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The Role of Building Façade on Place Attachment (Case study: Apadana and Ekbatan Town)

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Abstract: Today, the sense of place and attachment to the place are widely discussed. Meanwhile, the impact of place attachment in residential complexes is one of the issues which has been considered by the designers. On the other hand, the expansion of construction in metropolitan areas in Iran has caused lack of attention to the environment quality. Thus, building form and façade appear to be essential features of residential complexes. Also, one of the keys concerns architecture designers is the influence of building design on individuals' satisfaction as well as their attachment to a certain place. This study defines the concept of sense of place and place attachment and the factors influencing it. This paper intends to highlight one of the key concerns of housing designers i.e. the influence of Building form and facade on human satisfaction as well as their attachment to a particular place. In this study, depth interviews and questionnaires were used to collect data for process of testing. SPSS software was used to analyze and interpret the survey results. After research questionnaires were completed, the data were analyzed via the software through appropriate statistical methods at descriptive and inferential levels. The result has been presented in several tables and graphs. Finally, the paper presents hypothesis tests and discussion of the results. Obtained results show that there is a positive and significant relationship between the building form and facade and the attachment variables to the Ekbatan complex. The findings also suggest that physical factors of building are important to create attachment to place. Based on the results, people's interest in the building form and facade in Apadana town is lower than Ekbatan town. Also results showed that attachment to the place in Ekbatan town is more than Apadana complex.
Keywords: Place attachment, Sense of place, Façade, Residential Complex, Building form

I. INTRODUCTION

Place attachment is defined as "The affective link that people establish with place settings, where they tend to remain and where they feel comfortable and safe" [1]. Like attachment to others, attachment to place is so essential. Due to the application of place attachment to many perspectives, many definitions have been stated for it. Most conceptualizations of the construct have attempted to describe the range of feelings humans associate with specific environments. Previous studies defined place attachment as a positive emotional bond between individuals and groups and their environment [2],

To upgrade the quality of environment and the sense of place attachment is one of these major concepts that helps to upgrade the quality of human environment[3]. Studied seminal literature reveal that the growth of human societies, development of technological advances, globalization, increased mobility, and encroaching environmental problems [4] has threaten the person–place relationships. Due to the population growth over the past decades in Iran and the development of urbanization as well as the expansion of construction of residential complexes, considering the quality of the environment and the sense of place in the residential complexes is an issue that has been underestimated.

The issue of attachment of residential complex inhabitants to their place of living should not be ignored, since the sense of place attachment increases the social communications and partnership at the neighbourhood level, and at the larger social scale. So far, much research has been done on the sense of place and place attachment, approximately 70% of the research in the field of attachment to a place is related to the neighbourhood scale, 20% of them is related to sense of attachment to the house [5]. However, the outcome of those studies appears to have little impact on the way a design decision is being made. There seems to be a communication gap between researchers and designers.

This article seeks the relationship between the building facade and place attachment which plays a key role in the success of sustainable residential environments. In line with this, the aim of the present research is to understand such relationships and provide a clear answer to the raised questions. We aim to scrutinize and highlight the façade design factors which help us to develop inhabitant attachment to the place in residential complexes.

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II. LITERATURE REVIEW

A. Attachment to the Place

'Place' is a rich psychological concept, which has been ignored almost completely in the psychological literature until 1970s. Canter (1974), an environmental psychologist, called the place as an experiential unity which refers to a specific physical setting and has three main components: activities, conceptual evaluations, and physical properties [6]. To him, place is the outcome of interaction between these three elements. This theoretical framework including Person, Others and Environment as elements in creating meaning of the place. In other words, the place attachment (Fig. 1) is a concept which is based on interaction and relationship between person, others and environment.

