

Original Research Article

Road, Development, Expansion

(Role of the Road in Place-Based Development of Sirjan City; From Pre-Islamic Era to Contemporary Period)*

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Abstract | The road, as a structure, is one of the four pillars of the spatial organization of the Iranian city and its most significant independent element. The physical structuring of the road arises from its semantic structuring and its acceptance as a place, rather than a mere object or corridor. It is in this capacity that the road possesses the potential to integrate the city as a landscape phenomenon: a unified physical-semantic system. The semantic structuring of the road is the product of the manifestation of its ontological attributes. If the road is devoid of these ontological attributes, its structural role in the city's spatial organization becomes disrupted. This is because the city is fundamentally a phenomenon arising from a meaningful, human-dependent order, not a concrete, prescriptive physical entity.

In the present article, by selecting the city of Sirjan as a case study, the consequences of the shift in perception of the road—from place to corridor—on the process of place-based urban development are examined. To this end, the trajectory of the city's transformations from the pre-Islamic era to the contemporary period is investigated, focusing on the road's role in these changes. Finally, the recent economic transformations linked to the mining industry's development and its impact on the changing status of the road in the current city's development are discussed and evaluated.

Keywords | *Road, Place-Based Development, Expansion, Sirjan, Spatial Organization of the City.*

Introduction | In a mono-functionalist view, the road is no different from any other tool used by humans. In this perspective, the road is merely an instrument in the shape of a corridor and a conduit for connecting two points. In other words, this road is a space-object: an intermediary element, dependent on origin and destination, and devoid of intrinsic human-related values. In such a definition, the user (human) is not the producer of the road, but its consumer.

On the other hand, historical studies show that even if the road initially had only a connective function, it quickly became a meaningful and inseparable element of human social life. Evidence for this claim includes paths for meditative walks (Greece, Japanese tea garden), pilgrimages (Babylon, Jerusalem, Karbala), and promenades (Persian Garden). With this functional diversity, the road is no longer merely an object

but a place, meaning a locale for human existence within the environment.

The road is one of the oldest components of the human-made environment, with a history predating shelter. It is also one of the most crucial factors in the development of urbanization. Many cities throughout history were born along major trade routes. The road is a primary component in the spatial organization of the city and also its most important independent element. By playing a role in three dimensions—historical, geographical, and semantic—the road can ensure the spatial continuity and place-based development of the city at both intra-urban and territorial scales.

However, in the contemporary city, and due to the advent of motorized transport, the historical development of the road has been disrupted. The car-oriented road is assessed as having more civic benefits than the pedestrian-oriented road. The characteristic of being car-oriented rapidly usurps the ontological attributes of the road. In fact, the balance of the road's ontological attributes (the structural element of the city) has been disrupted

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in favor of a single epistemological characteristic (being car-oriented). Given the interconnectedness of the four elements of the city's spatial organization (Structure-Core-Territory-Small Units), the balance among the pillars of the city's spatial organization is disturbed, and its place-based development is challenged.

The aim of this paper is to examine the effects of this shift in perception (from road-as-place to road-as-object) on the city's development process. The city of Sirjan has been chosen as a historical example whose existence and continuity have been entirely dependent on trade routes. With four physical relocations throughout history, Sirjan is a unique case for evaluating the structural role of the road in the city's spatial organization. Furthermore, choosing this city makes it possible to trace the deviation from place-based development toward "Expansion" in the contemporary era. This research examines the trajectory of the city's transformations from the pre-Islamic era to the contemporary period, focusing on the road's role. Finally, the impact of Sirjan's recent economic transformations (dependent on the mining industry) on the changing status of the road in the city's place-based development is analyzed.

Following this, after explaining the theoretical foundations and introducing the concepts of "Development" and "Expansion," the ontology of the road is examined, and the criterion of "Walkability" is introduced as the basis for evaluating the "road as place." Subsequently, through a historical-spatial analysis of the city of Sirjan, the road's role in its existence and development is investigated. Finally, by applying the criterion to the contemporary situation of the city, the manner of deviation from development to expansion is analyzed.

Theoretical Foundations

The present research is structured around semantic binary oppositions related to the city. The semantic clarification of the intended binaries is necessary to illuminate the course of the text, which is presented in the following.

• Expansion versus development

Various definitions have been proposed for the term development, which can be examined depending on the field of study. In the realm of urban management, development is recognized as a gradual and comprehensive (quantitative and qualitative) progress. A review of the research literature suggests that no specific linguistic equivalent has been firmly established in Persian texts for the antonym of urban development. To express the opposite concept of development, terms such as non-development, one-dimensional development, and the like are generally used. The word growth has also been employed as an equivalent for non-comprehensive development. However, given the positive etymological nature of the word growth, meaning "being guided towards goodness and well-being" (Mostafavi, 2018, 182), its application in opposition to development seems inappropriate.

In this paper, we propose using the term Expansion (Ettesā) in place of the aforementioned terms. Lexically, Expansion means "widening" or "sprawling," and in the literature of urban studies, it can signify an increase in the physical extent of the city without comprehensive enrichment. The physical and non-comprehensive widening of cities is a common issue in urban management, leading to subsequent disruptions; therefore, the existence of such a term seems necessary to articulate the problem. For instance, the addition of dormitory towns or highway-edge settlements to the city's territory can be considered examples of expansion. In this state, urban policy is merely concerned with solving the issue of citizen housing, with cultural and social issues not being a priority.

• Object versus place

Etymologically, Place is a location for the being of the subject (human) and the realization of a matter related to them (Mostafavi, 2018). The common definitions of place also indicate its dependence on human existence and being. In contrast to the concept of Place in the literature, the Place/Space dichotomy is more common. In some definitions, the word environment is used, but there is no consensus on its application. The Place/Placelessness dichotomy, coined by Edward Relph, defines the other term in opposition to place (Relph, 1976). Meanwhile, the Place/Non-Place dichotomy proposed by French anthropologist Auge (1995) attributes a mono-functional and instrumentalist aspect to "what is not place." In our view, the latter dichotomy is closer to the theoretical foundation of the present paper. In Auge's definition, place is a relational, historical, and identity-related space where social life takes shape. In contrast, a non-place is a transient and temporary space where humans are anonymous, solitary, and defined solely by their user role (passenger, customer, driver). For Auge, function is paramount in such a space (ibid.).

In this research, the term "Object" is used as "what is not a place." The reason for this choice is that the problem of the contemporary city is not merely the road being emptied of meaning (becoming space), but its reduction to a mono-functional "tool" centered around vehicular transportation. The word "Object" emphasizes this service-oriented aspect and the dominance of the "user-consumer" logic, while also maintaining a direct conceptual link with the term "Space-Object" introduced in the introduction. Therefore, the "Place/Object" opposition is not a replacement but a conceptual refinement of the general "Place/Space" opposition.

Research Questions

This research, as part of the study of the road's role in place-based development, seeks to answer the following questions:

1) Is an objectifying view of the road influential in the deviation of development toward expansion, or does the road lack such a position in urban development?

2) Is the overlooking of the road's ontological values in urban development compensable by its epistemological characteristics, such as being car-oriented?

Research Hypothesis

In the present article, with the selection of the city of Sirjan as the spatial domain of the research, the following two hypotheses are examined:

- 1) The road has been the primary factor for the existence and spatial continuity (historical-geographical-semantic) of the city of Sirjan.
- 2) The road has also been a factor in Sirjan's development. With the reduction of the road from a place to a space-object, the city's development has been replaced by expansion.

