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## Sustainable urban design of historical city centers

FEZZAI Soufiane<sup>a</sup>, MAZOUZ Said<sup>b</sup>, AHRIZ Atef<sup>c</sup>

<sup>a</sup>Senior lecturer, Department of Architecture, University of Tebessa; Doctoral student, University of Biskra, Algeria

<sup>b</sup>Professor, university of oum bouaghi 04000, Algeria

<sup>c</sup>Senior lecturer, Department of Architecture, University of Tebessa, Algeria

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### Abstract

In the last few decades, sustainability had been introduced as one of the major concepts of design. It is the key to preserve a safe future for our communities. This concept introduces many techniques that change the way to read the urban configuration of urban heritage to search for the main parameters in urban space that manage the relation between designers think; it changes also the configuration of urban and architectural environment.

First we try to space configuration and urban behavior. This study has as aim to create a model of analyzing urban space as a support of urban behavior and a generator of social sustainability through preserving heritage and traditional values.

The analysis model is drawn theoretically then tested on a set of case studies of historical city centers to prove its efficiency; the main case tested in this work is the historical center of Constantine (Casbah).

The analysis model is based on space syntax methods and parameters, using applied analysis based on plans of different historical phases of urban growth and on site investigation.

As a conclusion, we try by this work to show parameters of sustainability in urban space and the influence of urban changes on these parameters. The analysis model can be used to show how to use these parameters in future design operations to ensure urban sustainability.

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### 1. Introduction

The traditional analysis of urban space is usually focused on a morphological or historical approach trying to determine the architectural and urban character or justify the historical development of the urban fabric. The main objective of such approaches is to analyze configurations, techniques and architectural style. Urban fabric is always studied as a result of other disciplines. However many researches approved that social behavior or transformation

depends heavily on spatial configuration, which means that it must be analyzed as an influent factor in social structure [1].

The paper's main aim is to study how the configuration of traditional urban space contributes in preserving social values especially in Specific societies, to understand how spatial transformation can contribute in social behavior transformation in order to build a new strategy for urban development of traditional sites.

The paper starts with a brief introduction of methods and tools used to analyze urban space and to evaluate social behavior by decoding urban characteristics in traditional space then in its extension. First as a theoretical support, we try to show relations between urban layout and social behavior by introducing space syntax parameters for analyzing space socially. Then we proceed with a historical presentation of the case study mentioning the different historical phases and the main characteristics.

The case study is supported on the hypothesis shown in the first part, a space syntax analysis through a historical approach (chronological development of the urban fabric) to show differences between different urban typologies, so their influence on social behavior.

As a consequence we try to synthesize the differences in urban layout that influence social behavior and to propose a different strategy of development oriented to preserve social values and behavior.

## **2. Research framework:**

The research adopts space syntax methods to analyze spatial configuration as interaction between spatial and social activities factors, as well as their interrelation with the built environment. Hillier argued their mutual interaction through history [2]. Space syntax is used to analyze different urban configurations of the case study, starting with the old urban core (Casbah) the old Ottoman city considering two main factors, spatial and social. Urban layout is the spatial component, analyzed using space syntax, mainly gates, cross section and urban space structure. Social component is analyzed through activities such as the land use, urban functions, and movements. The same study will be done to evaluate transformations in urban layout and social component by comparing the results of analyzing the different stages of development or extension of the old urban core.

The research is based on a set of theories linking behavior as a choice to spatial configuration; Carmona proposed six dimensions of investigation to understand historical urban spaces: Morphological dimension, perceptual dimension, social dimension, visual dimension, functional (economic) dimension and the temporal dimension [3]. Morphological dimensions are analyzed through axial maps, perceptual and visual dimensions are analyzed through visual graph analysis, social dimension through land use and functions.

## **3. A brief history of Constantine:**

On the rock in the form of Acropolis, the defensive site encouraged the old to install. These different populations through time developed the architectural heritage of the site. Historians tell us that the site was formed by the men of the Neolithic age, out of caves to live in a village. During its past, this site was submitted to the Libyans, Phoenicians, Romans, vandals, Byzantine, Arab Muslims, the Ottomans and the French finally [4].

### *3.1. Foundation of Constantine:*

Constantine was built approximately 3000 years BC, the Numides were original people.

The name "Cirta" appeared in the beginning of the third century BC, was assigned to the city in 308, when a terrible war which caused the total destruction of the city. Constantine the great Emperor rebuilt it, and this is how it took its name in the year 311 [5].

Constantine and the Muslim conquests: Conquered by the Muslim Arabs in 674, it was governed by several Walis dependent on Baghdad, Damascus, and by a number of notable locals. At the beginning of the 9th century during the reign of Fatimid and could enjoy particular splinter under Hafsid it was the largest city after Tunis and Bejaia, in three centuries.

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