

The role of cultural heritage in urban reuse

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Abstract

Cities face the challenge of transforming existing buildings to be reused, particularly those that are underused or not used at all. Tackling this issue, the European Commission approved in 2014 a package of measures to promote a circular economy. According to this agreement, our cities can be more sustainable and resilient by transforming these underused existing buildings with proposals for their adaptive temporary reuse, favoring the citizens' well-being and quality of life and promoting social inclusion and economic growth with respect for the environment. This paper studies the role of heritage education in adaptive urban reuse, exploring the possibilities and methodologies for the reprogramming of existing buildings for different types of activities to offer citizens and communities the opportunity to participate in the life of the city, favouring their social inclusion. In contrast to the common new-builds or refurbishment commissions, reuse offers a greater possibility of disseminating, transforming, and reinventing architectural methodologies and approaches to integrate in the design process forms of citizen participation, favouring the transition towards a model of a circular economy and more sustainable consumption. The paper analyses the possibilities of urban reuse applied to five major public heritage buildings in Barcelona: the Post Office Building, the Old Customs House, the France Train Station, the Martorell Museum and the Castle of the Three Dragons. Each of them has a particular condition regarding current uses and its public owning institution and presents specific characteristics regarding building typology, heritage protection, conservation and construction materials and techniques. The buildings date either from the late 19th century or the early 20th century and are grouped along a 1 km axis on the threshold between the historic center and the port of the city. This unique location represents a great strategic potential for the regeneration and urban reactivation of the city.

Keywords: Architectural education; urban reuse; heritage transformation; heritage education.

1. Introduction

Our cities can become more sustainable and resilient through the transformation of existing buildings and their adaptive temporary reuse, favoring the well-being and quality of life of citizens, promoting social inclusion and economic growth with respect for the environment. Currently, many cities continue to solve their space needs with new

construction and consumption of territory. The European Commission approved in 2014 a package of measures to enable the circular economy (CE) including proposals to revise waste legislation to stimulate the transition from a linear economy to a circular one (European Commission, 2020). Furthermore, this package included as a new challenge: the reuse and transformation of existing buildings,

particularly those not used or underused, with the logic of creating new economic and social opportunities aligned with the CE principles to: 1) take advantage of the existing common heritage; 2) improve the environmental performance of buildings throughout their life cycle; and 3) propose new scenarios for urban entrepreneurship.

However, the way in which we are materializing and learning architecture so far makes it difficult to achieve both the goals of the 2030 Agenda (European Commission, 2016) and our cities' goals regarding sustainable, environmental, economic and social development (Ayuntamiento de Barcelona, 2020). It is necessary to improve tools and methodologies to think more carefully about how we manage, use and reuse all the built environment that is already available, as with the rest of the natural resources.

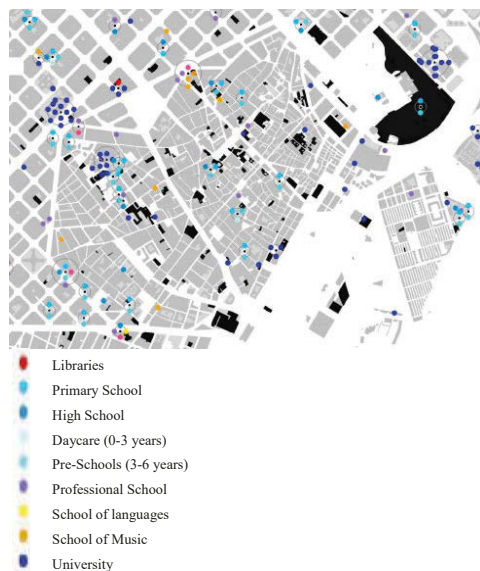


Fig. 1. Distribution of public activities and empty or underused public buildings.¹

¹ Participatory plan done by students from the School of Architecture of Barcelona: Sira Amat, Pau Castelló, Marta Gil.

