Place dependence as the physical environment role function in the place attachment

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Abstract. This research sheds light on the physical environment role in creating the place attachment, by discussing one of the important factors in the attachment creation, it is the concept place dependence, consisting of two important dimensions: the place quality and the place expectation; they contain a number of the supporter physical environment sub-indicators for place attachment. Eight physical indicators were reached; they were found to have a close relationship to the place attachment, including: the open and green spaces existence, land use diversity, diversity of housing types, dwelling / population density, accessibility, transport network development degree, transport multiple modes, and continuity of place over time. The presence of these indicators has been tested in the center of Nasiriyah city in the South of Iraq.

Introduction
The researches have often focused on the social environments impact on the creation and support of attachment to the place. The physical environment and its impact have been addressed to a few numbers of researches. This trend has become widespread in literature, when reviewing the research on the subject of attachment to the place, sometimes it happens that if one concludes that the place attachment is an association manifestation with people and social networks rather than physical environment [1]. As a result of this emphasis on the social side, the physical environment did not find a role for its meaning and association or did not play a central role either in the planning theory or in practice [2].

Although the structuralists have asserted that the physical and social structures remain in a “symbiotic relationship” and the physical structure has meaning only because they have been socially interpreted, many researchers in the subject have an opinion that both structures deserve discrimination and that they may play different roles in operations. People feel that they are connected to a place because of the close ties they have with them, their family roots or the strong religious symbolism of the place, that is, because of social factors. Others may feel connected to the physical structure of places such as beautiful nature, for entertainment, comfort, or physically stimulating environment [3].

This research has been done to contribute in filling the knowledge gap of the clarity lack of the physical indicators affecting the creation place attachment, in order to reach the identification of these indicators, by relying on the hypothesis that the place dependence concept analysis and its components will contribute to finding physical indicators of the place attachment, and these indicators act as an integrated system.
Goal, tasks, methods of study
The goal of this work is to determine the physical environment indicators influencing the place attachment creation and support.

To achieve this goal, the following tasks were completed: definition of place attachment and place dependence, the place dependence dimensions definition including: place quality and place expectation, derivation of physical environment indicators from dimensions of place dependence, and to find the methods of measuring and standards for these indicators by relying on a set of references.

The principal methods and means for meeting the task (subject matter) of the study are the analysis and comparison of various studies dealt with place attachment, using different methods for measuring, searching for appropriate criteria, and experimental testing of indicators in a realistic environment by relying on GIS maps, field survey and municipality data.

Place Attachment and Place Dependence
Place attachment is defined as a multifaceted and complex phenomenon that involves different aspects of interconnection between people and places, includes affect, emotions, knowledge, beliefs, behavior and actions, involves a reference to the place [4]. It is also known as the emotional attachment that people create to specific environments, as they have a tendency to stay where they feel comfortable and safe [1].

Place attachment is also reflected in the functional attachment between people and places, and this attachment type is developed when the place is well defined so that users feel that there are sufficient capacity and sufficient issues satisfying the requirement to meet their functional needs and support their behavioral goals better than another known alternative [5].

The functional attachment to the place, or place dependence, reflects the importance of the place in providing features and conditions that support specific objectives or desirable activities [6]. It highlights the physical environments role in the attachment to the place, that is providing some comfort and the resources with the artificial and natural environment supporting a person’s goals [7]. The higher individual dependence level on the place suggests more loyalty [8]

Place dependence is related to the perceived attachment power between the person and the specific place associated with the particular place quality and the other alternative places quality compared to the intended location. The term dependence refers to the fact that the attachment to the place is caused by the place basic value in achieving the desired objective [9]. Individuals are attached to a place that supports their pursuit of objectives. This perspective indicates that the positive emotional content of bonds results from the pursuit of a successful objective. The meanings and knowledge consist of the achievement expectations of objectives based on the experience; the behavior expressed is repeated use of place [7].

Thus, place dependence can be determined by the following factors:

1- Place quality: place quality is the ability of the place to achieve the objectives of the people, and aims to study the quality of the place to search for the best places to live, and is related to this aspect of the amenities availability, the availability of open spaces and entertainment, accessibility, diversity, and proximity [10], in addition, a number of studies identified a number of related vocabulary and summarized it by: residential density, mix land use, mix of housing types, and street network connection [11].