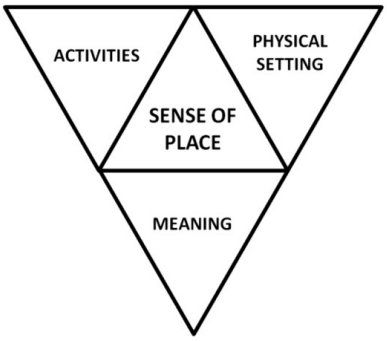

Fig 1. Diagram of sense of place proposed by Punter and Montgomery(Carmona,2006,99)

After years, Altman and Low (1992) published a comprehensive discussion concerning place attachment [7]. This formed the theoretical foundation for supporting subsequent studies in this field. Altman and Low (1992) described place attachment as an affective link between individuals and their environments. They stated that place attachment consists of interactions between affect and emotions, knowledge and beliefs and bahaviors and actions regarding a setting. Shamai believes that the sense of place persuades the individual to participate in the location-related activities [8]. Hummon (1992) argued that while place focuses on the environmental setting, the main face of attachment is affected. Norberg-Schultz argues that the sense of place is found in places that have a specified and distinctive character and this distinctive character draws from tangible things that are characterized by materials, shape, texture and color [9]. Lynch holds that the sense of place connects between the humans and the locations and brings about the unity [10]. Hernandez et al. (2007) identified Place attachment as affective bonds that people establish with specific places where they prefer to remain and where they feel comfortable and safe. In order to investigate more, the place attachment has been reviewed from two perspectives: phenomenological [11],[12],[13] and environmental psychology [14],[15].

Table 1. Definition of place attachment [16]

Author	Definition
Shumaker & Taylor(1983)	"A positive affective bond or association between the individuals and their residential environment"
Hummon(1992)	"Emotional involvement with places"
Low(1992)	"An individual's cognitive or emotional connection to a particular setting or milieu"
Twigger-Ross & Uzzell(1996)	"Affective bond or link between people and specific places."
Klatenborn (1997)	"Complex affective bonding with physical environment"
Kyle, Graefe, Manning & Bacon (2003)	"The extent to which an individual value or identifies with a particular environment setting"
Hernandez, Hidalgo & Salazar-Laplace (2007)	"The affective link that people establish with specific settings, where they tend to remain and where they feel comfortable and safe"
Florek (2010)	"Affective links that individuals establish with places."
Morgan (2010)	"Experience of a long-term affective bond to a particular geographic area and the meaning attributed to that bond."
Scannel & Gifford (2010)	"The bonding that occurs between individuals and their meaningful environments."

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B. Factors Influencing Place Attachment

Scannell and Gifford (2010) explained that urban sociologists consider place attachment as a social procedure and it fundamentally compared to 'sense of community'. The framework of place attachment which is proposed by Scannell and Gifford (2010) consists of a three-dimensional framework of place attachment that usefully structures the varied definitions in the literature. This framework proposes that place attachment is a multidimensional concept with person, psychological process, and place dimensions (Fig. 2). The first dimension is the actor: who is attached? To what extent is the attachment based on individually and collectively held meanings? The second dimension is the psychological process: how are affect, cognition, and behaviour manifested in the attachment? The third dimension is the object of the attachment, including place characteristics: what is the attachment to, and what is the nature of, this place? This three-dimensional framework of place attachment organizes the main definitions in the literature and, as knowledge grows about the specific levels within each of these dimensions, a comprehensive understanding of place attachment will be reached.

