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**DESIGNING STREET FURNITURE:  
PRINCIPLES AND CRITERIAS TO PROVIDE ADEQUATE  
APPROACHES TO ENHANCE THE QUALITY OF LIFE IN URBAN  
SPACES**

Thesis booklet  
Doctor of Philosophy in Architectural Engineering

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Pécs, Hungary

January 2023

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## ***Abstract***

In the face of global warming and the global health crisis, how should we rethink our cities and streets to make them more pleasant, livable, and sustainable? Should we promote well-being? Should we prioritize the functional city? Should we develop a smart city? What if street furniture were the critical issue in transforming tomorrow's urban streets? Street furniture could not only help to refresh streets, neighborhoods, and cities but also promote sustainable mobility, increase the comfort of citizens in public spaces, and encourage community living.

Public spaces evolve, and change: and so, does street furniture. Users' and residents' expectations are increasing in street furniture, which is becoming a challenge for cities and municipalities. Today, cities must provide the population with an increasingly pleasant experience in urban spaces but also make these spaces attractive and appealing. There is nothing like sunbathing in a public square with beautiful deckchairs, and nothing better than taking a break in a park by sitting on a comfortable and ergonomic public bench.

The primary role of street furniture is to meet the expectations of residents and users. In addition, urban development must also make it possible to embellish public space and make it more attractive. Comfort, solidity, resistance, ergonomics, design, and style are now an integral part of the design of public spaces.

It is no longer possible to manufacture street furniture because it must integrate perfectly into the landscape while meeting essential satisfaction criteria. Functional and innovative street furniture must also meet environmental protection standards, and using environmentally inert and fully recyclable materials is fundamental. To meet this challenge, street furniture must be designed with the most appropriate materials, adapted to local social and environmental conditions, and in accordance with safety regulations.

The Mediterranean Garden in Sidi Bou Said was chosen as an example of neglected street furniture. The research aims first to evaluate the current state of street furniture and its relation with its users. The investigation results from classified street furniture according to four main criteria: Technical design, social integration, participative approach, and ecological aspects integration while designing street furniture. As a result, the potential and the resolution of different problems and pathologies while designing will be considered for this study.

Based on the evaluation and the analysis applied in Sidi Bou Said to understand the user's needs, inventory approaches were developed to rethink designing street furniture in similar urban spaces. The diagnosis was established by selecting a festive and representative area that serves as a definition of a potential landmark based on its significant geographical situation and qualities. In the process of developing the image of the city, the inventory approaches highlight the significance of the selected research area, presenting a unique design proposition that sets the light on both the social and environmentally friendly design, and contributes to a better understanding of the importance of street furniture design in Sidi Bou Said and cities with similar Mediterranean atmosphere.

***Keywords:*** Street furniture design, Social integration, Participative approach, Eco-design, Sustainable Design, Urban Development.

## **1. Overall aim of the Research**

This research aims to forecast the implications of suitable street furniture in urban public spaces by evaluating the impact of the street furniture lack on user behaviors. It helps to assess its interaction effect and analyze the importance of well-integrating street furniture in urban spaces to understand relationships within society and urban spaces better. What is the importance of combining the essential design criteria (aesthetic and functionality) with the principle of sustainability and eco-design criteria? How could the community be involved in the development of street furniture production quality?

## **2. Research Questions**

To establish a new approach to registering street furniture into the public urban space with all that surrounds them and adopt new techniques regarding sustainable development in Tunisia through the diverse type of street furniture, this research aims the answer the following questions:

- ◆ What is the impact of the street furniture lack on its users? Moreover, how it affects the interaction space/user relationship?
- ◆ How could street furniture ensure social integration within public spaces? What would be the appropriate approach?
- ◆ What processes help to accomplish the combination between essential design criteria and environmental criteria?
- ◆ How could society take part in revalorizing the street furniture and thus their city?

