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## Urban Furniture in the Framework of Economic, Social, and Environmental Sustainability

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### Abstract

Urban furniture plays an important role in the making of sustainable cities and the need to incorporate sustainability requirements into the manufacture of urban furniture has been a part of ongoing debate for the last few decades and numerous studies have been performed on sustainable urban furniture. Notwithstanding above, there is only a limited number of integrated studies that address urban furniture with all its aspects associated with sustainability. Whereas, urban sustainability is a doctrine which is practically concretized with economic, social, and environmental aspects thereof. Accordingly, the present study investigates the material, production, and design stages of urban furniture in social, economic, and environmental contexts, and suggest recommendations regarding the necessary qualities of sustainable urban furniture. These recommendations include utilization of natural and local materials in the design of urban furniture, re-usability of the material, easy supply opportunities, durability against external factors, accidents, and vandalism, compliance with manufacture standards, allowing local intervention in case of damage, use of environmentally friendly technologies in production and design, suitability for long-term use, compatibility of design with the identity of the urban space in which it is located, arrangement and positioning in a way that allows its users to establish social relations, accessibility, and ability to serve all members of the society as much as possible.

### Keywords

Urban furniture; Sustainability; Economic sustainability; Social sustainability; Environmental sustainability.

### 1. Introduction

Urban furniture plays an important role in creating the image of the city and emphasizing the identity of the city (Arruda et al., 2017) and therefore it is one of the most important elements that decide the relationship between urban space and residents. Urban furniture strengthens community life and social relations by means of creating environments for rest, seating, and dining, and having social encounters with others (Yücel, 2013). Urban furniture not only serves the functional use of the urban space, but also, as an important part of the urban space, has an impact on the visual beauty of the city, development of tourism, cultural and historical effects of the city, its sustainable development, and welfare (Pahlavani, 2021), thanks to its quantity, beauty, and durability (Allahdadi, 2017).

Urban furniture plays an important role in the creation of sustainable urban spaces and improving the urban environment quality. In the context thereof, it is important to adopt sustainable design approaches in both material selection, and production and design stages of urban furniture.

There have been many recent studies on urban furniture in terms of economic sustainability (Nasser, 2013; Friedman, 2021), social sustainability (Siu and Wong, 2015; Allahdadi, 2017; Rinaldi et al., 2018; Hacıoğlu et al., 2021) and environmental sustainability (Fan and Feng, 2019; Tereci and Atmaca, 2020; Liebenberg, 2022). Nevertheless, there is only a limited number of integrated studies that address urban furniture based on all the three domains of sustainability. As a matter of fact, sustainable practices towards urban furniture make up a meaningful whole with

their economic, social, and environmental dimensions. Economic issues, social conflicts, and environmental degradation can only be resolved if addressed through a broader perspective. If it is designed with a holistic approach, urban furniture can make an economic contribution to the city, strengthen social relations, and help reduce environmental problems. Thus, urban furniture is a significant urban component that meets the physical, social, cultural, psychological, and ideological needs of users (Lee and Chan, 2008; Siu, 2007) and makes urban spaces more sustainable and efficient. In the context thereof, the present study aimed to emphasize the economic, social, and environmental importance of urban furniture and accordingly suggest design recommendations.

## 2. Sustainability and Urban Furniture

The concept of sustainability has become a center of attraction as a result of the tensions associated with global climate and energy crisis, environmental problems, and social inequalities as emerged with the rapidly increased world population, and social and environmental sustainability have gained increased significance across the globe (Giovannoni and Fabietti, 2013). Sustainability is closely related to the economy, society and environment concepts (Munier, 2005) and aims to prevent global warming, reduce environmental pollution, protect natural resources and carry them towards the future, strengthen social relations, and raise people's living standards (Yadav et al., 2021; Panwar et al., 2011; Rogers et al., 2012). In the context thereof, the aim of sustainability is to meet the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987).

Sustainability has also been one of the main concepts across urban planning practice. It offers a broadly integrated approach to the revitalization, development, and reform of cities and regions in economic, environmental, and social performance terms (Basiago, 1998). For instance, sustainability aims to provide economic viability in cities upon focus on economic sustainability, effective design, and good management, planning, and control (Tredwell, 2004). Similarly, social sustainability means protecting and improving the welfare of current and future generations (Chiu, 2003), and help make cities socially sustainable

by means of preservation of local characteristics, ability to fulfill psychological needs, accessibility and provision of social infrastructure (Chan and Lee, 2008). Environmental sustainability (Morelli, 2011) is positioned at the intersection point of human activities and ecological systems, and provides a balance between society, nature, and the built environment during urban interventions.