Research Method

This research is qualitative and based on a "Case Study" strategy, for which the city of Sirjan has been chosen as a case with specific conditions (a city with four historical relocations and a deep dependence on the network of trade routes). The purpose of this selection is not merely to describe the transformations of a city but to test the applicability of an analytical framework for distinguishing "place-based development" from "Expansion."

The research approach is organized into two main steps:

• First step: Formulating the analytical framework (documentary-theoretical studies)

In this step, through a systematic review of theoretical literature related to the phenomenology of the road and place, the characteristic of "Walkability" has been identified as a fundamental criterion for evaluating "the road as place." This criterion—not presented as a comprehensive theory but as an analytical-operational framework—has been formulated to assess the degree of a road's "placeness" in different historical periods. Accordingly, the presence or weakening of the characteristic is used as a criterion for distinguishing the "road-as-place" from the "road-as-object" in the case study.

• Second step: Applying the analytical framework to the case study (historical-field studies)

In this step, the analytical framework from the previous stage has been applied to the city of Sirjan. This step itself is divided into two sub-sections:

Historical-spatial analysis (documentary): Written historical sources (including geographical texts, historiography, and travelogues) and visual documents (including the oldest available maps of Sirjan, aerial photographs from the Pahlavi era, and maps of the qanats) have been analyzed. The analysis method is "interpretive-comparative," and by matching textual narratives with visual documents and maps, the process of the city's formation, relocations, and development has been reread based on the role of the three systems of "Road, Qanat, and Waqf (endowment)." Subsequently, the position of the analytical

framework characteristic (Walkability) in this historical narrative has been documented.

Field analysis: With the aim of evaluating the current situation, systematic field observations in various districts of Sirjan (including the old fabric, middle neighborhoods, and new peripheral developments) have been conducted within the framework of a research trip. The unit of observation has been the "road and sidewalk," and aspects such as the presence and behavior of pedestrians, patterns of stopping and edge activities, and the type of services located along the edge of the roads have been recorded and analyzed.

Ontology of the Road: Review and Assessment of Research Background

Ontology, as a semantic tool, is the structured knowledge about a specific domain, formed through the presentation of concepts and the relationships between them within that domain. Ontology can help create a common semantic understanding of information (Fathian Dastgerdi, 2011, 4). The use of this term in the present article is intended to initiate a path toward the ontology of the road and the recognition of its intrinsic attributes—attributes that define the semantic structure of the road.

In this section of the article, drawing on the views of scholars in the field of road landscape studies, the ontology of the road is briefly examined. Based on the existing studies and relying on the diversity and expertise of researchers, an attempt is made to extract a basic ontological characteristic of the road and clarify its relationship with "the road as place."

According to Mansouri (2016, 3), with the beginning of human movement along the road, this element becomes a part of the living environment, and not merely a habitat. In this state, the road becomes a destination and a landscape, not just an access route to somewhere. Based on a linguistic study, Barati & Zarringhalam (2013, 112) also concluded that, in the history of our country, "road" was not considered merely a path to connect two points; rather, it possessed various dimensions, most of which were qualitative—a matter evident in the different meanings and concepts of words related to the road.

Gathering of various social and economic activities bestows a diversity upon the road, which, according to Mansouri (2013, 58-59), transforms it [in the form of the Bazaar] into the structure and backbone of the city's spatial organization. Uthman (1997, 197) also addresses the direct impact of the diversity of intra-urban activities on the city's traffic conditions. In this context, he points to the flourishing business of itinerant peddlers on the sidewalks of major Islamic cities. He also considers ceremonies, festivals, and holidays as effective factors in the density of urban traffic. According to Charkhchian (2017, 70), in a study on the desirable street, it is the creation of initial capacities in the [street] space to support everyday life and provide a basis for people's presence

that naturally leads to the production of meaning in space. Mansouri (2016) considers the road's capacity for viewing to be a platform for memory-making.

The alley (*kucheh*) is one form of the road in the Iranian city, which Mansouri (2013, 58) introduces as the most important collective space of the city, playing an essential role in creating collective memory. Criticizing the "boulevard disease" that has plagued Iranian cities, Pirnia (1968) mentions the merits of Iran's roads and considers their totality to be aimed at the comfort and tranquility of citizens. In this context, he does not limit the road to formal characteristics but considers its form subordinate to the possibility of comfort; for example, he attributes the narrowness and winding nature of some alleys to security reasons (and in some cases to the land's slope). In Uthman (1997, 197)'s view, nighttime population density in the streets signifies the availability of security and comfort for the city's people. Collective activity on sidewalks, as well as the supportive aspects of the road (including security and welfare), can be inferred from these views as the driving force behind walking.

In the views of Western scholars, particularly in the critique of contemporary urbanism, walkability is emphasized as a fundamental characteristic of the road, and extensive studies have been conducted in this field. Solnit (2001) has considered walking as creating paths as well as a sense of place, local and intercontinental. She also counts walking as one of the ways to preserve a bulwark against the erosion of mind, body, landscape, and city. This view emphasizes the interactive aspect of the road, the influence of the observer on its formation, and consequently, its essence as a place and landscape—a value achieved through walking.

Jacobs (2019) attributes three functions to urban sidewalks: security, contact, and assimilating children. Gehl (1989, 8) classifies ordinary daily street life among the traditional pleasures of living in urban spaces, alongside other human activities such as interaction with others and watching urban scenes. Speck (2012) considers walking one of the privileges of urban life. He emphasizes the importance of street life as a cultural feature of walking and considers its absence a hindrance to the growth of society's creativity. In his essay "Walking in the City," De Certeau (1984) addresses the human role in creating the path. Counter to the holistic view of urban planners, he places the pedestrian's detailed perspective. In his view, the path is produced by pedestrians through the act of walking, in the form of lived practice; they—the pedestrians—are the agents and creative producers of the environment and the path. By walking ancient routes, Macfarlane (2013) brings himself closer to the narrative of the people who once lived there. For him, walking is not just a passage through place but crossing the bridges of time. Ingold (2016) considers the coming-into-being of places (destinations) to occur through the path. Furthermore, according to him, life is lived not just in places (destinations) but along the paths. Elsewhere, Ingold (2015) considers the ground a

substrate for enabling the human (and animal) capacity to stand and walk. In a study focused on the walking dimension of the road, Gros (2023) demonstrates its immaterial values. He also emphasizes the supportive role of the ground for the walker. The supportiveness characteristic of the road, raised by various researchers, also encompasses its security-providing aspect. Benjamin (2006) considers walking in a city like Paris a method for collecting memories. As a serious walker, Dickens (2015) regarded nighttime walking in London as a cure for his distress. Sarkin (2019, 102) addresses the importance of diversity on the road [for pedestrians]. In his view, spatial diversity is an advantage in the context of choosing [among multiple] roads because it creates an opportunity to describe and refine the individual's network of human relationships concerning those places.

By examining the views of Eastern and Western scholars, the characteristic of Walkability can be proposed as an aggregation of the road's ontological feature, which implies the capacity of road for interaction humans. We introduce this characteristic in the present article as criterion for evaluating "the road as place." We will also examine the presence or absence of the characteristic in the historical periods of the city of Sirjan.

