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Research Paper

Rethinking the Urban Design Language at Main Squares and Civil Buildings (1925-1941) Case Study: Main Cities of Tehran- North Railway: Tehran, Ghaemshahr, Sari, and Gorgan

Hadi Pendar [1*], Sajad Moazen [2], Mahsa Ghane [3]

[1] *Department of Urban Planning, Faculty of Architecture and Urban Planning, Tehran University of Art, Tehran, Iran*

[2] *Department of Architecture, Faculty of Architecture and Urban Planning, Iran University of Science and Technology, Tehran, Iran*

[3] *Department of Urban Planning, University of Tehran, Kish International Campus, Iran*

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Abstract

Urban centers in many Iranian cities have gradually lost their historical identity and civic vitality due to rapid physical transformations and neglect of the architectural and spatial logic of early modern civic centers. Therefore, rereading the urban design language of these centers can contribute to contemporary urban regeneration and identity-oriented planning. This study aims to identify and decode the urban design language of railway and municipal squares developed during the Pahlavi railway expansion period (1925–1941) in the main cities of the Tehran–North railway route, including Tehran, Ghaemshahr, Sari, and Gorgan. The research addresses two questions: first, what characteristics shaped the urban design language of these civic centers; and second, what common urban and architectural patterns can be identified among them. The study employs a comparative case study method with a historical-narrative approach. Data were collected through documentary studies, historical maps and photographs, and field observations. Using triangulation and qualitative comparative analysis, the common spatial, morphological, functional, visual, social, and cognitive characteristics of the case studies were identified and classified. The findings show that the integration of railway infrastructure, squares, streets, and civic buildings played a key role in the transition from the traditional urban structure to a quasi-modern urban system. Furthermore, the study extracts 32 urban design principles in eight dimensions that formed the distinctive urban design language of this period. These principles can provide a conceptual basis for the regeneration and reinterpretation of historic civic centers in contemporary Iranian cities.

Keywords: *Urban design language, Civic centers, Transition from traditional city, Main cities of tehran-north railway.*

[*] *Corresponding author: H.pendar@art.ac.ir*

INTRODUCTION

Lack of attention to the architectural design language of civil buildings in the early decades of this century, which were formed simultaneously with the transformation of traditional cities (by creating new functions such as municipality and banks in many cities of Iran), has provided the basis for ignoring the identity of these buildings and the logic of their placement in urban open spaces such as streets and squares. The lack of knowledge of the principles governing the design and placement of these buildings by architects who have paid special attention to urban architecture and identities related to sculpture and visibility has also led to the use of inefficient standards, such as physical privacy, in the current urban planning regulations for construction in their vicinity. On the other hand, during the past decades, relying too much on the needs of vehicular movement and neglecting the maintenance and organization of pedestrian spaces has caused the decline of social, cultural, and visual values and the reduction of the quality of the urban environment in these centers. Today, urban centers in various countries around the world are renovating and becoming the cultural heart of the city. Therefore, recognizing the identity of the architecture and urban planning of urban centers, especially in the policy documents prepared in recent years (comprehensive and detailed plan) to guide the quantitative and qualitative aspects of their development, provides a new opportunity for the regeneration of pedestrian-oriented and lively centers by understanding the thoughts of their designers.

One of the results of the introduction of the "Semi-Modern" movement to Iran was the creation of new urban centers through civic buildings, the need for which was felt by changing the urban management system and traditional life to modern in the cities. The aim of the present research is to review the key concepts of urban centers from 1925 to 1941, to decipher the urban design language[1], and to introduce the identity of the squares known as railway squares and the municipality and urban architecture created in this period. Despite extensive studies on urban morphology and modern urban transformations, limited research has systematically decoded the urban design language of early Pahlavi railway cities as a hybrid, state-led modernization model in an international comparative framework. Therefore, it is necessary to examine the theoretical and practical framework of modernism in relation to changing the structure of traditional cities and get familiar with urban architecture with new civil functions such as the municipality, while considering the historical and identitical context of cities. Generally, railway and municipal squares are two important civil centers formed in the process of transformation of cities, simultaneously with the construction of municipal buildings and railway stations in this period. The relationship between these two and other components of the city and the spaces formed in the connecting streets of these new civil components has led to drastic changes in the morphology of cities in Iran and urban behaviors. In terms of geographical scope, this study focuses on the Tehran–North railway corridor in Iran, with particular emphasis on four main cities located along this route, namely Tehran, Sari, Ghaemshahr, and Gorgan. These cities were selected because they represent key urban nodes influenced by the emergence of railway infrastructure and early civic modernization during the Pahlavi period.

One of the signs of the arrival of modernity and industrialization, and following it, the beginning of the transformation in the spatial organization of cities, is the creation of railway lines, squares,

[1] "Urban design language" refers to the models and methods that were prevalent and accepted or are being accepted at that time.

streets, and civil buildings; therefore, the basis of this research is to reread and identify the language of the municipal square and the railway square model on the Tehran-North railway route. Among the important cities along this route, we can mention Tehran, Ghaemshahr, Sari, and Gorgan. Although previous studies on early modern urbanization in Iran have mainly focused on architectural history, modernization policies, or physical transformations of cities, limited attention has been paid to decoding the urban design language of civic centers formed around railway and municipal squares during the Pahlavi period. In particular, there is a lack of comparative urban design research examining how railway infrastructure, civic buildings, and public squares collectively transformed the spatial organization and identity of Iranian cities. Therefore, this study contributes to the international urban design literature by proposing a comparative framework for understanding the relationship between infrastructure-led modernization and the formation of civic urban spaces in transitional cities. The research also provides a set of urban design principles that can support the regeneration and reinterpretation of historic civic centers in contemporary contexts.

This research has sought to answer the research questions in five sections. For this purpose, after introducing the scope and dimensions of the subject in the introduction, the research method was explained in the second part in order to enter the research field. Considering the importance of the research method in the review of theoretical texts and with this assumption, the review of the theoretical foundations related to emphasizing the understanding of the concepts and models related to the urban design language and the recovery of the pattern of spatial organization in urban centers was carried out in the third part. The fourth part includes the introduction of the dimensions related to the subject in the studied cities and the introduction of elements that created the historical transformation of the urban centers related to the railway station from 1925 to 1941. Introducing the studied cities (Tehran, Ghaemshahr, Sari, and Gorgan) and explaining the dimensions and indicators of the research have been important parts of these field studies. After that, it was possible to discuss the findings, specify the location of extracting the design language of the city center, and answer the initial questions.

Research Questions

1. What are the main characteristics of the urban design language in the railway and municipal squares of the Tehran–North railway cities during 1925–1941?
2. What common urban and architectural patterns can be identified in the civic centers of Tehran, Ghaemshahr, Sari, and Gorgan?

RESEARCH METHODS

One of the useful methods to extract design patterns in the fields of architecture and urban planning is the comparative case study method. The case study method is a type of experimental research that examines the current phenomena in their real-life context, especially when the boundaries between the phenomenon and its context are not clearly defined (Danayee Fard et al., n.d.).

In this method, a limited number of cases are studied in real conditions and analyzed qualitatively. The comparative case study process involves reviewing the theoretical foundations, developing the theoretical framework, identifying research dimensions and indicators (Table 2), and extracting a checklist for case analysis (Table 3). Data were collected through documentary studies, field visits, historical documents, maps, and photographs. At a large scale, historical and aerial images were used to reinterpret urban transformations following the arrival of the railway and to identify civic buildings and their connecting street networks. At a smaller scale,

historical and contemporary images of less-altered buildings were used to reconstruct architectural patterns shaping the urban design language of squares and streets.

To enhance validity and reliability, triangulation was applied using multiple data sources (Abbaszadeh, 2012). Comparative analysis of case studies was then conducted to identify recurring morphological, visual, social, functional, and perceptual patterns. Finally, these patterns were interpreted through explanation and pattern-matching strategies (Khanifar & Moslemi, 2018).

