The Interplay of Form, Space, and Function in Urban Landscapes In Iran: A Case Study of Hegmataneh

Abstract:

Urban squares have historically played a pivotal role in shaping the sociocultural and spatial identity of cities. This study investigates the hierarchical framework underlying the formation and evolution of Imam Square in Hamedan, Iran, within the broader context of Iranian urban development. By employing a combination of qualitative and quantitative methodologies, including field observations, in-depth interviews with experts, and data collected from questionnaires distributed among the citizens of Hamedan, the research explores the spatial, cultural, and historical dimensions of the square.

The designed questionnaire is divided into three main sections: the first part includes demographic information of the respondents, the second part addresses the citizens' opinions and experiences regarding the recent changes to the square, and the third part gathers their suggestions for improving and enhancing the role of Imam Central Square or sweet Square. The data analysis is conducted using both quantitative methods, such as tables, charts, and statistical analyses, and qualitative methods, including thematic analysis to extract main themes from citizens' suggestions and opinions.

The findings reveal that the transformation of Imam Square reflects a dynamic interaction between historical legacies, cultural practices, and modern urban pressures. By employing this dual analysis approach, the study provides a comprehensive picture of the current state of the square and the impact of the changes on the social and cultural interactions of the citizens. The results of this research serve as a basis for presenting practical recommendations and improvement strategies for Imam Central Square or sweet Square. Additionally, the analysis can assist urban managers and planners in better considering the needs and expectations of citizens in future decision-making and strengthening the role of the square as one of the important urban centers. These insights contribute to contemporary discourse on preserving cultural heritage while addressing the challenges of urbanization.

Keywords: Central Square, Square Design Quality, Central Public Space, Hegmatane.

1 Introduction:

Urban design, as one of the critical elements in the development and improvement of city quality, plays a key role in shaping the identity and structure of cities. Among these, squares hold a special place as one of the most important urban spaces. Roland Barthes, the French philosopher, in his book Empire of Signs, described squares as political regulators within the ideogram of the city, emphasizing the paradox of their centrality. He described squares as spaces that, due to their

emptiness, belong to everyone and yet to no one, thus providing universal access and use (Byron, 1982).

In the context of Iranian architecture, Burckhardt points out that Iranian architecture strives to create spaces that function as voids, serving as unmediated connections between humans and God, a concept also observable in urban structures, particularly in squares (Burckhardt, 2009). Squares, as the social and cultural cores of cities, have historically been arenas for public gatherings and platforms for the realization of power relations and social control (Nasr, 1987).

Recent studies emphasize the importance of squares in preserving the cultural and social identity of cities. These spaces are recognized as cultural, social, and economic assets of cities, and urban changes can pose serious threats to the sustainability and identity of these spaces (Ferretti & Grosso, 2019) (Chandan & Kumar, 2019). Therefore, Imam Square in Hamedan, as one of the historical and spatial cores of the city, is a significant example for examining the role of square transformations in reflecting the cultural and social identity of cities. This square, with its unique design featuring six radiating streets, is one of the first examples of such structures in Iran's history and has repeatedly redefined its role over time.

This research focuses on Imam Square in Hamedan, redefining a new hierarchy for the formation of Iranian squares and examining the impacts of the square's transformations on the cultural and social identity of the city. The findings of this study can provide a framework compatible with contemporary urban fabric, which, in particular, does not align with the existing state of Imam Square.

2 Research Methodology

This study analyzes the data collected from questionnaires distributed among the citizens of Hamedan regarding the changes made to Imam Central Square or sweet Square. The main objective of this analysis is to identify the viewpoints, satisfaction levels, and impacts of these changes on the social and cultural lives of the citizens. The data under review includes demographic information, experiences of using the square, and citizens' opinions on various aspects of the changes. This analysis helps to identify patterns and trends that influence general satisfaction and the cultural and social role of the square.

The designed questionnaire is divided into three main sections: the first part includes demographic information of the respondents, the second part addresses the citizens' opinions and experiences regarding the recent changes to the square, and the third part gathers their suggestions for improving and enhancing the role of Imam Central Square or sweet Square. This structure allows the researcher to precisely examine the effects of these changes on the needs and expectations of the citizens and to assess the strengths and weaknesses of the square from a public perspective.

Data analysis is conducted using a combination of quantitative and qualitative methods. Quantitative data, including numerical variables and response frequencies, are interpreted

through tables, charts, and statistical analyses. Qualitative data, such as citizens' suggestions and opinions, are examined using thematic analysis to extract main themes. This dual analysis provides a comprehensive picture of the current state of the square and the impact of the changes on the social and cultural interactions of the citizens.

The results obtained from this chapter serve as a basis for presenting practical recommendations and improvement strategies for Imam Central Square or sweet Square. Additionally, this analysis can assist urban managers and planners in better considering the needs and expectations of citizens in future decision-making and strengthening the role of the square as one of the important urban centers.

3.1 Analysis and Description of Demographic Data:

In addition to information related to various questionnaire questions regarding independent and dependent variables, some demographic information was also collected from the respondents, which is mentioned in this section. This information is summarized and presented in tables and charts related to the collected sample. This analysis is important as it describes the distribution and normality of the sample and shows that the sampling has enough balance for subsequent analyses.

Examination of Respondents' Gender: The frequency distribution of the sample based on gender separation according to Table 1-1.