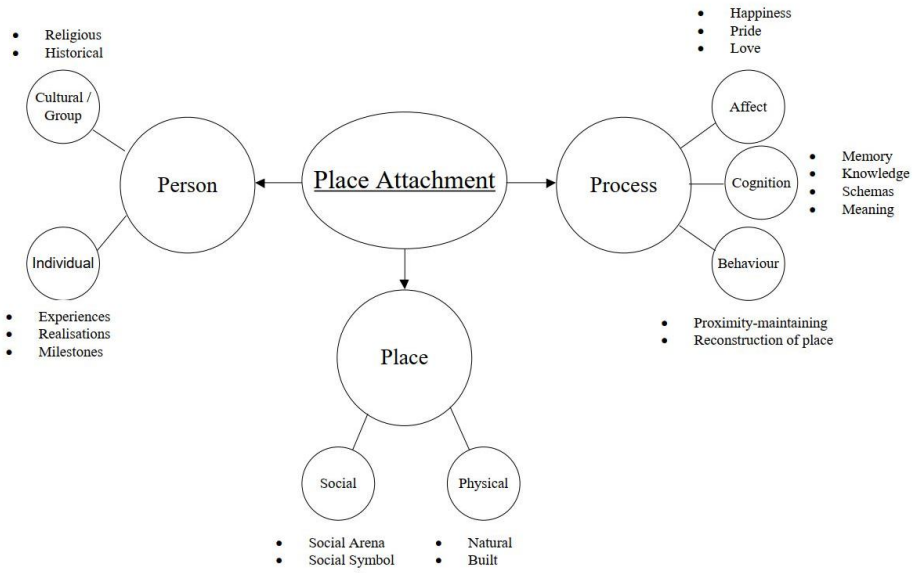

Fig 2. The tripartite model of place attachment [4]

C. Effective Place Predictors Increasing Place Attachment

1) *Physical Predicators:* The literature review shows that physical characteristics of environment, not only are led to differentiate between different places but also effect on the meaning which people percept from those. Steele explains the physical parameters which effect on sense of place as: Size, Scale, Components, Diversity, Texture, Decoration, Color, Odor, Noise, Temperature. He also explains that Identity, History, Fun, Mysterious, Pleasant, Wonderful, Security, Vitality and memory also has an effect on the way people communicate with places [17]. Physical predicator is consisted of 2 elements which is Natural and Built environment. In this study the important factors of building form and façade will be discussed.
2) *Social Predicators:* One of the most notable predictors that help us to measure place attachment is the duration of residence. In most cases, people who have lived in a place for a long time show greater attachment to the place [1]. Drawing from past research, we expect place attachment relates to temporal and financial investments, social cohesion and control and low fear of crime. These variables also are indicators of healthy neighborhood [18].

D. Measuring of Place Attachment

Place attachment has received extensive theoretical examination during the last decades. Research in environment and behavior, however, suggests that most people experience feelings of place attachment which go beyond the usefulness of a particular place or setting for pursuing a particular activity. Environmental psychologists [19]. have addressed these meanings in terms of attachment to places such as home, neighborhood, and country. Bonnes et al [20] argued that place attachment conveys a positive emotional bond between public and places due to the people's satisfaction with, evaluations of, and identification with a specific place. Therefore, the quality of place is measured mostly based on the way places are perceived and evaluated by the users [21]. Nowadays, scholars from different disciplines attempt to discover place-based concepts empirically. In this case, most of the aforementioned empirical

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researches focus on measuring the strength of attachment. On the other hand, the interest and importance of place attachment is growing but there is still a great deal of uncertainty as to how to accurately measure this construct. The purpose of this chapter is to discuss this issue and identify which approach is the most appropriate for this study. Most of the approaches used questionnaires containing items measured by way of Likert scales. The number of items ranged from nine [1],[22] to thirty-seven [23]. Most of the approaches used questionnaires containing items measured by way of Likert scales. It's Important to note that not all of these studies focused solely on place attachment. Some also measured other concepts such as religion, economic factors and recreational and other bahaviors.

Psychometric scaling follows a series of steps [24]. In Step 1, the researcher develops a comprehensive understanding of the theoretical literature regarding the constructs to be measured. In Step 2, a comprehensive pool of questionnaire items designed to measure each of the study's concepts (place Attachment) is constructed. The questionnaire items are administered to a sample of respondents for item testing and analysis in Step 3. Step 4 evaluates the items for reliability and validity of data from Step 3. The goal of these analyses is to evaluate the performance of the individual items so that appropriate ones can be identified to constitute the scale. Although researchers have pursued various applications of place attachment, important psychometric properties and refinements to the scales remain largely unexamined [25]. These include the traditional issues of item selection and reliability, the dimensional structure of the construct, evidence of construct validity, and the generalizability of place attachment dimensions across places.