The extraction of 32 urban design principles was carried out through a qualitative coding process. Data were first analyzed based on the defined indicators in Table 2. Recurrent characteristics across cases were then coded and grouped into broader categories. Through comparative interpretation and pattern matching, these categories were synthesized into 32 urban design principles representing the dominant design language of civic centers along the Tehran–North railway corridor during the Pahlavi period. Each indicator was operationalized through repetition across cases, visibility in historical records, and cross-case validation to ensure reliability.

Finally, in order to measure the validity of the data, they are objectively reviewed. After confirming the validity and reliability of the data to analyze the obtained data, in the comparative research case studies, three strategies of pattern matching, explanation, and time sequence are applied. According to the nature of the current research, for data analysis, the explanation strategy will be used in the sense that the researcher will make an explanation about the research subject by issuing judgments about the cause or causes of the phenomenon under investigation (Figure 1) (Khanifar & Moslemi, 2018).

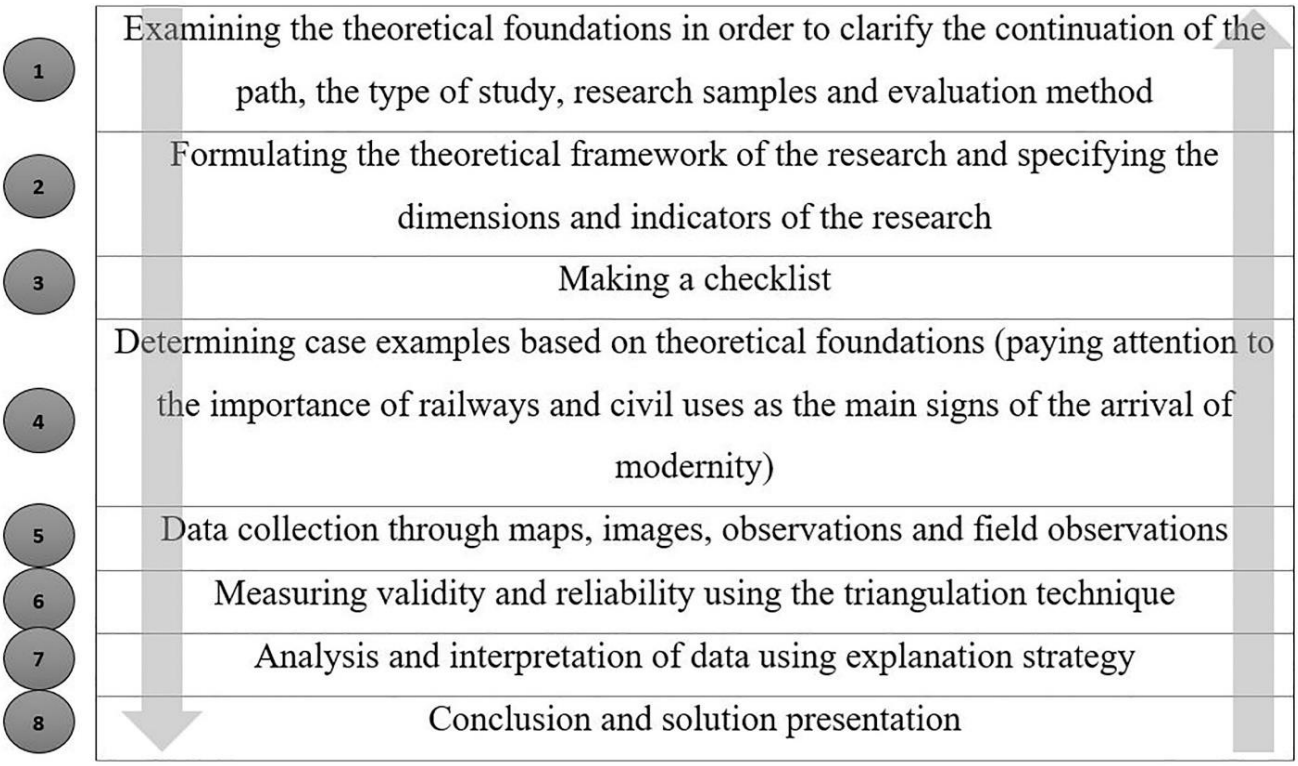


Fig 1. Introduction to the Research Method Process (Source: Authors)

THEORETICAL FOUNDATIONS OF THE RESEARCH

Spatial organization plays an important role as the main and key factor in the formation of cities. Considering the significance of examining the spatial organization in cities, it can be said that among the achievements of Reza Khan, the construction of railways has had a great impact on the formation of the spatial organization of the cities in Iran during the past decades. Railway stations act as magnets for all kinds of socio-economic activities. The public space around the station is often one of the main gateways to the city (Van Acker & Triggianese, 2021). Recent studies have also highlighted the role of railway stations as strategic urban nodes that stimulate civic, social, and spatial development beyond their transportation function (Triggianese et al., 2019). Accordingly, the introduction of railway infrastructure significantly contributed to the transformation of urban centers and the emergence of new civic spaces in Iranian cities during the Pahlavi period.

On the other hand, the function of the railway station as an engine of urbanization caused the train lines to penetrate deeper into the urban fabric. At the same time, the construction of government-administrative buildings such as the city hall, the justice building, the governor's office, the city police and the national bank gave a new shape to the center of the cities in the transition from a traditional city. In addition to the above, the street was the most important symbol and reality of the first Pahlavi urban development. The common pattern of street planning in this era was to create perpendicular streets. The common pattern of street planning in this era was to create perpendicular streets. Studies in urban morphology emphasize the importance of axial organization, street networks, and spatial integration in understanding the structure and legibility of urban environments (Pafka et al., 2020). On the other hand, urban morphology and spatial configuration play a central role in shaping accessibility, movement patterns, and the social vitality of public spaces (Dovey & Pafka, 2017). In this period, Iranian cities had a complex structure.

Apart from the linear concentration of less important elements (commercial-service elements) in the walls of the street network, the main elements were placed individually or in groups next to this network and created nuclei for it. The dominant and common style of architecture of this period can be considered European neoclassical with the combination of Iranian elements, which was named as the national style during the second Pahlavi period. This type of style and design language is a kind of reading of Hitler's German architecture, from the point of view of European neoclassical architecture, which acquired an Iranian image by adding elements of ancient Iran and the Islamic era. Eternalism, power seeking, and most importantly, the tendency towards the past and antiquity, increased the attractiveness of neoclassical architecture for Reza Khan, who had a dictatorial spirit. This architecture, presented mainly by German engineers, was to offer a special statement (returning to the seemingly legal building forms of the past) for the current form of government, with the intention of making it look legal and also strengthening it.

The architectural integrity of Iran's railway stations and other civil buildings in the first Pahlavi period was adapted from the common architectural language of this period. Something which corresponds to the characteristics derived from the common style of using European neoclassical architectural patterns (German architecture) and the architecture of the ancient period of Iran and combining it with the local architectural characteristics of each region throughout Iran.

During the period of transition from traditional to modernity that occurred during Reza Shah's time, the physical and spatial organization of cities has underwent a fundamental transformation, so that it can be categorized according to the division

of (Carmona & Tiesdell, 2007) in terms of different morphological, perceptual, visual, social, functional, and temporal dimensions. Due to the limitations of the research, the explanations of each dimension are not discussed here; therefore, the theoretical framework of the research is presented using theoretical and documentary studies in the aforementioned five dimensions (Table 1). Despite the growing body of research on railway urbanism, modernization, and urban morphology, limited studies have examined how railway infrastructure, civic buildings, and public squares collectively shaped the urban design language of early modern cities in Iran. Existing studies have mainly focused either on architectural history or on physical urban transformations, while less attention has been paid to the comparative interpretation of civic centers as integrated urban design systems. Furthermore, the relationship between railway-led modernization and the formation of civic identity in transitional urban spaces remains underexplored in the international urban design literature. Therefore, this research contributes to urban design studies by proposing a comparative framework for analyzing the spatial, visual, social, functional, and perceptual dimensions of civic centers formed along the Tehran–North railway corridor during the Pahlavi period.

It is worth mentioning that in this research, the characteristics of the time dimension in the centers of the studied cities listed in the tables of the social and functional dimension can be seen mixed with the characteristics proposed for those dimensions.