Urban furniture plays an important role in the making of sustainable cities and the need to incorporate sustainability requirements into the manufacture of urban furniture has been a part of ongoing debate for the last few decades. As a matter of fact, in today's world, healthy and sustainable city concept is prioritized and urban areas are envisaged by means of more habitable, inclusive, and sustainable design strategies, and further, urban furniture is an important contributor in the support of sustainability.

It is important and required to consider urban furniture, which is shaped by many factors such as user needs, social structure, urban texture, geographical features, economy, technology and materials (Kaya et al., 2022), in combination with the three basic components of sustainability. In this context, sustainable design strategies built upon economic, social, and environmental pillars, should be considered in the manufacture of sustainable urban furniture.

It is necessary to consider the investment, production, use, maintenance, and repair costs in order to ensure that urban furniture is economically sustainable. As a matter of fact, economic sustainability is closely associated with the concepts of construction, demolition, materials, labor, and therefore, cost. Furthermore, urban furniture has the potential to make economic contribution to the city. Accordingly, it is important that urban furniture possesses aesthetic qualities and help make the region interesting for both domestic, and foreign tourists.

Closely related to the concept of social equality, the social sustainability notion requires that urban furniture is considered through a universal design approach. This approach, also known as inclusive design, can be defined as making all designs and environments appealing to users of all ages, genders, races, and abilities to the extent it is possible,

from macro scale to micro scale. Therefore, it is expected that urban furniture that features social sustainability is designed in accordance with the universal design approach. Social sustainability also requires consideration of social value judgments, cultural accumulations, and the actions and habits of the society. In other words, it is similarly important that urban furniture is arranged and positioned in a way that allows users to establish social relations, that it is compatible with the identity of the urban space it is located in, and reflects cultural continuity and diversity.

Environmental sustainability aims to preserve biodiversity and atmospheric stability, and thus promotes renewable resource systems and efficient use thereof. Accordingly, it is expected that urban furniture is designed and produced based on an environmentally friendly approach with its materials complying with environmental standards. In the context thereof, important criteria include prioritizing natural and local materials in the production of environmentally sustainable urban furniture, efficient use of resources, and minimizing the damage to the environment during production.

### **3. Economic, Social, and Environmental Sustainability in Urban Furniture**

Urban furniture plays an important role in improving the quality of urban areas and adds value to the representation of urban identity and therefore it is important and necessary to consider urban furniture in combination with the social, environmental, and economic dimensions of sustainability. For instance, urban furniture is one of the determinant factors as regards the image, quality, and environment of the city (Krauel, 2007), and in the respect thereof, they prove to be important tools to promote local culture and strengthen the image of the city (Trang, 2018). Urban furniture can also foster or prevent the behaviors of users, support different codes of conduct, or express the values of a society (Wirdelöv, 2020). Urban furniture also has an economic dimension in addition to the social aspect above. For instance, the use of easily available local materials, environmentally friendly production technologies, and long-term designs contribute to urban economies in the light of economic sustainability; whereas, unconscious consumption of natural resources and raw materials may lead to global economic losses. Approaches

in consideration of environmental sustainability, including efficient use of natural resources in the manufacture of urban furniture, reducing amount of waste, and ecological material choices etc., are essential to leave a better world to future generations.

#### **3.1. Material Selection in Urban Furniture**

The materials topic covers both economic, social, and environmental qualities in the context of sustainability. For example, the depletion of natural resources and unavailability of raw materials complicates procurement of materials, which not only affects local economies but also global economies in financial terms. As a matter of fact, economic sustainability prioritizes the use of sustainable materials and recycled resources (Sewardono, 2022). The toxic and harmful materials may lead to environmental pollution, and therefore the use of such materials is associated with a series of environmental problems from climatic problems to disruption of ecological balance. Production and assembly stages are as important as the quality of the materials (Ons, 2023). The correct and appropriate use of natural materials can ensure that the final product would look beautiful and sustain positive effects on the environment and human health. Although today's technology can replicate natural materials to an extent, the replicated materials may not demonstrate the mechanical, acoustic, or thermal properties of the original materials (Ulay and Yeler, 2020).

Material also encompasses social and cultural qualities. It conveys the urban identity, history, and culture to the users and visitors of the urban space (El-Ghonaimy, 2020). For instance, the colorful ceramics of the Park Güell in Barcelona, Spain, are an important part of the urban identity. In the sense thereof, use of location-specific materials in the urban furniture that would reflect historical and cultural values may also serves as an important design input.