III.METHODOLOGY

A. Case Study

The study has been done on Ekbatan and Apadana Residential complexes.These 2 towns are located on the west of Tehran a few km away from Tehran-Karaj highway. They are separated by a wall between these two towns. The two settlements have a pedestrian access without any street access to each other.

1) *Ekbatan Town (Tehran Metropolitan):* Ekbatan town is one the biggest towns in middle east. It's located on the western flank of Tehran metropolis, about 5km from Tehran-Karaj highway. The town consists of multiple-family housing (Fig.3), which was built in 1975s by the Housing Corporation, a government entity, to the advantage of middle-income groups, especially Iran Air staff members. About 45000 people live in Ekbatan neighborhood comprising about 15,500 housing units. This town consist of 3phases and 33 blocks. The survey population of the proposed research has been done in all 3 phases of this town in a random manner.
2) *Apadana Town (Tehran Metropolitan):* Apadana town is a planned residential society in the northwest of well-known Azadi square in Tehran, Iran. It is located between Azadi Square and Ekbatan Complex. Construction of Apadana Complex started in the 1970s, and some parts of it were finished before 1978 Islamic revolution. There are 46 blocks in Apadana Complex, comprising 6 "phases", each contains 7 or 8 blocks. The population of the Apadana Complex is about 15,000. It additionally includes 3 shopping centers , 7 schools and a mosque. The survey population of the proposed research has been done in all 6 phases of this town in a random manner.

