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Sustainable Urban Public Squares

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Abstract
Urban public spaces have had a prominent role in social and economic life of people. Among different types of urban public spaces, square has always played a central role through the history of urbanity and urban life. Square is a mixed-use and multi-dimensional environment, where all kinds of activities including social, political, religious, environmental, economical, etc. are taken place there. A place designed for all people from different social levels and incomes. Accordingly, to understand how a square could serve urban life efficiently and improve the quality of urban life, the concept of sustainable squares should be considered. As it is clear, sustainability deals with society, environment, and economy. Therefore, when the term of sustainability is merged with urban squares, it is necessary to investigate how an urban square could be sustainable and serve the sustainability of urban communities. To do so, in this study through seminal literature the concept of urban public square and the principals of its designing are defined. Then, the indicators making an urban square environmentally, socially, and economically sustainable are determined.

Keywords: Urban Public Square, Sustainability, Physical Environment, Society, Economy

1. Introduction

In recent years, environmental problems across the globe request new approaches and plans in order to support natural resources. The anticipations of how long human ecological resources will be productive, has raised the level of awareness and co-operation toward sustainability [16]. It means that modern societies have become aware that the rapid growth of their communities have to be associated with ecological support system [4]. Therefore, recently, the importance of sustainable urban design has been taken into account. The concept of sustainability embraces various human activities, researches, plans, and knowledge in which three major inter-related factors of society, economy, and environment are considered [16][23].

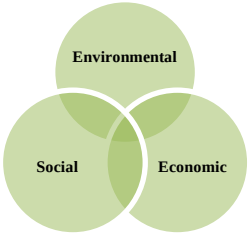

Figure 1: Three pillars of sustainable development, [16].

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To achieve urban renewal and sustainable development, there are many factors, which have to be taken into consideration. These factors including nature, man, society, economics, politics, culture and so forth, which influence a complex built environment from metropolis up to small parts [2]. Drawing all of these factors into attention, researchers and urban designers want to examine that how sustainable development and globalization influence human life [1].

2. Urban Public Squares

From very beginning, urban squares have been the place of public gathering and special ceremonies, since Agora in Greek till now. Agora was a square surrounded by roofed porches while inner-routs could be ended to it. That is why Agora was named as an interjection of main and secondary roads [18]. In addition to historical squares, there are different types of squares such as religious, residential, civic, educational, and commercial. Public squares have become the target of many activities. They are complex spaces, which are constituted of social, environmental, architectural, symbolic, and economical characteristics. In fact, squares contributes to history and identity of cities [5].

3. Sustainable Urban Public Squares

Sustainable development is the issue dealing with new methods and techniques in which using resources in terms of society, economy, and environment are optimized [23]. There is a conceptual model consists of tripartite classification of each environment including physical, economic, and social. In this model, to reach sustainability three factors of physical, socio-cultural, and ecological are evaluated [17]. Accordingly, to aim this goal, sustainability of urban public squares will be evaluated in terms of following factors such as physical, ecological, social, and economic [8].

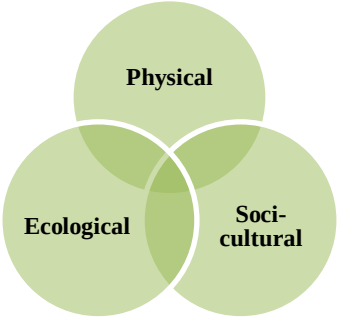

Figure 2: tripartite classification of urban environments, [17].

3.1 When is a Square Environmentally Sustainable?

In recent years, saving environment in order to meet the need of today generation without neglecting the need of future generation, has been turned into a controversial issues [24]. With regard to this, due to make an urban square environmentally sustainable, *physical aspects* and *ecological aspects* of squares should be

evaluated. Environmental sustainability is the best practice to take care of urban landscape in order to design memorable squares with efficient foundation [19].

