

## **Heritage adaptation beyond the technical: conflicts and compromise between social, environmental and economic sustainability**

Heritage buildings are physical artefacts that embody the memory of the past in order to guide and inform future generations. Given the strategic role of heritage buildings in shaping national identities, there has been growing research and practical interest in the adaptation of such buildings, particularly in terms of how the adaptation of heritage buildings can contribute to the sustainability agenda (see, e.g. Bullen and Love, 2011; Conejos *et al.*, 2013). Indeed, increasing awareness of climate change and the need to renew cities means that the conservation of heritage buildings has to be considered. Yet, unique traditional designs, coupled with the use of localised materials of the past can create challenges for the adaptation of such buildings.

Early research has therefore focussed on the technical challenges and problems of adapting and refurbishing heritage buildings. For example, Bullen and Love (2011) found that the lack of traditional materials and components, coupled with the challenge of finding skilled labour to handle such materials, means that the adaptation of such buildings is often economically unviable. Dyson *et al.* (2016) identified a number of critical success factors of adaptation, including the need for the design to match the function of the building, commercial risks, and legislation and building codes. In the context of adapting City Hall buildings in Queensland Australia, Mehr and Wilkinson (2018) also found that installing energy-efficient equipment in what are traditional structures are not only technically challenging but also one that can face resistance from local communities. Indeed, more recently, Rispoli and Organ (2019) found that the main challenges of heritage building adaption lie in the ability to communicate and collaborate between stakeholders, and for professionals to be sufficiently skilled to balance the finding of appropriate energy-efficient solutions while maintaining the preservation of heritage values.

Strategies have thus been formulated to holistically manage the economic, environmental and (to a lesser extent) social aspects of sustainability in relation to the adaptation of heritage buildings. Conejos *et al.* (2013), for instance, developed a holistic AdaptSTAR strategy that takes into account physical, economic, functional, technological, legal, political and social concerns. This framework was later applied in a comparative analysis of two iconic nineteenth century heritage buildings in Australia and Hong Kong to examine how the functional, technological and legal attributes that require improvement so as to achieve future adaptivity and environmental sustainability (Conejos *et al.*, 2017). What is common in many of these frameworks and strategies is the desire to create tools to support those involved in adapting heritage buildings to make more informed decisions.

Nevertheless, what marks the adaptation of heritage buildings from other kinds of buildings is the level of uncertainty and imperfection. Littlefield (2017), for instance, reflected on how information about heritage buildings is distinct from other types of buildings, and concluded that heritage buildings embody much of the unknown, often competing and evolving ideas. Whereas information models, especially of new buildings, tend to emphasise exactness, predictability and perfection, information about heritage buildings require the art of negotiation, interpretation and to capture the narratives and stories that matter to the communities that use such buildings. The social aspects are therefore integral to the adaptation of heritage buildings, elements that must be incorporated rather than eradicated from the designs. Indeed, the critical element of the social has also recently been identified in the renovation of buildings more generally.



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Buser and Carlsson (2017) and Tjørring and Gausset (2019) have found that energy retrofits of existing residential buildings is not just (or not even) a technical challenge, but one that is socially constructed as the occupants live in the buildings. Yet, while studies on the adaptation of heritage buildings have recognised the issue of the social, these are often downplayed in favour of addressing economic, environmental and technological ones. In this special issue, we present a collection of papers that, individually and collectively, examine the conflicts and compromises made to adapt heritage buildings with social, environmental and economic concerns in mind.

*The papers in this special issue*

In the first paper of this special issue, Februandari's ethnographic study of what constitutes authenticity in the design of Chinese Indonesians' houses highlights how identity especially of post-diaspora communities is always in flux, and that this struggle to become authentic is inscribed in architectural quality. Through life story interviews, participant observations, house tours and documentary analysis, Februandari analysed and compared two Indonesian Chinatowns in Lasem and Semarang to show how Chinese Indonesians design their homes to find a balance between traditional, modern and Indische (colonial Dutch) styles as they confront seclusion and discrimination as an inauthentic foreigner and assimilate in society. Thus, the design of houses is not simply a technical issue of using local designs and materials to suit the local climate and environment, but also a process of social acculturation as minority and migrant communities find their place in their adopted societies.

While Februandari's analysis shows how heritage buildings can leave traces of identity-in-flux, the second paper by Sharma and Lee emphasises how heritage buildings can also help stabilise one's sense of identity. As dementia becomes a growing problem in aging populations across the world, Sharma and Lee undertook a review study to examine what research has been done to develop dementia-friendly heritage settings. From a sample of 185 studies, and focussing particularly on 19 studies published over the last decade, Sharma and Lee reported how studies have shown that programmes to visit heritage sites can have positive effects for dementia patients by giving them a sense of identity, stability and opportunities to make sense of their condition. Studies have also found the need for heritage objects to stimulate the senses of sight, touch and sound and how designers of heritage programmes for dementia patients should not only emphasise the deficiencies of patients but also take a strengths-based approach to account for the abilities of these individuals. Where the built environment is concerned, there is a need for more longitudinal research to evaluate how the design and adaptation of spaces can lead to improved wellbeing of dementia patients, beyond the narrow concerns of wayfinding.