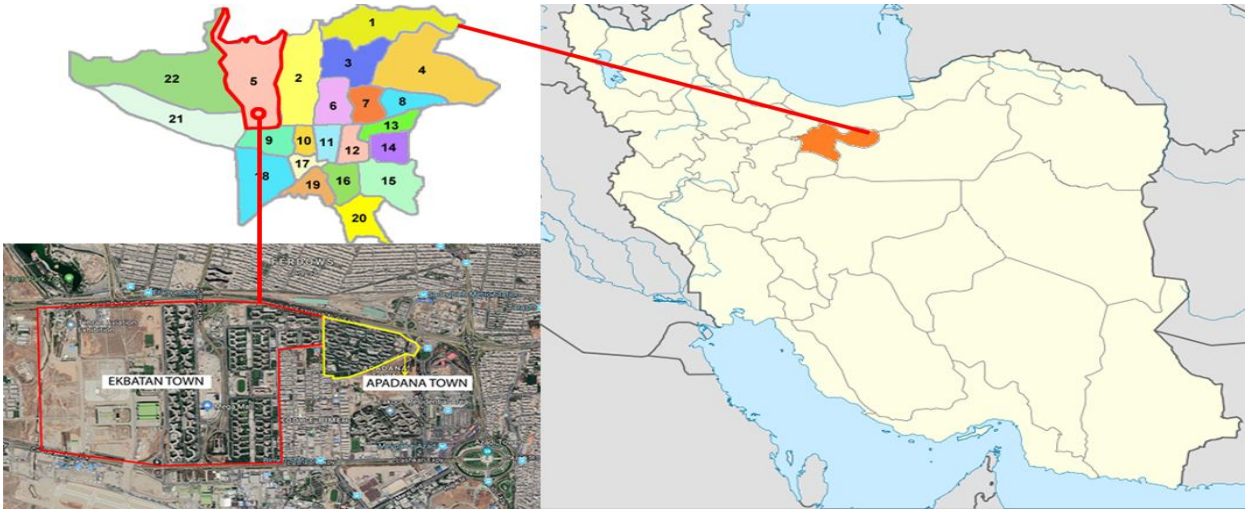

Fig 3. Apadana and Ekbatan town location in Tehran

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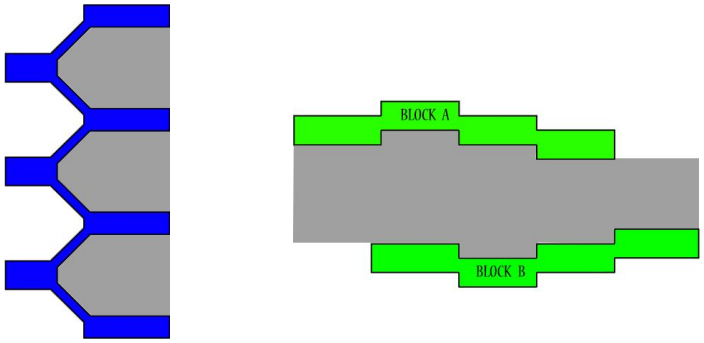
To achieve the two samples suitable for conducting the research, we studied and compared the main towns around the Greater Tehran. In this regard, Ekbatan town(A) and Apadana town(B) were more equivalent and similar in terms of indicators affecting the sense of place attachment. Both of these complexes are built in the same decade (1970) and they are locating near the Azadi square next to each other. Since the building form and façade of these were the indicators of the study, the difference in the façade and the building form of the residential complexes were also an important criterion for the choice of the statistical population (Fig.2). These 2 residential complexes have different building forms and different façade.

The form of Ekbatan town is a combination cubic shapes which are connected to each other through 120-degree angles. This way provides the maximum visibility and prevents shading of buildings on each other. Also this form will reduces the visibility of the units. In the phase 1, blocks are designed in different levels which at the lowest level, the buildings are 5 story. This makes the audience feel the open space more see the surroundings better. The facade of the building in the Ekbatan Town is made of exposed concrete (Fig.5).

The form of Apadana town is a combination of a few cubes which are joined on a horizontal axis. In order to provide sufficient light, the projection in façade has been considered. The open space between the blocks in Apadana complex is smaller in compare with Ekbatan complex as the blocks in apadana complex are closer to each other.The facade of the building in Apadana is made of concrete panels which are painted in yellow(Fig.6).



A. Enclosed form of Ekbatan B. Open form of Apadana

Fig 4. Building forms in Apadana and Ekbatan town

Fig 5. Ekbatan Town

Fig 6. Apadana Town

B. Method

In relation to the subject of place attachment, several variables are involved. In this study, the physical factors related to the form and facade of the building will be measured and the level of attachment to the location will be measured in these two residential complexes. Based on previous studies physical attributes such as building architecture, extent of open space, connection and green area are the physical factors which influences place attachment (Fig.7).

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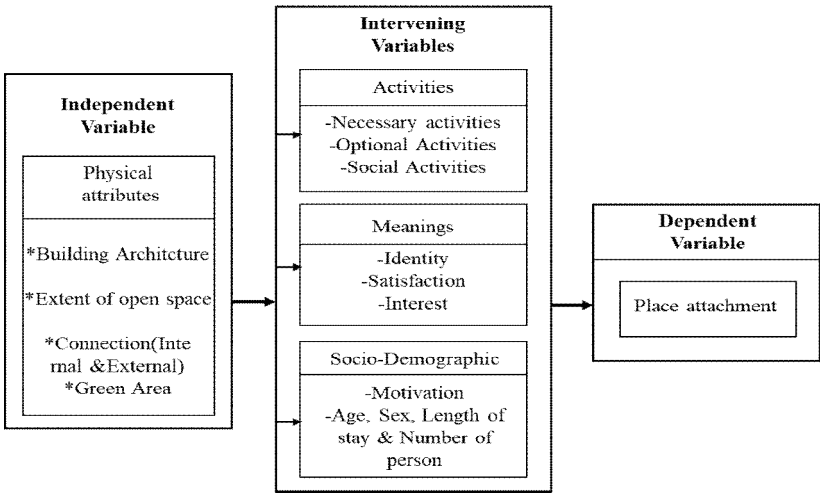