3.1.1 In terms of Physical Aspects

Squares are public places provided for gathering and various types of activities and ceremonies. Therefore, square as an interactional space has to meet some physical requirements and aspects. Physical aspects includes facilities and amenities in which make the square a place of relaxing and joy, and a platform for social, economic, and political activities [8]. Regarding to physical aspects of each urban squares, *size*, *accessibility*, *furniture*, and *quality of physical* structure should to be considered [27].

3.1.1.1 Size

Size of the square means that square should not be neither too much large nor too small. To make a square seems hospitable there are many factors, which one of them is size. Besides of hospitality, size of each square has mental messages for its users. For instance, huge squares (e.g. Red Square in Moscow) may represent the sense of fear. Besides, it shows that these square are provided for political statements and ceremonies instead of public gathering. On the other hand, small squares could not be an appropriate ground for meetings and different activities. Tibbalds (2001) argued that since urban squares are designed for human being, they should be in human scale [12] [8].

3.1.1.2 Types

Urban squares have always defined by their adjacent buildings. Character and form of the surrounding buildings and edges express and articulate the characteristics of urban squares. Correct edge conditions create an appropriate enclosure, and make the square as a popular public space, which contributes to civic life [19]. Regarding to typology, four different types have been defined for urban squares including *closed square*, *dominant square*, *amorphous*, and *street plaza* [23].

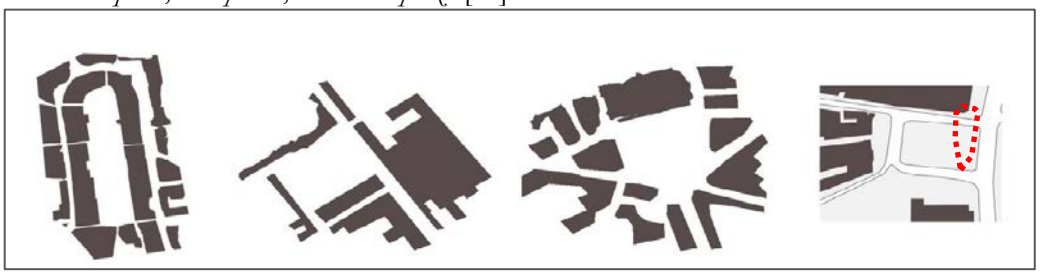

Figure 3: Types of squares; from left to right closed square, dominant Square, amorphous square and street plaza respectively, [23].

3.1.1.3 Accessibility

One of the aspects influencing the quality of an urban public square is accessibility. Urban public squares should be well located in a site in which having several accesses to traffic and transportation routes and be close to pedestrian ways [27]. Accessibility is closely related to *Mobility*. The term of mobility refers to the group of

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urban facilities such as roads, sidewalks, bike lanes and rail and bus networks, which provide comfort transportation for people. Existing these facilities in an urban square means that spaces are easily accessible [25]. From morphological point of view, squares are classified in six categories such as a) rectangular; b) angled, divided, added to and superimposed; c) circular; d) geometrically complex; e) triangular; f) large-scale composite [11]. Three figures below represent the most common urban squares' forms and their accessibility to other urban areas.

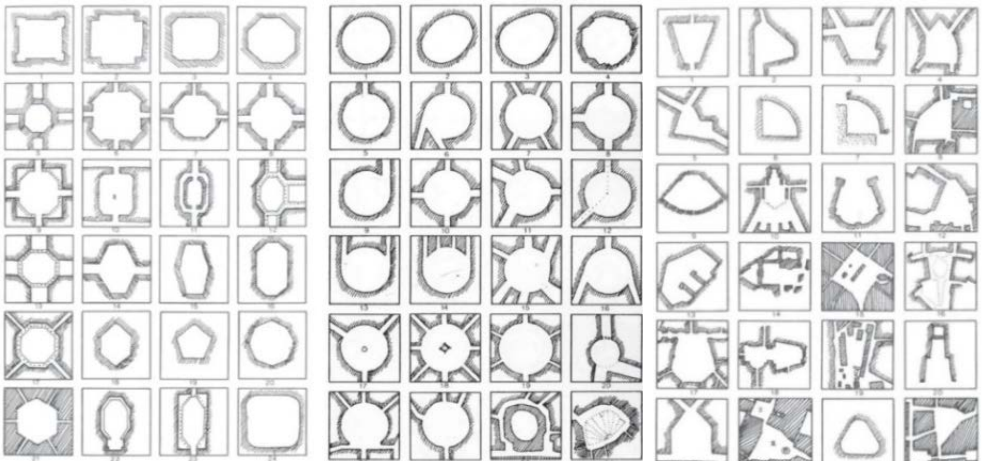

Figure 4: From left to right, Circular forms, Rectangular forms, and Triangular Forms, [11].