It is essential to emphasize that the aim of the present paper is not to present a comprehensive and final theory on the ontology of the road. The criterion of "Walkability" is proposed in the current research as an analytical-operational framework, derived from a systematic review of scholarly views (detailed in this very section). The role of this criterion in the forthcoming article is to provide coherent and assessable measures for distinguishing the "road-as-place" from the "road-as-object" within the context of the historical and contemporary transformations of Sirjan. The nature of this framework is susceptible to further expansion, critique, and theoretical refinement, which itself could be the subject of future research. Here, only the preliminary applicability of the theory is tested.

Epistemology of the Road: The Creation of the City

One of the epistemological characteristics of the road can be seen in its power to create and develop cities.

The place-based role of the road is not limited to the urban scale. Notably, in the land of Iran, which has always encompassed a vast network of the world's most important trade routes, the placeness of the road is also assessable at the territorial scale. At this scale, the road in many cities is a continuation of the territorial road network; indeed, the very existence and development of the city may have been founded on the road. In their book *Road and Rabat*, Afsar & Pirnia (1991) consider the three factors of the Aryan migration, the Achaemenid Empire, and Iran's intercontinental position connecting the two worlds of the ancient East and West as the causes for the creation of the territorial road network. This road network was more or less used for centuries before modern road construction. Along these

roads, road services were provided, and some service centers, if they had access to water, would transform into villages or cities. Sirjan city is one such city dependent on Iran's territorial road network. What distinguishes this city from most wayside cities is its location at the intersection of two important roads. The junction of trade routes was considered a significant point, and people gravitated toward it—to buy and sell goods or provide services to caravans (Uthman, 1997, 162). In the remainder of this paper, the role of the road in the three domains of Sirjan's existence, continuity, and development will be evaluated. Subsequently, by applying the analytical framework of the ontological criterion of Walkability, the road's role in the three dimensions of existence, continuity, and development of the city of Sirjan in the historical period will be examined.

Road: Existence and Spatial Continuity

Based on historical and archaeological sources, Sirjan has undergone at least four physical relocations¹ (Vosoughi Rahbari, 2001; 15-16; Karimian et al., 2019), such that at each stage, the city core was entirely moved:

- 1) Old City (Kohan-Shahr)
- 2) Qaleh Sang
- 3) Bagh-e Bamid
- 4) Saeedabad

The history of Sirjan's presence along major highways dates back at least to the invasion of Alexander the Great. In reconstructed maps, the route of Alexander's campaign returning from India passed through this city (Vosoughi Rahbari, 1993, 16). Subsequently, the position of Sirjan in the network of Iran's territorial-international trade routes throughout history has been such that it can be deemed worthy of the title "A Minor Crossroads of History." From a historical-geographical perspective, two Silk Road routes pass through this city:

- 1) The Spice Route (East-West)², which connected Fars to Kerman via Sirjan. This route dates back to before the Parthian era; in the map of Alexander's campaign to Persia and India published by the Sahab Center, Sirjan (Qaleh Sang) was also on the route. The alignment of the Spice Route has been fixed, based on maps and historical texts (Route One).
- 2) [The Overland Extension of] the Maritime Silk Road (North-South): which connected Iran's southern ports on the Persian Gulf to Yazd. The geographic location of this route changed once due to historical events, an impact observable in the historical significance and spatial location of Sirjan city. The route's first alignment corresponds to the pre-Safavid era and the importance of the port of Hormuz (especially after the decline of Siraf in the early Islamic centuries) and, earlier than that, the historical and later Islamic city of Jiroft. In this period, the route was "Hormuz-Jiroft-Sirjan-Yazd" (Figs. 1 to 3). After the irreparable destruction of Jiroft in the 6th century AH (12th century CE), the weakening of Hormuz, and finally the rise of the port of Gambroon (Bandar Abbas) in the Safavid era, the route changed to "Bandar Abbas-



Fig. 1. Route branching from the Maritime Silk Road from Hormuz to Sirjan during the Seljuk period. Source: Authors.



Fig. 2. Route branching from the Maritime Silk Road from Hormuz to Sirjan during the Samanid period. Source: Authors.



Fig. 3. The network of territorial roads leading to Sirjan in the 3rd to 6th centuries AH (9th to 12th centuries CE). Source: Vosoughi Rahbari, 2001.

Sirjan-Yazd." Accordingly, over time, Sirjan has had two north-south routes (Routes Two and Three) (Fig. 4). By matching the historical findings with the map, it becomes clear that the spatial locations of Sirjan's early cities, i.e., Old City and Qaleh Sang (west of Old City), were along/adjacent to Route Two. The spatial locations of the subsequent two cities, i.e., Bagh-e Bamid and Saeedabad, were along/adjacent to Route Three. Therefore, the geographic location of the city

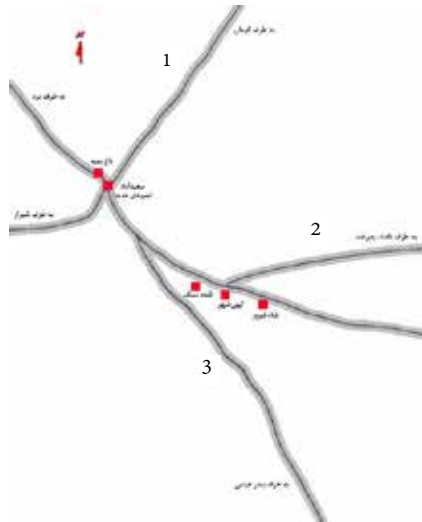


Fig. 4. Locations of the city of Sirjan along the territorial road routes.
Source: Authors.

corresponded with the historical events of the road, and with changes in the road, the physical location of the city also changed. In this way, the road must be considered the fundamental factor in the existence of Sirjan (as a highway service city) and its continuity (considering the road-dependent physical changes). Not only at the urban scale but also at the territorial scale, the road has been the structuring factor of the city.

Road-Qanat-Waqf: The Triangle of Place-Based Development

The historical studies of the research and their interpretation reveal the role of three elements—Road, Qanat, and Waqf (endowment)—in the development of the city of Sirjan. These three elements, in the form of three systems of infrastructure (Qanat), institution (Waqf), and structure (Road), constitute the three sides of the triangle of Sirjan's place-based development. The above claim is examined in the remainder of the article.

• Road

Based on historical documents, the role of the road in the historical development of Sirjan can be examined from two aspects: security and prosperity.

1) Security: Sirjan was completely destroyed in three invasions by the Ghuzz, the Timurids, and the Afghans; nevertheless, historical texts have addressed the security of this city and its resistance (especially at the Qaleh Sang site). Sirjan's security becomes particularly evident when compared to the fate of the historical city of Jiroft. Following the sack of Jiroft in 566 AH (1171 CE) by the Khorasan army, the route through this city was thereafter deemed unsafe, and caravans no longer passed through Jiroft (Kermani, 1994, 29-30). Meanwhile, according to Vaziri (1974, 153), Qaleh Sang in Sirjan served as the refuge and sanctuary for the sultans of Kerman. The resistance of

Qaleh Sang demonstrates the high level of security of this fortress, which provided security for road services on the one hand and the safety of citizens and refugees on the other.