The Urban Design Language and Recovery of the Spatial Organization Model in the Squares Related to the Railway

In cities of Iran, there is no organized system for targeted intervention in traditional urban centers, and the lack of a model seems to be one of the most important reasons in this regard. Therefore, explaining the transformation pattern language for each city can resolve this problem to a great extent. The pattern language is derived from a spatial quality and related to the topic of space identity.

At the end of the Qajar period and the beginning of the first Pahlavi period, in parallel with the developments in the West, the use of urban design methods common in the West in combination with traditional methods became popular, and over time, during the first Pahlavi period, a historical break occurred in the local principles and methods of urban design (Bamanian, 2006).

Table1. The Theoretical Framework of the Research (Source: Authors)

Dimensions	Indicators	Sources
Morphology	Pattern of plots	(Salvati et al., 2018; Sima & Zhang, 2009; Aryan et al., 2019)
	The pattern of buildings	(Marshall & Çalişkan 2011; Yu et al., 2017)
	Interaction pattern of closed and open space	(Yu et al., 2017; Sadeghi & Li, 2019)
Visual	City image	(Esmaili et al., 2020; Krier, 1998)
	Urban Furniture	(Kamvar Shalman & Hanachi, 2016; Mahmoodi & Alimardani, 2015)
Social	Type of governance and management	(Schindler et al., 2021; Cunningham & Platt, 2019; Imani Jajarmi, 2016)
	Security	(Khaziri Afravi et al., 2015; Kozegarkaleji et al., 2020)
Operational	Behavioral Setting	(Hamzenejad & Ghelichy, 2019; Huang et al., 2019)
	Access	(Mirhoseini & Jahanbakhsh, 2017; Zahedi Mahboub & Molkabadi, 2013)
	Mixed Use	(Habibzadeh Koozehkonani & Abdollahzadehtaraf, 2016; Dovey & Pafka, 2017)
Perceptual	Identity	(Nasr, 2018; Habibi & Seyed Berenji, 2017)

INTRODUCTION OF THE RESEARCH CASE

Introduction of the Studied Cities

In this article, the Tehran-North railway is studied with a focus on the main cities of this route. In this period, the train station was considered a city catalyst for economic and industrial development. Tehran, Sari, Ghaemshahr, and Gorgan are the main cities of the mentioned route (figure 2). In a general view, by observing urban documents such as comprehensive and detailed development plans in the studied cities, it can be mentioned that the beginning of the physical development of the railway area, followed by the municipal squares, is almost parallel with the presence of the manifestations of modernity in the cities of Tehran, Ghaemshahr, Sari, and Gorgan.

Tehran

Historical-structural Understanding of the Square Related to the Railway Station

Morphological dimension: The shape of the railway square is circular, and the placement of the statue in the middle of the square emphasizes its centrality. The railway building is located in the south of the square and has a continuous structure. Also, its plan has a regular shape (stretched rectangle) and a horizontal stretch that adds to the connection of the wall to the square. The plan form of the square is designed to facilitate the movement of people in cars and pedestrians. Symmetry and balance in the square have made it cohesive, and the construction of the building in the south of it as the dominant element has turned the view towards itself. The view of all the buildings is towards the square, and their semi-public open space is located behind it.

In the design of the municipal building, pure volumes (rectangles) are used, and the continuity of the walls can also be seen. Its semi-public open space is located behind the building, such as the railway building, and the streets around the building have created a break from the surrounding fabric.

Visual aspect: Imported elements such as statues and electric lights were used in the design of the railway square. The wall of the railway building has elongated and tall windows, which increase the permeability and visual transparency and give the building a human scale. The presence of stretched and vertical windows in the building creates rhythm and symmetry.

Fig 2. Introduction to the Studied Cities

Also, the presence of porticoes and windows in the municipal building increases the visual permeability and transparency, and the corner of the building is well defined by creating a protrusion and a break in the skyline. In the municipal building, like the railway building, rhythm, symmetry, and balance can be seen very well, and the building has a human scale.

Perceptual dimension: In the railway square, the design of the square with a circular shape, and attention and emphasis on its centrality, has caused a break from the past, and the presence of landmark buildings with new uses has also highlighted this issue. The shape and scale of the square display the sense of authority and glory, and the use of stone as a material in the facade induces a sense of archaism in the viewer. Regarding the municipal building, the presence of arched porticoes on the facade of the building can be regarded as a sign of archaism.

Social dimension: The formation of the space was based on top-down policies and without people's participation. Although the existence of the streets around the square and the large number of cars made it possible for citizens to be present only on the sidewalks, thanks to the large scale of the square, it was also possible for people to be present in the square.

Functional dimension: Because of the existence of the railway building and retail shops around it, it was possible for people to be present in this place at different hours of the day and night. Moreover, citizens could use the green space around the square, which would increase urban interactions. In the municipal building, it was also possible for people to be present at certain hours of the day; however, the citizens used the space around it at different times of the day (Figures 3 to 6).

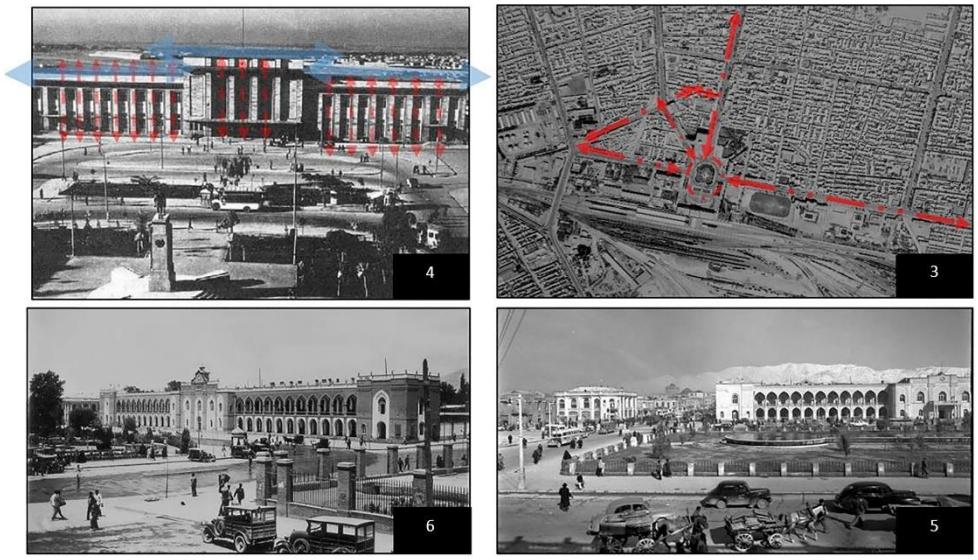


Fig 3. Aerial view of Rah-Ahan Square and its relationship with the surrounding urban fabric, as well as the spatial disruptions caused by street construction during 1956–1966 (Source: National Cartographic Center of Iran, edited by the authors)

Fig 4. Tehran Railway Station in the early years after its construction (Source: National Library and Archives of Iran, edited by the authors)

Figs 5 and 6. The first Tehran Municipality building (former Baladieh), constructed between 1921 and 1923 by Monsieur Gaspar Ipekian, the Armenian mayor of Tehran at the time. The building was located on the northern side of Toopkhaneh Square and was demolished between 1966 and 1969 (Source: National Library and Archives of Iran)

Ghaemshahr

Historical-structural Understanding of the Square Related to the Railway Station

Morphological dimension: The shape of the municipal square is oval, which facilitates the movement of cars, and the placement of the statue in the middle emphasizes the centrality of the square. The municipal building has coherence and continuity with the square, and in the Ghaemshahr municipal building, like the railway building and the Tehran municipality, there is a semi-public open space behind the building. The presence of the municipal building has given direction to the square.

Visual dimension: Similar to the previous ones.

Perceptual dimension: the design of the square with a central form, attention to, and emphasis on its centrality, as well as the construction of landmark buildings with new uses, have caused the complex to be disconnected from the past. The shape and scale of the municipal square display authority and glory, and the use of stone as a material in the facade induces a sense of archaism in the viewer. The presence of square openings in the facade of the municipal building also shows a kind of modernism. In the building of the National Bank, the columns give the building grandeur, and its arched windows are reminiscent of traditional Iranian architecture.