3.1.1.4 Street furniture and Amenities

The term of *street furniture* is dedicated to all equipment, which is used in an urban public space such as seating elements, benches, bins, lighting elements, monuments, and statues. Carmona et al. (2003) noted that street furniture significantly affect the spatial quality of the squares and consequently enhances the mental image, which people perceive from the environment [27]. Arrangement the seating elements in squares can affect the social role of square. That is to say, well-organized seats and benches persuade people to use the square and play a role in social interactions. Another point related to seating elements is they have to be easily achievable. This means a square should provide excellent seating possibilities, and be equipped with both primary seats such as chairs and benches, and secondary seat such as steps, edges, and short walls. Carmona et al. (2003) argued that to create a local identity for urban squares, designer should pay attention to produce a "particular" furniture for the square [8].

3.1.1.5 Beauty

Each city needs beautiful and pleasant public places. Beauty and aesthetic of urban squares is another environmental aspect, which affects the people's presence in urban squares. Moreover, it has a close relationship with users' perception of the place. It improves the visual quality of the space, which is an important element to design a public square [6]. In order to make public squares beautiful and cheerful, both natural and artificial elements should be applied [8]. Beauty of an urban square could include landscaping, painting, decoration, memorials, and sculptures. Beauty of an urban

environment can be considered as an effective factor to increase public health [17]. Since urban public squares are people-oriented and have ornamented with beautiful and efficient landscaping, they can clearly draw people attention. Attractions and beauty of urban squares are closely related to the urban quality of life [4]. Beauty of the urban square create visual comfort for the users, and create an emotional bones between the square and people [17].

3.1.2 In Term of Ecological Aspects

Due to rapid growth of urban communities, the issues of microclimate and temperature in urban public spaces have been influenced [21]. The importance of ecological aspects in designing urban square is that they are very vulnerable about weather conditions. That is to say, the usage of urban squares is dependent to users' thermal comfort, wind comfort, and sun comfort. Since a square is ecologically comfortable, it can attract visitors and users and consequently give benefits to the city life [10]. Accordingly, following factors represent the ecological aspects of a sustainable urban square.

3.1.2.1 Thermal Comfort

Generally, the aim of urban outdoor spaces is to provide comfort for the users. Human thermal comfort is one of the factors influencing the quality, and image of urban public spaces. Without doubt, well-designed urban public squares contribute to the livability of cities and besides to attract people. Studying microclimate, there is a relationship between users' spatial properties and microclimate perception [10]. This means that acceptance or avoidance of any public square depends on users' microclimate perception, mood, and behaviour [13]. However, it should be considered that social, cultural, and economic conditions of each society affect people's thermal sensation. Since then, to design a square in terms of thermal comfort, an optimized spatial pattern, which embraces climate conditions of all seasons, should be provided. In this pattern, four factors of *width*, *material*, *building arrangement*, and *degree of openness* of the square are very important. Because these factors directly affect microclimate's issues like wind speed, wind direction, sunlight, and shadow. Moreover, materials used for pavement and ground surface should have high albedo in order to reflect solar radiation [13][21].