2) Prosperity: Historical sources have generally described the prosperity of Sirjan by the flourishing of its caravanserais, bazaars, and the extent and multiplicity of its alleys and gates. As emerges from historical descriptions, this prosperity aligns with the criterion of Walkability: bazaars and alleys provided walkability and narrativity, while security and economic prosperity ensured the supportive aspect of the road. According to Vaziri (*ibid.*), Sirjan has always been distinguished from other districts of Kerman in terms of prosperity and the amount of produce and revenue. He directly links this prosperity to its location at a territorial crossroads: "...because it is situated across the road from Shiraz and most districts of Fars and Kerman, and between Bandar Abbas and Yazd; gradually, its prosperity increased, and bazaars and caravanserais were built" (*ibid.*, 151). Al-Maqdisi (1982, 685) writes of its high walls and ramparts, beautiful bazaars, wide streets, and gardens with running water. He also mentions two bazaars, old and new, and the Congregational Mosque [Jameh Mosque] between them, which describes the city core. The author of *Hudud al-'Alam* in the 4th century AH (10th century CE) referred to Sirjan as the capital of Kerman and the royal residence, a large city where merchants gathered. (Anonymous, 2002, 141). According to Al-Himyari (1980, 491-492), Sirjan was the center of the province of Kerman, the seat of government offices, with crowded and thriving bazaars. The emphasis on caravanserais and bazaars in describing the city's development indicates the importance and growth of the road and road services.

The development of Sirjan in its last relocation was, as before, influenced by its wayside location. Munshi Kermani (2012, 284), a chancellery writer of the Naseri era, attributed the population increase of Saeedabad to this area's location on the caravan and trade routes of Bandar Abbas and Shiraz, and to migration from Lar, Jahrom, Yazd, Fars, and Kerman to it. The core and initial fabric of Saeedabad—before the urban planning interventions of the first Pahlavi era—was located south of a Trident Junction leading northeast to Kerman, west to Tabriz (likely referring to a route via Shiraz), and south to Bandar Abbas (Arseh Architecture and Urban Planning Consulting Engineers, 2016b, 178), (Fig. 5). An important point is the sixty-meter width of the north-south road (*ibid.*), which was specifically intended to facilitate the movement of trade caravans. an issue that can be expected to disrupt walkability, especially for residents. However, the development of the agricultural and residential fabric and the city core to the southwest of this very road indicates a balance between normal urban activity—based on walking—and commercial road activity. Newer uses, such as the school at the end of Mesgari Bazaar (the location of the Saeedabad qanat's daylight point), also confirm the walkability of the city despite its adjacency to the road. As will be explained later, the direction



Fig. 5. Location of the core of the city of Saeeadabad and the territorial road during the Qajar period (overlaid on the 1941 map). Source: Authors.

of the city’s development was fundamentally and deliberately oriented toward the road.

In sum, historical evidence shows that despite repeated relocations, the road in Sirjan has maintained the main criteria of placeness: walkability persisted in the form of the network of alleys and the bazaar; which was ensured through security and continuous prosperity in one side; and the diverse activities of the bazaar, caravanserais, and collective spaces in the other side.

• Qanat

The impact of water supply methods on the structure of urban streets is not unprecedented, particularly where water is supplied through channels branching from a river or via bridges and water conveyance and collection channels (Uthman, 1997, 171). Similarly, the hydraulic system dependent on qanats has played a significant role in the morphology and orientation of Iranian cities, a matter addressed in various studies. These include the impact of the qanat on the form of the cities of Shiraz (Mansouri & Arab Solghar, 2022), Yazd (Ramezanzadeh & Behnamfar, 2017), Qazvin (Iranmanesh et al., 2021), Zanjan (NejadEbrahimi et al., 2021), and Arak (Ansari & Gholami, 2019). The latter case is an example of a pre-planned urban design reliant on the hydraulic system of qanats. In the city of Sirjan, too, the qanat holds a special place in the form and development of the city. Some texts consider the etymology of Sirjan (originally Sirgan) to mean a place possessing many qanats (Vosoughi Rahbari, 1993, 18). Given Sirjan’s location on a vast, gently sloping plain, numerous qanats with rāyīn³ (mother wells) at a distance of about four to five farsangs irrigated its settlements (Bastani Parizi, 2003, 244). The importance of the qanat to Sirjan’s survival was such that blocking the qanats or diverting

their water to the moat was one of the attackers’ tactics to break the city’s resistance and siege (Golabzadeh, 2003, 95).

The importance of the water supply method to the form of the city of Sirjan goes beyond the multiplicity of qanats. The fundamental point about Sirjan’s qanats is the alignment of their paths (rāyīn). According to historical narratives, Sirjan had “twelve thousand qanats, all oriented in the same direction” (Vosoughi Rahbari, 1993, 206). The historical information regarding the qanats’ direction is confirmed by the qanat map. Based on the existing qanat map (Fig. 6), all of Sirjan’s qanats are, firstly, parallel and, secondly, oriented northeast-southwest. Given the role of qanats in the orientation of orchards and farms (for maximum irrigation efficiency), the plots of these lands are expected to be in the same alignment. The oldest aerial photographs of Sirjan, which show the remaining agricultural lands and orchards, also confirm this theory (Fig. 7). This matter becomes doubly important because present-day Sirjan is essentially the result of the development, prosperity, and merging of various villages. The continuation of this topic and the importance of orchards and farms in the development of Sirjan will be further examined.

As mentioned, the role of the qanat in the structure of cities is not unprecedented. What distinguishes Sirjan is the correspondence of the orientation of the water-qanat system with the road system, such that the alignment of this city’s qanats is parallel to the Spice Route highway and perpendicular to the Maritime Silk Road highway (Fig. 7). In Sirjan (Saeeadabad), the water system does not play a longitudinal role in producing the road system; rather, these two systems are aligned alongside each other. The correspondence of the water system with the road system supports the role of the road in the city’s development. Furthermore, as previously mentioned, the direction of the city’s development based on the qanat was toward the main north-south caravan road. The development was oriented from the village of Saeeadabad toward the northeast (southwest of the road—the location of the qanat daylight point and the new bazaar). Thus, in Sirjan, the two systems of water and road operate in mutual interaction, reinforcing each other and the overall and detailed structure of the city.

• Waqf

Waqf (endowment) is another factor influencing the formal structure and place-based development of Sirjan after its relocation to Saeeadabad. Like the qanat, the role of the waqf element in Iran’s urban order is well-established in history. The importance of waqf in the life of human societies is so extensive that Bemanian et al. (2008, 61) have aptly referred to it as the “Waqf System”, which can, alongside other systems such as the “Water System” and the “Architectural System,” serve to explain the order of the Iranian city.

The founding of the new city of Sirjan (Saeeadabad) was carried out on the basis of the Waqf System. In 1210 AH (1795/1796 CE), Mirza Saeed Kalantar, by digging a qanat, established a



Fig. 6. The route of qanats leading to Sirjan. Source: Authors.



Fig. 7. Aerial photograph of Sirjan, 1956: Alignment of the city's development direction with the orientation of orchards and farms. Source: Authors.

village named Saeedabad, around which the people of Sirjan gathered (Vosoughi Rahbari, 2001, 15). The daylight point of the Saeedabad qanat was located on endowed (waqf) land behind the bazaar, at the end of the Mesgari row and next to the endowed Haji Gholamhossein Khan Mosque.⁴ Thus, the bazaar (related to the road, aligned with the network of roads and qanats), the mosque, and the qanat formed the initial core of the new city of Sirjan, at least two components of which were waqf endowments (Fig. 8). Consequently, the role of the Waqf System in the existence of the new city is established, alongside the other two factors.