Table 3-1: Gender Distribution of the Research Sample

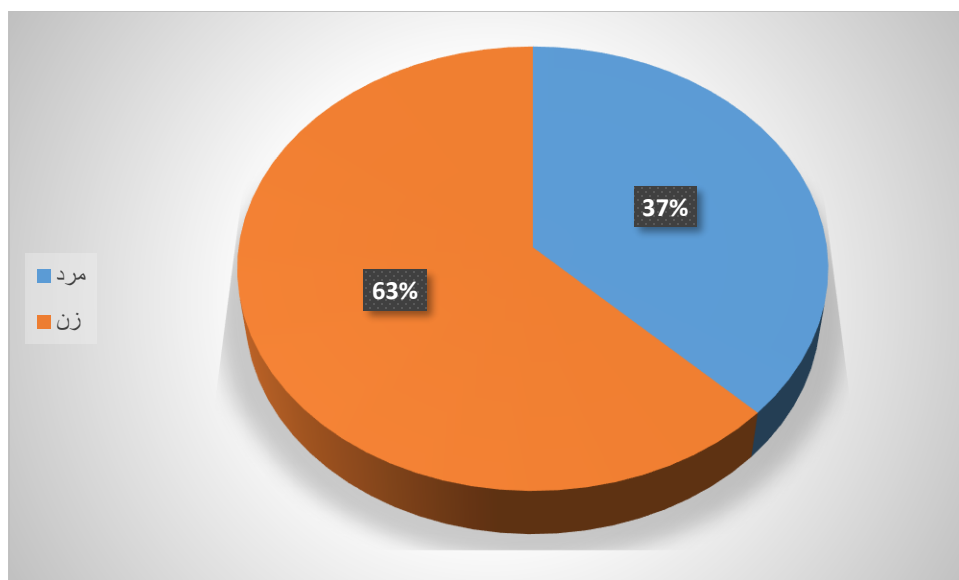| Gender	Frequency	Percentage of Frequency
Man	37	37
Woman	63	63
Total	100	100

Figure 3-1: Gender Distribution of the Research Sample

Examination of Respondents' Educational Status: Table and Chart 1-2 show that approximately 70 percent of respondents have a high school diploma or higher.

Table 3-2: Educational Status of Respondents

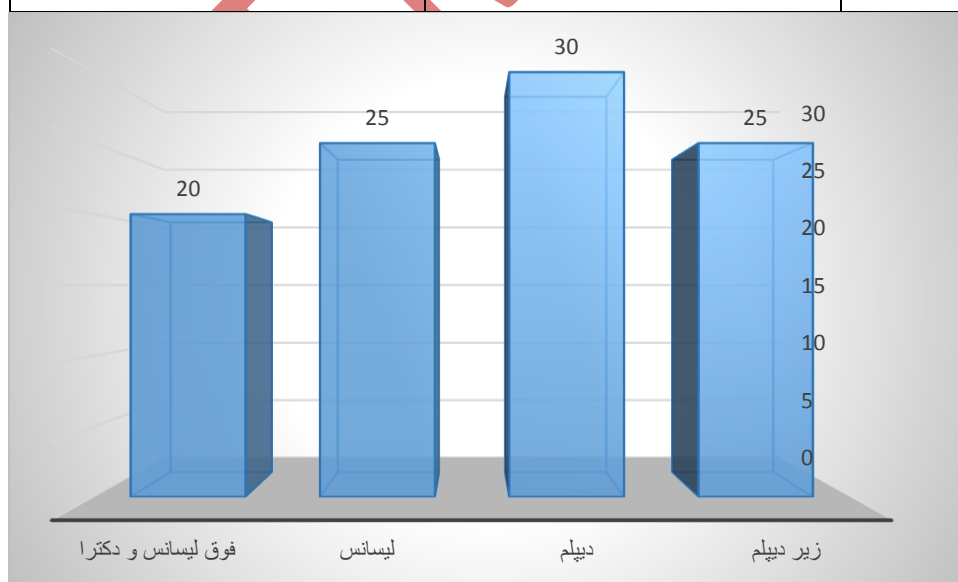| Education Level	Frequency	Percentage of Frequency
Below High School Diploma	25	25%
High School Diploma	30	30%
Bachelor's Degree	25	25%
Master's Degree and PhD	20	20%
Total	100	100%

Figure 3-2: Educational Status of Respondents

Examination of Respondents' Age Distribution: Table and Chart 4-3 show that the highest frequency of respondents is in the age group of 18 to 30 years.

Table 3-3: Age Distribution of Respondents

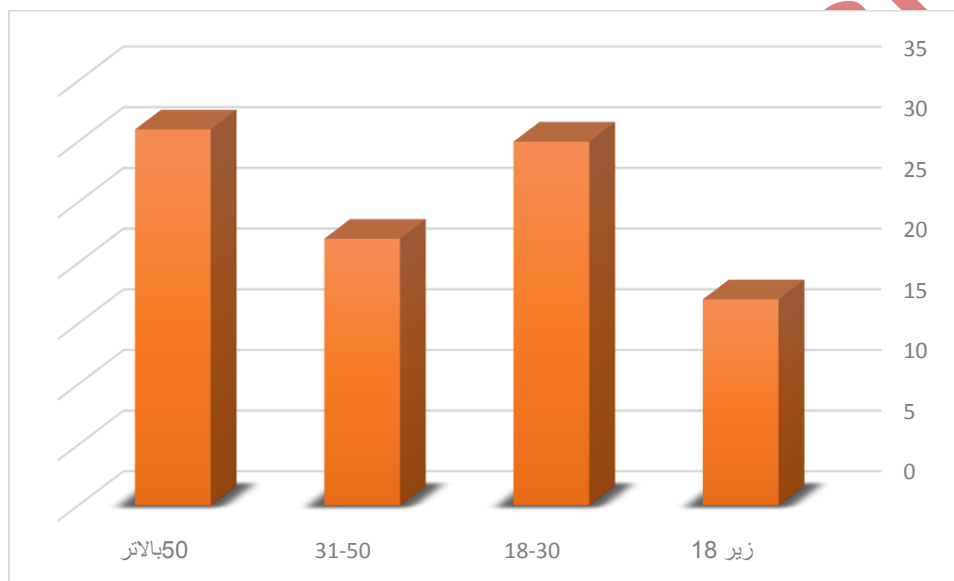| Age Group	Frequency	Percentage of Frequency
Below 18	17	17%
18-30	30	30%
31-50	22	22%
Above 50	31	31%
Total	100	100%

Figure 3-3: Age Distribution of Respondents

Duration of Residence in Hamedan: Table and Chart 4-4 show that more than 50 percent of respondents have lived in Hamedan for more than 5 years