Social dimension: Similar to the previous ones.

Functional dimension: On the one hand, the nature of this square, with the presence of the municipal building, makes it possible for citizens to do administrative work, and on the other hand, it facilitates the movement of people at all hours of the day. In addition, the space around it with urban furniture and suitable lighting equipment has been useful for family gatherings and interactions (Figures 7 to 11).

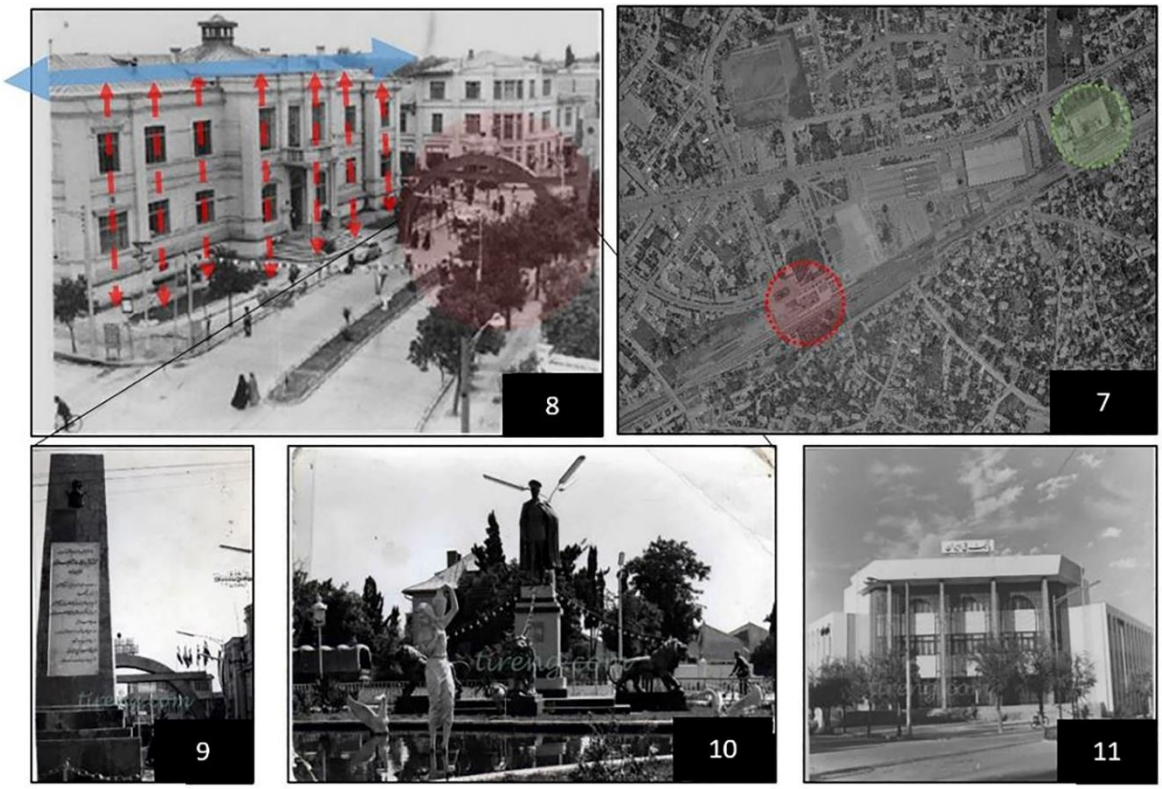


Fig 7. Aerial photograph of the city center of Qaemshahr during 1956–1966. Rah-Ahan Square is marked in red, and Municipality Square is marked in green (Source: National Cartographic Center of Iran, edited by the authors)

Figs 8, 9, and 10. Municipality Square and the former Municipality and Governorate buildings of Qaemshahr in 1971 (Source: National Library and Archives of Iran, edited by the authors)

Fig 11. National Bank building (Source: National Library and Archives of Iran)

Sari

Historical-structural Understanding of the Square Related to the Railway Station

Morphological dimension: The shape of the municipal square is rectangular, and in the center is a circular pond. There are prominent buildings around the square, such as the municipal building and the National Bank building. Like the railway building and the Tehran and Ghaemshahr municipalities, in the Sari municipality building, there is a semi-public open space behind the building, and the National Bank and the municipal building have coherence and continuity. The square is surrounded by buildings that are stretched around the square without discontinuity, and this stretch continues to the adjacent streets, so that it connects the square to the nearby streets.

Visual dimension: In the design of both the National Bank building and the municipal building, stairs and recesses have been used to differentiate the entrances. In both buildings, owing to the presence of openings, the human scale has been observed, but in the Melli Bank building, the ratio of empty space to transparent space is very high. In both squares, the corners are well defined by the continuity of the buildings.

Perceptual aspect: The design of the square by emphasizing the centrality and the presence of landmark buildings with new uses has caused a break from the past, and the attempt to restore the authority and glory of Iranian architecture and the use of stone in the facade and columns to distinguish the entrance is proof of archaism. On the other hand, the presence of square openings in the facade of the municipal building shows a break from the past.

Social dimension: Top-down policies without people's participation, the existence of street paving around the square, and the large number of cars and their role in the presence of citizens in the space of the square are the characteristics of this era.

Functional dimension: Similar to the previous ones (Figures 12 to 16).

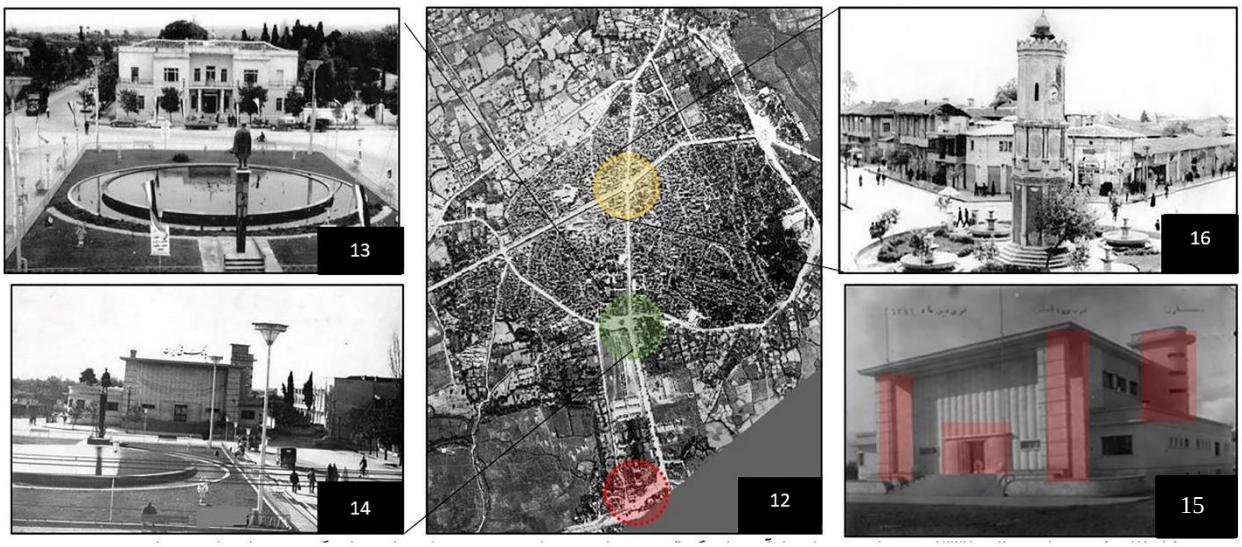


Fig 12. Aerial photograph of the city of Sari in 1956. Rah-Ahan Square is marked in red, Municipality Square in green, and Clock Square in yellow (Source: National Cartographic Center of Iran, edited by the authors)

Figs 13 and 14. Municipality Square (Source: National Library and Archives of Iran. National Library and Archives of Iran)

Fig 15. The National Bank building located in Municipality Square, Sari, in 1932. National Library and Archives of Iran (Source: National Library and Archives of Iran)

Fig 16. Clock Square. National Library and Archives of Iran (Source: National Library and Archives of Iran)

Gorgan

Historical-structural understanding of the square related to the railway station: This station was opened on October 31, 1960.