The next stage of the Waqf System's role becomes apparent in the development of the new city. Consulting the documentation sources for endowments, it was observed that very extensive agricultural lands were endowed by various benefactors of Sirjan; both the endowment process and the change in the use of the endowments were gradual (Table 1). As discussed in the section on the qanat, the new city of Sirjan is a product of the transformation of village/

agricultural lands into a city. The benefactors (who were also the cultivators of the agricultural lands) played a much more effective role in the formation of this new city compared to the central government. The gradual change in the use of agricultural plots and orchards to urban places is discernible in the comparison of aerial photographs from the Pahlavi era. By referring to the oldest map of Sirjan, dating back to 1941, the impact of this change on the city's block and road system is evident. The road system derived from this map is an irregular network (Fig. 9). It appears that after endowment and change of use, the agricultural plots preserved their outer edges, and the boundaries between two adjacent blocks (which, as mentioned, were parallel) were transformed into urban thoroughfares. Through a comparative analysis of the farms and orchards in the Bagh-e Bamid area (northwest of Saeedabad) in the 1956 aerial photograph with the map of current roads, the shared edges of the road and land have been identified (Fig. 10), which significantly confirms the above statement.

Given the different sizes of agricultural plots and orchards, the resulting road network is not Hippodamian. It can be said that the road structure in the new city of Sirjan has a regular geometric form with an organic nature—arising from local logic—derived from the intersection of the three systems of Road, Water, and Waqf. In this way, the development of the new city of Sirjan, at least during the Qajar period and before the Pahlavi interventions, was a place-based development arising from the geographical, historical, and local community context.

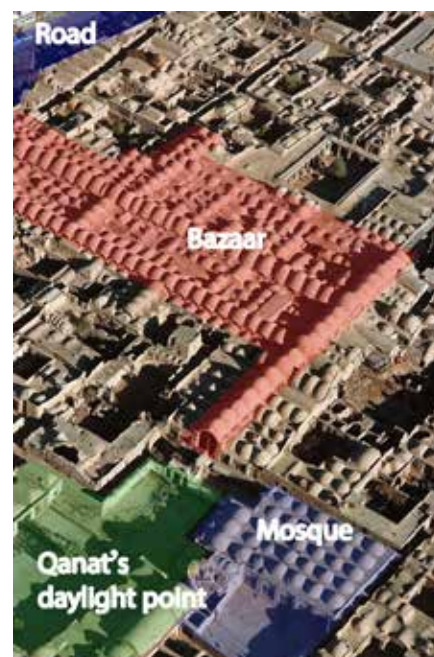


Fig. 8. Aerial photograph, 1976: Location of the initial city core and the road. Source: Authors.

Table 1. List of some urban endowed (waqf) properties of Sirjan. Source: Authors.

Title/ Use/ Location of endowment	Date of endowment or change of use	New use/ Title	Name of benefactor (waqif)
Aminabad Farm (three dangs)	1227 AH (1812 CE)	-	Mirza Saeed Kalantar
Bagh-e Bamid Farm (one dang and two habbahs)	1227 AH (1812 CE)	-	Mirza Saeed Kalantar
Saeedabad Farm (one and a half dangs)	1227 AH (1812 CE)	(Part) Bu-Ali Commercial-Medical Complex on Sadeghi Blvd. Mirza Saeed Kalantar	Mirza Saeed Kalantar
Saeedabad Afshari Farm known as Hosseinabad Khani (five dangs)	1227 AH (1812 CE)	-	Mirza Saeed Kalantar
Hosseinabad Aqa Baqeri Farm (one dang and one tasbuj)	1227 AH (1812 CE)	-	Mirza Saeed Kalantar
End of Mesgari Bazaar	Qajar Era	Haj Esmail Khani Mosque	-
End of Mesgari Bazaar, next to mosque (daylight point of Saeedabad Qanat)	1916 CE	Hosseiniyeh – (later) Badr Elementary School for Boys	Mirza Saeed Kalantar
Dowlatabad Qahestan	1122 AH (1710/1711 CE)	Akbariyeh Mubarak School (Saadatabad School)	Khajeh Hakim or Bicheh Shahrbanoo
-	1937 CE	Khajeh Karim al-Din Elementary School for Boys	Khajeh Karim al-Din Berakouhi Parizi
Makiabad	1931 CE	Makiabad Coeducational Elementary School (current Shahid Shekari)	Khajeh Karim al-Din Berakouhi Parizi
Vicinity of Haj Rashid Alley	1932 CE	Khajeh Karim al-Din Elementary School	Khajeh Karim al-Din Berakouhi Parizi
Endowment of the late Dr. Sadeghi	Pahlavi Era	First public hospital of the city (Health Clinic opposite the Municipality)	Dr. Sadeghi
Nosratabad	Pahlavi Era	Educational	Haj Davoud Shokat Saedi
Next to the Jameh Mosque	-	Haj Sabzali Bathhouse	-
A'la Alley, corner of Dr. Sadeghi Blvd.	-	Esmail Khani Bathhouse	-
-	Qajar Era	Makiabad Bathhouse	Umm al-Salameh
Endowed lands of the late Haj Mirza Saeed	-	- Educational (Zeinab High School, Shaded Girls' High School, Shahid Moqari High School, etc.)	Mirza Saeed Kalantar
North of Dr. Sadeghi Blvd.	-	Fatemeh Elementary School	Mirza Saeed Kalantar
Bagh-e Bamid	-	Mer'at Esfandiari Elementary School (Shahid Moridi)	Mirza Saeed Kalantar
Haj Rashid's House	Est. 1855 CE Endowed 1862 CE	Hosseiniyeh	Seyed Ebrahim Razavi
Opposite Haj Rashid's House	-	Haj Mohammad Reza Mosque known as Qotbi	Qotb al-Arefin
Several farms in Koran	1829/1830 CE	-	Morteza Qoli Khan
Maleki House	-	Seyed Ebrahim Razavi Elementary School	Seyed Hossein Maleki (Rashid al-Soltan)
Two and a half dangs of a caravanserai in Nokhod Berizi Square	Mid-Qajar Era	Caravanserai (Warehouse)	Sons of Mohammad Mohavhedi
Two and a half dangs of Dowlatabad Kafeh Farm	Mid-Qajar Era	-	Sons of Mohammad Mohavhedi
Part of the properties	Early Pahlavi Era	-	Sheikh Ahmad Mohavhedi



Fig. 9. The road network of Qajar-early Pahlavi Sirjan, extracted from the 1941 map. Source: Authors.

Place-Based Development Based on the Three Systems

Based on the foregoing, the development of Qajar-early Pahlavi Sirjan is a gradual, place-based development. This development was founded on the three systems of “Infrastructure-Institution-Structure.” Based on these systems, the city’s spatial organization was formed around two elements of spatial organization—structure and core—and with the city’s expansion, small units were connected to the structure.