3.1.2.1.1 Landscape

Landscape is an integral part of each urban square and has a huge portion to create sense of place [19]. Landscape in urban design is divided to two parts of hard landscape and soft landscape. Hard landscape is the material used in different parts of squares like stone and brick, and soft landscape refers to plants, trees, flowers, grass etc. [8]. In addition to all mentioned factors, *vegetarian* and *water feature* are factors, which can exert huge influences on thermal condition of each urban square such as [21][10]:

- Filtering the sunlight
- Increasing chill and humidity
- Modification of wind direction
- Reducing the air temperature

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3.1.2.2 Wind Comfort

Wind protection is another ecological aspect in which provides wind comfort and thus satisfaction for users of urban squares. Square morphology and type, size, width, and direction of square and its adjacent buildings all affect the wind direction and velocity [22]. Wind protecting should control the wind speed and airflow as well. Interestingly, comfortable wind velocity decreases the square's temperature and humidity. Besides, wind direction influences heat exchange. Vegetation and landscaping, water elements, and covering materials have a huge influence on the temperature of wind and airflow [10][22].

3.1.2.3 Sun Comfort

Creating shadow with natural and artificial elements is one of the ways in which incident solar radiation will be blocked and short-wave radiations will be obstructed [21]. Shading and shelter persuade people to prolong the period of use [8]. The human body's temperature will change with respect to the overall temperature of surrounding environment, therefore seating in shadow make the body feel cooler. Consequently, users' thermal satisfaction will increase. Shading urban square should be adapted with the seasonal temperature. This means in winter shaded places become very cold and uncomfortable [21][22].

3.2 When is a Square Socially Sustainable?

Social sustainability deals with many planned practices in which social outcomes of the urban development are the focus of them. Social sustainability refers to strategies in which social cohesion and social interactions are emphasized [9]. There are different definitions for social sustainability such as the ground of equity and democracy, addressing basic needs, and preserving social values and tradition. However, there is a consensus, which introduces social sustainability as a combination of underlying themes, which provide social and human well-being [26]. It is important however to know that political and economic situations have always had profound influence on social sustainability, and social sustainability will be also beneficial to promoting economic successes. Thus, to understand the meaning of social sustainability in urban public squares the following issues are considered.

3.2.1 Identity

A successful urban square is able to provide the sense identity and sense of place. According to Relph (1976), identity of square refers to *physical and ecological qualities*, *mental and emotional meanings* in which people receive from the square, and *activities and function* of square [3][7]. Lynch (1960) claimed that the mental image of the square makes it memorable and vivid for the users [3]. Relph (1976) argued that the identity of squares could be perceived positively or negatively. That is to say, there has to be a balance between square social, cultural, ecological, physical, mental, emotional characteristics to make its identity either positive or negative. Identity has a close relation with place attachment and sense of place through socio-cultural factors and symbolic meanings [7]; Lewicka, 2008). Besides, as long as urban public squares are human-oriented, and meant for people's needs, they are able to create strong sense of belonging in users [27].

3.2.1.1 Sense of Place

Sense of place is the factors of psychological aspects dealing with users' satisfaction and bones to an urban space like square. Actually, it refers to the relationship between people and the place. In a built environment like urban squares, not only physical setting has to be considered, but the meaning and mental well-being of the place also have to be take n into consideration [15]. Relph (1976) claimed that sense of place is not a clear concept, and it varies greatly from someone's perception of the environment to another one [20][15]. However, Carmona (2003) defined a triplex model of sense of place representing meaning, activity, and physical setting [7][27].

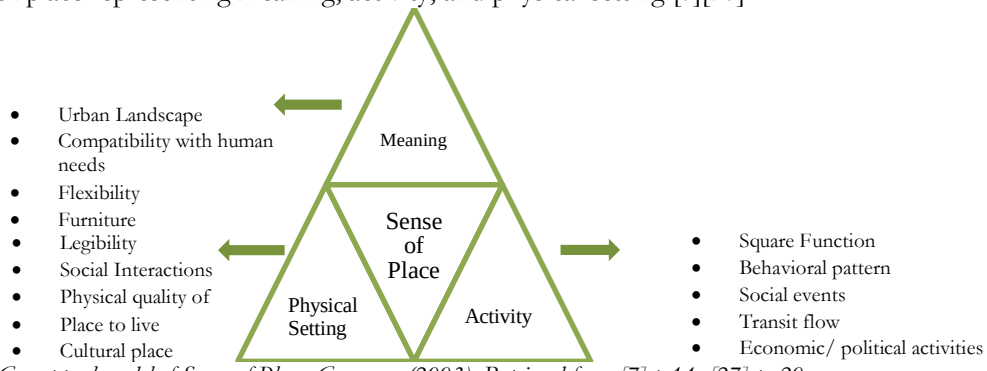

Figure 5: Conceptual model of Sense of Place; Carmona (2003), Retrieved from [7] p.14, [27] p. 20.