Morphological dimension: All squares except the railway have a circular central shape. Unlike the Tehran railway, which has a central space, a triangular space has been designed in front of the railway station, and the open space of the municipality, the railway, the National Bank, and the hotel are also located behind the building.

Visual dimension: The use of imported elements and windows with regular geometric shapes in the wall of the municipal building is similar to the previous ones. Also, to define the entrance, as in the building of the Miami Hotel, stairs and recessions were used in the building. The crescent at the entrance of this building causes a break in the skyline and is proportional to the skyline of the National Bank building (the entrance of the National Bank is also higher than its surroundings). The human scale has been observed in all three buildings because of the presence of openings. In both squares, the corners are well defined by the continuity of the buildings.

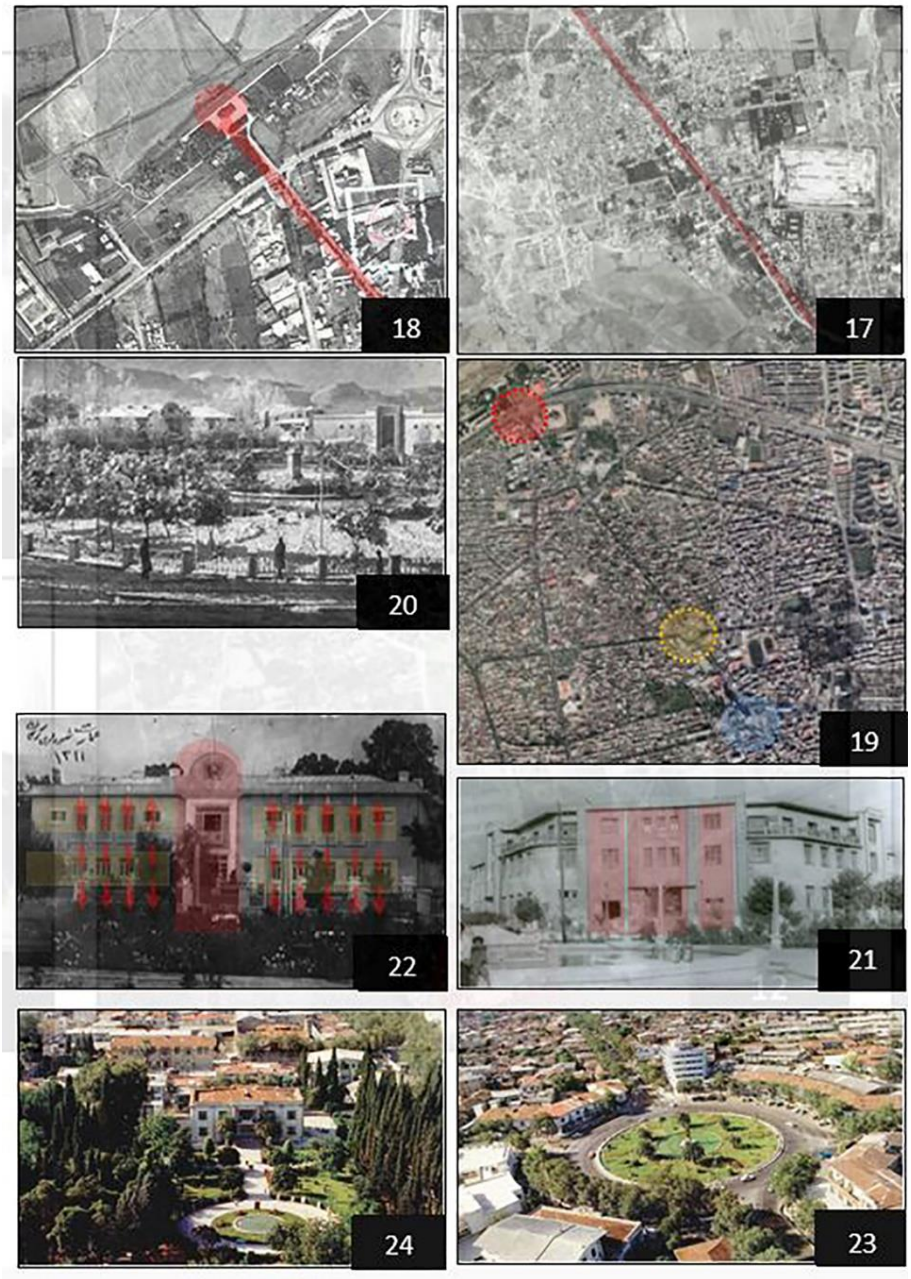
Perceptual dimension: The architecture of the squares and buildings in question indicates the disconnection from the past and the restoration of authority and glory (Figures 17 to 24).

Social dimension: similar to the previous ones.

Functional dimension: Similar to the previous ones.

Description of Research Dimensions and Indicators

According to the samples of the research and the theoretical framework, each of the morphological dimensions can include the indicators of the pattern of parts, the pattern of open spaces, the pattern of the building, the visual dimension including the urban appearance, urban view, urban furniture, the perceptual dimension including the sense of place pattern, place identity, the social dimension including indicator of the type of governance, management and security, the functional dimension including the indicators of behavioral location, access, and multi-functionality were investigated (Table 2). The indicators presented in Table 2 were operationalized through observable spatial, visual, functional, and social characteristics identified in the studied case samples. By preparing a checklist of these indicators (Table 3), it is possible to perform a proper analysis on the research samples.



Figs 17 and 18. Aerial photographs of the city of Gorgan in 1966. The new urban spine, terminating at the railway station on its northern end, is visible in the left image. The railway station, located on the northern edge of the city, is marked in red (Source: National Cartographic Center of Iran, edited by the authors)

Fig 19. Palace Square is marked in blue, Municipality Square in yellow, and Gorgan Railway Station in red (Source: Google Earth, 2023)

Fig 20. The Municipality building and the National Bank located on the western side of Municipality Square (Source: National Library and Archives of Iran)

Fig 21. Mimami Hotel located on the southwestern side of Municipality Square in Gorgan. (Source: National Library and Archives of Iran)

Fig 22. The Municipality Mansion building in 1932. National Library and Archives of Iran.

Fig 23. Aerial photograph of Municipality Square in 2006. (Source: National Library and Archives of Iran)

Fig 24. The Pahlavi Palace buildings located in Palace Square, Gorgan. (Source: National Library and Archives of Iran)

Table 2. Legislation of Research Dimensions and Indicators (Source: Authors)

Morphological dimension			
Indicator	Observable Criteria	Empirical Evidence	Description
Pattern of parts	Centrality of spatial composition; concentration of built forms around a focal point; axial orientation toward center; presence of dominant central element	The squares are organized around a central focus, with buildings and open space oriented toward the center. A statue of Reza Khan on horseback is located at the center, while in rectangular squares the statue is placed on a raised platform to enhance visual dominance and attention.	The spatial configuration emphasizes central attention and hierarchical organization of urban elements within the square.
Building pattern	Continuity of built form along urban edge; enclosure of square by continuous building frontage; spatial continuity between square and adjacent streets; linear extension of building massing	The buildings forming the square exhibit continuous and uninterrupted edges around the perimeter of the square. This continuity extends into adjacent streets, creating a connected urban fabric between the square and surrounding street network.	The spatial structure is defined by a continuous built edge that strengthens the enclosure of the square and integrates it with surrounding streets.
Interaction pattern of open and closed spaces	Degree of spatial enclosure in square layout; circular configuration of open space; centralized placement of landscape elements; interaction between built edges and central open space	The studied squares predominantly exhibit circular spatial configurations, where built edges define a continuous enclosure around the open space. Central elements such as statues, fountains, and water ponds are located in the middle of the square, reinforcing spatial focus and organization.	The spatial relationship between open and closed spaces is organized around a circular configuration that strengthens centrality and visual focus within the square.
	Degree of axial symmetry in spatial layout; presence of central geometric order; directional orientation of square edges; asymmetrical distribution of dominant civic buildings	The analyzed squares demonstrate a clear axial and central symmetry in their spatial configuration. However, in some cases, dominant civic buildings such as municipal halls and railway stations are located on one side of the square, creating a directional emphasis within the spatial structure.	The spatial organization reflects a combination of formal symmetry and directional hierarchy, where central geometric order coexists with functional asymmetry introduced by civic landmarks.
	Location of service and administrative open spaces relative to building mass; presence of secondary open spaces behind civic buildings; orientation of main façade	In the studied cases, administrative and governmental buildings are typically accompanied by open spaces located at the rear side of the buildings. The primary	The spatial organization reveals a clear functional and spatial differentiation between public-facing façades and semi-public rear spaces, reinforcing the

