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Green Transportation as a Confident Method in Cities to Improve Citizens' Environmental Conditions[1]

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ABSTRACT– Lack of attention to bicycle as an option for urban transportation and views to it as a sole recreational means are a weakness point that is observable in plans developed in this regard. Whereas, bicycles have won a particular place in urban public planning in western and some Asian countries since last three decades. In this study, the role played by bicycles in urban transportation aimed at provision of better environmental, mental, and physical conditions for citizens residing at Qazvin Ferdowsi St. is addressed. In case instructions to citizens and provision of their safety in the process for normalization of cycling and promotion of its culture in cities are paid good attention, expansion of cycling could bring about better leisure time for citizens and secure their safety and serenity in a healthier manner. This study's methodology is descriptive-analytical, and information is collected and results are concluded using documentary and field methods with reference to successful plans performed in the world.
Key words: Green transportation; city; environmental conditions; citizens

Introduction

In modern urbanization, planning for vehicles has gained priority against planning for humankind. In fact, vehicles, which are basically invented to facilitate human life, have imposed their large-scale presence in human life in such a way that they have transformed human beings into their servant. Instead of being a place of serenity for human beings, cities have been occupied by vehicles. Focusing on motorized transportation has provoked detrimental and, at times, irreparable effects on cities and human life. Increasing focus on this manner of transportation is leading this issue into thresholds of a major crisis (Sadeghi, 2003). Studies have shown that if walking and/or cycle routes are found by people to be of desirable quality, they would most likely develop great interest to walk and cycle. This would *per se* cause decreased congestion and improved environmental conditions, lessening damages to pedestrians. Fighting with immobile lifestyle, undesirable quality of weather, and damages to pedestrians might make great contributions to improvement of public health in the society. Physical activities are the most natural behaviors by human beings. They, until only recently, constituted an integral part of human beings' development. As technology and industry grew on the rise, however, human beings made changes in their most basic behavior. Recent evidence shows that potential dangers is present-day stasis are tremendously worrying. Developments which emphasize on mixed functionalities as well as connection of streets and walking spaces have great impacts on walking and cycling practices as suitable options for mobility. People would gain marvelous benefits provided that they choose to allocate daily 30 minutes to walking and cycling. Therefore, fabricated environment and the manner by which we arrange our trips are important for improvement of public health in our society (Arendt, 2007). In some countries, number of bicycle routes is around 800 and increasing. In others, number of such routes has grown double as before so that more than half of daily intercity trips are made by bicycle (Newman and Kenworthy, 1999). In our country, although, substantial problems ensuing from conglomeration of motorized vehicles are still there despite attentions to king-size urban projects paid by mayors of such metropolises as Tehran and Isfahan as well as recently constructed bicycle routes. Noteworthy is the point that expansion of bicycling culture in cities does not require large-scale investments and it could dilute congestion of motorized vehicles if it turns out to be compatible with socioeconomic conditions of the society. As a matter of fact, promotion of bicycling culture with apt criteria and designation of cycle routes could be applied as a leading paradigm in urban planning and urbanization. What this paper intends to address is explanation of human-centered transportation principles, i.e., bicycling, in order to improve environmental status in cities and provide a continuous, attractive network of cycle routes aimed at prevention and/or reduction of harmful repercussions ensuing from development of urban transportation systems. It, in addition, wishes to control extra-large number of intercity trips in order to minimize environmental damages and provide a human-centered transportation system. This is, furthermore, intended to provide arenas for cities that are thereby get teemed with vivacity as a result of human presence rather than vehicle appearance. Lastly, a *bicycle-friendly city* is longed to be created. Scope of this research is part of Qazvin streets that have bicycle routes and are cited hereunder. In this

[1] Adapted From M.Sc. Thesis

study, a mixture of causal and analytical methods has been employed. For completion of information, library-based studies, interviews, and field studies are also applied.

Objectives of the Research

This research wishes to reinstate serenity and vivacity, adjust presence of motorized vehicles, relieve anxiety, and create a healthy life in harmony with natural environments in cities. According to studies, *bicycle* is only one solution by which above-mentioned purposes are somehow fulfilled. This study is conducted to meet following objectives:

- Identification of components affecting planning bicycle-friendly cities;
- Recognition and examination of benefits coming from application of bicycles; and,
- Presentation of suitable solutions to develop human-centered transportation, particularly bicycling.