The third paper in this special issue also focusses on disability in the context of heritage building adaptation. Zahari *et al.* undertook an audit of four heritage buildings in Malaysia, which comprised semi-structured interviews with heritage building operators and "go along" walking interviews undertaken by three wheelchair users. Although there was acknowledgement of the need to improve accessibility of heritage buildings for people with physical disabilities, Zahari *et al.* found that such improvements were not done in practice in part due to financial physical constraints that act as a key barrier to the adaptation of heritage buildings. Moreover, heritage buildings, especially those constructed centuries ago, were never designed with accessibility of disabled persons in mind. Thus, the physical layout of such buildings can lock in logics that make adaptation more challenging.

This challenge of dealing with an existing structure is described in the fourth paper, which describes and analyses the opportunities and challenges associated with the refurbishment of a Grade II listed chapel on the site of Hidcote Manor Gardens in the Cotswold in England. Through a single case study, Organ traced the process of this

refurbishment and how the often-conflicting values of preserving cultural heritage and meeting the modern needs of energy conservation and sustainability are addressed, element by element. While the choice of materials and techniques for refurbishment matter, Organ found that resolving the tensions between economic, environmental and social concerns requires an interdisciplinary project team with strong leadership that can steer the team with clear objectives amidst the unfamiliarity and uncertainties associated with the bringing an historical building up to date.

Finding a balance between competing requirements is also a central theme in the fifth paper by Eriksson *et al.* that, through a case study of the World Heritage Town of Visby in Sweden, examined how conflicts between heritage preservation objectives and the goal of reducing energy use can be resolved. Moving beyond the single building as a unit of analysis, Eriksson *et al.* developed a method that categorised building stock in Visby to find techno-optimal lifecycle solutions based on energy reduction measures while capturing, maintaining and improving heritage value. Through this method, decision-makers at a district, neighbourhood or city scale would be able to formulate differentiated energy renovation strategies to meet the needs of preservation of heritage value and conservation of energy use.

While Eriksson's *et al.* method can facilitate decisions about strategies for renovating heritage building stock, the long-term effects of such decisions will need to be examined as well. In the sixth paper of this special issue, Tunefalk *et al.* undertook a long-term evaluation of retrofitting 1940s buildings constructed in the Årstra area of Stockholm in Sweden. By taking the addition of façade insulation as an example, they noted that policy drivers for retrofitting changed over time; the energy conservation agenda shifted from one that responded to the energy crisis in the 1970s to today's concern over climate change adaptation. Nevertheless, by analysing the energy performance alongside heritage values of these buildings, Tunefalk *et al.* found that while additional insulation did result in better energy performance, it is also the case that heritage values suffered as a result.

This tension in balancing between improving energy performance of heritage buildings and the preservation of heritage values continues in the final paper of this special issue. Whitman *et al.* undertook quantitative and qualitative comparative analysis of three timber-framed buildings in the UK, including a fifteenth century Cruck Hall in the Wye Valley restored between 2000 and 2012 to become holiday accommodation today; a private residence on the Brockhampton Estate in North East Herefordshire let by the National Trust, and; a Grade II listed former farmhouse converted into a private residence. Through simulations of various retrofit strategies and analysis of occupants' perceptions of thermal comfort, Whitman *et al.* found that it is possible technically to improve the thermal performance of infill panels by incorporating well-detailed and well-installed insulation coupled with consideration of airtightness. Yet, what is technically possible also means that the defining heritage feature of the exposed timber frame can also be lost. It would seem, therefore, that a compromise is often the case in retrofitting heritage buildings for better energy performance.

### *Closing reflections*

As already mentioned, heritage buildings play a vital role in linking the past to experiences of the present and projections of the future. Throughout the papers in this special issue, this temporal connection between history and the future features heavily in the papers, from examining what authenticity means to Indonesian Chinese householders in Februardari's ethnographic study, to the evaluation of historic buildings in Organ's and Whitman's *et al.* analyses, to Tunefalk's *et al.* review of 1940s housing in Sweden. What these studies add to existing studies of heritage building adaptation is to take into account a more longitudinal analysis of the impacts of adaptation strategies. Unlike most research that tended to focus on developing decision-support frameworks and tools to initiate adaptation projects, the studies featured in this special issue examine the impacts, often over a long period of time, of adaptation choices.