	toward square; degree of spatial separation between public and semi-public zones	façades are oriented toward the square, while the rear spaces function as semi-public or service-oriented areas, particularly in municipal and governmental complexes.	representational role of civic buildings toward the square.
Visual dimension			
Indicator	Observable Criteria	Empirical Evidence	Description
Urban furniture	Presence of imported decorative elements in public space; central placement of monuments and statues; integration of fountains and water features within square design; degree of symbolic centrality of urban furniture	The studied squares include imported urban furniture elements such as fountains, statues, and ornamental landscape features. In most cases, statues (notably equestrian statues of Reza Shah) are positioned at the central point of the square, while fountains and water elements are integrated into the spatial composition.	Urban furniture functions as both a decorative and symbolic device, reinforcing the centrality and representational role of civic squares, while reflecting the hybridization of Western design elements with local political and cultural narratives.
	Type of lighting system (lantern vs. electric poles); presence of fixed lighting infrastructure in the square; distribution pattern of light sources in the public space; integration of lighting elements with spatial composition	The studied squares show a transition from traditional lantern-based lighting systems to fixed electric lighting infrastructure. Electric light poles are installed within and around the squares, contributing to the illumination of circulation paths and central open spaces.	The introduction of electric lighting transformed the nighttime readability of the squares and became an integral component of their spatial identity and urban design composition.
	Degree of skyline uniformity; presence of vertical focal points within the square; variation in building heights along the square edges; continuity or interruption of the roofline profile	Two main skyline typologies are observed in the studied squares. The first typology is characterized by a central vertical emphasis or projection (e.g., clock tower), which creates a directional spatial composition. The second typology presents a relatively uniform and continuous skyline, mainly formed by commercial and non-public buildings with similar heights.	The skyline composition contributes to the overall spatial legibility of the square, where either a centralized vertical emphasis or a homogeneous roofline structure defines the urban image.
	Degree of façade openness; number and size of openings (windows, doors); presence of display-oriented ground floors; existence of balconies as projecting elements; visual	The buildings surrounding the square exhibit high levels of façade permeability through multiple openings and transparent ground-floor shopfronts. Commercial units	Increased façade transparency enhances visual interaction between interior and public space, contributing to the vitality and activity of the square

	connection between interior and public space	display goods through storefront windows, while balconies function as outward-facing architectural elements replacing inward-oriented traditional porches.	as a continuous urban environment.
Urban landscape	Ground-floor transparency level; façade articulation at street level (plinth differentiation); frequency and rhythm of openings (windows/arches); presence of colonnades or porticoes; degree of vertical façade segmentation	The buildings surrounding the square demonstrate a high level of ground-floor articulation through transparent façades, repeated openings (windows and arches), and clearly defined plinths. In several cases, colonnades and porticoes are present along the street edge, enhancing spatial transition between built form and public space.	The articulation of the urban edge at street level enhances human-scale perception by improving visual connectivity, spatial rhythm, and transitional experience between public space and building interiors.
	Degree of façade symmetry; repetition pattern of architectural elements (arches, openings, colonnades); spatial rhythm along building frontage; presence of emphasized architectural modules (entrances or corner elements)	The buildings surrounding the squares demonstrate regular rhythmic repetition of architectural elements such as arches, colonnades, and window openings. Symmetrical façade compositions are frequently observed, particularly in governmental and civic buildings.	The use of rhythmic repetition and symmetry in façade composition enhances visual coherence and reinforces the formal and ordered character of the square edges.
	Presence of architectural focal elements at intersections; use of vertical landmarks (e.g., clock towers); degree of visual emphasis at building corners; articulation of corner geometry; role of corner buildings in spatial connection between street and square	In the studied squares, key corners are emphasized through architectural focal elements such as clock towers and distinctive corner treatments in governmental and civic buildings. These corners visually stand out within the urban fabric and mark transitions between streets and squares.	Corner articulation strengthens spatial legibility by defining edges, highlighting intersections, and enhancing the visual connection between the square and the surrounding street network.
Perceptual dimension			
Indicator	Observable Criteria	Empirical Evidence	Description
	Change in dominant land uses compared to previous urban period; replacement of traditional civic functions with modern administrative functions; absence of stylistic continuity from earlier	In the studied squares, traditional urban functions such as mosque, bath, bazaar, and residential-commercial mixed uses are largely replaced by administrative, governmental, and modern commercial	The spatial identity of the squares reflects a structural transformation in urban function and architectural language, indicating a shift toward modern civic

	architectural periods; emergence of new institutional building typologies around squares	functions. Architectural forms also show limited continuity with previous (Qajar) façade typologies.	representation and institutional centrality.
Place Identity	Presence of monumental or iconic elements in square composition; visibility of civic landmarks within urban space; degree of landmark centrality; use of symbolic architectural elements (statues, towers, monumental façades)	The main squares constructed during the Reza Shah period include prominent symbolic elements such as statues, monumental civic buildings, and clock towers. These elements are visually dominant within the spatial structure of the square and are easily recognizable within the urban fabric.	Symbolic architectural and urban elements enhance the recognizability of the square and contribute to its function as a city-level landmark and identity marker.
	Degree of ceremonial spatial organization; presence of axial and symmetrical composition; existence of monumental civic elements; scale and massing of surrounding buildings; presence of formal entrances, stairs, and processional spaces	The studied governmental and railway squares are characterized by formal spatial organization with strong symmetry and axial composition. Monumental elements such as statues, fountains, and clock towers are frequently present. Buildings surrounding the squares exhibit large-scale massing, while formal stairs and emphasized entrances contribute to a structured spatial hierarchy.	The ceremonial configuration of the squares reinforces their role as representative civic spaces, where spatial order, monumentality, and formal architectural articulation contribute to their performative identity.
	Use of classical architectural elements (columns, plinths, arches, decorative reliefs); stylistic reference to historical Iranian architectural forms; degree of historicist façade composition; integration of traditional motifs in modern civic buildings	The façades of buildings surrounding the squares include classical architectural elements such as columns, stone plinths, arches, and decorative wall details. These elements are combined within modern civic buildings and show formal references to historical architectural traditions, particularly ancient Iranian styles.	The incorporation of historic architectural motifs within modern civic architecture reflects a hybrid design language that combines modern functions with historical references, contributing to a layered urban identity.
Social dimension			
Indicator	Observable Criteria	Empirical Evidence	Description
Type of governance and management	Degree of top-down planning intervention; presence of state-led urban projects; level of centralized decision-making in square design; absence of	The formation of squares and surrounding urban spaces in the studied cities reflects strong state-led planning interventions during the first Pahlavi period.	The governance structure of urban transformation is characterized by centralized and state-driven planning, which

	participatory planning indicators; uniformity of design across cases	Urban development projects, including streets, squares, and civic buildings, were implemented through centralized decision-making processes, with limited evidence of participatory involvement in design or planning.	shaped the spatial organization and design logic of civic squares.
	Degree of functional accessibility of squares for different social groups; presence of class-specific social activities (cafés, elite-oriented spaces); car-oriented spatial design; mismatch between design intention and actual mobility patterns; spatial segregation of uses	The studied squares show differentiated patterns of use, where certain social and economic groups, particularly educated and higher-income users, are more frequently associated with emerging modern functions such as cafés and commercial leisure spaces. The design of squares emphasizes vehicular circulation; however, in some smaller cities, the level of motorized mobility was initially limited.	The spatial and functional configuration of squares reflects differentiated patterns of accessibility and use, indicating emerging socio-spatial differentiation associated with modernization processes.
	Width and continuity of pedestrian paths; separation between pedestrian and vehicular zones; dominance of vehicular circulation within the square; degree of pedestrian accessibility within the square space	The studied squares show reduced pedestrian space due to the dominance of vehicular circulation. Pedestrian movement is mainly restricted to sidewalks surrounding the square, while the internal space of the square functions primarily as a vehicular circulation hub, particularly in areas adjacent to administrative and transport-related buildings.	The spatial configuration prioritizes vehicular movement over pedestrian accessibility, resulting in reduced walkability and a redefined function of the square as a traffic-oriented space.
Security	Level of pedestrian presence in square; diversity of active ground-floor uses; presence of evening/night-time activities; degree of spatial openness and accessibility; mixed-use intensity around square	The studied squares demonstrate increased levels of social activity due to the presence of diverse urban functions such as shops, cafés, cinemas, and hotels. These uses contribute to continuous pedestrian presence, including during evening hours. Despite a vehicular-oriented design, the squares maintain visible levels of social interaction and public activity.	The spatial configuration supports urban vitality by enabling continuous social presence and activity, despite the dominance of vehicular design logic.

