

Towards an evaluation framework to assess Cultural Heritage Adaptive Reuse impacts in the perspective of the Circular Economy

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Introduction

The evaluation key role in cultural heritage adaptive reuse choices for identifying the best relationship between the “intrinsic value” and new use values.

This paper investigates the relationships between Circular Economy, Circular City and Cultural Heritage Adaptive Reuse through evaluation tools based on criteria and indicators of circularity.

The Horizon 2020 CLIC project (Circular models Leveraging Investments in Cultural heritage adaptive reuse) develops integrated evaluation tools to support choices for cultural heritage adaptive reuse, taking into account the “intrinsic value” and thus the Social Complex Value of heritage in the perspective of the Circular Economy (Fusco Girard et al., 2018). The Circular Economy is the economy of relationships and efficiency (Ellen MacArthur Foundation, 2013, 2015; Wijkman and Skånberg, 2015; Ghisellini, Cialani and Ulgiati, 2016; Kirchherr, Reike and Hekkert, 2017), which conserves the “intrinsic value” over time, through new use values / functions (Fusco Girard and Gravagnuolo, 2017; Fusco Girard et al., 2018). The Social Complex Value (Fusco Girard, 1987; Fusco Girard and Nijkamp, 1997) of cultural heritage can orient evaluation processes to identify good practices.

Objectives

This work is focused on the structuring of a systemic evaluation framework based on criteria to assess Cultural Heritage Adaptive Reuse impacts in the perspective of the Circular Economy. Pilot applications in Belgian and Italian case studies are presented.

Circularity assessment for cultural heritage adaptive reuse practices

Circularity of cultural heritage has always been on the agenda, since adaptive reuse practices are fundamentally related to heritage conservation. Cultural heritage can be defined as an amount of resources (cultural capital) that provides over time a range of cultural, social, economic, and environmental output. Even before sustainability became mainstreamed in the world agenda, practices of conservation were characterized by keeping existing resources, and trying to adapt such resources to changing needs and uses for the local communities (Labadi and Logan, 2016; Larsen and Logan, 2018). Hence, the process of circular economy has always been, and still is embedded in any decision of protecting and conserving cultural heritage. What has changed today is for adaptive reuse of cultural heritage not to be justified by cultural values only, but by the sustainable development paradigm. Today we acknowledge that adaptive reuse provides social, economic, and environmental values, together with cultural values (CHCfE Consortium, 2015). Hence, the circularity assessment for cultural heritage adaptive reuse practices must take into consideration all categories of values together, as a combined result of conservation practices (Gravagnuolo et al, 2017).

In order to identify evaluation criteria in the perspective of circularity, it is necessary to define the key concepts:

- *Circular economy* is the economy of natural bio eco/system that reduces entropy, increases resilience and stimulates cooperation between components (it starts from the search of efficiency, but it is based and it stimulates cooperation / synergies). It is the economy of co-evolution, co-operation, co-ordination of actions for a common interest.
- *Circular city* is the concept of city as a living complex dynamic circular system: cities able to self-organize, self-manage, self-govern themselves.
- *Cultural Heritage* is the memory itself of the urban living system; it is the heart of the city, its identity conserved over the centuries.

The methodology for assessing circularity of decisions for adaptive reuse of cultural heritage must address five perspectives attached to the conservation decision: conservation

as circular transmission of heritage values, conservation works as circular environmental process, conservation works as circular intangible process (arts and crafts), conservation works as circular business, governance, and financing models, and conservation as circular provider of new, innovative, creative uses on site and across the area.

Conservation as circular transmission of heritage values:

Decisions for adaptive reuse contributes to preserve, maintain and enhance heritage values (artistic, historic, architectural, social, economic, aesthetic, scientific, etc). Authenticity and integrity of cultural heritage are key-factors for such decisions.

Conservation works as circular intangible value generation process:

Decisions for adaptive reuse implement local skills, techniques and knowledge, and preserve an important link between tangible and intangible values of the place.

Conservation works as circular environmental process:

Decisions for adaptive reuse implement sustainable energy systems, water storage and reuse systems, with the utilization of local traditional materials, bio-materials or reused materials. It also contributes to:

- 1- reducing land and resources consumption
- 2- diminishing construction waste and landfill
- 3- preserving the ecosystems, and
- 4- halting/reversing biodiversity loss

Circular business, governance, and financing models:

Decisions for adaptive reuse implement the use of circular business models (balancing cultural and economic values), the use of circular governance model (public, private and social stakeholders in cooperation and/or partnerships, top-down and bottom-up approaches), and the use of circular financing models (crowdfunding, investment at local level through local banks, ethical banks, Foundations, and involvement of the third sector, NGOs, Foundations, Social Enterprises, Associations).