While environmental and economic concerns are still critical, these analyses also foreground the important element of the social, capturing, for instance, the experiences of patients living with dementia (Sharma and Lee) or visitors with disabilities (Zahari *et al.*). It is worth noting, nevertheless, that whereas the community is not always problematized as a plural, heterogeneous and often-conflicting entity in previous studies, Februardari's study reminds us of the dynamic and ever-changing character of the communities for which these heritage buildings serve. Thus, as Churchill famously remarked, we make buildings as much as buildings make us. It is therefore vital that future research considers how social groups change over time, with inevitable consequences for changes in designing and executing adaptations. Furthermore, this opens up questions not only of how heritage buildings help societies remember, but also how such buildings re-member societies and associated cultural identities (see Suddaby *et al.*, 2016).

A corollary of taking a more dynamic approach to managing stakeholders lies also in moving the analysis towards methodologies that help visualise the effects of decisions. It is through walking about in Zahari's *et al.* study, or visualising the tensions between finding techno-optimal energy-efficient solutions and heritage values in Organ's or Eriksson's *et al.* studies that these more dynamic methodologies can open up conversations between stakeholders in order to identify where the conflicts lie and what compromises can be made. These methodologies go beyond early explorations of critical success factors often based on the perceptions of practitioners, to incorporate the experiences and views of end-users.

Finally, it is worth mentioning that the papers selected for this special issue have tended to focus on residential and cultural heritage buildings. What seems to be missing is analyses of heritage buildings of work and industrial importance. Whitman's *et al.* analysis of timber-framed buildings, which highlighted an historical overview of how such architectural style was in part a response against industrialisation, points to the significance of industrial heritage. Elsewhere, Mulholland *et al.* (2018, 2019) also show how the adaptation of industrial heritage can generate social value and contribute to the sustainable development (or decline) of local communities. There is therefore scope for future research to examine the role adaptation of industrial heritage buildings in defining the ways societies live, work and play.

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## References

- Bullen, P.A. and Love, P.E. (2011), "Adaptive reuse of heritage buildings", *Structural Survey*, Vol. 29 No. 5, pp. 411-421.
- Buser, M. and Carlsson, V. (2017), "What you see is not what you get: single-family house renovation and energy retrofit seen through the lens of sociomateriality", *Construction Management and Economics*, Vol. 35 No. 5, pp. 276-287.
- Conejos, S., Chew, M. and Yung, E. (2017), "The future adaptivity of nineteenth century heritage buildings", *International Journal of Building Pathology and Adaptation*, Vol. 35 No. 4, pp. 332-347.
- Conejos, S., Langston, C. and Smith, J. (2013), "AdaptSTAR model: a climate-friendly strategy to promote built environment sustainability", *Habitat International*, Vol. 37, pp. 95-103.

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- Dyson, K., Matthews, J. and Love, P. (2016), "Critical success factors of adapting heritage buildings: an exploratory study", *Built Environment Project and Asset Management*, Vol. 6 No. 1, pp. 44-57.
- Littlefield, D. (2017), "Heritage and time: mapping what is not there", in Arayici, Y., Counsell, J., Mahdjoubi, L., Nagy, G., Hawas, S. and Dewidar, K. (Eds), *Heritage Building Information Modelling*, Routledge, London, pp. 32-44.
- Mehr, S.Y. and Wilkinson, S. (2018), "Technical issues and energy efficient adaptive reuse of heritage listed city halls in Queensland Australia", *International Journal of Building Pathology and Adaptation*, Vol. 36 No. 5, pp. 529-542.
- Mulholland, C., Chan, P.W. and Canning, K. (2018), "Deconstructing social value in decommissioning: a case study of industrial heritage at Dounreay", in Raiden, A., Loosemore, M., King, A. and Gorse, C. (Eds), *Social Value in Construction*, Routledge, Abingdon, pp. 194-207.
- Mulholland, C., Ejohwomu, O. and Chan, P.W. (2019), "Spatial-temporal dynamics of social value: lessons learnt from two UK nuclear decommissioning case studies", *Journal of Cleaner Production*, Vol. 237.
- Suddaby, R., Foster, W.F. and Trank, C.Q. (2016), "Re-membering: rhetorical history as identity work", in Pratt, G., Schultz, M., Ashworth, B.E. and Ravasi, D. (Eds), *The Oxford Handbook of Organizational Identity*, Oxford University Press, Oxford, pp. 297-316.
- Rispoli, M. and Organ, S. (2019), "The drivers and challenges of improving the energy efficiency performance of listed pre-1919 housing", *International Journal of Building Pathology and Adaptation*, Vol. 37 No. 3, pp. 288-305.
- Tjørring, L. and Gausset, Q. (2019), "Drivers for retrofit: a sociocultural approach to houses and inhabitants", *Building Research and Information*, Vol. 47 No. 4, pp. 394-403.

**Further reading**

- Misirlisoy, D. and Günçe, K. (2016), "Adaptive reuse strategies for heritage buildings: a holistic approach", *Sustainable Cities and Society*, Vol. 26, pp. 91-98.