2- Place expectation: A term that has been defined as future cognitive experiences that are likely to occur somewhere and based on long-term expectations between the individual and the place [12], place expectation is influenced by several physical characteristics of the place: continuity, accessibility and street network connection [13].

Based on the place quality and place expectation definition, the following indicators were derived: existence of open and green spaces, diversity of land use, diversity of housing types, dwelling / population density, accessibility, degree of communication of the transport network. Multiple modes of transport, and continuity of place over time, they will be clarified in subsequent paragraphs.
Experimental Part
Nasiriyah city center covers 224 hectares, it is located in the city middle and overlooking the Euphrates River in the south of Iraq. It consists of three large and distinct neighborhoods called Aljazeera, Alsharqeah, and Alsabeah (Figure 1). Physical indicators were applied in the study area to determine their existence any of them below the approved standard in attempt to diagnose and address the problems in the study area, to support and strengthen the place attachment.

![Location and neighborhoods of Nasiriyah city center](image)

**Figure 1.** Location and neighborhoods of Nasiriyah city center

**A- The open and green spaces existence:** an influence in increasing the place attachment, people prepare these areas for relaxation, social gatherings and children's play areas [14]. The population believes that the presence and quality of green spaces enhance their connection to the place and makes their life quality better [15]. Measured by Green Index (GI), the percentage of green in each cell, is based on binary classification (green and non-green classes) of NDVI measurements. Each cell had been classified in four green quality classes’ i.e., low, moderate, high and very high green quality on the scale of 0.25–1 where less than 25% of green in a cell has been categorized as low-quality green hence, given a value of 0.25. In the same manner 0.5 (moderate green quality), 0.75 (high green quality) and 1 (very high green quality) value had been given to the cells where the green percentage is 25–50%, 50–75% and more than 75%, respectively.

It was found with the survey results of the studied area and GIS maps that the green index was low because the percentage of green and open spaces is as low as shown in (Figure 2a), it is a very bad indicator as there is no social interaction required to the place attachment and there is no environmental comfort.

**B- The land use diversity:** diversity has a great impact in encouraging people to place attachment and attracts people because it works to meet all the daily needs of the population and meets their interests in line with their way of life and culture [16]. It is measured by Entropy index. The value of this index is from 0 to 1, where the uses average combination range is 0.5, while the value (1) expresses large mixing, which is the optimal value for diversity, while this value (0) expresses the dominance of one use on other uses.

The diversity percentage in land use in the study area was moderate at 0.64 according to the entropy index shown in (Figure 2b), it is a good indicator because diversity serves the inhabitants’ functional requirements.
Figure 2 a) Open and green spaces in the studied area; b) Land use diversity in the studied area

C- The housing types diversity: People living in single-family dwelling are more likely to be rooted in the place and have long-term survival plans, so they have higher place attachment levels than those living in multi-unit or multiple-family buildings [17], however, the possibility of choosing between different types of dwellings and trade-off objects between them is also an effective place attachment indicator [18]. It is measured by the Simpson’s Index. The value of this index is from 0 to 1 when the value (1) expresses large diversity in housing types. while this value (0) expresses the dominance of one type on other types. The optimal limits for the diversity of housing options from 0.5 to 0.7.

It was found with the survey results of the studied area that there is no diversity in the types of housing because the dominant type is attached housing, it is a bad indicator because it does not give the choice possibility and does not fit with the inhabitants’ different desires.

D- Dwelling/Population density: When the density increases, place attachment decreases [3], but the density effect may be nonlinear as the positive effects occur at specific density values [11]. It is measured by: net density, gross density and neighborhood density. The units measured are a person/ha for the population density and housing unit/ha for the density of housing units, as shown in Table 1.

It was found with the survey results of the studied area that the density indicator where it did not achieve the required standards on the three levels: net, gross, and neighborhood density, as shown in Table 1.

Table 1. Density indicator in Nasiriyah city center

| Type of density | standards | Aljazeera | Alsharqeh | Alsabeah |
|-----------------|-----------|-----------|-----------|----------|
| Dwelling Pop.   | dwelling  | dwelling  | dwelling  | dwelling |
| Net             | 40-50     | 120-200   | 92        | 555      | 78       | 468      | 58       | 345      |
| Gross           | 30-40     | 90-160    | 35        | 209      | 51       | 305      | 38       | 225      |
| Neighborhood    | 27-35     | 80-140    | 29        | 173      | 44       | 263      | 30       | 181      |

The density rates are very high because of the small housing units’ area causing the increase in number and the population density high rates due to the increasing growth rates of about 3.3%.

