https://doi.org/10.1038/s43017-024-00609-y

Focusing on architectural beauty to reduce construction waste

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Construction and demolition waste is the most substantial waste stream in developed countries, prompting policymakers to enhance circularity, recycling and recovery rates. While strategies that simplify deconstruction and promote material reuse are important, prioritizing architectural beauty offers a compelling solution to extend the lifespan of buildings, reduce construction waste and enrich urban environments.

Historic buildings occupy a unique place in the public consciousness, valued for their aesthetic appeal and as icons of history and culture. Extraordinary architectural works often find adaptive uses, allowing them to serve multiple generations and increase in value over time. These structures, through careful conservation, adaptation and maintenance, have endured for centuries. By stark contrast, many contemporary buildings are designed with a limited lifespan — often around 60 years, as dictated by building norms. This modern approach inherently anticipates eventual obsolescence and demolition, emphasizing a transient and utilitarian view of architecture that differs substantially from the enduring legacy of historic structures. There is often also a notable lack of emphasis on ensuring that new constructions strive for the same high standards of quality and beauty that characterized historic architecture. Though some contemporary buildings break this trend — such as the Guggenheim Museum, Bilbao; Gardens by the Bay, Singapore (Fig. 1); or the Vessel at Hudson Yards, New York — they are exceptions rather than the norm. These iconic structures contrast sharply with the repetitive, profit-driven architecture that dominates much of today's urban landscape. This Comment advocates for prioritizing architectural beauty to enhance building durability and reduce the generation of construction waste.

From beauty to utility

It is important to note that today's historic buildings were once contemporary works. However, over time, the emphasis on aesthetic value in architecture has diminished, leading to shorter lifespans for modern buildings. The pursuit of novelty has overshadowed the creation of structures meant to endure. The 'form follows function' principle[1,2] marked a shift away from aesthetic considerations and instead promoted functionality. While this approach promotes efficiency in terms of speed and cost of construction by delivering only what is necessary for the building to fulfil its role, it also aligns with the interests of investors who benefit from the rapid turnover of function-oriented building structures that often lack lasting value beyond their immediate utility.

Despite the broad consensus among policymakers and scholars that waste prevention is the most effective strategy for waste mitigation, the primary focus of current AEC (architecture, engineering and construction) research and policymaking remains on the lower tiers of the waste hierarchy — such as optimizing disposal methods, enhancing energy recovery, improving recycling processes and preparing materials for reuse.

The current emphasis on enhancing material recoverability rates through recycling and reuse presents a new challenge to the quality of urban environments. Buildings are increasingly viewed as mere repositories of materials, or 'urban mines', designed primarily for their capacity to serve a specific function and subsequently provide components for future constructions. This perspective risks reducing architecture to a utilitarian approach that overlooks the importance of creating lasting and aesthetically pleasing urban landscapes.

A call for beauty and sustainability

Among researchers and practitioners in the reuse field, there is a growing advocacy for embracing a new aesthetic characterized by patchwork and collage. Architects of the reuse field are often faced with a limited supply and variety of salvaged components, restricting their material choices and presenting design challenges. Academic institutions are preparing a new generation of architects to adopt this approach in their work[3] and to consider the intersection of circularity and aesthetics in a creative process[4]. While this shift is commendable, particularly when executed by skilled professionals, architecture is frequently driven by contractors or large developers who view the substantial time and effort required to transform reused materials into beautiful, durable objects as an unnecessary burden. This attitude of contractors and developers poses a substantial threat to the quality of urban surroundings, as it often leads to uninspired architecture that lacks aesthetic and cultural value.

Architecture — fundamentally an art form — is meant to evoke emotions, an idea supported by emerging neurological studies suggesting that certain architectural forms and spaces can stimulate emotional responses in the human brain[5]. Beauty and emotion are intrinsically linked[6]; perception of beauty is deeply rooted in our emotional experience. Throughout history, great masters of architecture have placed aesthetic values at the core of their practice; for example, as early as the first century BCE, Vitruvius identified "*venustas*" (beauty) as one of the three essential principles of architecture.

The connection between architectural beauty and the state of society remains profoundly relevant today. When people are moved by emotions stimulated by architecture, they are more likely to take action to preserve and maintain the structures that elicit such sentiments. Therefore, beautiful buildings have the potential to endure for centuries, much like the architectural masterpieces of the past. Durability of the modern built environment is a key to economic, social and environmental sustainability[7].