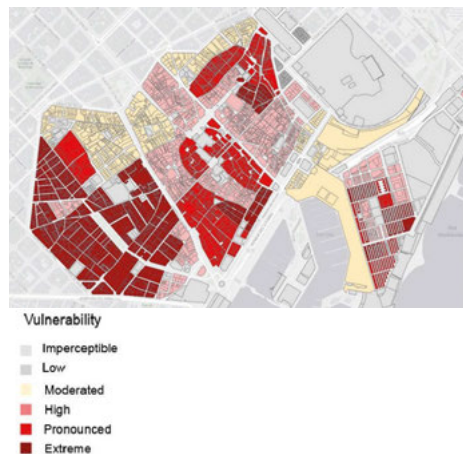


Fig. 2. Ciutat Vella district: Socially vulnerable areas (red scale) (Source: Cornadó et al., 2017).

Regarding social inclusion, the adaptive reuse of existing buildings for different activities also offers citizens and communities the opportunity to participate in the life of the city more easily (Tanac Zeren, 2013). Compared to new constructions that are normally carried out or integral rehabilitation commissions, adaptive reuse offers a greater possibility of transforming and reinventing the uses of the city through the participation of citizens, favoring the transition towards a circular economy and a much more sustainable consumption model. It is necessary to rethink the cities taking into account the real housing needs and the needs of the economic-productive and cultural sector, based on a global, sustainable, resilient and inclusive vision of the city. It has been proved relevant that being able to host new functions and accommodate flexible uses within buildings originally designed for other activities, has a positive effect on the surroundings creating a social impact through job opportunities and service (Bellamy and Palumbo, 2010). This approach on how to rethink the city must take into account the changing needs and ambitions of residents through spaces that can contain temporary uses with relatively low costs, which

are capable of offering access to accommodation for families at risk of exclusion and to open new spaces for new innovative economic activities (Fig. 1).

Ciutat Vella is a district in which its residents can live in poor living spaces (Fig. 2), while local entrepreneurship is drowned by rental prices marked by the centrality of the district and its great tourist incidence. Likewise, we find that large public-owned buildings are currently empty or underutilized. In addition, in the case of Ciutat Vella, the accumulation of urban land in large property holders has worsened in the last decade and the availability of urban plots for new buildings is scarce.

This educational proposal is framed in the context of the project funded by the Barcelona City Council *Co-inhabiting Barcelona - five case studies in Ciutat Vella for urban reuse and the promotion of innovative production models*².

This proposal arises after the social and health crisis triggered by the Covid-19 viral pandemic that has aggravated the consequences caused by the lack of housing in urban areas and also the great difficulties that local entrepreneurship encounters to grow, especially in the historic center of Barcelona.

2. Methodological approach to heritage education and social inclusion

This article describes the implementation of heritage education and social inclusion in a case study in the historical center of Barcelona and it is structured in the following methodological phases:

1. Case selection: Five strategic cases located in an axis of potential regeneration of the city of Barcelona were selected.

2. Multidisciplinary analysis: the applied methodology included a constructive analysis of the buildings and their state of conservation, an analysis of climatic data, and sociological data:

- Cartography and Diagnosis of the current state of buildings.
- Index of Sustainable Economic Welfare (ISEW or BES, “Benessere Equo e Sostenibile”).
- Analysis of climatic data.

3. Determination and proposals of the reuse feasibility, based on the multidisciplinary approach, is defined.

2.1. Case selection

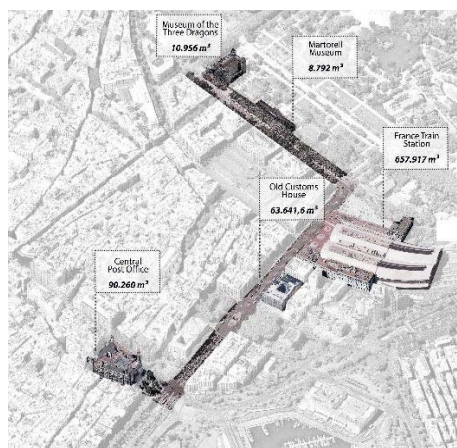


Fig. 3. Studied buildings and their strategic location in the surroundings of the Ciutat Vella district, Barcelona.