Conservation as circular provider of positive net impacts through new, innovative, creative uses:

Decisions for adaptive reuse contributes to new, innovative, creative uses that connect the project to the broader area. Impacts in the area includes economic spill-overs (direct and indirect jobs creation, output, and expenditures, real estate, attractiveness for cultural and creative industries, new businesses, new residents, new visitors), social spill-overs (social cohesion, social inclusion, heritage community creation). Decisions must also mitigate negative spill-overs (gentrification, mass tourism, loss of local jobs).

An evaluation proposal: two cultural heritage adaptive reuse practices in Belgium and Italy

A case study in Belgium, Tour à Plomb, Brussels
The industrial complex of Tour à Plomb, alias Brussels shot tower, was built in 1832 as a gunpowder factory (poudrière). Subsequently, a foundry and a workshop were established and in 1898 the shot tower was constructed. In 1873, the industrial site became the property of the company Pelgrim and Bombeeck and in the 1930s it became part of the Hoboken Overpelt Metallurgy (Mardaga, 1975). In 1962 the site was abandoned. Since 1975, it was partially used by the Arts and Crafts institute and the Bischoffsheim Institute (high school) and successfully by the Demot-Couvreur Institute (high school). Since the 2000s, the complex was unused.

Intrinsic value and new use values. The shot tower became a distinct element of Brussels urban landscape. This 55 meters' height tower witnesses the last industrial activity of this kind in Belgium and one of the last few prototypes in Western Europe. It was listed as a monument in 1984 and it is an integral part of Brussels heritage. By dropping from the top of the tower drops of the mixed lead it was brought to its melting point while significant cooling and shaping processes occurred during the fall in the chimney. The technological advancement at the end of the 20th century, led to requiring less height and eventually to the demolition of most of the shot towers. The new use value is related to neighborhood events, associations activities, sports hall, theatre, multifunctional space and school classrooms. It embodies the strong linkage of citizens with the heritage building

as a symbol of local identities, open to existing and new residents – a place where new community relationships can be built, giving new sense and meaning to the old fabric.

Adaptive reuse of Tour à Plomb. This industrial vestige is situated in rue des Fabriques, in the popular neighborhood of Jardin aux Fleurs in the heart of Brussels. The project was the result of a Contrat de Quartier (2011-2015), a sustainable neighborhood contract. An action plan between the Brussels-Capital Region and the City of Brussels aimed at improving the living environment of a precarious neighborhood. The City received a fixed budget and it had four years to implement its action plan and additional two and a half years were dedicated to the construction phase. The Contrat de Quartier is normally financed by the Brussels-Capital Region; BELIRIS¹; the municipality, and regional or para-regional bodies and/or private operators. The restoration works amounted to 6.8 million euros. The Brussels-Capital Region and the City of Brussels contributed each by 1.823.587 thus, their total contribution amounted to: 3.647.174 Euros. The renovation works started on 11 April 2016 and the site was inaugurated on 24 June 2018.

Impact of new uses. The adaptive reuse restituted to the neighborhood a part of its industrial heritage. This socio-cultural, and educational center is completely dedicated to the neighborhood activities. The current site is composed of a theater and gymnasium hall open to neighborhood initiatives on the ground floor, a hall with a bar in the basement, offices and a mezzanine linked to the theatre on the first floor, and on the third floor a multipurpose hall/library. On the 2nd floor five classrooms and a teachers' room were added for the use of the high school next door, Demot-Couvreur Institute, while the school's courtyard was refurbished with repurposed materials reused from the site. The multipurpose spaces for the school and the neighborhood's associations strengthened the neighborhood's social cohesion and created a hub for community activities and cultural exchange. The tower is visitable once a year during the annual heritage day in Brussels.

Circular economy. The project was the winner of Be Circular 2017, the annual call for projects of Brussels Regional Program of Circular Economy (PREC). In terms of conservation works, the materials reused in this

project came from the site itself. According to entrepreneur Arnaud Dawans², Jacques Delens enterprise has developed a circular approach in order to minimize waste construction and use of new materials. In this regard, 60 m³ of old bricks were dismantled, cleaned and reused in situ; nine old beams and an old floor of almost 500 m² were conserved and reinforced to preserve the old shape; old wooden beams 9.5 m long were refurbished into urban furniture as benches; old small granite stones were repurposed into urban furniture at the entrance and in the courtyard; the existing wooden beams were conserved and reinforced; the old logs (used for formwork) were repurposed and reused as big wooden doors. Moreover, the project developed a synergy of thermal and acoustic insulation in respect of the authenticity of the place tailored to each room and its reuse destination. Finally, a peculiar aspect was the innovative construction method based on in-situ training. Workers were trained in selective deconstruction and repurposing techniques. The availability of skilled human capital and in-situ reuse workshop, facilitated an in-situ decision-making process and shortened the loops.