Table 3-4: Residence Duration in Hamedan

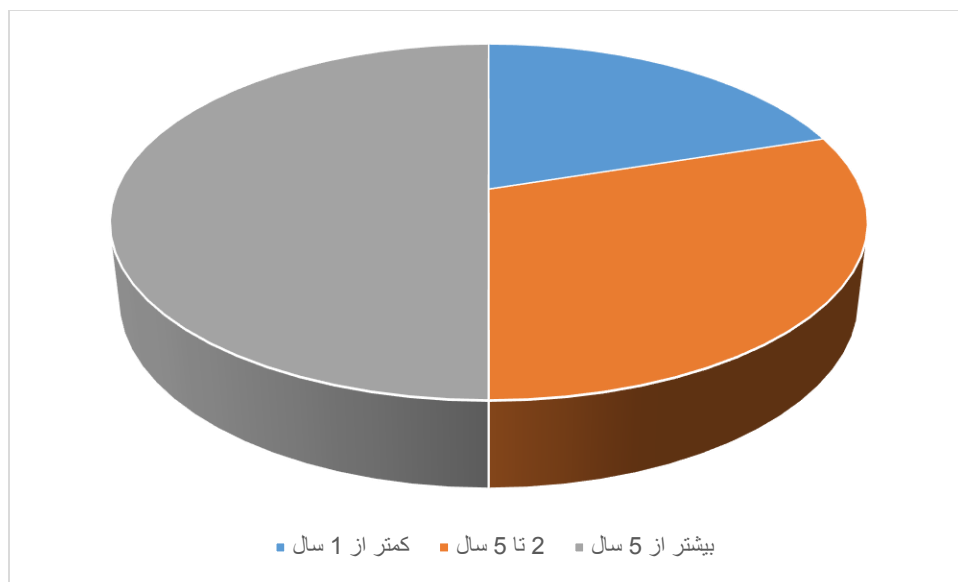| Residence Duration	Frequency	Percentage of Frequency
Less than 1 year	20	20%
2 to 5 years	30	30%
More than 5 years	50	50%
Total	100	100%

Figure 3-4: Residence Duration in Hamedan

3.2 Examination of Data Normality

The examination of data normality in terms of skewness and kurtosis is one of the important stages in statistical analysis, helping to identify the distribution of data. Skewness indicates the tendency of data to one side of the distribution, and kurtosis shows the degree of concentration of data in the center of the distribution. Analyzing these two indices allows for evaluating the conformity of data with a normal distribution.

If the data follow a normal distribution, standard statistical tests and models can be used for analysis. Conversely, if the data are not normal, non-parametric methods should be used to keep the analysis results reliable. Therefore, determining the normality of data plays a crucial role in selecting statistical tools and methods.

Several methods exist for assessing data normality, including the Kolmogorov-Smirnov and Shapiro-Wilk tests. Additionally, normal distribution charts and QQ plots are useful tools for visually analyzing data normality. These tools help identify any deviations from normality and improve statistical decision-making.

In this research, data normality was first examined using skewness and kurtosis indices and then, for further assurance, the Kolmogorov-Smirnov test was used. According to standard criteria, if the skewness and kurtosis values of the data fall within the range of -2 to 2, the data are considered normal.

Table 3-5 displays the skewness and kurtosis values related to the data of this study, providing a basis for deciding on the use of statistical analyses.

Table 3-5: Skewness and Kurtosis of the Research Data

Variable	Kurtosis	Skewness	Status
Social Interactions	-0.1	0.34	Normal
Space Usability	1.36	-0.12	Normal
Vehicle Entry Restriction	-0.35	0.15	Normal
Construction of Public Museum	0.89	0.0	Normal
Preservation and Reflection of Cultural	0.24	-0.1	Normal
Principles of Modern Urban Design	-0.76	-0.01	Normal
Historical Preservation, Overall Quality, and Performance of Public Squares	-0.17	0.13	Normal

The provided table analyzes the skewness and kurtosis of various variables related to the changes in Imam Central Square or sweet Square in Hamedan and specifies the status of each variable based on these indices. Skewness refers to the asymmetrical distribution of data around the mean, while kurtosis indicates the peak height of the distribution relative to the normal distribution. All variables in this table have a "normal" status, indicating that the distribution of data related to these variables is generally close to a normal distribution.

For the variable "Social Interactions," skewness is 0.34 and kurtosis is -0.1, showing that the data distribution is slightly skewed to the right but still considered acceptably normal. The variable "Space Usability" has a skewness of -0.12 and kurtosis of 1.36, indicating a distribution that is somewhat more concentrated than normal, but this concentration remains within an acceptable range, maintaining a normal status. The variable "Vehicle Entry Restriction" with skewness values of 0.15 and kurtosis of -0.35 also indicates a relative balance in the data.

Variables related to "Construction of Public Museum" and "Preservation and Reflection of Cultural Identity" also have a normal status. The kurtosis of 0.89 and skewness of 0.0 for the

construction of the public museum indicates a distribution that is slightly more concentrated than normal but still acceptably normal. For the variable "Preservation and Reflection of Cultural Identity," the kurtosis of 0.24 and skewness of -0.1 show very little asymmetry in the distribution, having no significant impact on the overall status.

Finally, the variables "Principles of Modern Urban Design" and "Historical Preservation, Overall Quality, and Performance of Public Squares" also have a normal status. The kurtosis of -0.76 and skewness of -0.01 for the principles of modern urban design indicate a distribution that is slightly wider than normal, but this feature does not affect the acceptability of the distribution. The variable for historical preservation and quality of the square, with a kurtosis of -0.17 and skewness of 0.13, remains within the normal range. This analysis demonstrates that the changes in Imam Central Square or sweet Square have had a significant impact on maintaining the balance and equilibrium among various variables.

Table 3-5: Kolmogorov-Smirnov Test for Research Variables

Variable	Test Statistic	P-Value	Normality Status
Social Interactions	0.055	0.904	Normal
Space Usability	0.051	0.943	Normal
Vehicle Entry Restriction	0.065	0.761	Normal
Construction of Public Museum	0.073	0.633	Normal
Preservation and Reflection of Cultural Identity	0.045	0.982	Normal
Principles of Modern Urban Design	0.058	0.869	Normal
Historical Preservation, Overall Quality, and Performance of Public Squares	0.048	0.969	Normal

3.4 Sample Size Adequacy Test

To evaluate the adequacy of the sample size, two important indicators, the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test, are used. These evaluations are key steps in data analysis, ensuring the accuracy and validity of statistical results. The KMO indicator helps to determine whether the existing data has enough variability for factor analysis. This indicator ranges

between 0 and 1, with values above 0.6 generally considered suitable and values above 0.7 regarded as excellent. Therefore, if the KMO value for the dataset is greater than 0.6, it indicates that the sample size is adequate for factor analysis.

