownership and procurement models to help the community-led, non-speculative re-use of vacant or underused spaces (Patti and Polyak, 2017). Several cities, regions and or countries have started to generate several management models to face up with the urban circular re-use of properties. Governance agencies have recently emerged to inventory vacant prop-

erties, facilitate their re-use and set up networks of property owners, prospective users and local authorities interested in creating accessible spaces for entrepreneurs, social initiatives and community groups.

## **2.1 Urban Agency for Re-use**

In the Municipality of Prato (Italy), a newly designed management office is in charge to facilitate urban regeneration and the circular re-use of unused and under-used buildings and spaces: the Urban Agency for Re-use facilitates local public administrations in the definition and the application of strategies of building re-use at city level. The agency acts as facilitator in the functional transition of parts of the city with the aim to manage the public and private spaces and buildings included in the urban re-use program and to connect the potential demand for new functions with privately owned properties (private to private match), following diversified models for public and private spaces and buildings. The proposed model has a high degree of transferability. Any city can establish its own agency for the promotion of re-use of buildings and spaces, through an integrated approach and using new model of governance in order to manage and plan the various re-use strategies. Potential roles of the agency are:

- convey and collect the existing demand at city level;
- create the demand for the use of empty spaces or buildings on the basis of urban strategies for economic development, social cohesion and cultural policies;
- keep the inventory of unused spaces and buildings constantly updated in the form of due diligence;
- enhance the different areas and harmonize the forms of active participation in the territory;

The agency is governed by a steering committee consisting of representatives of the municipal administration and the economic and social stakeholders.

## **2.2 Reusability Index**

Through the transformation of the existing building and adaptive re-use future cities will be more sustainable and resilient, with well-being and quality of life, identity, memories, culture, respect for the environment, the social inclusion and economic growth. The introduction and application of a new

designed Reusability Index (RI), presented in this paper in its early concept, can also provide useful information and ideas to change the destination of spaces and buildings, and giving life to new creative and innovative hubs.

Within a circular approach, RI is based on a multi-disciplinary approach. In fact, there are many indicators related to environment, which have already been proposed by several organisations. Thus, RI includes technical, environmental, economic and social indicators. Beyond the physical condition of a building, evaluated through a building condition assessment, many intangibles have to be also considered and included in the overall analysis. Particularly, RI considers and integrates requirements and indicators taken from the following methodologies:

- Due diligence. It consists of a survey aimed at the overall evaluation of an existing building. It is therefore an activity to identify the strengths and weaknesses of a building subject to a possible change. In fact, the evaluation consists of at least three aspects: technical, with relative evaluation of the costs and time necessary for the adaptation of the building between repairs, renovations, change of use or demolition; economical, evaluating the building in relation to the actual and potential use, to the location and to the trend of the reference market; legal by verify the documentation relating to the property.
- Life cycle assessment (LCA) is a method used to evaluate the potential environmental impacts of products and services and their resource consumption.
- BES (Benessere Equo e Sostenibile) defined by CNEL and ISTAT. The BES does not aim at identifying a single synthetic index, but rather it is a system of indicators grouped into 12 domains, which in their complexity and multidimensionality describe the level of well-being of a territory.

When evaluating a building, it is frequently the lack of the availability of information. For these reasons, the new proposed RI results the combination of specific requirements and indicators taken from the existing methods. Starting from the full set of requirements and indicators of the considered assessment methodologies, 24 have been selected. The best performing building will be the most suitable to host the new function with the lower need of technical elements and the reduced addition of materials and waste production. The waste produced during adaptive re-use or demolition processes shall be reduced to a minimum and the residues that are unavoidable should be recycled or re-used. In regeneration process, emphasis should be



given to new construction methods and technologies such as lightweight construction, modular construction, prefabrication and industrial construction. The proposed selected indicators, by topic, are:

Tab.1 (Source: Authors)

<p><b>GENERAL BUILDING DATA</b></p> <ul style="list-style-type: none"> <li>-Type/destination of building</li> <li>-Location of the building</li> <li>- Total GFA of the building (m<sup>2</sup>)</li> <li>- Seismic area</li> <li>- Climatic area</li> </ul>	<p><b>DUE DILIGENCE</b></p> <p><b>SITE AND GROUNDS</b></p> <ul style="list-style-type: none"> <li>-External walls</li> <li>-Pavement, walks</li> <li>-Landscaping</li> </ul> <p><b>STRUCTURAL SYSTEMS</b></p> <ul style="list-style-type: none"> <li>-Foundations and structural framing of walls</li> <li>-Internal walls</li> </ul> <p><b>MECHANICAL SYSTEMS</b></p> <ul style="list-style-type: none"> <li>-Electrical system</li> <li>-Plumbing system</li> <li>-Heating ventilation</li> <li>-Air conditioning</li> </ul> <p><b>BUILDING ENVELOPE</b></p> <ul style="list-style-type: none"> <li>-Exterior finishes, doors and windows</li> <li>-Roof</li> </ul>
<p><b>LIFE CYCLE ASSESSMENT</b></p> <p><b>POTENTIAL WASTE FLOWS</b></p> <ul style="list-style-type: none"> <li>-Hazardous waste disposed</li> <li>-Non-hazardous waste disposed</li> </ul> <p><b>POTENTIAL OTHER FLOWS LEAVING THE SYSTEM</b></p> <ul style="list-style-type: none"> <li>-Components for re-use</li> <li>-Materials for recycling</li> <li>-Materials for energy recovery</li> </ul>	<p><b>BES</b></p> <p><b>[5.] SOCIAL RELATIONS</b></p> <ul style="list-style-type: none"> <li>[5.4] Social participation</li> <li>[5.8] Non-profit organizations</li> </ul> <p><b>[9.] LANDSCAPE AND CULTURAL HERITAGE</b></p> <ul style="list-style-type: none"> <li>[9.3] Illegal buildings</li> <li>[9.9] Density of historic greenery</li> </ul> <p><b>[10.] ENVIRONMENT</b></p> <ul style="list-style-type: none"> <li>[10.5] Air quality PM<sub>10</sub></li> <li>[10.8] Availability of urban greenery</li> </ul> <p><b>[11.] INNOVATION, RESEARCH, CREATIVITY</b></p> <ul style="list-style-type: none"> <li>[11.6] Occupied in creative enterprises</li> </ul> <p><b>[12.] QUALITY OF SERVICES</b></p> <ul style="list-style-type: none"> <li>[12.5] Broadband coverage</li> </ul>

The proposed approach aims at the integration between structural, environmental and social criteria regarding the buildings and the immediate surrounds. Starting from the results of the individual assessments, the data relating to the selected requirements and indicators can be extrapolated. Time need to be considered as a key variable for local administrators and owners on whether to start a re-use process of an empty building. In the application

of RI, starting from the proposed indicators, cities can choose their own effective parameters and define the calculation method giving much or less importance to each indicator.

### 3. Conclusions and future perspectives

The application of the circular approach within an urban area involves all stakeholders in order to create opportunities lowering the depletion of new resources. Application and validation of the new Reusability Index are still ongoing. Experiences like the Urban Agency for Re-use and the Re-usability Index have a high degree of transferability as best practices also in other cities.

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