A case study in Italy: Palazzo Innovazione, Salerno

The Benedictine monastery of St. Sophie in Salerno was realized in the X Century AD and has a great long history of uses and reuses over centuries. In 1309 it became seat for Benedictine nuns, which use lasted until 1589, when they moved to another monastery. The building passed to Jesuits until 1778 and after this date it was given to Carmelitan fathers of Pope Clemente IX. In 1807 a Napoleonic decree suppressed the religious use and the building became a Civil Courthouse. In 1938 the use value was linked to education (public school).

Intrinsic value and new use values. The intrinsic value is the "essential" value that is rooted in history and culture. It is here linked to the Benedictine Regula, and in particular to some specific aspects:

- The value of the circuit of human relationships that generates a collaborative / cooperative community
- The value of relationships with the natural environment / territory to ensure a systemic harmony

• The value of hearing and communication, as condition to stimulate the promotion of culture and thus of creative acting. The intrinsic value of religious cultural heritage has always oriented the design and management of religious architecture, giving physical-spatial form to the cultural heritage, as well as offering a direction to local urban development.

The intrinsic value still represents the fundament that should orient any adaptive reuse perspective of disused cultural heritage. A “rational” choice is that aiming at the compatibility between possible use values and intrinsic value.

Adaptive reuse of St. Sophie Benedictine monastery. After a long period of abandonment, the monumental complex was recovered by the Municipality within the URBAN programme in Salerno (1994-1999) and it was used as place of public events and exhibitions. In 2016 a renovation and reuse project was proposed to the Municipality to use the former monastery as Innovation Palace hosting a co-working space for start-ups, incubator and venture capital services, meetings and events rooms. The private company Healthware s.r.l. invested more than 700.000€ to recover the internal areas and adapt them to the new functions. The investment in technology was important, since the 30 Km of new cables required a specific design. The renovation works were closely supervised by the local Heritage Authority, the building having a heritage protected status by national law (Law 1939). The Municipality restored 10% of the investment as contribution. The adaptive reuse was realized through the cooperation of public and private actors, which built a synergic win-win model in which all parties recognize benefits. A monthly rent for the use of the building is paid to the Municipality by the private company, which has moved its EU headquarters to the city of Salerno and manages the coworking space and other services through a spin-off start-up.

The reuse appears to reflect the circular virtuous process between intrinsic and use values.

Impacts of new uses. “Palazzo Innovazione” started its activity in April 2018. The building currently hosts 10 start-ups and about 100 coworkers who find a peaceful and creative atmosphere in the monastery. The major

ity of users work in the creative and cultural industry. The brand of Palazzo Innovazione is strictly linked to the heritage value of the place, which represents its specific added value to attract businesses. Although scarcely perceived in the surrounding area, the adaptive reuse as innovation hub is slowly generating positive impacts. Commercial activities as bars and restaurants, once open only in the evening, are starting to open for lunch to capture the opportunities of about 100 new workers in the area. Local Hotels and B&b, as well as Taxis, served the 1100 people hosted since April 2018 for the events and business meetings of Palazzo Innovazione. Commercial activities are starting to contact the managers to propose commercial partnerships. The surrounding area is becoming cleaner and thus more attractive, due to the synergic efforts of Palazzo Innovazione and locals.

Circular economy. The renovation project includes for the moment the substitution of the entire halogen lighting system with a led lighting system, ensuring the reduction of energy consumption and cut of costs. Energy efficiency is combined with an internal awareness raising campaign (M’illumino di meno) targeting the users of Palazzo Innovazione to optimize the use of artificial light. Green procurement has been adopted to choose the furniture of the building: most stuff is made of reused and recycled materials. The ancient windows have been recovered, using more efficient glasses where possible. The building is “plastic free”: users bring their own water dispensers and a water tank is available for all to avoid plastics need. The building has a precise “car-free” and health policy targeting users to stimulate healthy lifestyles: partner parking lots have been chosen at a minimum distance of 1.500 steps, allowing a 20 minutes’ walk or quick bike tour to reach the working space.

Conclusions

The discussed projects in Salerno and Brussels demonstrate that circularity of decisions are possible and capable of challenging existing mind-sets.

In the Brussels case, the importance of the investment in the human capital and its active engagement in the decision making process was key to preserving the authenticity of the place, reducing the construction waste and

energy dispersion related to transportation and CO2 emissions. Moreover, it was perceived by the entrepreneur as a capitalisation for future projects. In the meantime, the financial model of the Capital Region of Brussels for a sustainable construction project, based on the design (conception phase), circular construction site and the impact is an interesting incentive mechanism which triggered creativity.