Five large buildings were selected, these are from the end of the 19th century, beginning of the 20th century, publicly owned and located in the Ciutat Vella district on the threshold between the historic city center and the port of Barcelona. The five have heritage protection and are currently underused. The number of buildings selected was five since their study was feasible within the project but, through

² Context of the project developed in the Universitat Politècnica de Catalunya: <https://www.upc.edu/ca/sala-de-premsa/noticies/la-upc-repensa-el-model-de-ciutat-i->

[dissenya-solucions-per-fer-front-a-limpacte-de-la-covid-19-a-barcelona](https://www.upc.edu/ca/sala-de-premsa/noticies/la-upc-repensa-el-model-de-ciutat-i-dissenya-solucions-per-fer-front-a-limpacte-de-la-covid-19-a-barcelona)

this pilot test, the methodology could be tested and the study extended later (Fig. 3). The buildings that are proposed as objects of study are: The Old Customs House, The Central Post Office, the France Train Station, the Martorell Museum and the Museum of the Three Dragons. These are grouped along a 1-km linear axis formed by Paseo de Colón, Paseo de Isabel II, Paseo de Argentera, and Paseo Picasso.

The location close to the Parc de la Ciutadella, an area undergoing transformation (Gomà Carmona, 1997), which will foreseeably become an area focused on innovation and research, can generate an innovative axis for the grouping of local entrepreneurship to recover the port area for citizens and mitigate the effects of the overcrowding of tourist activities.

2.2. Multidisciplinary analysis

a) Cartography, diagnosis of the current state of buildings and heritage protection:

A phase of collecting historical technical information on the buildings of the existing archives was carried out. This phase was completed with systematic inspections of the buildings, obtaining the following information: constructive characterization, detection of unused or underused spaces, detection of existing damage and legal rules for their transformation. The evaluation consists of, at least, three aspects:

1. Technical, with a relative assessment of the costs and the time necessary for the adaptation of the building renovations and change of use;
2. Economic, evaluating the building in relation to actual and potential use, location and trend in the reference market;
3. Legal, checking the documentation related to the law of possible uses. Said information has been systematized in the following table:

| | Selected requirements | Questions |
|----|-----------------------------|--|
| | Potential Waste | |
| 1 | Enclosure | Is it detachable? |
| 2 | Structural system | Is it detachable? |
| 3 | Facilities | Are they detachable? |
| | Enclosure diligence | |
| 4 | Exterior doors and windows | Are they well preserved? |
| 5 | Roof | Does the roof need to be replaced? |
| 6 | Exterior walls | Are they well preserved? |
| 7 | Exterior enclosures | Is there insulation? |
| | Structure diligences | |
| 8 | Foundations | Are there settlement cracks? |
| 9 | Structural Supports | Are there cracks in the support systems? |
| | Facilities diligence | |
| 10 | Electric | How long are they expected to last? |
| 11 | Plumbing | How long are they expected to last? |
| 12 | Ventilation | How long are they expected to last? |
| 13 | Air Co. / Heating | How long are they expected to last? |

Table 1. Definition of the parameters for the prediagnosis for existing buildings.

b) Sustainable Economic Welfare (ISEW):

The importance of diagnosing a territory in its entirety allows to contextualize the buildings, their uses, the context in which they are inserted and the opportunities for their reuse for social, productive, sustainable purposes, etc.

In relation to the diagnostic component of Sustainable Economic Welfare (ISEW), different sources with indicators to contemplate can be found (Garcia-Almirall et. al. , 2021; Partnership on Circular Economy and Sustainable Land Use, 2019; Istat, 2021; Garcia-Almirall et. al., 2017; Hernández Aja et. al., 2018; Observatorio de la vulnerabilidad urbana; Sanchez Riera and Roca Cladera, 2021).

A system of indicators grouped into 9 axes has been established and the urban conditions of the district have been analysed through these dimensions: Health, Education, Work, Economic Welfare, Social Relations, Politics and Institutions, Safety, Subjective well-being, Surroundings and Innovation and creativity.

| | Selected requirements | Questions |
|----|--|--|
| | Social relationships | |
| 1 | Social participation | Is the community engaged? |
| 2 | Non-profit organizations | Which concerns are addressed? |
| | Landscape and cultural heritage | |
| 3 | Illegal buildings | Are they representative of the total building stock and what are their implications? |
| 4 | Historical vegetation density | How dense are they and what was it like in the past? |
| | Environment | |
| 6 | Air quality | What is the air quality and what are its implications? |
| 7 | Urban vegetation | Are there any green areas and how do people use them? |
| | Innovation, research and creativity | |
| 8 | Creative companies | How many local enterprises exist and are there any interactions? |
| | District facilities | |
| 9 | Fiber installation | Is the area connected? |
| 10 | Existing of <i>district heating</i> facilities | Are there any large-scale heating facilities and what are their implications? |