Fig 7. Research Model based on variables

Of the 388 inhabitants participated voluntarily in this study (194 in each complex),8 participants were eliminated because they had left too many questions unanswered. The final sample was composed of 380 inhabitants. Of the total sample, 54% were male, and 45% female. All participants lived in dwellings at the time the study was undertaken. Participants were so elected from all of the three phases of the Ekbatan complex and all 6 phases of Apadana complex. The two groups showed no significant differences in their response to the questions. 45% of residents have lived in complexes more than 7 years, and 46% of residential houses were personal property. Identification marks of the questionnaire covered age, sex, marital status, social class, homeownership, length of residence in dwelling. According to the research of Stedman, we used general place attachment questions on the first part of the questionnaire. On this part, the dimension of attachment was asked. The second part of the questionnaire was mainly about the physical characteristics of the building such as form, façade color, materials, windows, scales and the overall attraction to façade design.

Table 2. Participants attributes

VARIABLES	GROUP	FREQUENCY	PERCENT
Sex	Man	208	54.62
	Woman	172	45.38
Age	18-29	38	17.89
	29-39	114	30.00
	40-50	160	42.11
	51-62	68	10.00
Marital status	Married	251	66.05
	Single	129	33.95
Employment status	Retired	104	27.37
	Unemployed	65	17.11
	Housewife	50	13.16
	Student	31	8.16
	Employed	130	34.21
Home ownership	Personal property	175	46.05
	Mortgage(full mortgage)	109	28.68
	Rental	76	20.00
	government-leased houses	20	5.26
Length of residence In dwelling	Under 1 year	18	4.74
	1-3 years	39	10.26
	3-5 years	78	20.53
	5-7 years	74	19.47
	More than 7 years	171	45.00

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The place attachment tends to increase with an increase in the length of residence. Other socio-demographic variables including-- age, sex, number of people in a family-- had no significant direct relation with the attachment. Results show that those who are satisfied with the building attributes, have a sense of attachment to the place, as well. The 2 main hypothesis here were analyzed.
The first Hypothesis in this study is "The form and building facade has a significant effect on place attachment in residential towns.

1) *H0:* The hypothesis of the research is that there is no meaningful relationship between the two variables (significance level ≥0.05).
2) *H1:* The assumption of the research on the meaningfulness of the interface between the two variables (significance level ≤0.05)

C. Pearson's Correlation Coefficient Test

We used Pearson correlation test to investigate the existence of a significant relationship between the viewpoints and place attachment factors in the two Apadana and Ekbatan residential complexes.
According to the Pearson Correlation Coefficient test, based on of Table (3), and the error level of less than 5%:
In Ekbatan, and apadana town the significance level of the Pearson correlation test was less than 5%. Therefore, there is a positive and significant relationship between the building form and facade and the attachment variables to the Ekbatan complex with the amount of (.672). Therefore, for these two towns, the assumption H1 of the research is accepted and the condition H0 of the research is rejected.
Making use of the model, the analysis of outcomes demonstrates a significant relationship between the aspects of form and façade of the building activities and meaning (Table 3). The value of meaning, as evident in these results, demonstrates that buildings form and facade, from viewpoint of inhabitants, has meaningful impact on attachment to the place in both complexes.

Table 3. Pearson's Correlation Coefficient Test on the building facade variables and place attachment

Correlations		
		Building form and façade
Place attachment	Pearson Correlation	.672**
	Sig	.000
	N	380

Investigation of Hypothesis 2: The building form and façade and place attachment in Ekbatan and Apadana residential towns have meaningful difference.

1) *H0:* The hypothesis of the research is that there is no meaningful relationship between the two variables (significance level ≥0.05).
2) *H1:* The assumption of the research on the meaningfulness of the interface between the two variables (significance level ≤0.05)

According to the above table, we observe that the average place attachment score to place in Ekbatan (3.86) is higher than Apadana (2.85), and the mean score of façade and building form in Ekbatan (3.9) is higher than Apadana (2.84). Therefore, in order to express the meaningful or meaninglessness of 'difference mean' from the significant level we used 2 independent samples for T test.