#### **3.2. Manufacture and Design Stages in Urban Furniture**

The manufacture stage, combined with maintenance and repairs thereof, is associated with an economic cost. For instance, manufacture of urban furniture outside standard production patterns may bring an extra cost. Similarly, manufactures that are not suitable for long term use may increase consumption. Maintenance and repair costs

should also be considered during the production phase of urban furniture. Accordingly, it is important to adopt an approach that would allow local interventions in such cases as replacement and repairs during the manufacture and design phase. In terms of economic sustainability, urban furniture plays a role in the economic development of cities as well. Therefore, design of urban furniture that could provide aesthetic added-value to the city is important.

Social sustainability requirements should also be taken into account during the production and design stage. For example, in some societies, privacy is an important phenomenon. Male and female users often act separately especially in Muslim countries. Therefore, it is necessary to design the urban furniture in accordance with the cultural and social values of the country and region (Askarizad and He, 2023). Accessibility is also important as a measure of the quality and operational effectiveness of the community in urban furniture in the context of social sustainability (Grava, 2003). Furthermore, where and how they are positioned in the design of urban furniture also constitutes an important part of the design. On the other hand, urban furniture is important urban equipment that helps the society with establishing social relations. Urban furniture should be considered on the basis of a design approach that makes life easier for all members of the society and increases the quality of life of the urban residents. This is because of the fact that urban furniture is an important element that strengthens not only the relationship between the city and its residents, but also the interrelationship of the residents.

It is important to adopt environmentally friendly approaches in the manufacture and design phase of urban furniture, protect the environment, and maintain a balance between people and ecosystems. Use of environmentally friendly technologies and clean energy sources in manufacture, saving energy, and developing highly efficient designs are important approaches for environmental sustainability.

### 3.3. Qualities of Economic, Social, and Environmental Sustainability That Should Be Included in Material Selection, Production, and Design Stages of Urban Furniture

Sustainability has a special importance especially for cities and the residents living in them. This is because, the

environmental pollution, climatic problems, economic problems, and disconnections in social relations are rather urban problems. Urban furniture, an important component of cities, is a major element that contributes to the sustainability of cities in that regard. As a matter of fact, there are a number of previous studies, which reported that urban furniture with sustainable qualities increased the quality of urban living spaces (Aziz, 2013; Siu and Wan, 2011), benefited the society and urban development (Allameh and Heidari, 2020), had social importance in terms of providing the city residents with opportunity to enjoyment (Sewandono, 2022), that urban furniture with sustainable features would contribute to the creation of spaces, where users would want to spend time (Liebenberg, 2022), and that urban furniture strengthened the urban identity (Ginting et al., 2018).

The sustainability concept introduces a holistic approach featuring economic, social, and environmental domains. That approach ensures a balance between human and natural systems in all production levels and environments, from product scale to urban scale. In the context thereof, the qualities that should be included in the material selection, production, and design stages of sustainable urban furniture can be listed as follows:

- Use of natural and local materials;
- Choice of reusable material;
- Use of non-toxic, healthy materials;
- Choice of highly available materials;
- Choice of materials are resistant to climatic conditions;
- Durability for accidents and vandalism;
- Materials' compliance with production standards;
- Allowing local intervention (replacement and/or repairs) in case of damage;
- Use of low-maintenance materials;
- Efficient use of resources in production and supply;
- Use of environmentally friendly technologies in production;
- Minimized amount of waste in production;
- Production for long term use;
- Design of energy-saving and high-efficiency furniture;

- Designs that reflect cultural continuity and diversity;
- Compatibility with the identity of the urban space in which urban furniture is located;
- Arrangement and positioning in a way that allows users to establish social relations;
- Design and positioning pursuant to the value judgments, actions, and habits of the society;
- Serving all members of the society to the greater extent possible;
- Accessible;
- Featuring qualities that would provide aesthetic added-value to the city;
- Choice of versatile designs.

#### 4. Discussion

The present study investigated the material, production, and design stages of urban furniture in social, economic and environmental contexts, and suggested recommendation as regards the necessary qualities of sustainable urban furniture.

Selecting the materials is one of the most important issues in the context of sustainable urban furniture. Along with the fact that the material is use should be environmentally friendly, locally available, and natural, it should also be fit for reuse and easy to provision for the purposes of ensuring sustainability. Similarly, sustainable approaches should be adopted in the production and design processes of urban furniture. In the context thereof, efficient use of resources, minimized waste and accommodation of environmentally friendly technologies would contribute not only to the economy, but also to minimization of the damage to the environment, and further, to protection of public health.