On the other hand, Bartlett's test specifically examines the significance of the data's covariance matrix. This test allows us to determine whether the covariance matrix for our data is significant. If the calculated p-value from Bartlett's test is less than a specified significance level (usually 0.05), it indicates that the covariance matrix is significant and that the data is suitable for factor analysis and other statistical analyses.

Ultimately, assessing sample size adequacy using these two indicators gives us confidence that the results from data analysis are accurate and reliable. Based on the results of this test, the KMO value obtained is 0.862, indicating the adequacy of the sample size for factor analysis. Additionally, Bartlett's test value is 0.000, which is less than 0.05, confirming that factor analysis is appropriate and valid for the data in this study.

4.5 Inferential Statistics

In inferential statistics, the researcher uses sample values to calculate statistics, which are then used to estimate and test hypotheses about population parameters. Generally, in statistical discussions, whenever we talk about inference and extraction, it is referred to as inferential statistics (Azar, 2013). In the following, the results of inferential data analysis using PLS software are presented.

This research employs qualitative methods to examine the changes in Imam Square in Hamedan before and after its redesign. The study is conducted along two main axes:

a) Identifying the transformations of urban spaces before and after the implementation of square design projects.

b) Investigating the effects of restrictions on vehicle entry into the city center and the construction of a public museum on the social space of the square.

Field observations and semi-structured interviews with shopkeepers and pedestrians were conducted for data collection. In the observation phase, the researcher directly analyzed spatial changes and how individuals used the square to assess the impacts of these changes. Additionally, the interviews aimed to capture the opinions and experiences of citizens regarding the quality of the square's space and the transformations that had occurred.

2.1 Results and Discussion

The results highlight the negative impacts of the initial design of Imam Square on the historic core of the city, particularly the vital role of the central market in Hamedan's social and economic structure. The street construction during the Pahlavi era, which disregarded the historical fabric and climatic needs of Hamedan, resulted in the destruction of key parts of the market, such as caravanserais. Additionally, the introduction of vehicles into this historic area caused further damage to the already fragile spatial structure.

However, recent projects have improved the square's social space by restricting vehicle traffic and constructing a public museum. Interviews revealed increased social interactions, such as conversations, reading, observing others, and leisure activities, occurring in the square. Shopkeepers, although dissatisfied with a lack of commercial space, acknowledged better security and higher public presence in the area. Moreover, there is greater confidence among people, particularly women, who feel safer in the central urban space.

Despite a few ongoing urban anomalies and pedestrian disorientation, recent changes have led to improved pedestrian experiences and enhanced usability of the square. The transformations illustrate the significance of integrating modern urban design principles while respecting the historical identity of the city.

3.1.1 Development of the Conceptual Model of the Research

The conceptual model of the research related to the examination of changes in Imam Central Square or sweet Square in Hamedan should precisely identify and depict the main dimensions of the research and the relationships between the variables. The following conceptual model is designed based on the questionnaire and research objectives:

Main Dimensions of the Conceptual Model:

1. Influencing Dimensions (Independent Variables):

   - Elimination of vehicle entry

   - Redesign of the square

   - Construction of a public museum

   - Improvement of infrastructure

2. Influenced Dimensions (Dependent Variables):

   - Social interactions

- Usability of the space

- Preservation of historical and cultural identity

- Reflection of modern urban design principles

- Overall quality and performance of the square

3. Mediating or Moderating Mechanisms:

  - Citizens' historical awareness level

  - Citizen participation in decision-making

  - Managerial and executive infrastructure

Model Description:

- Model Inputs: Changes and actions implemented in Imam Square (e.g., elimination of vehicles, construction of the museum, and redesign of the square) are considered as the main influencing factors.

- Model Outputs: The effects of these changes on social interactions, space usability, and cultural identity preservation.

- Mediating Factors: The role of citizen participation and their historical awareness level in moderating the impact of independent variables on dependent variables.

- Causal Relationships: The model is designed based on direct and indirect relationships to determine the role of each variable in creating changes.

Proposed Conceptual Model:

The changes implemented in Imam Central Square or sweet Square, including the elimination of vehicle entry, redesign of the square, and construction of a public museum, directly affect the quality of social interactions, space usability, and preservation of historical and cultural identity. These impacts can be strengthened or weakened by factors such as citizens' historical awareness level and their participation in the decision-making process. Additionally, managerial and executive infrastructure act as key moderating factors in achieving the goals of these changes. Reflection of modern urban design principles and the enhancement of the overall quality and performance of the square are other outcomes of the proposed changes.

3.1.2 .Examination of Research Hypotheses

Given the type of research hypotheses proposed, all of which are causal, attention to the regression coefficients between the research variables and their significance levels obtained through the

structural equation modeling method is essential. Based on this, the results of these analyses, indicating the acceptance or rejection of the research hypotheses, are shown in Table 4-14.

Table 3.6: Research Hypothesis Testing

Independent Variable	Dependent Variable	Spearman Correlation Coefficient	p-value	Significance (alpha=0.05)
Vehicle Entry Elimination	Social Interactions	0.496	0.0	Significant
Vehicle Entry Elimination	Space Usability	- 0.248	0.013	Significant
Vehicle Entry Elimination	Cultural Identity Preservation	0.326	0.001	Significant
Square Redesign	Social Interactions	0.531	0.0	Significant
Square Redesign	Space Usability	0.479	0.0	Significant
Square Redesign	Cultural Identity	- 0.046	0.648	Not Significant
Public Museum Construction	Social Interactions	0.001	0.991	Not Significant
Public Museum Construction	Space Usability	-0.065	0.519	Not Significant
Public Museum Construction	Cultural Identity Preservation	0.899	0.0	Significant
Infrastructure Improvement	Social Interactions	0.017	0.865	Not Significant
Infrastructure Improvement	Space Usability	0.694	0.0	Significant
Infrastructure Improvement	Cultural Identity Preservation	0.027	0.79	Not Significant

3 Literature Review and Research Background

Previous studies have extensively explored the significance of squares in urban life, particularly in Iranian cities, as multifunctional spaces with historical, cultural, and social dimensions. Squares

such as Naqsh-e Jahan in Isfahan have been studied as reflections of Safavid architectural and urban planning ideals. (Habibi, 2003), emphasizes their dual function as public spaces and symbolic manifestations of power and culture. Similarly, (Soltani, 2011) highlights the political and symbolic significance of Azadi Square in Tehran, especially during the 1979 revolution, where it served as a site of mass protests and collective action.