Functional dimension			
Indicator	Observable Criteria	Empirical Evidence	Description
Behavioral setting	Type and configuration of green space within square (central island, linear planting, peripheral greenery); spatial distribution of vegetation; relationship between green elements and square geometry; presence of adjacent park spaces	In the studied squares, green spaces are typically organized as central islands within circular squares or as structured tree planting in rectangular layouts. Vegetation includes grass, flower beds, and tree rows integrated into the spatial structure of the square. In some cases, park functions appear adjacent to squares, supporting recreational use.	Green infrastructure is integrated into the spatial design of squares, contributing to environmental quality and supporting recreational and social functions within the urban space.
	Presence of new civic and institutional land uses; diversity of modern urban functions around squares; spatial co-location of administrative, service, and entertainment functions; degree of functional transition from traditional to modern uses	The studied squares contain a range of newly introduced urban functions, including municipal buildings, post offices, cinemas, and other civic or commercial facilities. These functions are spatially concentrated around the square areas and are associated with early modernization processes in the urban structure.	The introduction and spatial clustering of new urban functions reflect a functional restructuring of the urban core, contributing to the transformation of squares into multifunctional civic centers.
Access	Degree of vehicular permeability at intersections; presence of radial or multi-directional street connections; spatial configuration supporting continuous traffic flow; absence or limitation of traffic control devices (e.g., signals)	The studied squares are located at key street intersections and are characterized by high vehicular permeability. Their spatial configuration supports continuous traffic movement through multiple access points, and in many cases, traffic flow operates without the need for formal traffic control systems such as traffic lights.	The spatial structure of the squares prioritizes vehicular accessibility and movement efficiency, reflecting their role as circulation nodes within the urban network.
Mixed Use Mixed Use	Degree of land-use diversity within and around the square; coexistence of administrative, commercial, and leisure functions; vertical or horizontal mixing of functions; temporal variation of activity (day/evening use patterns)	The studied squares exhibit a combination of multiple urban functions, including administrative buildings, retail shops, cafés, and cinemas. These uses are spatially co-located around the square and contribute to continuous patterns of urban activity during both daytime and evening hours.	The presence of mixed land uses enhances functional diversity and supports continuous urban activity, contributing to the role of squares as multifunctional urban centers.

DISCUSSION OF RESULTS

Compilation of the analytical model of urban design language 1925-1941 in urban centers related to the railway station: Background developments in the first Pahlavi period led to the formation of a new language of urban space design. In relation to the dimensions of urban design, models have expanded and developed since the formation of this knowledge, Such as Panther's sense of place model, Kanter's sense of place model, Montgomery and Mateen's sense of place model. Among the presented dimensions, Matthew Cremona's model, which is used in this article, enables a comprehensive and complete analysis of the urban space. Therefore, according to the theoretical framework and the identification of its indicators and examples, the following table examines the cities of Tehran, Ghaemshahr, Sari, and Gorgan (Table 3).

The comparative analysis of Tehran, Ghaemshahr, Sari, and Gorgan along the Tehran–North railway corridor reveals the emergence of a coherent yet context-dependent urban design language during 1925–1941. This language is not merely a stylistic outcome, but a structured system of spatial, functional, perceptual, and governance-related logics that collectively redefined the civic core of Iranian cities in the early Pahlavi period. The findings suggest that railway-induced modernization operated as a catalyst for the formation of new urban centralities, particularly through the integration of civic squares and administrative buildings.

From a morphological perspective, the results indicate strong spatial centralization, axial organization, and formal geometric order across all cases. These findings are consistent with classical urban morphology theories emphasizing spatial configuration and legibility in urban form (Lynch, 2008; Carmona, 2021). In terms of visual structure, the findings reveal a consistent emphasis on façade rhythm, symmetry, and repetition of architectural elements. Imported urban elements such as statues, fountains, and electric lighting introduce a hybrid visual language that aligns with broader discussions on modernization and architectural transfer in civic spaces. At the perceptual level, the analysis demonstrates a transformation in place identity, where symbolic representation becomes central to urban form. This aligns with theories of imageability and place identity, emphasizing landmarks and symbolic elements in urban perception(Lynch, 2008; Nasar, 1998). The social dimension highlights the role of centralized governance in shaping urban form. The results correspond with critical urban studies emphasizing state-led modernization processes in the production of urban space (Harvey, 2008; Scott, 2020). Additionally, emerging socio-spatial differentiation reflects broader theories of unequal access to modern urban public spaces. From a functional perspective, the findings are consistent with theories of mixed-use urbanism and urban vitality (Jacobs, 1992; Pafka et al., 2020), but they differ in that functional diversity is primarily the result of planned institutional placement rather than organic urban evolution.

Overall, the urban design language of the Tehran–North railway corridor is characterized by three interrelated processes: formal spatial ordering, functional modernization, and symbolic redefinition of civic space. These processes collectively demonstrate a hybrid modernization model shaped by infrastructure, governance, and imported architectural logics.

Table 3. Comparison of the Study Case Using a Checklist (Source: Authors)

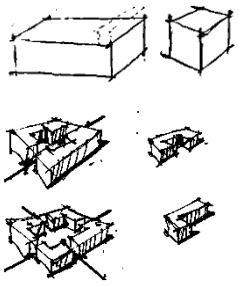
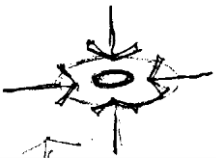
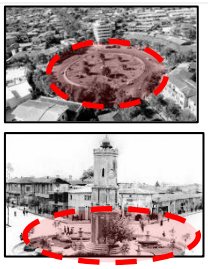
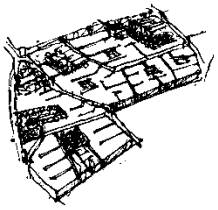
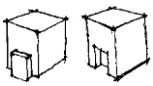
Dimensio	Indicator	Characteristic of Examples-measure	Case Study											
			Tehran			Ghaemshahr			Sari			Gorgan		
			R	B	R	O	B	R	O	B	R	O	B	
Morphology	Pattern of parts	Centralization (location of buildings around a center)	*			*			*			*		
	Pattern of open spaces	Square with a circular plan	*			*			*			*		
		The presence of semi-public open space behind the buildings	*	*	*	*	*	*	*	*	*	*	*	
		Central and axial symmetries and directionality of the square	*		*	*		*	*		*	*		
	Building pattern	The presence of extended and continuous buildings forming Urban edge	*	*	*	*	*	*	*	*	*	*	*	
Visual	urban furniture	Imported design elements such as fountains and statues	*		*	*		*	*		*	*		
		lighting		*		*			*	*		*		
	Urban landscape	The human scale of urban Edge	*	*	*	*	*	*	*	*	*	*	*	
		Rhythm, symmetry and emphasis	*	*	*	*	*	*	*	*	*	*	*	
		The design of prominent corner				*			*			*		
		Increasing permeability and visual Transparency				*				*			*	
		Similarity in the skyline	*	*	*	*	*	*	*	*	*	*	*	
Perceptual	Place Identity	Breaking from the past and changing values in the establishment of elements around the square	*		*	*	*	*	*		*	*		
		Symbolism	*	*	*	*	*	*	*		*	*		
		An square with a performance-ceremonial feature	*		*	*		*	*		*	*		
		Archaism in architecture	*	*	*	*	*	*	*	*	*	*	*	
Social	Type of governance and management	The formation of space based on top-down policies and lack of public participation	*	*	*	*	*	*	*	*	*	*	*	
		Exclusion of square use for certain classes of society				*		*			*	*		
	security	Lack of walkability	*		*				*					
		The square as a driver of presence	*		*	*		*	*		*	*		
operational	Behavioral setting	The importance of green spaces and parks (imported element)	*	*	*	*	*	*	*	*	*	*	*	
		Focus on new functions	*	*	*	*	*	*	*	*	*	*	*	
	Multi-functional	Mixed Use	*	*	*	*	*	*	*	*	*	*	*	
	Access	Facilitating vehicle traffic	*		*	*		*	*		*	*		

