

Chapter 12

Integrating Upcycling and Biomaterials to Rethink Waste in Sustainable Design

Pınar Öztürk Demirtaş

 <https://orcid.org/0000-0001-7237-4974>

Istanbul Ticaret University, Turkey

Çınar Narter

 <https://orcid.org/0000-0002-1043-2232>

Istanbul Ticaret University, Turkey

ABSTRACT

Sustainable design is considered an important tool in combating environmental problems. In this article, biomaterial and upcycling approaches that have the potential to encourage societies and industries to design more responsibly, as well as the production of environmentally sensitive and sustainable products, are discussed. Therefore, the use of more innovative and effective methods such as biomaterials and upcycling in design is gaining importance. In this context, examples from different fields such as architecture, textile, industrial design, and studies conducted in the field of design and education will be given regarding the use of these methods. In the education, focusing on topics such as the use of biomaterials and upcycling, the responsibility of designers to design products that are not only aesthetic and functional but also environmentally responsible will be emphasized. As a result, it will be discussed with examples for designers, academics and industry professionals that they can become powerful tools in sustainable design.

DOI: 10.4018/979-8-3373-0862-3.ch012

INTRODUCTION

The climate crisis, global environmental issues, waste problems, and the rapid depletion of natural resources have made radical changes in production and consumption systems inevitable. The concept of “Sustainability”, which emerged as a response to the future concerns caused by climate change resulting from global warming, the depletion of natural resources, and the disruption of the natural balance, has become a common approach in various fields in recent years. Sustainability is defined as sustaining, continuing, supporting, and existing (Tıraş, 2012, p.59). It first entered the agenda in the 1960s through discussions and studies on environmental awareness. Later, it was formally defined in the 1987 report titled “Our Common Future” (the Brundtland Report), which gathered the decisions made by the World Commission on Environment and Development established by the United Nations. According to the report, sustainability means “meeting the needs of the present without compromising the ability of future generations to meet their own needs.”

Today, the most important issue for sustainability is the consumption habits of societies. Especially in consumer societies, the race to purchase “new products” has led to a problem of rapid obsolescence and waste. This is a critical issue that needs to be addressed in every new product design. At this point, adopting sustainable approaches in design is one of the most important priorities. It has become necessary to consciously use design as a tool for sustainability and to spread this approach widely. Since the 1980s, “Design for Environment” practices have been limited to the production of ecological products. However, this is not sufficient on its own to ensure future sustainability. Traditional waste management models are built around the 3R principle (Reduce, Recycle, Reuse). However, these strategies are often insufficient to reduce the long-term environmental impacts of waste materials. In sustainable design approaches, methods such as recycling and using ecological raw materials have limited impact. There is a need for more effective methods that can create lasting behavior changes in society. For an effective solution, it is necessary to initiate both individual and societal behavioral changes.

The concept of sustainability in design has undergone significant transformation. It is no longer limited to traditional waste reduction strategies but includes more comprehensive approaches. This study aims to explore how environmental awareness can be created in societies, how habits and behaviors can be changed, and how designers and manufacturers can proceed with these environmentally friendly design methods.

For this purpose, the study will focus on two sustainable approaches and analyze designs created using these approaches, along with examples from design education. By examining the intersection between industrial design and advanced sustainability, this research aims to highlight the critical role of design in alleviating environmental

36 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/integrating-upcycling-and-biomaterials-to-rethink-waste-in-sustainable-design/402770

Related Content

Localisation of Indigenous Content: Libraries and Knowledge Centres and the Our Story Database in the Northern Territory

Jason Gibson, Brian Lloyd and Cate Richmond (2011). *ICTs for Global Development and Sustainability: Practice and Applications* (pp. 151-175).

www.irma-international.org/chapter/localisation-indigenous-content/47135

Framework for Sustainable Transformative Learning: Promoting Changes for Sustainability

Lisiane Celia Palma and Eugênio Ávila Pedrozo (2022). *International Journal of Social Ecology and Sustainable Development* (pp. 1-17).

www.irma-international.org/article/framework-for-sustainable-transformative-learning/298336

Sustainable Tourism Practices in Mountain Regions and Its Impact on Tourism Sectors: A Case Study of India

Kuldeep Singh, Sanjeev Kumar, Sujay Vikram Singh and Arnab Gantait (2025). *Balancing Mountain Tourism, Cultural Heritage, and Environmental Stability* (pp. 513-522).

www.irma-international.org/chapter/sustainable-tourism-practices-in-mountain-regions-and-its-impact-on-tourism-sectors/378867

Analysis Sustainability of Women's Leadership for Watershed Conservation in the Urban Area

Donna Asteria and Herdis Herdiansyah (2020). *International Journal of Social Ecology and Sustainable Development* (pp. 38-50).

www.irma-international.org/article/analysis-sustainability-of-womens-leadership-for-watershed-conservation-in-the-urban-area/246087

Unveiling the Ecological and Geopolitical Contradictions of Large-Scale Development Initiatives: A Critical Analysis of the Belt and Road Initiative

Shruti Rathore and Judith Anne Lal (2026). *Critical Approach to Sustainability Discourse and Action in International Relations* (pp. 121-150).

www.irma-international.org/chapter/unveiling-the-ecological-and-geopolitical-contradictions-of-large-scale-development-initiatives/391028