E- Accessibility: People living in a neighborhood with accessibility have a higher level of attachment than those living in a neighborhood that does not have this characteristic. Neighborhood planning
and its linking with major streets act as central corridors with access to amenities and services, its inhabitants tend to have a sense of attachment to the place more than the inhabitants of the suburbs neighborhoods where there are no major streets, as the neighborhoods design in this way promotes the attachment to the place [19]. It is measured by:

- Accessibility to community center: Walking distance (200 m) which can be crossed in two minutes.
- Accessibility to neighborhood center: Walking distance not exceeding (400 m) can be crossed within 5 minutes.
- Accessibility to sectoral service centers: It is within a range not exceeding (1600 m) which can be crossed by bicycle in six minutes.
- City Center Accessibility (CCA): It is within a distance of 15 miles which can be crossed by public transport or private vehicle within 30 minutes.

It was found with the survey results of the studied area that the accessibility indicator is very good because accessibility was achieved a high degree in the study area, all the distances traveled by the population were within the proposed standards.

F- Degree of the transport network communication: The high communication in the street networks is working to increase the direct connection and shorten the distances between the trips generation source, which is often from housing to destinations for different uses of work, shopping, and entertainment, which promotes the functional integration between them [20]. It is measured by:

Points of contact between the streets be about 250 points per square mile, and the number of quadruple or more quadruple intersections for private cars within the street network, and do not conflict with pedestrian traffic.

This indicator is very good in the study area, there are points of contact connecting the streets and facilitate the movement of residents but found that there are four quadruple intersections conflict the cars movement with pedestrian movement, threatening the pedestrians’ safety.

G- Multiple modes of transport: The transport modes multiplicity in the place contributes to increasing the place attachment with its work to achieve the residents’ need to move according to their desire and ability. It is measured by the proportion of use for each mode of transport. The studies indicate that the best ratios for the transport modes use are: use the bike and walking be about 40% of total trips, Public Transit be about 20% of total trips, and private vehicle be about 40% of total trips.

Based on the municipality data and the field survey results, the study area is found to be varied in transportation modes, but the bicycles use is very small and is almost nonexistent, as shown in Table 2.

| Type of transport mode | number of trips | percentage |
|------------------------|----------------|------------|
| walking                | 86992          | 55%        |
| Public Transit         | 16431          | 11%        |
| private vehicle        | 53803          | 34%        |
| total                  | 157226         | 100%       |

H- Continuity of place over time: continuity refers to the place creating continuity, stability, and sustainability impressions. The roads network, monuments, and public buildings are the relatively permanent parts of the city, and within this permanent framework individual buildings appear and vanish. The parts persisting over time contribute to the continuity sense [21]. The public place must be adaptable to the constant change in the social and cultural patterns of the communities that make up the city and use its space, through this continuous re-invention process, the place can remain suitable for the inhabitants’ needs [22]. It is measured by change in land uses over a given period of time, it must be the change in uses is supportive in maintaining the continuity the concept of self by maintaining the place or issues that provide references to the place identity, which creates excellence and continuity, which makes the place reflects the identity of individuals [23] thus strengthen place attachment.
In the framework of the several maps and plans study for the area under consideration for 20 years, it was not noticed that spatial changes affect the place identity or hinder the reference place. Some renovations have taken place in several important parts of the study area to support their continuity.

Summary

Thus, based on the results of the above-mentioned, it can be concluded that the physical indicators that have been reached may be tools by urban planners and designers with the help of which they can improve the place physical environment quality and thus increase the place attachment, where people feel that the place meets their wishes and fulfills their ambitions stayed and attached to it, and this reflected positively on permanence and continuity of places and increase its vitality.

The center of Nasiriyah city is characterized by a number of good indicators supporting and stimulating the place attachment, but there are some bad indicators that need attention and development in order to activate their role in creating place attachment, especially the green and open spaces indicator, which is very few compared to the area of Nasiriyah city center and number of its population. The study area needs to be reexamined concerning its high population density because of its many environmental and social problems.

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