The social dimension of sustainability is as important as its economic and environmental dimension for the purposes of urban furniture design. As a matter of fact, urban furniture, an important component of the city, contributes to the image and identity of the city. It also strengthens social relations. In the respect thereof, the actions and habits of the society should be taken into consideration in the design of urban furniture, and an inclusive design approach should be adopted so as to ensure that designs benefit as many users as possible.

#### 5. Conclusion

Emerged as a result of environmental pollution, global climate and energy crisis, the concept of sustainability is a hot topic for a range of disciplines, especially architecture and urbanism. In particular, wrong urban policies, which are at the root of environmental problems, have prompted city planners to develop sustainable urban design approaches. Urban furniture has a deep-rooted history as early as the cities themselves, and is an important element of sustainable urban approaches. Addressing all aspects of sustainability in urban furniture, responding to the functional needs of the city and strengthening the social relations of the citizens, is a necessary approach not only for the welfare of today's cities and societies, but also for future generations.

As emphasized throughout the present study, all the three components of sustainability are essentially interrelated, and all the three components should be taken into account both in choice of material and in the production and design process.

As a consequence, sustainable urban furniture envisaged in combination with the three components of sustainability, namely the economic, social, and environmental components, has an important potential in terms of providing economic contribution at both local and global scales, minimizing environmental problems, and strengthening the relations between the city and society.

#### Conflict of Interests

The author declares no conflict of interests.

#### References

- Allahdadi, M., 2017. Explaining the criteria of designing urban furniture and landscape, with a cultural-social design approach, *Journal of History Culture and Art Research*, 6(4), 165-175
- Allameh, E., Heidari, M., 2020. Sustainable street furniture. *Periodica Polytechnica Architecture*, 51(1), 65-74
- Arruda, A., Moroni, I., Bezerra, P., Silva, P., de Paiva, R.B.F., *Practical urban: The urban furniture and its relationship with the city*, in: *Advances in Ergonomics Modeling, Usability &*

- Special Populations, Springer: Berlin/Heidelberg, Germany, pp. 413–423.
- Askarizad, R., He, J., 2023. Gender equality of privacy protection in the use of urban furniture in the Muslim context of Iran, *Local Environment*, 1-20.
- Aziz, A., 2013. Sustainability of street furniture design in urban Malaysia, Doctoral dissertation, Universiti Putra Malaysia, Malaysia.
- Basiago, A. D., 1998. Economic, social, and environmental sustainability in development theory and urban planning practice, *Environmentalist*, 19(2), 145-161.
- Chan, E., Lee, G. K., 2008. Critical factors for improving social sustainability of urban renewal projects. *Social indicators research*, 85, 243-256.
- Chiu, R. L. H., 2003. Social sustainability, sustainable development and housing development: The experience of Hong Kong, in R. Forrest, J. Lee (eds.), *Housing and social change, East-west perspectives*, Routledge, USA, pp. 221–239.
- El-Ghonaimy, I. H., 2020. Street furniture influence in revitalizing the Bahraini identity, *Journal of contemporary urban affairs*, 4(1), 11-20.
- Fan, K. K., Feng, T. T., 2019. Discussion on sustainable development strategies of the traditional handicraft industry based on su-style furniture in the ming dynasty, *Sustainability*, 11(7).
- Friedman, A., 2021. Public art and street furniture, in: *Fundamentals of sustainable urban design*, Springer, Cham.
- Ginting, N., Rahman, N. V., Nasution, A. D., Loebis, M. N., Sinaga, F. A., 2018, March. Street furniture concept in Pasar Buah and Bukit Gundaling Based on place identity, in: *IOP Conference Series: Earth and Environmental Science*, 126 (1), p. 012195. IOP Publishing.
- Giovannoni, E., Fabietti, G., 2013. What is sustainability? A review of the concept and its applications. *Integrated reporting: Concepts and cases that redefine corporate accountability*, 21-40.
- Grava, S., 2003. *Urban transportation systems. Choices for communities*, McGraw-Hill: New York, NY, USA, pp. 1–12.
- Hacıoğlu, E., Eren, İ., and Polatoğlu, Ç., 2021. Enhancing socio-spatial activities in urban areas through urban furniture: Case of Bağdat avenue-Istanbul, in: *Contemporary Issues in Architecture and Urban Planning*, DAKAM Books, Istanbul.
- Kaya, H. S., Kaya, M. E., Yakut, E. S., Çiçek, M., Tozluoğlu, E. G., 2022. An interdisciplinary urban furniture design model, *A|Z ITU Journal of The Faculty of Architecture*, 19(3), 721-740.
- Krauel, J., 2007. *Urban Elements*, Page One Publishing Private Ltd., Singapore.
- Lee, G., Chan, E., 2008. Factors affecting urban renewal in high-density city: case study of Hong Kong, *Journal of Urban Planning and Development*, 134 (3), 140-148.
- Liebenberg, A., 2022. Exploring the opportunities for street furniture to contribute to climate resilience and sustainability, UBC Sustainability Scholars report, Vancouver.
- Morelli, J., 2011. Environmental sustainability: A definition for environmental professionals, *Journal of environmental sustainability*, 1(1), 2.
- Munier, N., 2005. *Introduction to sustainability*, Springer, Verlag.
- Nasser, F., 2013. Multifunctional furniture for underprivileged communities: A milestone in sustainable development, M. thesis, Purdue University, Indiana.
- Ons, B. D., 2023. *Designing Street Furniture: Principles and Criterias to Provide Adequate Approaches to Enhance*