Table 2. Definition of the indicators to take into account for the ISEW.

c) Analysis of climatic data

The energy efficiency certificates (CEE) of buildings offer valid geolocated data to assess the possible environmental impacts of buildings and their consumption of resources. CEE is also used in the construction sector, where it is a crucial part of assessing the environmental sustainability of buildings.

| | Selected requirements | Questions |
|---|-------------------------------------|-------------|
| 1 | Useful area | m2 |
| 2 | Qualification according to the NREC | letter |
| | NREC Flows and Values | |
| 3 | Building energy consumption | kWh/m2 year |
| 4 | CO2 Emissions | Kg |
| 5 | Annual cost | € |

Table 3. Definition of the climatic data.

The assessment data consists of two aspects to assess the potential waste generation and the reusability of buildings: the base values of the buildings to be compared and the potentials of noncircular flows leaving the system³.

The Life Cycle Assessment (LCA) is commonly used in the building sector to assess the environmental sustainability of buildings and its use is recommended for the assessment of an index of reuse. However, in heritage constructions the climatic data are more useful because they are not going to be demolished (European Commission, 2020).

2.3. Re-use opportunities in heritage buildings

The possibilities and limits of the role of cultural heritage in urban reuse have been tested in the fifth-year design studio at the School of Architecture of Barcelona (ETSAB, UPC).

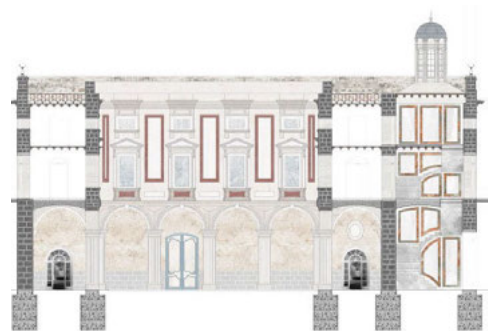


Fig 4. Cross section of the Old Customs House representing heritage elements to be protected. (Source: Ainhoa Varela and Africa González).

³ See hyper map: https://sig.gencat.cat/visors/hipermapa.html#param=param&color=vermell&background=orto_ICC_grisos&BBOX=410860,4567836,419125,457227
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See also available ICAEN data: http://icaen.gencat.cat/es/energia/usos_energia/edificis/certificacio/registre_certificats/index.html



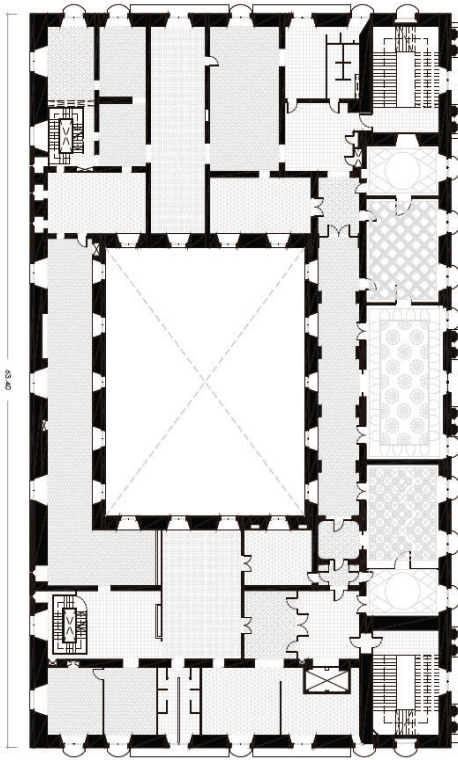


Fig. 5. Plan of the *Old Customs House* representing heritage elements to be protected. (Source: Ainhoa Varela and Africa González).

Regarding the first phase of analysis, the characteristics of the buildings were defined and the limits of architectural intervention were mapped and determined. Figures 4 and 5 show examples of the cartographic definition made in the studio.

As for the second phase, through the study of the socioeconomic parameters of the district, the possible combinations of programming activities necessary for the promotion of social inclusion in the district were extracted.