Questions and Hypotheses

Aligned with the issues under examination, the most important pivotal questions and research hypotheses are as follows:

Questions

- What experiences have been gained in cities which have managed to institutionalize the culture of *bicycle-friendly city*?
- How development of human-centered transportation could add to mental and social serenity of citizens?
- What are architectural and urbanization necessities for a *bicycle-friendly city*?

Hypotheses

- It appears that designation of bicycle routes and connection to network of these routes could cause a transformation in countenance of cities, the issue which is significantly related to culture and economy.

Scope and Methodology

Scope of this research is part of Qazvin Ferdowsi St. and bicycle route has been examined as per standard criteria. In this study, a mixture of causal and analytical methods has been employed. For completion of information, library-based studies, interviews, and field studies are also applied.

Significance of the Study

Reliance on motorized transportation and lack of attention to non-motorized transportation have negatively affected human life. Necessity of making use of bicycles in intercity transportation systems might be summarized as follows:

- Protection of environments and natural resources and reduction of air noise pollutions;
- Reduction of infrastructural expenses and maintenance of routes;
- Saving in fuel consumption, application of non-fossil energies, and provision of better transportation systems with less consumption of energy;
- Prevention from high vehicle-manufacturing expenses and increased ownership degrees;
- Encouragement of physical kinesis and reduction of immobility-caused mental and physical illnesses;
- Provocation of increased civility levels and neighborhood senses in civil environments and elevated level of interactions among citizens;
- Reduction of motorized movements and lessening dangers for pedestrians;
- Provocation of increased relationship among different urban spaces.

Theoretical Fundamentals

Presently, bicycles constitute a major part of urban planning and provide a key to achieve the perfectionistic city (Hanachi and Mahdavi Nejad, 2010). In a number of urban developments, a body of measures has been taken to expand application of bicycles. These measures include separate parallel bicycle lines with special signs, right of passage in intersections, and construction of large areas for bicycle parking (especially in train stations and public buildings). Many cities have started to gradually change their vehicle parking lots into bicycle ones, since 6 to 10 bicycles are able to be parked in place of 1 vehicle. These cities, in addition, have offered innovations in public bicycling respects, as the project for presentation for public use of 2,000 bicycles in city center being significant among them. Bicycles are tinted with bright colors. Companies have purchased these bicycles and offered them to city municipalities in order to advance their own promotions on bicycles' frameworks and wheels. Only by one coin, these bicycles are hired. This plan has proved an utter success, and the number of bicycles is growing. These European stable cities have understood that bicycles are suitable and rational alternatives for vehicles and they might be expanded by suitable and sufficient attention (Newman and Kenworthy, 1999).

Investigation of Benefits and Limitations of Bicycling Compared to other Transportation Modes

Each transport system comes with benefits and limitations. In order to make efficient use of each transport system, strength and weakness points should first of all be identified. In doing so, advantages and disadvantages of bicycles are examined in this section.

Advantages of bicycles

Bicycles offer advantages that distinguish them from other transportation modes:

- *Reduction in air pollution*: Bicycles give rise to no greenhouse gas, create no pollution, and strengthen body and soul (Pucher, 2005). For instance, thousands of tons of plastic materials are annually dissipated in air as a result of erosion of vehicle wheels. Erosion of roads ensuing from passage of vehicles and pulverization of brake pads and clutch plate are also among factors which give rise to pollution of air and environment (Sheikh al-Islam, 1994).
- *Reduction of noise pollution*: The noises created by motorized vehicles are unpleasant and annoying. Those who are subject to such noises for a long period of time are most likely to display signs of hearing loss (Ale Ebrahim, 2002).
- *Saving in consumption of natural resources and energy*: The energy consumed in 600 kilometers by bicycle is equal to the energy generated by combustion of one liter of benzene. The energy required for manufacturing of 100 bicycles is only equal to construction of one vehicle. Bicycles are driven by human force. Thanks to a bicycle's low level of consumption of raw materials, it has the lowest energy consumption level compared to other transportation modes (LIU, 2005).
- *Space occupation*: Generally, a passing vehicle occupies a space eight times more than a passing bicycle. While, a parked vehicle needs a space 12 to 20 times more than a parked bicycle (Ale Ebrahim, 2002).
- *Increased safety*: Application of bicycle brings about increased safety for two reasons: firstly, a bicycle rider cannot cause serious damages to anyone. Due to a bicycle's low weight and speed, it cannot cause serious damages to others. Secondly, an increase in the number of bicycle riders would naturally cause a decrease in the number of vehicle users, resulting in increased safety in hybrid transportation.
- *Exercise and health*: Another important advantage of riding bicycle is fulfillment of health for bicycle riders and improvement of public health in the society. Generally speaking, those who regularly ride bicycles are capable of completing their daily tasks with less fatigue levels and more excitement (LIU, 2005).