the Quality of Life in Urban Spaces, Doctoral dissertation, University of Pécs, Budapest.

Pahlavani, F., 2021. Investigating the influential components in urban furniture design and a case study of urban furniture of ganjnameh park in Hamedan, *Journal of Design Thinking*, 2(2), 215-228.

Panwar, N. L., Kaushik, S. C., Kothari, S., 2011. Role of renewable energy sources in environmental protection: A review, *Renewable and sustainable energy reviews*, 15(3), 1513-1524.

Rinaldi, A., Caon, M., Khaled, O.A., Mugellini, E., 2018. Designing urban smart furniture for facilitating migrants' integration: the co-design workshop as approach for supporting inclusive design, in: *Congress of the International Ergonomics Association*, Springer, Cham, pp. 461-470.

Rogers, D. S., Duraiappah, A. K., Antons, D. C., Munoz, P., Bai, X., Fragkias, M., Gutscher, H., 2012. A vision for human well-being: transition to social sustainability, *Current Opinion in Environmental Sustainability*, 4(1), 61-73.

Sewardono, M., 2022. Sustainable street furniture and its effect on streetscape perception, Bachelor thesis, University of Groningen Sustainable Transformation Of Urban Regions In Europe, Netherlands.

Siu, K.W.M., 2007. *Urban renewal and design: City, street, street furniture*, SD Press, The Hong Kong Polytechnic University, Hong Kong.

Siu, K. W. M., Wan, P. H., 2011. Sustainable urban living environment: Street furniture design for an urban fishing village, *International Journal of Environmental, Cultural, Economic and Social Sustainability*, 7(2), 167-181.

Siu, K.W.M., Wong, K.S.L., 2015. Flexible design principles street furniture design for transforming environments, diverse users, changing needs and dynamic interactions, *Facilities*, 33, 588-621.

Tereci, A., and Atmaca, M., 2020. Integrating renewable energy systems into urban furniture for recreational spaces: A design proposal for Konya Adalet park, *Gazi University Journal of Science*, 33(1), 1-12.

Trang, N. T. T., 2018. From understanding of national design characters and suggestion of the improvement of Vietnamese urban outdoor furniture toward a sustainable cultural environment, in: *MATEC Web of Conferences*, 193, p. 01023, EDP Sciences.

Tredwell, A., 2004. Design and its effects on Society, Culture, Economics and the Environment, in: *The Four Pillars of Wisdom*, 343-364

Ulay, G., Yeler, O., 2020. Wood and wood-based materials in urban furniture used in landscape design projects. *Wood Industry and Engineering*, 2 (1), 35-44.

WCED, 1987. *World Commission on Environment and Development. Our Common Future*, Oxford University Press, Oxford.

Wirdelöv, J., 2020. The trash bin on stage: On the sociomaterial roles of street furniture, *Urban Planning*, 5(4), 121-131.

Yadav, P., Singh, J., Srivastava, D.K., Mishra, V., 2021. Environmental pollution and sustainability, in *Environmental Sustainability and Economy*, Elsevier: Amsterdam, pp. 111-120.

Yücel, G.F., 2013. *Street furniture and amenities: Designing the user-oriented urban landscape*, in: *Advances in landscape architecture*, IntechOpen, London.