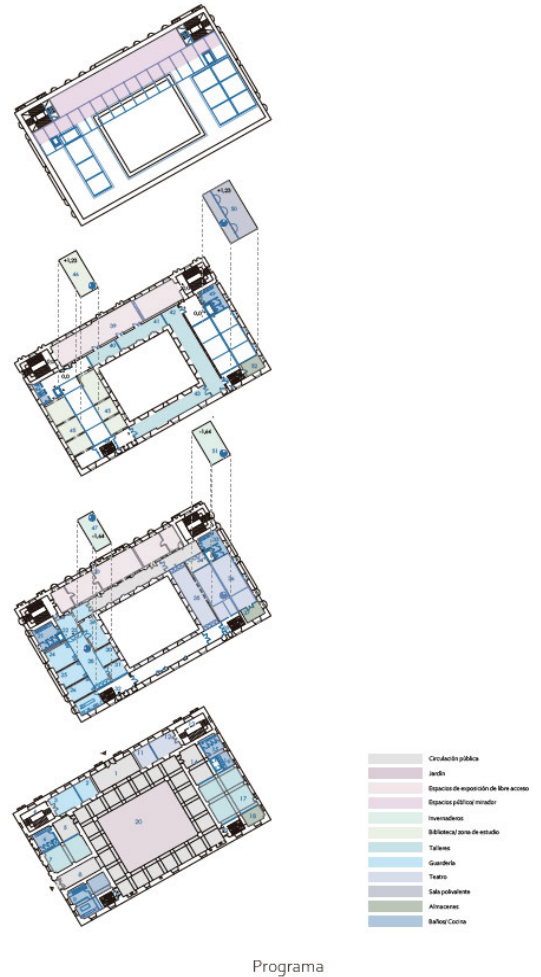


Fig. 6. Reprogramming of activities for the *Old Customs House* building. (Source: Ainhoa Varela and Africa González).

Finally, in the third phase of analysis, the buildings' energy performance together with their passive behavior were studied.

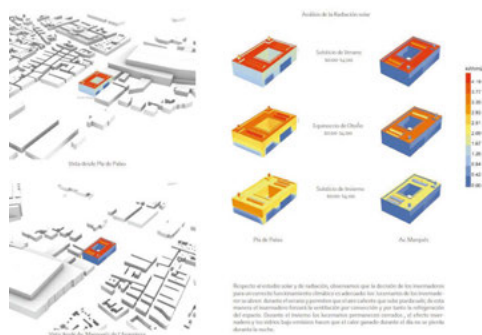


Fig. 7. Analysis of the climatic data, *Old Customs House*. (Source: Ainhoa Varela and Africa González).

The presented methodology to assess the potential and opportunities of a building to be re-used can be applied to any existing building. However, specific regards need to be considered when addressing the re-use assessment of heritage buildings.

In addition to the technical requirements reflected in the codes and the mandatory respect for the protected parts of the building, which already mean a substantial difference in the process of designing and materializing the reuse compared to a non-listed building, there are social and cultural aspects in the reuse of heritage constructions that need special attention. For the strategy of re-use to be more resilient and effective in the long term, the circularity of the approach is key to its success (Barnes, 2006; Bevir, et al., 2003).

3. Conclusions

A methodology for the urban reuse in heritage education has been developed and allows the drawing of conclusions that go along the following lines:

1. At the level of cartography and specification of the current uses in the selected buildings, these have been redrawn in their current state with the uses that are currently present in them. This has made it possible to identify which spaces are fully available and which can vary to adapt to present and future needs.

2. At the level of the current state of the buildings, a pre-diagnosis has been carried out, which includes constructive characterization, description of damage and diagnosis. In the studied buildings, this has led to the conclusion that the buildings are perfectly usable for most current uses. However, specific restoration tasks are necessary, in general, on facades and roofs.

3. At the level of well-being, equity and sustainability analysis (ISEW), a set of available indicators were defined for the city of Barcelona. These allowed the axis of study (where the buildings are located) to be identified as an area of potential at the level of social improvement. During the propositive section, architectural proposals for reprogramming the buildings were developed to change the destination of disused spaces and be able to provide them with new functions in response to the temporary needs of each moment.