Sirjan’s place-based development in the discussed timeframe can be summarized in four stages:

- 1) Establishment of the village of Saeedabad at the intersection of historical highways (Structure)
- 2) Formation of the Bazaar + Mosque + Qanat combination (Core)
- 3) Gradual addition of endowed (waqf) lands around the core and structure (Small Units)
- 4) Renaming [again] from Saeedabad to Sirjan (Semantic Development)

Based on the findings of the second part of the article (historical studies), it was determined that the road in pre-contemporary Sirjan possessed the criterion for the “road-as-place,” and the city’s development occurred based on walkability. Proceeding, as the research enters its third part (the contemporary era) and relying on the theoretical framework of the first part (the ontological characteristics), we will examine the condition of

the road in present-day Sirjan. This section aims to determine whether the road in the contemporary city still functions in the capacity of a “place” or has been reduced to a “space-object.”

Road-as-Object Instead of Road-as-Place; Expansion Instead of Development

After explaining the historical role of the road in the formation and development of Sirjan, the condition of the road in contemporary Sirjan will now be evaluated using the initial theoretical framework. The continuation of the research has been carried out in two sub-sections—documentary (first sub-section) and field (second sub-section)—within the research method framework. The goal of this section is to assess the degree to which the road in the contemporary city of Sirjan conforms to the ontological criterion of the “road-as-place” (Walkability).

The totality of the documentary studies and field observations indicates that the new city of Sirjan, after its initial development (place-based and reliant on the requirements of the local community), has encountered a deviation from development toward expansion. We trace the root of this deviation to the neglect of the ontological characteristics of the road as a place and the adoption of an instrumentalist view toward it.

The deviation of the new Sirjan from the path of place-based development, reliant on the road-as-place, toward expansion based on the road-as-object, is examined in two stages:

Stage One can be traced from the 1941 map. From this map, three important aspects of the city’s development compared to the Qajar-era situation are evident:

- 1) The transformation of the Trident Junction north of Saeedabad into a square (Arseh Architecture and Urban Planning Consulting Engineers, 2016b, 178)
- 2) The construction of the two current streets of Pahlavi (Imam) and Enghelab
- 3) The establishment of government centers and urban services around the square (Police Headquarters, the Governorate, and the Health Department)

In the aforementioned changes, the expansion of the city, in terms of development direction, is consistent with the orientation and

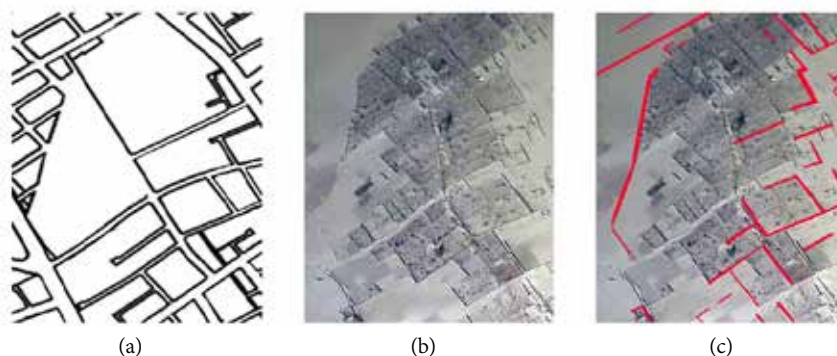


Fig. 10. Comparative analysis of the farms and orchards in the Bagh-e Bamid area, a) current road map, b) 1956 aerial photograph, c) shared edges of the road and land marked with a red line. Source: Authors.

spatial location of the initial core. The administrative-service core is also situated in proximity to the commercial core. Nevertheless, the consequences of street-laying in the first Pahlavi style, cutting through the Qajar fabric, can be observed. The construction of the square was also aimed at facilitating vehicular movement. This form of intervention in the road system, despite its apparent compliance with the initial network system, actually steers the city toward a specific form of the network system, namely the regular grid system. This (grid) system bears little relation to the semantic and functional logic of the Qajar network system (Fig. 11). The sixty-meter width of the old roads was compatible with the new semantic system of the thoroughfares—car-orientation—and paved the way for the establishment of large-scale buildings along these routes. This is while the said roads had previously been situated at the outer edges of the city, and while providing structure to the city, they did not interfere with walking. Moreover, these roads had been organized in accordance with the speed of caravan transportation, prior to motorized transport. The new development of the thoroughfares was carried out without considering these characteristics of the trade road and based solely on its location and width. In the thoroughfare development plans from the 1960s onward, the new road system's adherence to the principles of modern urbanism becomes more apparent. After the Islamic Revolution and following the development of the urban fabric, the city's street network expanded eastward and toward the Kerman–Bandar Abbas transit axis, such that all main city axes, such as Shariati, Dr. Sadeghi, and Saeidi, connect to this axis (Arseh

Architecture and Urban Planning Consulting Engineers, 2016a, 76). The goal of thoroughfare development in recent decades has been to prioritize motorized and vehicular transport over walking—a matter evident in the urban development pattern of most Iranian cities from the first Pahlavi era to the present day. Regarding Sirjan, the difference is that the changes appear to align with the Qajar street network. However, this similarity occurs merely in the physical dimension. Ontologically, the new streets hold a car-oriented, space-object, and one-dimensional view of the road, which is entirely different from the pedestrian-oriented and place-based characteristics of the Qajar roads of the city. Physically, too, the direct yet irregular thoroughfares are replaced by direct and long thoroughfares that also cut through the old fabric where necessary. The result of these changes is a grid street network close to the Hippodamian pattern and Haussmannian urbanism (Fig. 12).

Stage Two commenced following the establishment of the Special Economic Zone and the development of mining activities around the city. With the commencement of operations at the Gol Gohar Mine, Sirjan's role as a national transit hub became more pronounced than ever. According to the National Logistics Centers Spatial Planning Document (2018, 143), the Sirjan hub is designated as a logistics village due to its significant share of international freight, its proximity to commercial and mining industries such as the Gol Gohar Mine, and its location on the Bandar Abbas route. Approximately 54 percent of the freight passing through the Sirjan logistics hub consists of international freight. Furthermore, 34 percent of the hub's freight share belongs to the mineral goods category (ibid., 147) (Fig. 13).

Sirjan's new transit position, based on high exchange volume and nationally significant commercial value, has directed the urban planning approach toward the road issue in favor of providing optimal transit conditions. In the city's new situation, priority is given to providing the transportation infrastructure for the Sirjan hub. Accordingly, facilitating road services for the movement of trucks and heavy vehicles from the Gol Gohar Mine to the designated destinations on the map—especially Bandar Abbas—becomes the primary objective of road planning for Sirjan on a national scale. This matter is evident in the proposed development plans for the Sirjan hub's road network within the National Comprehensive Transportation Plan (2015). The physical manifestation of this shift in approach can be traced in the widening of internal roads, numerous ring roads, and the expansion of parking zones and services for transportation within and on the periphery of residential fabrics (Fig. 14).

On the other hand, with the mine's job creation and the prioritization of local employment⁵, a significant portion of truck owners and drivers are citizens of Sirjan and city residents⁶. Hence, not only the ring roads and primary transit routes but also the secondary and neighborhood roads, and in sum, the entire road system, have been subjected to a comprehensive takeover by the automobile (Fig. 15).