The evolution of Iranian squares, from traditional spaces for ceremonies and trade during the Achaemenid and Sassanian periods to multifunctional hubs in modern cities, demonstrates their adaptive nature. (Khalatbari & Partovi Moghadam, 2010) discuss how these spaces transitioned into centers of commerce and social interaction following the advent of Islam. Iranian squares often reflect the concept of the "urban courtyard," characterized by central voids surrounded by built environments. (Ardalan & Bakhtiar, 1973) describe these spaces as "roofless rooms of the city," emphasizing their spiritual and functional significance.

(Mumford, 1961) and (Kostof, 1991) examined how, globally, squares such as "Piazzas" in Italy and "Plazas" in Spain have served as vital urban spaces for gatherings, commerce, and cultural events. While comparisons with these examples provide valuable context, (Khodabakhshi, 2014) notes that Iranian squares uniquely integrate cultural and religious elements into their designs, as seen in structures like Naqsh-e Jahan.

While the literature provides valuable insights into the historical and cultural roles of Iranian squares, there is limited focus on the interplay between modern interventions and historical preservation in smaller yet significant squares such as Imam Square. (Bahrami & Atashinbar, 2020) explore urban changes introduced during the Pahlavi era, particularly the construction of streets and modernist redesigns, but they do not address the specific implications of these transformations on Imam Square's social and spatial dynamics.

This research seeks to fill this gap by focusing on the transformations of Imam Square in Hamedan. The study examines how recent interventions, such as pedestrianization and the construction of an underground museum, have influenced the square's functionality, social interactions, and integration with the surrounding urban fabric. By bridging the gap between historical context and contemporary urban needs, this research contributes to a deeper understanding of the challenges and opportunities in revitalizing public spaces in historical cities. میراث شهری به آخر متن اضافه شود

4 Historical Background of Hamedan

Hamedan, one of the oldest continuously inhabited cities in Iran, holds a unique place in the historical and cultural fabric of the country. Known as the "City of History and Civilization," it has served as a central hub for various historical periods, from the Median Empire to modern times. The city's historical landmarks, such as Ecbatana (Hegmataneh Hill), the Old Bazaar, and Avicenna's mausoleum, reflect its deep cultural heritage and intellectual significance. Avicenna, the renowned Persian polymath, and Baba Taher, the celebrated poet, are among the figures who

have contributed to the city's legacy as a center of knowledge and art (Bahrami & Atashinbar, 2020).

The spatial and cultural evolution of Hamedan has been shaped by its strategic geographical position and historical role as a capital city during the Median and Achaemenid periods. During the Pahlavi era, significant urban transformations occurred, including the construction of radial streets and modern urban designs influenced by European planning principles. These changes, while modernizing the city, often conflicted with its historical fabric (Bahrami & Atashinbar, 2020).

Imam Square, formerly Pahlavi Square, emerged as a focal point during these transformations. Located at the intersection of six radiating streets, the square symbolized a new approach to urban planning in Iran. This design, inspired by European models, marked a departure from traditional Iranian layouts and reflected the ambitions of the Pahlavi regime to modernize urban spaces (Mirmozafari & Abdollah Zadeh Taraf, 2018).

The historical significance of Imam Square is intertwined with the socio-economic dynamics of Hamedan. As a central urban space, it has served as a meeting point for various social, cultural, and economic activities. However, the initial design and introduction of vehicular traffic during the Pahlavi era disrupted the square's connection to the traditional bazaar and surrounding historical sites. These changes diminished its role as a pedestrian-friendly space, highlighting the tension between modernization and historical preservation (Bahrami & Atashinbar, 2020) (Mirmozafari & Abdollah Zadeh Taraf, 2018).

In recent years, efforts to pedestrianize the square and integrate it with surrounding areas, including the creation of an underground museum, have aimed to restore its historical significance and enhance its functionality as a public space. These interventions underscore the need to balance historical preservation with contemporary urban needs, a challenge that continues to define the development of Imam Square and Hamedan as a whole.

5 5. Case Study: Imam Square, Hamedan
5.1 5.1 History of Imam Square, Hamedan
During the first Pahlavi era, with the initiation of the modernization process in the city of Hamedan, the first urban management law, titled "Construction and Development of Streets and Roads," was passed by the National Consultative Assembly in 1933 (1312 in the Iranian calendar). This law marked the beginning of physical transformations in Hamedan, leading to the creation of the first thoroughfares. In this process, the modernist ideas of the first Pahlavi, supported by a group of German engineers along with Iranian and Russian engineers, led to the design of a network of urban streets and passages. The Shourin (Shohada), Darius (Shariati), and Bu-Ali streets were constructed between 1933 and 1935 and became operational by the late 1940s, while Baba-Taher, Ekbatan, and Takhti streets were built in the 1950s. At the intersection of these streets, Imam Square (formerly Pahlavi Square) emerged, playing a significant role in connecting the old center of Hamedan, including the bazaar and mosque, to the new urban center. This street network, as a

novel experience, had a considerable impact on the urban landscape and spatial structure of Hamedan (Bahrami & Atashinbar, 2020) (Fig. 3).
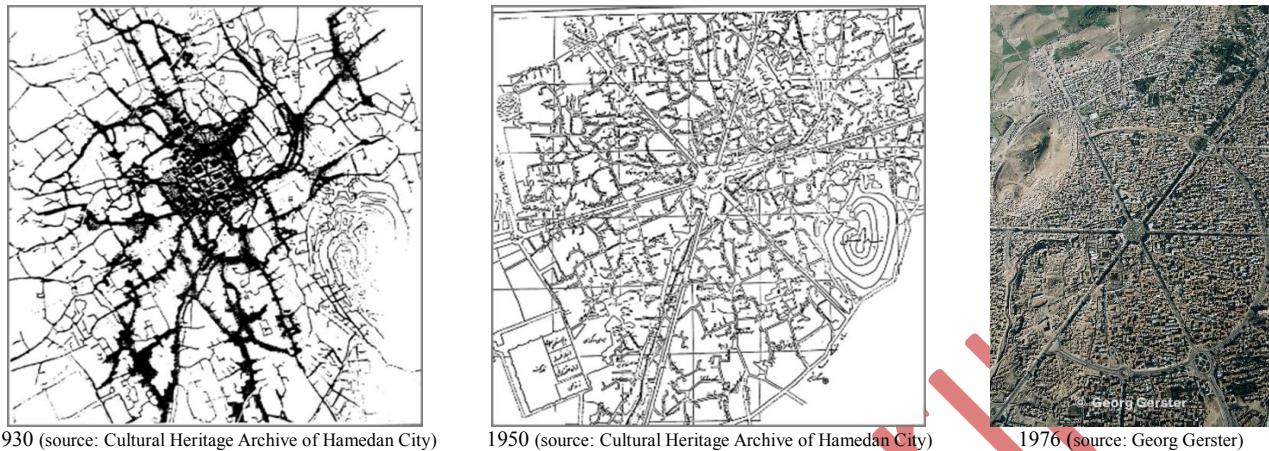