## **3. Research Objectives**

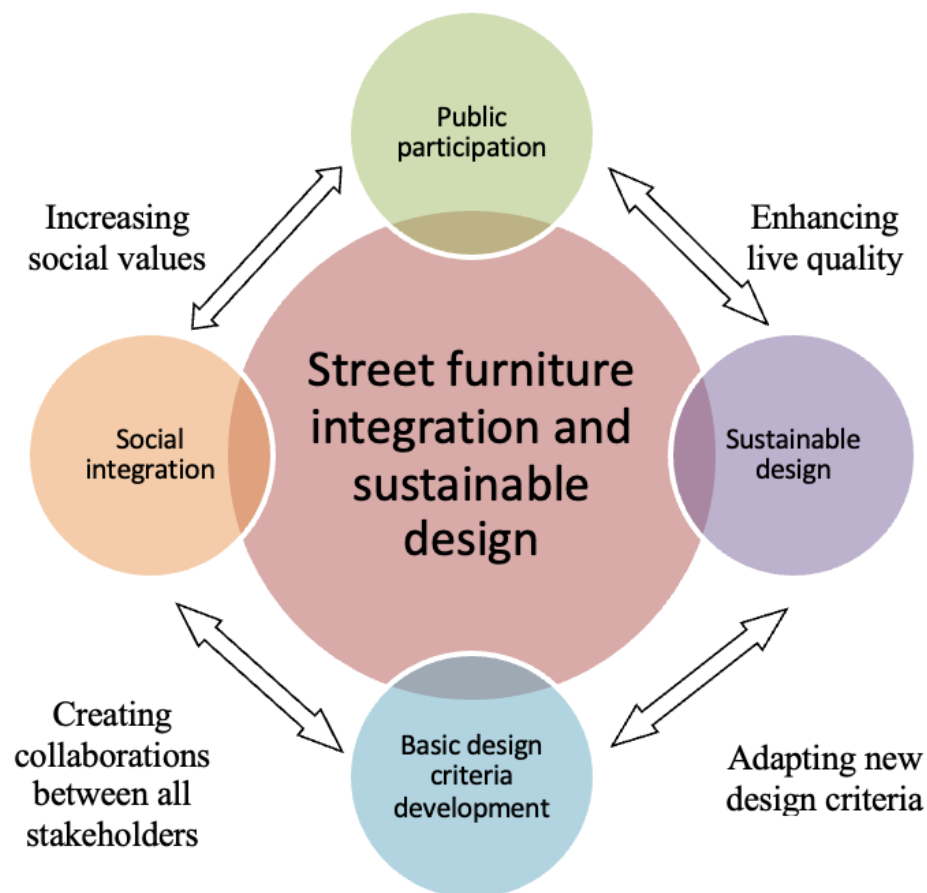
The research objectives are:

- ◆ To analyze the existing street furniture in its relation with urban spaces, then propose recommendations to recover the street furniture lack.
- ◆ To enhance the street furniture integration not only on the functional level but also on a more social level and formulate recommendations to increase a social interpretation of the space.

- ◆ To explore the necessary criteria to design sustainable street furniture to present its importance, helping to ameliorate the quality of living in Sidi Bou Said.
- ◆ To identify new techniques for improving social participation in street furniture implementation.

#### 4. Conceptual Framework

To answer the research questions, based on the literature review, the research starts with identifying the key variables to develop an understanding of the contribution toward street furniture integration and its sustainable design development. The key variables, urban landscape adaptation, social integration, essential design criteria, and sustainable design, resulted in collaborations between all stakeholders, adapting new design criteria, increasing social values, and enhancing live quality.



**Figure.** Identified concept contribution and variables synergies (Author, 2023)

## 5. Scientific findings

Street furniture in some places is considered a common accessory to the urban landscape to be apparently and causally designed and arranged. It is essential to understand that street furniture is an important element of the urban landscape and directly influences the urban environment and life, reflecting the economics, society, politics, culture, etc. of a city. The emphasis on street furniture, especially by the policymakers/governments (the party who owns and manages most of the street furniture), can help improve the city's quality in many aspects.

In order to achieve development in Sidi Bou Said city, the design of street furniture has to be linked to social integration and participation, ecological and sustainable criteria. Proposing approaches was mandatory to develop strategies that apply attractively, multifunctional, and sustainable street furniture that inhabitants and tourists like to use. These approaches are as follows:

- ◆ **Social Integration Approach** to link the street furniture design to the social aspects and needs. Street furniture seems to be the significant element that defines the city's social interaction.
- ◆ **Street furniture design Approach** focuses on the street furniture user's experience and the quality of service that can offer as the key value for combining functionality and aesthetics.
- ◆ **Participative Approach** serves to involve the community of Sidi Bou Said in taking their opinion regarding the street furniture conception and the city development process.
- ◆ **Sustainable and ecological Approach** to provide the design with environmentally friendly aspects that consider the overall ecological impact, including materials used while designing.