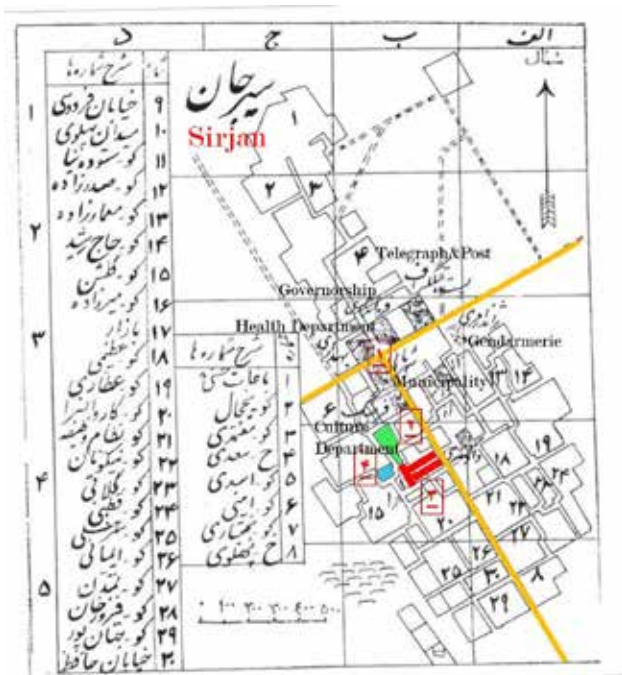


Fig. 11. Road development and the beginning of the transformation of the road system from a network to a grid pattern. 1941 map. Source: Authors.

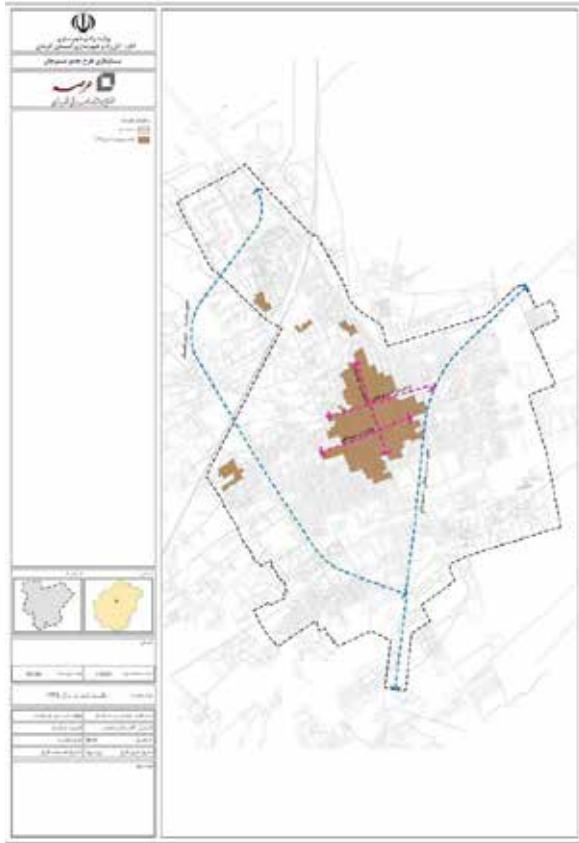


Fig. 12. Map of the urban fabric of Sirjan in 1966. Source: Arseh Architecture and Urban Planning Consulting Engineers, 2016b.



Fig. 13. Map of the periodic development of the Sirjan thoroughfare network. Source: Arseh Architecture and Urban Planning Consulting Engineers, 2016b.

Thus, Sirjan's new economic situation has confronted the city with two issues: the movement of heavy vehicles and their accommodation, such that all aspects of road services have been affected by these two issues.

The new road system in Sirjan faces two ontological deviations from the concept of the road:

1) Independence from the preceding place-based road system (Qajar-early Pahlavi)

2) One-dimensionality and service to the transit demands of the Sirjan hub

The semantic transformation in the road system has led to a change in the place-based values of the road—this identity-forming element of Sirjan over centuries—in the eyes of the current local community. Having lost the characteristic of Walkability, the road rapidly degenerates from a place into space. We will examine this claim in the following.

The Anti-Walkability Road and its Consequences

The deviation of the road's concept—from the place-based and place-making structure of the city to a corridor for vehicular movement—has resulted in the forced retreat of citizens in favor of the car-oriented road. Field observations and household car ownership per capita statistics (National Comprehensive Transportation Plan, 2015, 186) confirm this issue. The behavioral patterns of the local community show that walking has lost its semantic value among citizens. The new streets are very wide; nevertheless, the city suffers from considerable traffic, exceeding the usual urban traffic for a medium-sized population. A portion of the present traffic is related to the excessive use of private vehicles by citizens for mobility. This phenomenon is not merely a physical problem but an indication of a change in the semantic structure of the road in the minds of the residents: the road is no longer regarded as a "place" with a social and citizen-friendly function; rather, it is considered a vehicular route for passing through.

In the newer parts of the city, very wide sidewalks have been built along the edges of streets (for example, along Fatemiyeh Boulevard), but they are empty of pedestrians during the expected evening and early night hours. Sirjan's current pedestrian aversion is not a physical problem of the road system but relates to its subjective aspect and the alteration of the semantic structure of the road in the residents' minds.

In new areas such as Chamran Boulevard, modern and well-equipped pedestrian spaces have been built near traffic axes and are more or less used. These spaces function not as a part of the road but as a concretized and isolated path separated from its main body. These paths serve more as recreational service spaces for the affluent stratum of society rather than as a part of the development system (Fig. 16).

The development of the Gol Gohar Mine has created a quasi-mono-economic base for Sirjan (with heavy dependence on mining), in which a huge portion of employment related to this economy is tied to the mine's transportation sector. The entry of local heavy vehicles—especially trucks—into the city and their accommodation within the residential fabric has become the groundwork for various social, physical, and psychological harms, which make the road unwalkable. Despite the legal prohibition on the entry of trucks into the inner city limits, these problems persist. The main reason is the lack of formal and planned infrastructure for the movement, accommodation,

and servicing of transit vehicles. As a consequence, trucks are forced to travel through and park in informal and unplanned spaces within residential areas. The old main ring road and the neighborhood routes leading to them have turned into stopping and parking areas for transit vehicles.

Along the road edges, jobs and services related to trucks and trailers—from repair shops to refueling centers and welfare services—have formed in a scattered manner. The provision



Fig. 14. Flows between the Sirjan hub and other hubs. Source: National Logistics Centers Spatial Planning Document, 2018, 146.



Fig. 15. The encroachment of heavy vehicles into the pedestrian realm within the urban fabric of Sirjan. Source: Author's archive.



Fig. 16. A linear park dedicated to walking along Shahid Chamran Boulevard; an isolated space with a limited and predefined function. Source: Author's archive.

of special services for heavy vehicles along the main streets inside the city (such as Shahid Abbaspour Street), alongside other urban services, has created a contradiction in the road's narrative as a space for everyday civic life (Fig. 17). Nodes and intersections have the potential capacity to become narrative places, such as parks and collective spaces. However, in many cases, these spaces have been transformed into parking areas for transit vehicles (Fig. 18).

In the new, non-walkable road system, the diversity, continuity, and connection of human activities have been disrupted. First and foremost, the central fabric and the initial core of the city are being cast aside from the new road system. The traditional bazaar, which held a logical function and economic dynamism in the initial road system of Sirjan-Saeedabad, has lost its status in the current system. The low value of commercial exchanges and social activities, as well as the abandonment of caravanserais inside the bazaar, such as Haj Ebrahim Saray, corroborates the above statement. In the central part of the city, especially on Hefdah Shahrivar Street, and in some peripheral neighborhoods like Makiabad, there are aspects of pedestrian-orientation and vitality accompanied by the diversity and narrativity of the road. For example, we witness queues at the bakery, elderly residents sitting and socializing, and the presence of children and cyclists. However, the supportive aspect of the road remains weak due to the presence of trucks. Nevertheless, these sections have no connection with the totality of the road system and function as islands.