Reinforcement of heart muscles, more refreshed body muscles and framework, better digestion of food, better sleeping practices, less lethargy and weakness, higher self-confidence, increase resistance against malaises, etc., are among advantages of application of bicycle (sheikh al-Islam, 1994).

- *Lower expense*: Low budget amounts required for purchasing a bicycle is a main cause of using bicycles for city trips (one tenth of expense for bus). Particularly for those who have low income degrees, the expense required for having and maintaining a bicycle is greatly less than those of a personal vehicle (LIU, 2005).
- *Higher service level*: In addition, a bicycle is more flexible and is subject to personal ownership. A bicycle rider is able to choose when and where to make a trip. This, therefore, presents higher service levels to a bicycle rider. Another advantage offered by a bicycle is its small size, which gives it higher maneuver power. While a bicycle rider easily travels through traffic jams, other vehicles might get stuck there for hours (LIU, 2005).

Disadvantages and limitation of bicycles

Two groups of limitations are investigable in this respect: natural and non-natural barriers. The logic behind this categorization is that natural obstacles are not often completely obviated by planning; rather, planners should suitably try to cope with them.

A. Natural barriers: Natural barriers are divided into two topographic and climatic conditions (Ale Ebrahim, 2002).

- *Topographic conditions*: Bicycle riders cannot maintain their maximum speed required for securing their balance upon sharp steeps. Likewise, those bicycle riders who dispossess needed skills to keep their balance upon sharp downhill are subject to serious damages. Generally, the cities with wider flat grounds have larger number of bicycle riders. Moreover, when air conditions are tough in mountainous regions, a great number of bicycle riders are bound to make use of public transportation systems, the point which deteriorates performance of such transportation systems.
- *Climatic conditions*: Climatic conditions are factors which negatively affect bicycling practices in some regions like high rainfall zones. Similarly, therefore, this barrier cannot be wholly eliminated, and the only solution is to make measures by which bicycling practices are less affected.

B. Non-natural barriers: Unlike natural barriers, elimination of non-natural barriers is, though difficult, but feasible. Such limitations include:

- *Sociocultural obstacles*: Younger generations, due to their higher physical preparedness, are more capable than the elderly to make regular use of bicycles. Application of bicycles is affected by occupational structures dominant on a region. Previously, for instance, more than 70% of Isfahani weaving factory workers used to make use of their bicycles to make their trips to their workplace (Sheikh al-Islam, 1994). Personal sociocultural attitudes held by society members toward application of bicycle share

common points and, just like all other personal viewpoints, are given shape by prior experiences, personal values, long-run customs, social practices, etc. Despite several attempts, for example, there is still an absence of positive views toward women's cycling in several cities.

- *Unjustified urban officials*: Urban officials are largely affected by official impressions regarding cycling as to positive results obtained by expansion of cycling in the society. If urban officials attach importance to application of bicycles in their policies and plans, community members would be attracted to bicycles as a significant transportation instrument and the concept that bicycles are second-hand transportation means would be removed out of peoples' minds.

The fact that bicycles are not an inferior urban transportation means and their application does not conflict with social and employment codes is an issue which should be promoted by political, social, and cultural officials of a country.

- *Budget and investment*: The expenses required for advancement of bicycle riding practices in cities could be categorized as follows:

- Promotion and training;
- Expenses related to planning and designing;
- Redressing existing streets and intersections;
- Construction of separate cycling routes;
- Maintenance of routes (repairing, snow removing, cleaning);
- Expenses related to parking lot construction;
- Extra expenses related to compatibility of motorized transportation systems and bicycles.

- *Low safety*: Compared to vehicles, bicycles have lower safety coefficient and they are highly vulnerable in their accidents with motorized vehicles.