### *1<sup>st</sup> theory: Social Integration Approach*

This part will discuss the requirements and criteria that should be considered while designing street furniture. At this point of research, it seemed necessary to develop a protocol to assess street furniture design considering and evaluating the following features:

**Location and implementation rules:** Accessibility to all people with good circulation.

**Comfort:** When it comes to comfort, urban furniture can encourage city dwellers and tourists to take their time to enjoy the present moment and the surrounding landscape;

**Accessibility:** The urban furniture must be arranged in such a way as to promote the development of an obstacle-free route in outdoor public spaces;

**Technical design measurement:** Analyzing the model's design and quality may lead users to create new activities in the space;

**Harmonization and city image promotion:** Street furniture could advertise and affect the city image in terms of aesthetic/visual appreciation;

**Design and city identity:** Urban furniture becomes a real issue for municipalities to create an identity;

**Materials and sustainability:** Design for use of recycled materials with a minimum negative impact on the environment;

*2nd theory: Street furniture design Approach*

The proposed protocol allows researchers to identify critical physical characteristics of each street furniture, thereby classifying its location and occupancy aspects. Through this protocol, the main aspects of each street furniture can be outlined, focusing on the user's comfort. It is a valuable tool for mapping multiple aspects of street furniture, but it can also be used to analyze public spaces. The data collected are easily obtained because the practical aspects are mainly quantitative. This study conducted questionnaires and interviews with street furniture users to complete the data collected. This street furniture represents a fundamental aspect that allows research to be carried out and improved.

		Location and implementation rules		Comfort		Accessibility		Technical design measurement	
		yes	no	yes	no	yes	no	yes	no
STREET	Rest	x	-	x	-	x	-	x	-
	Information	-	x	-	x	-	x	-	x
	Street signage	x	-	x	-	x	-	x	-
	Stalls, Stands	-	x	-	x	-	x	-	x

	Parking	-	x	-	x	-	x	-	x
	Playing furniture	-	x	-	x	-	x	-	x
	Sanitation	-	x	-	x	-	x	-	x
	Lighting	x	-	x	-	x	-	x	-
	Furniture for people with limited mobility	-	x	-	x	-	x	-	x
	Landscaping	-	x	-	x	-	x	-	x
	Protection	-	x	-	x	-	x	-	x
		<b>Harmonization and city image promotion</b>		<b>Design and city Identity</b>		<b>Materials and sustainability</b>			
		Yes	No	Yes	No	Yes	No		
STREET FURNITURE	Rest	x	-	x	-	-	-	x	
	Information	-	x	-	x	-	-	x	
	Street signage	x	-	x	-	-	-	x	
	Stalls, Stands	-	x	-	x	-	-	x	
	Parking	-	x	-	x	-	-	x	
	Playing furniture	-	x	-	x	-	-	x	
	Sanitation	-	x	-	x	-	-	x	
	Lighting	x	-	x	-	-	-	x	
	Furniture for people with limited mobility	-	x	-	x	-	-	x	
	Landscaping	x	-	-	x	-	-	x	
	Protection	-	x	-	x	-	-	x	

### *3<sup>rd</sup> theory: Participative Approach*

Apart from the urban furniture found in the streets, benches, signs, garbage baskets, Etc., the supplies and sports and cultural equipment become indispensable in the renewal and attractiveness of the place, but also in the shaping of a new urban experience by taking into account the health of the inhabitants and thinking about their entertainment.