Without doubt, in addition to all these aspects legible design of squares affects users' sense of place [4]. A well-designed square should bring a sort of comfort, relaxation, joy, motivation to take part in passive and active engagements, besides of providing users with a sense of discovery to make them more attached to the place [27]. In another theory, sense of place has a direct relation with place attachment in which human create a mental and emotional relationship with the square. With regard to this, several factors affects the place attachment as follows [15]:

- Social and environmental characteristics
- Familiarity with the place
- Culture
- Users' degree of satisfaction
- People preference in the square
- Active and passive activities
- Physical features and attributes

3.2.2 Visual/ Mental Comfort and liveability

The term of *comfort* refers to adequate and comfortable setting of urban squares. Square not only has to provide facilities to protect users from climate elements such as wind, sun, rain etc. but it has to also bring visual and mental comfort. Physical and mental comfort of each square has a direct relation with liveability of the square. If a square is usable and provides physical, visual, and mental comfort for its users, then it has liveable [6].

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3.2.3 Equality

As an indicator of describing sustainability and quality of life, equality puts emphasis on the advantages of urban squares [4]. In other words, urban squares should be designed for all people from different age groups. Moreover, they should allow people to do various activities [6].

3.2.4 Safety and Security

Safety and security are important prerequisites for each urban square in which encourage people to staying and lingering. Besides, safety is one of the factors influencing user satisfaction. An urban square has to be safe and secure in order to attract people from different age group such as children, women, and elderly citizens [6].

3.2.5 Flexibility in Activities

A successful urban square is where provides facilities for users and encourage them to take part in various activities and engagements, including passive or active. People's participation in social, cultural, religious, economic, political activities will help to promote social cohesion. Location and size of squares are factors influence types of activities in a square. For instance, huge squares can be used for demonstration, political and religious ceremonies. Moreover, squares, which are located near the commercial centres could be places for meeting, gathering, drinking, dancing, and art performances [14]. Social activities are dependent to presence of people in the square. In other words, *people* themselves are a factor encourage others to take part in square activities whether necessary or optional such as talking, listening, watching, or participating in performances and entertainments. Physical surrounding and social cohesion of a square are essential prerequisites to foster various activities and certain behaviour [3]. Besides, "activity" in urban squares positively serves square identity and image [27].

3.3 When is a Square Economically Sustainable?

Urban public squares have always been a tool for subsistence of many people. Well-designed squares are a destination for many tourist [14]. As long as social activities and physical aspects of each square are systematic and useful, economy of the urban square is more secured [8]. Urban squares should be commercially oriented, to contribute the economic profits and economic growth [22]. In other words, to make sure that the square is economically sustainable, there has to be a good management and monitoring to support the diversity of social interactions and physical structures. Therefore, social, cultural, ecological aspects of urban square will lead to a vibrant economy development, which is based on local self-reliance rather than governmental resources [1][4]. Urban policy makers try to enhance the quality of urban public spaces and living environment, due to attract investment and economic boost [21].

Conclusion

As it was mentioned, sustainable urban squares increase the quality of life, which includes economic development, physical improvement, and social health and well-being. In addition to the social role, urban public squares through facilitating the relation of

natural and physical setting, and people satisfaction, could provide a ground for commercial activities, and consequently play a profound role to boost the economy of cities. Generally, to reach sustainable development in urban public spaces, as in this study squares, not only theories of "what qualities are needed to make a public open space more sustainable and to maintain and increase their quality" are important, but also the importance of strategies of turning the theories into practice should not be neglected. To sum up, in order to achieve sustainability in urban squares, apart from theoretical framework, adequate and appropriate financial, human, and technical capacity for implementations, management, monitoring, and increasing public awareness are required.

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