IV. RESULTS

A. T Test

Considering T-Test on 2 samples and also with the help of Table (4), it's noticeable that with and error level of less than 5%, Significance level of Leven's Test for both variables is more than 5%. Therefore, we can use the results of the first row which requires the condition od equality of variance. Regarding the significant level of T-Test in the first row, we observe that at an error level of less than 5%, the following results have been extracted:

1) There is significant difference between the place attachment variable among residents of Ekbatan and Apadana complexes (Considering the fact that the upper and lower limits are on the two sides of zero). As a result, the average difference of place attachment among these two complexes is significant, so this difference is a significant difference based on the significant level of T-test (.000). Therefore, for the place attachment variable, the H0 assumption is rejected and the H1 assumption is accepted.
2) The façade and form variable has a significant difference among inhabitants of Ekbatan and Apadana town(Considering that the upper and lower limits are on the two sides of zero), as a result, the difference between these two forms and facades is significant, as the difference is significant due to the level of T-Test(.000). Therefore, for the attachment variable, the H0 assumption is rejected and the H1 assumption is accepted.

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Table4. T test with 2 samples

Independent Samples Test									
		Levene's Test		T-Test for Equality of Means					
		F	Sig	t	df	Sig	Mean Differen	95% Confidence Interval of the Difference	
								Lower	Upper
Place attachment	Equal variances assumed	11.36	.00	20.46	378.00	.00	1.00	.90	1.10
	Equal variances not assumed			20.46	371.85	.00	1.00	.90	1.10
Form and façade of a building	Equal variances assumed	4.73	.03	16.75	378.00	.00	1.14	1.01	1.28
	Equal variances not assumed			16.75	356.08	.00	1.14	1.01	1.28

The results show that there is correlation between building attributes and place attachment in these two residential complexes. Based on the derived results, people's interest in the building form and facade in Apadana town is lower than Ekbatan town. Therefore, the level of place attachment in Ekbatan is higher than Apadana town. The building physical features showed a significant impact on place attachment.

According to the graph (Fig.8), the average place attachment in Ekbatan is about 1 unit higher than the Apadana town. It shows that attachment to the place in Ekbatan town is more than Apadana complex. Also according to graph (Fig.9), the average tendency to the physical features (building attributes) in Ekbatan is one unit higher than the Apadana town.

Fig 8. The graph of the difference in place attachment between Ekbatan and Apadana complexes

Fig 9. The graph of the difference in building attributes between Ekbatan and Apadana town

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V. DISCUSSION

Place attachment describes the bonding that occurs between people and their meaningful surroundings. Review on the concepts and theories related to this topic helps to form the theoretical framework. Place attachment is influenced by a number of factors and usually research in this area integrates the perceptual, psychological, physical, and the socio-cultural dimensions of people and place. Physical features of a buildings in residential complexes often influence the people's feelings toward the surrounding area. The results of the current study also show the principal role of building form and façade influences the attachment to the place. Residents has different feelings toward their residential environment. This study sought to identify the conceptual model of place attachment, including the relationship between attachment and building form and façade. Through an analysis of 380 data instances, the findings allow the following conclusions. The place attachment tends to increase with an increase in the length of residence. Other socio-demographic variables including-- age, sex, number of people in a family-had no significant direct relation with the attachment. Results show that those who are satisfied with the building attributes, have a sense of attachment to the place, as well. The results of this study showed a significant relationship, between building façade and attachment to the place. Based on the derived results, the more residents attract by the elements of building and façade the sense of place and attachment to the place increases. Also, the results showed that when the residents are less interested in the building façade the level of attachment to the place decreases. It shows that the Architecture design and physical feature play an important role in sense of place and attachment to the place.

Regardless of general criteria in planning of residential complexes, findings of the current research demonstrate functions for building form and façade, with respect to creating attachment. Physical role: From this perspective, building form and façade (including aesthetic, density and volume aspects) play important role in place attachment. In this regard, considering residents' aesthetic criteria is vital in designing building blocks. In other words, designers should take user's aesthetical inclinations into account. This issue is emphasized specially in places like residential complexes which a large number of residents live and spend their time there.