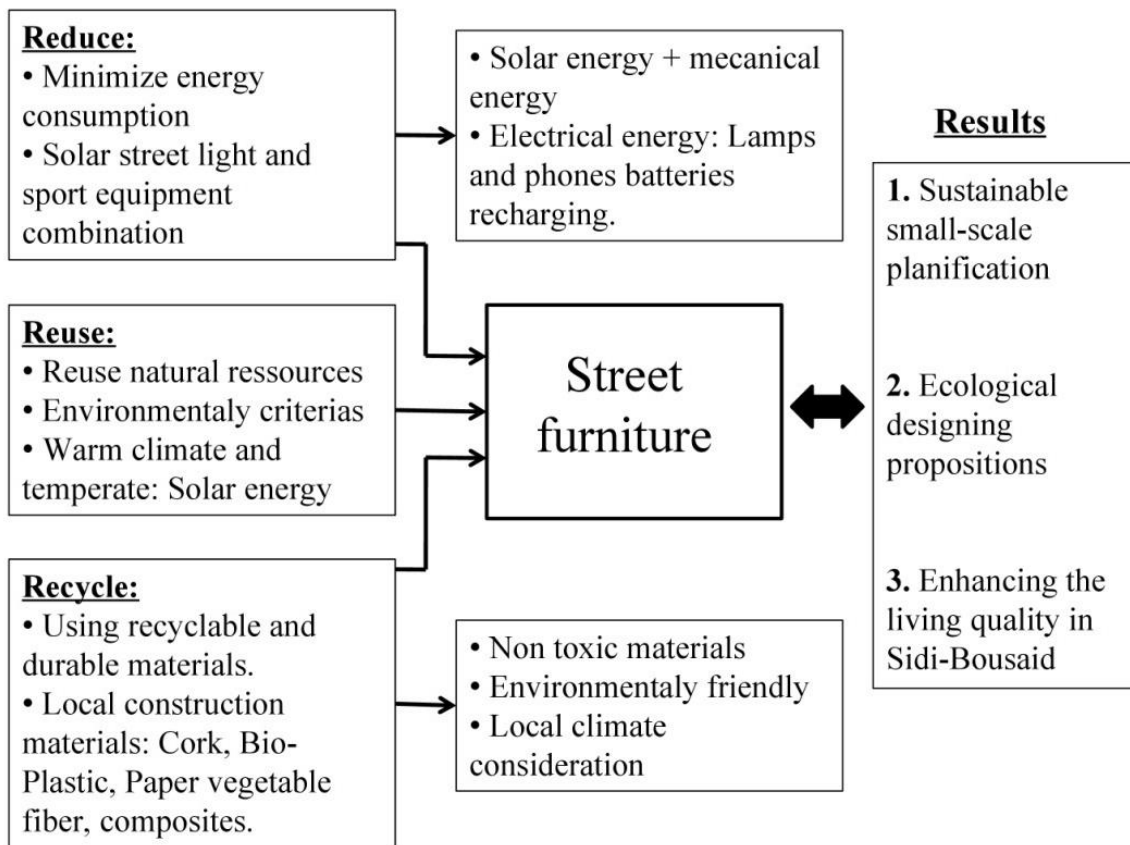
Here, in the case of Sidi Bou Said, many visitors perceive the place as a health trail, a place to take a good walk, practice sports, take a break and stop at some places. In this sense, we must read all the possible scenarios of the place.

As is a practice of creation turned towards the future and underpinned by an ameliorative intention. It is about putting itself at the service of improving living conditions and the quality of life. Design is an approach that allows space users to contribute to the improvement of their living environment by imagining innovative forms of use through its tools for a sustainable project.

#### ***4<sup>th</sup> theory: Sustainable and Ecological Approach***

In terms of people's physical needs and mental health, the ecological design method is applied in this research stage. The proposed design integrates local materials with modern design aesthetics to adapt to modern life. It carries a profound design conception mixing the historical background of Sidi Bou Said with natural resources. During the design conception procedure, it was mandatory to link ecological design with people's needs, environmental landscape, colors and materials used, and technology in serve. Therefore, an assortment of multiple conception designs should be considered according to ecological design aspects, flexible positioning, and coordination with the space and the users.

The idea consists of installing futuristic streetlights powered by photovoltaic panels; it allows consuming renewable and kinetic energy. Different from regular streetlights, they also include fitness equipment. When users train with these sports' equipment, a generator converts the resulting mechanical energy into electrical energy. The electrical energy obtained then recharges the battery of the lamp floor so that it can light the city's streets at night.



*Figure. Structural model relating street furniture with eco-design conception*

## 6. Contribution of the Research

Integrating street furniture in urban spaces became a new challenge for urban designers; this study will help them use new methods and techniques to combine essential criteria (functionality and aesthetic) with environmental aspects into their design.

The designated methodology to analyze the importance of integrating sustainable street furniture in Sidi Bou Said will help local and central government, urban designers, investors, and citizens understand that it is a multidisciplinary action and requires collaboration.

Perceived as a tourist destination that opens on the Mediterranean, "a city of the world" that welcomes so many visitors each year. Sidi Bou Said has enormous potential from the point of view of geographical location, climate, architecture, history, Etc., which makes it a world heritage for everyone that deserves to be maintained and highlighted. This research aims to

propose urban furniture that meets both the needs of the architectural environment, its climate, and the daily needs of visitors to the space.

In this research, the aim of this study was to identify a new approach and methodology in designing and developing street furniture qualities. It will serve a contribution for the decision makers and designers and help them find a balance between street furniture design and city development.

It will also help institutions to understand that designing street furniture is a multidisciplinary task and requires the participation of institutions, designers, urban planners, citizens, etc.

The identified approaches and methodology for designing functional, sustainable, participative street furniture will serve as a basis guideline for drafting the city development for Sidi Bou Said and for each specific neighborhood and similar areas.

The proposed design recommendations based on the stated methodology followed by technical solutions will be suggested to the local municipality after accomplishing further study of street furniture. To realize a new ecological spirit in local culture and aesthetics in modern life through this design criteria. Not only Sidi Bou Said, but the proposed recommendations will be shaped as a landmark of ecological outdoor living space with the conformance of architectural character and urban identity in every similar city around the Mediterranean area.