The dependence of road's cheerfulness to the pedestrian is evident in field observations within the Nasiri Street area. The physical body of this street is filled with diverse and modern commercial uses at a fine grain. Nevertheless, and contrary to expectation, the sidewalks of this street were observed to be empty of pedestrians in the early evening hours. Furthermore, there was no trace of the side activities of a lively pedestrian way, such as street vending.

In the affluent and new areas of the city, dedicated paths for walking—mostly motivated by exercise and health—have been implemented. In the authors' interviews with several users of the said spaces, the mono-functionality of these paths becomes more apparent. Like the previously mentioned paths, the sidewalks of Sirjan's affluent areas, despite their physical capabilities, do not host diversity-creating activities such as the services of street vendors and food sellers.

What has occurred in contemporary Sirjan is the rupture of the narrative continuity of the road (as place): the traditional bazaar has been separated from the road system; new neighborhoods have formed as isolated islands from one another; and diverse human activities have given way to mono-functional transit activities. The current expansion of the city of Sirjan in the new sectors is pushing the city toward an expanse of a series of separate fragments. This form of expansion itself leads to class divisions and the rupture of a unified sense of citizenship.



Fig. 17. Provision of specialized commercial services for vehicles in the central fabric of Sirjan (Shahid Abbaspour Boulevard) alongside other commercial services. Source: Author's archive.



Fig. 18. Occupation of urban nodes and intersections as parking areas for heavy vehicles. Source: Author's archive.

Fragmented development, instead of contextual development, contributes to the disruption of the city's spatial organization. Instead of protecting the city's spatial organization, the road is now disrupting it (Tables 2 & 3).

Conclusion

The results of the research can be explained in three parts:

• Historical findings

Returning to the research hypotheses, the first hypothesis—the road as the primary factor for the existence and spatial continuity of Sirjan—is confirmed. Historical evidence shows that the city's four physical relocations were always carried out along the territorial trade highway, and the road, as the structuring element in the city's spatial organization, has been the factor for Sirjan's survival as a “unified whole.”

The second hypothesis—the road as a factor in Sirjan's development—is completed by the identification of the two factors of qanat and waqf. Based on the research findings, the place-based development of Sirjan in the Qajar and early Pahlavi periods was the product of the alignment and physical correspondence, and the mutual reinforcement, of the three systems of “Infrastructure (Qanat), Institution (Waqf), and Structure (Road).” The harmony of the three mentioned systems led to the network-based development of the city's structure, which, despite its resemblance to modern urbanism, is rooted in place-based development. During this period, the road, possessing the criterion of Walkability, functioned in the capacity of a “place.”

• Contemporary findings

Examining the contemporary condition of Sirjan, relying on the ontological theoretical framework of the road-as-place, yields a different picture. Field observations show that the road in present-day Sirjan has systematically lost its main, historical criterion of placeness: “Walkability” has been weakened not only physically but through the mentality of the citizens. Road is no more Supportive for pedestrian. “Supportiveness” of road has been replaced by threat (from heavy traffic and

the accommodation of trucks in the residential fabric). Narrativity of sidewalks has also faded in the absence of diverse human activities and the dominance of the mono-functional transit-commercial function. This matter has also manifested in the city's physical dimension, such that the network-based development of roads has been replaced by grid-based expansion. In the latter situation, the criterion for new street-laying is mono-functional and based on solving the problem of vehicular movement. The expansion of Sirjan's new neighborhoods toward the eastern road (Sirjan-Kerman) and crossing over it, within the framework of the same grid structure, is a clear sign of the city's departure from the orbit of place-based development.

Based on the historical and contemporary findings, the placeness of the city of Sirjan appears to be dependent on its road system. By ignoring the ontological values of the road (clearly in this article: Walkability), the trajectory of the city's life has shifted from “place-based development” to “object-oriented expansion.”

• Policy/design implications

The present research shows that mining industry activity per se cannot be considered contradictory to Sirjan's place-based development. Fundamentally, this city was formed from the outset as a wayside city, and its life has been dependent on the movement of trade caravans. Sirjan's dependence on trade routes not only did not prevent the city's development but also provided the conditions for its place-based development. Therefore, trade in itself is not an obstacle to the city's development. The problem lies in the fact that the local community's view of the road element has changed in nature and has been reduced from a landscape-oriented view to an instrumental and service-oriented one. In the three dimensions of place—history, geography, and meaning—the road appears to have lost its credibility as the protective and structuring element of the city. The city's residents have also accepted the change in the road's function, and this is evident in the city's dominant anti-pedestrian lifestyle and the expansion of the neighborhoods. Instead of comprehensive development, the new neighborhoods have undergone an economy-driven

Table 2. Comparison of walkability in five selected sidewalks from different districts of Sirjan (new-old). Source: Authors.

	Hefdah Shahrivar St. sidewalk	Makiabad neighborhood sidewalk network	Fatemiyyeh Blvd. sidewalk	Nasiri St. sidewalk	Chamran Blvd. sidewalk
Position in city development	Historical fabric area	Village merged with the city	New recreational-commercial fabric	New commercial fabric	New affluent fabric
Road system	Network	Network	Grid	Grid	Grid
Walkability	Exists	Exists	Despite very wide sidewalks, empty of pedestrians	Limited to commercial use	Limited to exercise use

Table 3. Comparative comparison of Sirjan's two road systems based on the criterion of walkability. Source: Authors.

	Grid system	Network system
Walkability	Lacks Corridor for vehicular movement	Possesses Platform for social and commercial interactions
Development consequence	Object-oriented expansion	Place-based development

expansion, and the city is experiencing physical widening independent of the structure. Having deviated from the initial road system, Sirjan's new neighborhoods are no longer small, dependent units within the spatial organization.

The disruption of the semantic principles of the road system has weakened the place-making and place-creating power of this element, and the road, which was once the factor for Sirjan's survival as a place, has today become the disruptor of its semantic and physical integrity. Restoring the meaning of the road without considering the mine's position within the current local community of Sirjan is illogical. It is proposed that the mining industry be considered in future urban development planning not as an emerging phenomenon but as part of the historical trajectory of the trade routes associated with the city of Sirjan.

Conflict of Interest

The authors declare no conflict of interest regarding this study.

Endnotes

1. There is no consensus among experts regarding the independence of the Shah Firouz area from the Old City (Kohan-Shahr) of Sirjan. For more information, see: Afzali (2021).
2. It should be noted that both of the mentioned routes have an axis deviation from the stated (cardinal) geographic directions; they are introduced by the primary geographic directions for the sake of distinction and according to popular usage. Attention to this matter is essential for understanding the subsequent findings of the article.
3. The horizontal water channel (gallery) of a qanat (Bastani Parizi, 2003).
4. This plot of land was endowed in 1916 for the construction of Danesh (later Badr) Elementary School for Boys.
5. Drawn from the authors' interviews with Gol Gohar Mine employees.
6. According to news reports, Sirjan, with approximately 8,000 trucks, is the second city in the country in terms of truck ownership.

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