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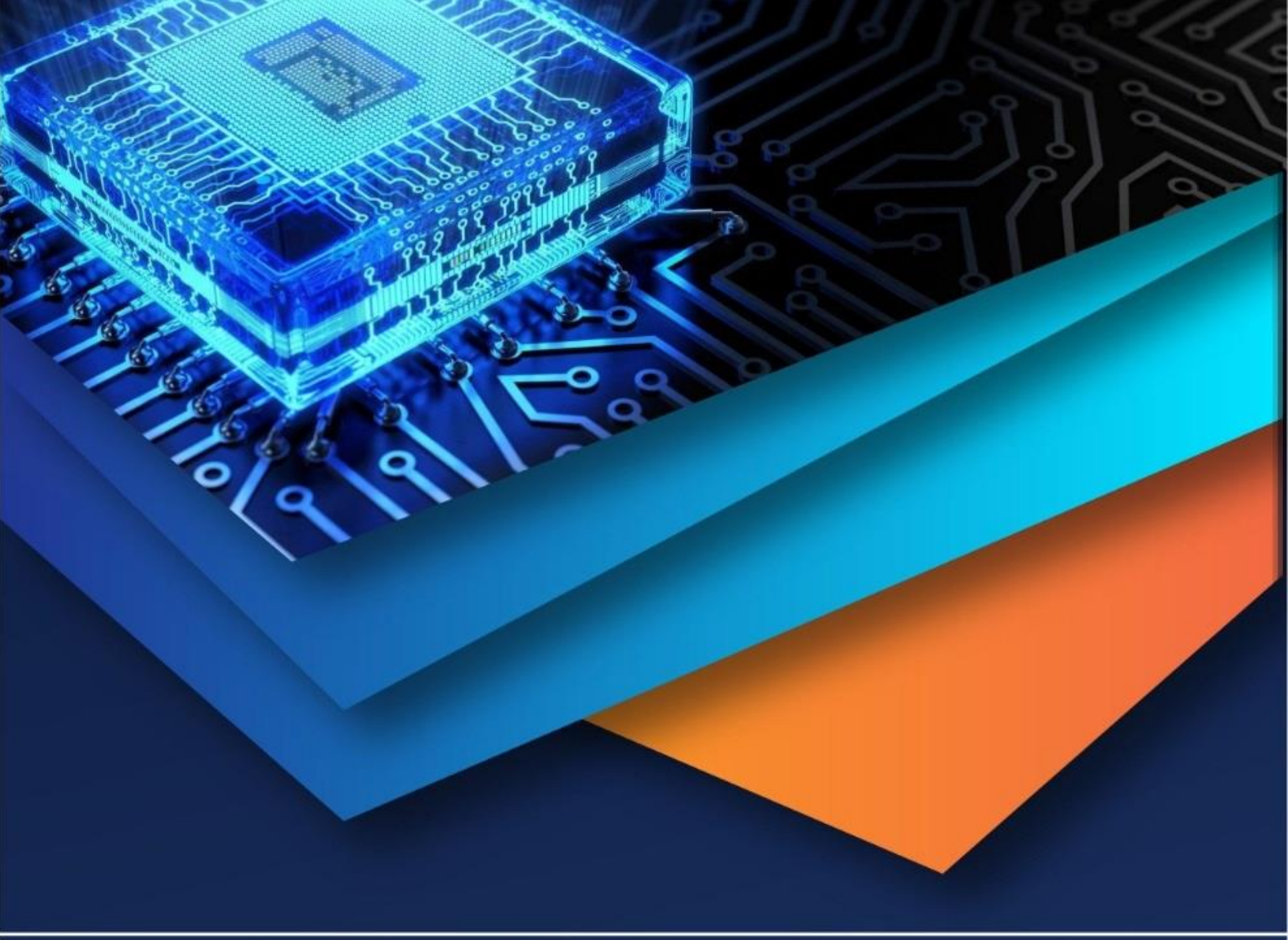

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