1930 (source: Cultural Heritage Archive of Hamedan City)   1950 (source: Cultural Heritage Archive of Hamedan City)   1976 (source: Georg Gerster)

Fig.3. *Hamedan - Before and After the Construction of Pahlavi/Imam Square between 1930 and 1976*

During the 1930s and 1940s, the historic cores of cities experienced a rapid social decline as the upper and middle classes relocated to newly constructed neighborhoods. Consequently, the characteristics of Iranian cities during this period exhibit dualism in their social and economic structures, physical features, and architectural details (Habibi, et al., 2010). However, despite the socio-economic changes and physical transformations of these urban cores, they continued to impact daily life in the city significantly. They served as hubs for social, religious, economic, and cultural activities, fostering a complex coexistence of the old and the new (Madanipour, 2006).

During the Pahlavi era, especially with the increase in vehicular traffic, the need to develop urban spaces and improve traffic flow led to further changes in the structure of the square. These developments resulted in the reduction of pedestrian spaces and challenged the connection of the square with the bazaar and surrounding historical areas (Mirmozafari & Abdollah Zadeh Taraf, 2018).

5.2 5.2 Analysis of the Public Space of Imam Square in Hamedan and Its Importance

Public spaces, especially squares, play a fundamental role in social interactions and urban development (Carmona, 2021). Imam Square, as one of the most important public spaces in the city, serves as a gathering place for people from various social groups. This square has been a venue for political, religious, commercial, and cultural activities, and has consistently played a central role in the daily lives of the city's residents (Shemirani, et al., 2021).

According to Oldenburg's definition, public spaces like Imam Square can be seen as a "third place"; that is, a space between home and work where people can voluntarily gather and establish social relationships (Rafiiyan, et al., 2012). Imam Square not only provides a platform for social interactions but also strengthens the city's cultural identity by connecting the traditional bazaar, museums, and religious buildings.

The centrality of Imam Square reflects its historical and functional role as a focal point for urban planning. Despite the disruption to the original historical core—shaped by urban morphology and climate—during its construction, the square has emerged as a pivotal point within the urban fabric. Its location enhances access to key parts of the city, including historical and modern markets,

mosques, and schools, underscoring its integrative role in urban connectivity. Similar to how mosques in Libyan cities, as discussed by (Sulayman, et al., 2024), have historically functioned as central spaces structuring the urban and social hierarchy, Imam Square demonstrates the universal importance of public spaces in shaping the spatial and cultural identity of cities.

Considering the significance of public spaces in historic cities, Imam Square functions as a central and multifunctional space in the city. Therefore, in the design and revitalization of this square, efforts have been made to meet the diverse needs of various user groups, ensuring that no particular group dominates the space (Madanipour, 2010). Additionally, ensuring security in these spaces is crucial for attracting people and increasing daily activities. After the removal of vehicle traffic, Imam Square has become a safer space, leading to increased active participation from various social groups and a rise in cultural and recreational activities (Pintos, 2020).

One of the main challenges in designing public spaces like Imam Square is maintaining a balance between social and traffic functions. In the past, with the introduction of automobiles, the square transformed from a social space into a heavily trafficked area, reducing human interactions. However, recent changes, including pedestrianization and converting the square into a space focused on urban life and tourism, have revitalized its value and vibrancy (Liu, et al., 2023). Imam Square now not only serves as a critical junction in the city's network but also strengthens its identity within the urban fabric. This square has become a dynamic and accessible space for citizens, offering diverse economic and cultural opportunities (Fig. 4).
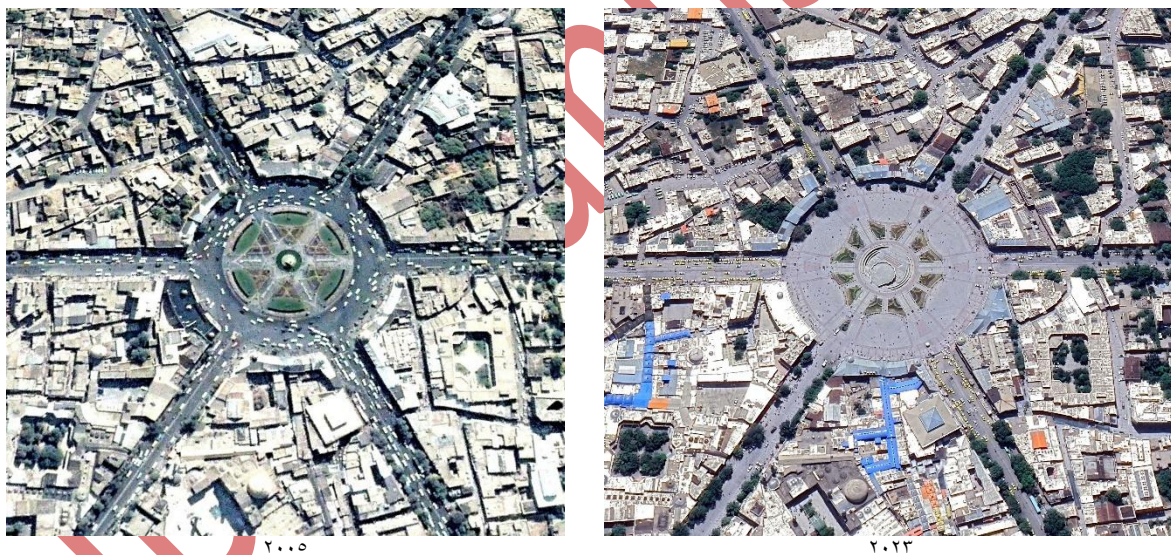

Fig.4. *Imam Central Square or sweet Square before and after sidewalk construction* (source: Google Earth)

5.3   5.3 Physical Transformations and the Revitalization of Imam Square

In Hamedan, the physical changes and modernization of Imam Square have been immense, especially since the Pahlavi era. These changes began with a modernist design inspired by the main European cities, featuring a round central square with six radiating streets. The design was created by a German engineer in the 1930s, positioning Imam Square at the heart of Hamedan's urban infrastructure: it was supposed to be the middle of the city. An iron statue of Reza Shah on a stone pedestal installed in the square, of course, further symbolized power and authority, marking the square as a symbol of the regime.