Acknowledgements

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References

- Ayuntamiento de Barcelona (2020). Informe de adhesión de Barcelona al programa Agenda 2030. p.119. Available on: <https://ajuntament.barcelona.cat/agenda2030/sites/default/files/2020-10/Informe%20Agenda%202030%20Barcelona%20Fites%20i%20Indicadors%20clau%20Plenari%2027102030.pdf> (Consulted: 28.01.2022)
- Barnes P. (2006). *Capitalism 3.0: A Guide for Reclaiming the Commons*, Berrett-Koehler Pub.
- Bellamy R., Palumbo A., (2010). *From Government to Governance*
- Bevir M., Rhodes R., Weller P., (2003). *Comparative governance: prospects and lessons*. In: Public Administration, Vol 81, Issue 1, pp. 191-210. <https://doi.org/10.1111/1467-9299.00342>

- Cornadó C., Garcia-Almirall P., Vima-Grau S., Vila-Busqued G., Uzqueda, A. (2017). *Methodology for the Detection of Residential Vulnerable Areas – the Case of Barcelona*. In: IOP Conference Series: Materials Science and Engineering, Volume 245, Issue 4. <https://doi.org/10.1088/1757-899X/245/4/042062>
- European Commission (2016). *Próximas etapas para un futuro europeo sostenible. Acción europea para la sostenibilidad*. Available on: <https://eur-lex.europa.eu/legal-content/ES/TXT/?uri=CELEX:52016DC0739&from=EN> PDF (Consulted: 14.01.2022)
- European Commission (2020). *Mainstreaming the circular economy as an eligible area into the post 2020 Cohesion Policy and corresponding Funds*. Available on: https://ec.europa.eu/futurium/en/system/files/ged/action_-_mainstreaming_ce_to_post2020.pdf (Consulted: 14.01.2022)
- Garcia-Almirall P., Vila G., Vima-Grau S., Uzqueda A. (2017). *Estudi i detecció a la Ciutat de Barcelona d'àmbits de vulnerabilitat residencial. Ajuntament de Barcelona*, Universitat Politècnica de Catalunya.
- Garcia-Almirall P., Cornadó C., Vima-Grau S. (2021). *Residential Vulnerability of Barcelona: Methodology Integrating Multi-Criteria Evaluation Systems and Geographic Information Systems*. In: Sustainability, Vol 1, Issue 24, pp.13659. <https://doi.org/10.3390/su132413659>
- Gomà Carmona R. (1997). *Degradació, crisi urbana i regeneració a Ciutat Vella de Barcelona: una anàlisi políticospacial*. In: Documents d'Anàlisi Geogràfica, 30, p. 65-92. Available on: <https://raco.cat/index.php/DocumentsAnalisi/article/view/41776> (Consulted: 14.01.2022)
- Hernández Aja A., Rodríguez Suárez I., Córdoba Hernández R.(Dir.) et. al. (2018). *Vulnerabilidad residencial y social en las grandes ciudades españolas. 2001/2011*; Instituto Juan de Herrera (IJH), 2018; ISBN: 978-84-9728-569-8.
- Istat (2021). *La misurazione del benessere (BES)*. Available on: [https://www.istat.it/it/benessere-e-sostenibilita/C3/A0/la-misurazione-del-benessere-\(bes\)](https://www.istat.it/it/benessere-e-sostenibilita/C3/A0/la-misurazione-del-benessere-(bes)) (Consulted: 28.01.2022)
- Observatorio de la Vulnerabilidad Urbana. Atlas of Urban Vulnerability (AVU); Ministerio de Fomento. Available online: <http://www.fomento.gob.es/MFOM.BarriosVulnerables/>.
- Partnership on Circular Economy and Sustainable Land Use (2019). *Handbook - Sustainable and Circular re-use of spaces and buildings* Available on: <https://ec.europa.eu/futurium/en/circular-economy/handbook-sustainable-and-circular-re-use-spaces-and-buildings.html> (Consulted: 28.01.2022)
- Sanchez Riera A., Roca Cladera J. (2021). *Propuesta metodológica para la determinación del mejor uso en edificios obsoletos de tejidos urbanos consolidados*. In: ACE. Arquitectura Ciudad y Entorno, Vol. 16, Issue 47. <https://doi.org/10.5821/ace.16.47.10448>
- Tanac Zeren M. (2013). Adaptive re-use of monuments “restoring religious buildings with different uses. In: Journal of Cultural Heritage, Volume 14, Issue 3, Supplement, June 2013, Pages S14-S19. <https://doi.org/10.1016/j.culher.2012.11.017>