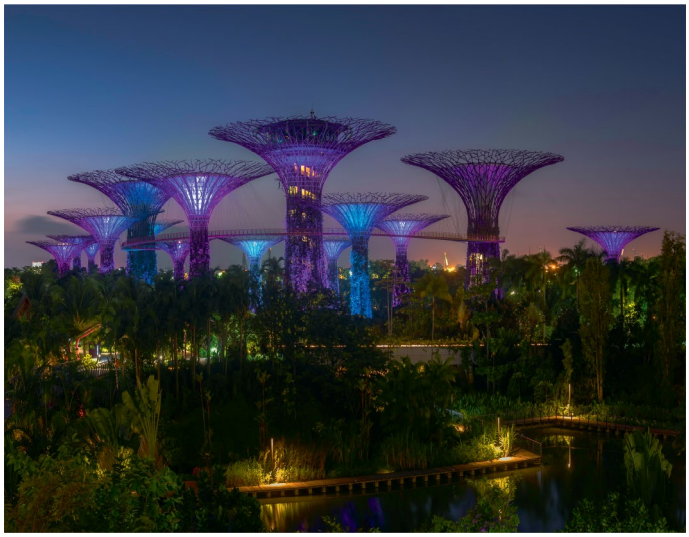

Fig. 1 | Gardens by the Bay, Singapore. An example of modern-day durable and beautiful architecture.

Challenges and solutions

Throughout the twentieth and twenty-first centuries, the growing demand for rapidly expanding cities and the urgent need to provide affordable housing and functional structures forced generations of architects to let beauty slip down the ladder of priorities. Architects lamented this degradation for decades, but their concerns were often dismissed as mere vanity. Today, the consequences of this grave oversight are being realized. Many cities have become filled with soulless structures — millions of cubic metres of building stock with lifespans of only a couple of decades before they become unfunctional. These buildings often lack intrinsic value beyond the materials from which they are made — or, worse, are valued only for the land they occupy — and, as such, are destined to be demolished rather than restored or refunctioned, and become part of the ever-growing problem of construction demolition waste.

To address this, a dramatic shift in policy is urgently needed. Independent public design review panels, composed of architects, urban planners, artists, cultural experts and community representatives should be established to evaluate substantial new developments to ensure they uphold aesthetic excellence while enhancing the quality of shared urban spaces. Policy incentives for aesthetic value must be introduced to encourage projects that contribute to the cultural and emotional fabric of communities. These incentives could include grants, tax breaks or expedited permitting processes for developers prioritizing beauty in their designs. Adaptive reuse of existing buildings, which are valued for their aesthetics by the communities they serve, should be promoted through policies favouring renovation over demolition.

Additionally, funding programmes should be established to support craftspeople and builders who focus on high-quality, durable construction that integrates reused materials in aesthetically pleasing ways, thus ensuring beauty and circularity do not compete but complement each other. Art must be urgently reintroduced into building design by involving artists alongside architects from the outset of the design process. Initiatives such as Percent for Art[8] and Kunst am Bau[9], which allocate a percentage of the construction budget towards the inclusion of artwork in an architectural project, should be widely applied and extend beyond mainly just public sector projects. The example of the Vessel at Hudson Yards is a fine but rare case of private investors generously contributing towards art in construction. Tools for measuring objective beauty based on neuroscience[10], such as the Buras beauty scale, which assesses the immediate, instinctive response to an object, or Visual Attention Software, which tracks people's visual attention in the context of architecture, should also be implemented. All the above comprehensive and wide-ranging actions are necessary to reverse the current trends of transient and utilitarian architecture.

While wealthy and developed countries are often privileged to be able to invest heavily in beautiful architecture, it is important to emphasize that true beauty transcends economic boundaries. Remarkable examples of circular, elegant buildings in less-developed countries, such as the Lycée Schorge Secondary School by Kéré Architecture in Burkina Faso, demonstrate how community involvement can offset limited funds, achieving sustainability and empowerment through local collaboration.

In conclusion, a shift in focus is needed, from merely viewing buildings as material repositories to recognizing them as enduring cultural artefacts that contribute to the aesthetic and emotional fabric of cities. Architecture that stands the test of time and resonates deeply with the people who inhabit it can be produced by prioritizing beauty as a technique to preserve the built environment and prevent demolition, ensuring that buildings are cherished for generations rather than becoming demolition waste.

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Published online: 24 October 2024

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Acknowledgements

The author thanks J. Pallasmaa for his comments on an initial draft.

Competing interests

The author declares no competing interests.