While the city started growing extensively and automobiles were <mark>invented</mark>, the square started changing from a pedestrian-based area into a traffic node. This merely changed the function of the square and the organic texture of the city. The changes that have been going on for several decades try to answer urban needs, and traffic jams, and solve some of them, meanwhile trying to balance modernity with the historical character of Hamedan. The reconstructive efforts taken continuously merge the historical character of the city with the requirements of modern city life to keep Imam Square alive as a vital, multifunctional area in Hamedan.
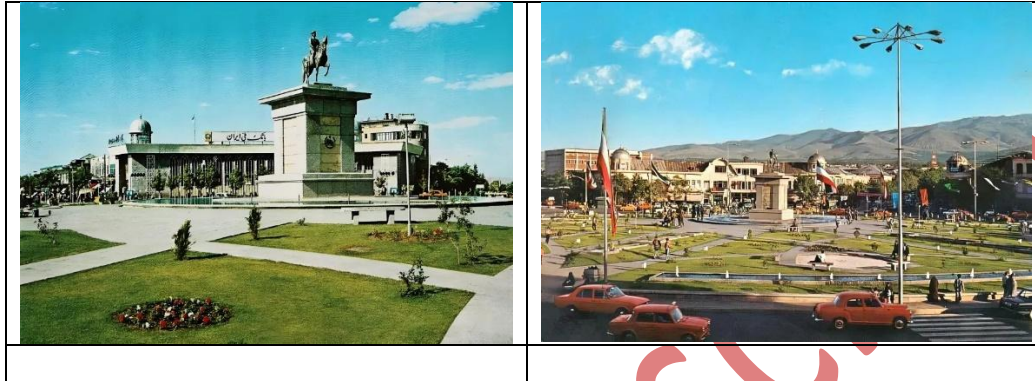
5.4 5.4 Archaeological Discoveries and the Importance of the Museum in the Center of the Square

The archaeological excavations at Imam Square, particularly those conducted in 2017 and 2018, uncovered new opportunities for discovering ancient artifacts and enhancing the cultural identity of the region. One of the significant findings was the discovery of human burials from the Parthian period, where bodies were interred in various ways, such as in clay coffins. This led to the development of a plan to establish a museum in the square. As a result, Imam Square has transformed into a space for showcasing the area's several-thousand-year history. The museum, in addition to presenting historical artifacts, has contributed to attracting both domestic and international tourists. This transformation, with its exhibition of Hamedan's ancient identity, has drawn the attention of history enthusiasts and tourists and has enhanced Imam Square's role as a cultural and historical hub. It has not only enriched the city's cultural heritage but also had a positive impact on the local economy, reinforcing the square's position as a center for displaying the city's history and culture (Fig. 5).
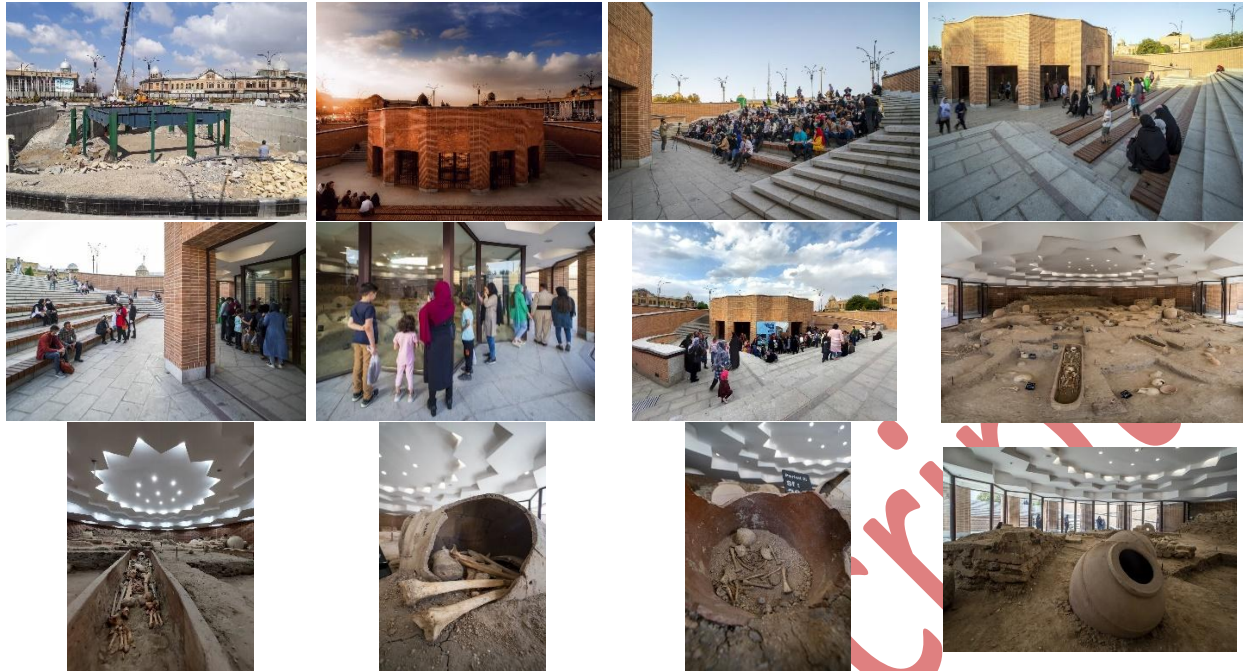
Fig.5. *Pictures of the museum and the presence of people* (source: Author)

5.5 5.5 Economic Development and Transformation of the Square into a Commercial Hub

The structural transformations of Imam Square and its shift from a traffic hub to a pedestrian-friendly space have had positive effects on the local economy and commercial activities in the surrounding streets, particularly Buali and Ekbatan Streets. These areas have evolved into economic centers, with shopping malls, restaurants, and local markets, contributing significantly to job creation and improving the quality of life for residents.