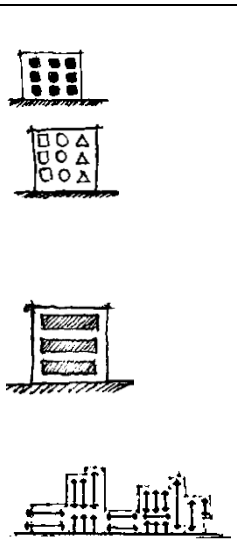
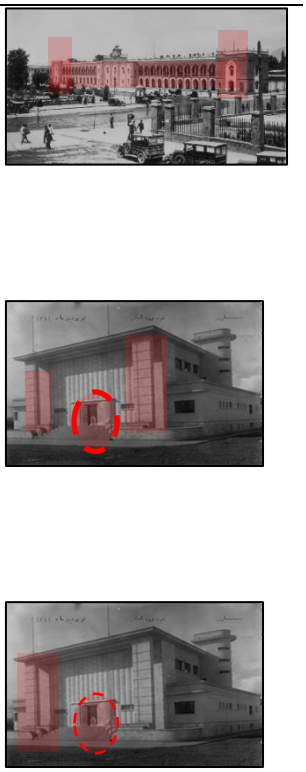
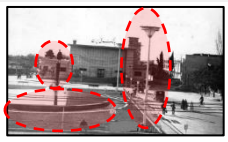
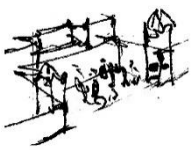
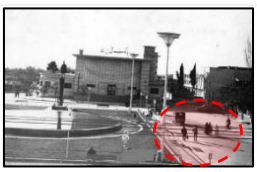
R: Railway Square
B: Building
O: Other Squares

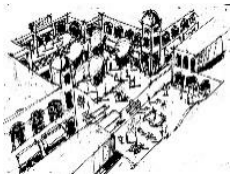
Extracting the Design Language of the City Center

Architectural buildings and new urban elements proposed at the beginning of the first Pahlavi period can be considered as the main elements that shaped the design language of this historical period. The typology of these buildings indicates that the principles of street architecture and authoritarian concepts of government buildings are combined in them (Table 4).

Table 4. The Main and Repeated Principles Governing the Language of Urban Design of Civil Buildings in the Squares of the Cities under Investigation (Source: Authors)

Dimensions	Components	The extracted principles of urban design language	Pattern	Exemplary instances
Morphology	Building pattern	Separation of forms by addition and subtraction of different dimensions Structural factors		
	Pattern of open spaces	The center of the square		
	Pattern of plots	Neighborhoods and passages (new streets and neighborhoods with historical context)		
Visual	Urban Townscape	Symmetry Indentation and protrusion in the volume and view net volumes; using the main shapes of circles, triangles, squares and rectangles in design Diversity in facade design Differentiation in the entrance view Coordination between elements in the view	  	 

Dimensions	Components	The extracted principles of urban design language	Pattern	Exemplary instances
		Modeling Western contemporary and modern buildings The use of relatively wide transparent surfaces Non-traditional and non-native combination of volumes Creating visual balance by using symmetry, rhythm and simple orientation Creating the enclosure of light and vision Combination of vertical and horizontal surfaces The large number of openings Axis definition Attention to the part and the whole at the same time Creating repetitive and single elements The importance of geometry and proportions Balance and symmetry Hierarchy Entrance as a representative of the building (entrance function, entrance form, entrance area, and order governing the entrance architecture) Creating greatness through the use of stairs in the design of the entrance		
	urban furniture	Use of statues, ponds and electric lamp posts		
Perceptual	Place identity	The use of ancient symbols in the design of spaces to show authority		
Social	Security	Using the space to create social interactions		

Dimensions	Components	The extracted principles of urban design language	Pattern	Exemplary instances
Operational	Behavioral setting	Using green space at the entrance counter of government places		

The dimensions presented in the above tables describe the ruling patterns in the urban design language of the period in question. Although this period is a transitional period, it has a special identity and in order to preserve the continuity and sequence of Iranian architecture and urban design, it is necessary that this period be reviewed and respected. Changing the structure of the city with the construction of civic buildings, which are necessary for the new life of the city, and the streets that connect them to each other, are the last link of this flow. And this issue needs a more detailed analysis in future studies. Because after the implementation of comprehensive and detailed plans in such cities and by forgetting the principles of designing civil buildings in urban squares in the later developments, these initial identities faded. And in some examples, the spatial totalities created by them have also disappeared to a large extent.

CONCLUSION

This study aimed to decode the urban design language of railway and municipal squares formed during the Pahlavi modernization period (1925–1941) along the Tehran–North railway corridor, focusing on the cities of Tehran, Sari, Ghaemshahr, and Gorgan.

In response to the first research question, the results demonstrate that the urban design language of the studied civic centers is characterized by a coherent set of morphological, visual, perceptual, social, and functional dimensions. Morphologically, centrality, axial organization, and geometric order in square layouts, along with elongated civic buildings, define the spatial structure. Visually, symmetry, rhythm, controlled permeability, human-scale façades, and emphasis on corners contribute to a legible urban image. Perceptually, these spaces reflect a transition from traditional meanings toward modern civic symbolism, where squares function as representations of authority, ceremony, and emerging modern identity. Socially, the spatial organization reflects top-down governance with limited public participation and differentiated accessibility, while functionally, increased vehicular accessibility, mixed uses, and the introduction of new civic activities such as municipalities and banks are evident.

In response to the second research question, the comparative analysis of the four cities reveals recurring and shared urban design patterns that form a recognizable design language across the case studies. These include the use of basic geometric forms (circle, square, triangle, and rectangle) in spatial and façade design, hierarchical entrance compositions, symmetry and axiality in urban layout, integration of imported modern elements such as fountains and statues, and the combination of solid and transparent surfaces to enhance visual permeability. Furthermore, repetition, rhythm, proportional order, and the creation of visual enclosure through building walls are consistent features across all cases. The railway and municipal squares act as organizing nodes that connect new civic functions with the evolving urban fabric of each city.

Overall, the study identifies 32 recurring urban design principles organized within eight analytical dimensions, which collectively define the "urban design language" of early modern civic spaces along the Tehran–North railway. These principles illustrate the transitional nature of Iranian cities during this period, shifting from traditional spatial structures toward a semi-modern urban system shaped by infrastructure, governance change, and imported architectural ideas.

Beyond the Iranian context, this research contributes to broader discussions in urban design studies regarding the role of transportation infrastructure and civic architecture in shaping transitional urban identities. The study demonstrates how comparative analysis of railway-oriented civic centers can provide a methodological and conceptual framework for interpreting early modern urban transformations in non-Western cities.

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AUTHOR (S) BIOSKETCHES

H. Pendar., *Department of Urban Planning, Faculty of Architecture and Urban Planning, Tehran University of Art, Tehran, Iran*

Email: H.pendar@art.ac.ir

S. Moazen., *Department of Architecture, Faculty of Architecture and Urban Planning, Iran University of Science and Technology, Tehran, Iran*

Email: Sajadmoazen@iust.ac.ir

M. Ghane., *Department of Urban Planning, University of Tehran, Kish International Campus, Iran*

Email: Mahsaghane92@ut.ac.ir

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