The Brussels case also indicate that economic and cultural values are well connected, because of a comprehensive project that exemplifies both heritage values (the last shot tower in Belgium) and urban values (spillovers in terms of visitors and of new facilities erected in the neighbourhood). The adaptive reuse enhanced the attractiveness of the area and in September 2018 during Brussels Comics Festival, a fresco was created by Turk and realised by Urbana. This 56th comic book mural, is the in Brussels to represent a screenwriter. The case-study highlights that adaptive reuse of cultural heritage can have circular processes both in terms of cultural than traditional sustainable values.

In Salerno, the heritage value of the ancient monastery acted as catalyst for private investment, in synergy with the municipality. While a circular strategy for building construction works has not been clearly expressed, the reuse of materials, spaces and furniture was implemented spontaneously in a sustainability perspective.

The adaptive reuse enhanced the attractiveness of the city of Salerno for start-ups and creative entrepreneurs, who started moving from other locations to Salerno, generating positive economic impacts in the city and new flows of people and local commercial activities. Currently, the managers established stronger direct connections with businesses outside the city, since the services developed are highly digitalized and can be self-sustainable exploiting virtualization strategies. However, the administration is starting strengthening the relationships with local stakeholders, also thanks to the participatory process started in Salerno through the CLIC project to co-create a Local Action Plan for heritage reuse in the perspective of the circular economy and circular city.

The case-studies demonstrate that conservation decision are interconnected and the fulfilment of the circularity of decisions depend

on the well and commitment of the authorities, the local community and the private sector to the sustainable development paradigm, a common vision towards a “humanized city” as stated in the Habitat III New Urban Agenda 2030 (United Nations, 2016), the most relevant international agenda to guide urban sustainable development strategies.

Notes

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1 Beliris is a collaboration between the Federal State and the Brussels-Capital Region.

2 site visit on 24/10/2018 under the framework of the annual meeting: Brussels pioneer region in circular economy

References

CHCfE Consortium (2015) Cultural Heritage Counts for Europe. Krakow.

Ellen MacArthur Foundation (2013) Towards the Circular Economy, Ellen MacArthur Foundation. doi: 10.1162/108819806775545321.

Ellen MacArthur Foundation (2015) Growth within: a circular economy vision for a competitive Europe.

Fusco Girard, L. (1987) Risorse architettoniche e culturali: valutazioni e strategie di conservazione. Milano: Franco Angeli.

Fusco Girard, L. Gravagnuolo, A. (2017) 'Circular economy and cultural heritage/landscape regeneration. Circular business, financing and governance models for a competitive Europe', BDC. Bollettino Del Centro Calza Bini, 1/2017(1), pp. 35-52.

Fusco Girard, L. Nijkamp, P., eds (1997) Le valutazioni per lo sviluppo sostenibile della città e del territorio. FrancoAngeli, Milano.

Fusco Girard, L., Gravagnuolo A., Saleh, R., Ost, C. (2018) 'Circular adaptive reuse of Cultural Heritage. Benefits and evaluation criteria', in 58th ERSACongress "Places for People: Innovative, Inclusive and liveable Regions" 28- 31 August 2018. Cork, Ireland.

Ghisellini, P., Cialani, C. and Ulgiati, S. (2016) 'A review on circular economy: the expected transi-

tion to a balanced interplay of environmental and economic systems'. Journal of Cleaner Production, 114, pp. 11-32, doi: 10.1016/j.jclepro.2015.09.007.

Gravagnuolo, A., Fusco Girard L., Ost, C., Saleh, R. (2017), Evaluation criteria for a circular adaptive reuse of cultural heritage, BDC. Bollettino Del Centro Calza Bini, 17, 2/2017.

Kirchherr, J., Reike, D., Hekkert, M. (2017) 'Conceptualizing the circular economy: An analysis of 114 definitions', Resources, Conservation and Recycling, pp. 221-232. doi: 10.1016/j.resconrec.2017.09.005.

Labadi S., Logan W. eds, (2016), Urban heritage, development and sustainability, Routledge.

Larsen P., Logan W. eds, (2018), World heritage and sustainable development. New directions in World Heritage Management, Routledge.

Mardaga, P. (1975), Le patrimoine monumental de la Belgique Bruxelles, Liege, 1, pp. 43-46.

Wijkman, A. and Skånberg, K. (2015) 'The Circular Economy and Benefits for Society: Jobs and Climate Clear Winners in an Economy Based on Renewable Energy and Resource Efficiency', The Club of Rome.

United Nations (2016), Habitat III New Urban Agenda, <http://habitat3.org/the-new-urban-agenda/>.