Imam Square has now become a focal point for attracting new investments, facilitating easier access for pedestrians, and providing a more appealing environment for shoppers and tourists. These changes, while enhancing cultural and social activities, have also supported sustainable urban development and revitalized the local economy of Hamedan. The square's transformation has reinforced the city's economic growth, making it a central space for both commerce and culture.

5.6 5.6 Challenges in Transportation and Future Plans for Sustainable Development

Notwithstanding these positive achievements, Imam Square in Hamedan still faces some challenges such as inadequate parking and the need to upgrade the public transportation system. As there is little room for further expansion and traffic is increasing accordingly, plans are being considered to improve urban accessibility and make traffic around the square easier. Projects such as the establishment of taxi and bus stations are under development, especially in regard to improving accessibility for tourists and residents alike. Other future goals include creating a multi-served space that can help meet the multiplicity of needs of both citizens and tourists. These initiatives not only guarantee the sustainability of the square development but also help strengthen

social ties, increase public satisfaction with the city space, and contribute to preserving the historical identity of the city.

Considering Hamadan's climate, it is essential to incorporate weather-responsive elements into the square's design. The absence of trees and shaded areas results in reduced functionality during summer and winter, discouraging public presence and activity. Thoughtful integration of natural and architectural shading solutions can enhance usability year-round.

6 6. Conclusion

The transformations of Imam Square reflect the success of urban regeneration in revitalizing historical public spaces. By integrating modern principles with an emphasis on pedestrian accessibility and social interactions, a new and valuable identity has been created for the square. This regeneration, which involved removing vehicular traffic, creating pedestrian pathways, and developing cultural spaces, has turned Imam Square from a traffic knot into a human-centered and social space. With reduced traffic and a focus on pedestrian access, the square's security and attractiveness have increased, making it a dynamic place for public gatherings and cultural events.

This approach, particularly with the construction of an underground museum showcasing the discovered archaeological artifacts, has strengthened the cultural and tourism aspects of the square, making it one of the main attractions in Hamedan.

The creation of the underground museum and its connection to the ancient history of Hamedan has added a deeper dimension to Imam Square beyond mere aesthetics and functionality. This museum, in addition to showcasing the city's history and culture, has contributed to the revitalization of the traditional bazaar and surrounding neighborhoods, providing an attractive environment for both domestic and international tourists. In fact, the regeneration of this square has resulted in the creation of a multifunctional space that accommodates both economic activities and social events. As a result, Imam Square has become a hub for new investments and job creation in the city. These transformations have not only contributed to the economic revival of the area but also provided a foundation for the sustainable development of the city.

Despite these positive developments, some challenges remain and require ongoing attention. Issues such as the lack of parking spaces and inadequate public transportation infrastructure continue to pose significant concerns. In future planning, increasing the number of public transportation stations around the square and creating multifunctional spaces for various uses could help address these issues and facilitate access for both tourists and residents. These improvements would not only ease mobility but also contribute to enhancing the overall functionality and sustainability of Imam Square as a key urban space.

Overall, Imam Square stands as a symbol of the successful integration of history and modernity, effectively meeting the contemporary needs of the city while preserving its cultural and historical identity. The revitalization of this square serves as a valuable model for the application of modern principles in urban management, demonstrating that by focusing on social and cultural needs, public spaces can become key drivers of social and economic development. Through fostering social interactions, enhancing economic activities, and preserving cultural heritage, Imam Square now exemplifies sustainable urban development. It can serve as a successful model for the revitalization of other urban spaces, both in Iran and globally.

Final Results

The results of the Spearman correlation test between independent and dependent variables explain significant relationships between the variables in the research model. This analysis includes correlation coefficients, p-values, and the significance of the relationships. The detailed results are as follows:

1. Impact of Vehicle Entry Elimination:

The elimination of vehicle entry to Imam Central Square or sweet Square has a significant impact on social interactions (correlation coefficient 0.496, $p < 0.05$) and the preservation of cultural identity (coefficient 0.326, $p < 0.05$). This indicates that reducing vehicles in the square can enhance social connections and strengthen the sense of identity. However, the negative relationship between vehicle elimination and space usability (coefficient -0.248, $p = 0.013$) suggests that this change may reduce accessibility to the square for some users or create limitations.

2. Impact of Square Redesign:

The redesign of the square has a significant impact on social interactions (correlation coefficient 0.531, $p < 0.05$) and space usability (coefficient 0.479, $p < 0.05$). This shows that the new design has improved the environment of the square for social activities and multiple uses. However, the non-significant relationship between square redesign and cultural identity preservation (coefficient -0.046, $p = 0.648$) indicates that the new design may have less focus on historical and cultural elements of the square.

3. Impact of Public Museum Construction:

While the construction of a public museum has a significant impact on cultural identity preservation (correlation coefficient 0.899, $p < 0.05$), its relationship with social interactions and space usability is not significant ($p = 0.991$ and $p = 0.519$, respectively). This finding suggests that the museum has contributed more to strengthening historical and cultural aspects without having a notable impact on increasing usage or social interactions.

4. Impact of Infrastructure Improvement:

Infrastructure improvement has a very significant impact on space usability (correlation coefficient 0.694, $p < 0.05$), indicating the positive role of infrastructure in enhancing user experience in the square. However, its impact on social interactions (correlation coefficient 0.017, $p = 0.865$) and cultural identity preservation (coefficient 0.027, $p = 0.79$) is not significant. This

may be because infrastructure improvements primarily affect the functionality of the square rather than its social or cultural aspects.

The results show that the variables of vehicle entry elimination and square redesign have the most significant impact on social interactions, while the construction of a public museum is highly effective in strengthening cultural identity. Additionally, infrastructure improvements have the greatest impact on space usability. These results assist decision-makers in taking coordinated and targeted actions to enhance Imam Central Square or sweet Square based on the desired objectives.

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