The different states in which a bicycle rider might come across a motorized vehicle are illustrated below:

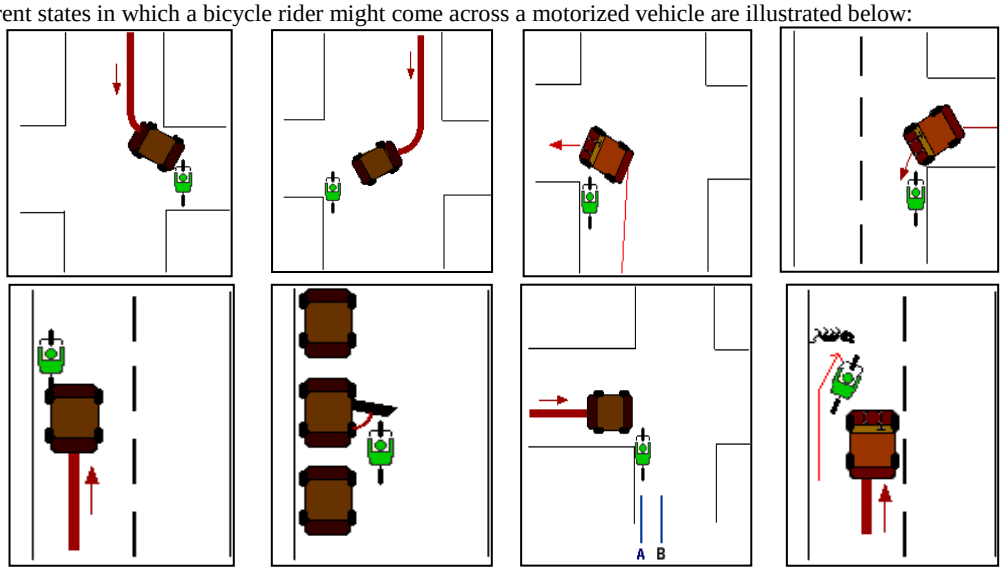

Figure 1: Different states of a bicycle rider-motorized vehicle encounter (LIU, 2005)

- Inefficient use of routes: *Inefficiency of bicycles is manifested especially in long routes. While other transportation modes present convenience, bicycle riders are negatively affected by bicycle's speed and the pressure imposed by riding it (LIU, 2005).*

- Performance problems in hybrid traffic (common route): *As an index of urban transportation, hybrid traffic means the same route to be commonly used by both motorized and non-motorized vehicles. Thanks to bicycles' high flexibility, this is difficult to control a bicycle, the fact that disturbs traffic passages, lessens speeds, and limits passage capacity (LIU, 2005).*

Despite relatively high advantages of cycling and in the face of the fact that climatic conditions of many Iranian cities are suitable for cycling, this is to assert that expansion of cycling is not trouble-free in present conditions and it requires comprehensive, long-term planning.

Bicycle riders' purposes might be classified into five classes:
1. *Local trips*: Many such trips include going to school, local shopping centers, and children's cycling yards. Speed of these trips is lower than 15 km/h. Issues which are important about these trips include convenience, sufficient safety, low speed, low gradient, facilities for traffic signs, facilities for suitable parking lots, suitable illuminations for nocturnal trips, etc.
2. *Bicycle as a trip's instrument*: Many such trips are made by students to go to their schooling centers and employees to refer to their workplaces. Speed of these trips is between 20 and 30 km/h, and the average distance passed is 5 kilometers. This group constitutes the main horde of bicycle users. The issues which are important for this group are high quality of routes, directedness and continuity of routes, traffic sign facilities, intersections with the least encounter with motorized vehicles, proper lighting at nights, safe parking lots in travel destinations, facilities to lock bicycles, and facilities for dressing and washing.
3. *Cycling as exercise*: Bicycle riders usually ride at speeds higher than 30 km/h. This group of riders tends to ride in two-person groups or more. They are equipped with adequate cycling experience. What they demand is suitable quality of routes, sufficient width of routes, and the least delays.
4. *Cycling to have recreation*: Destinations of such trips usually are parks, seashores, riverbanks, and other attractions where size and speed of traffic are low. Needs of these groups include convenience, high-quality levels, low gradients, high safety, fascinating routes, and parking facilities for places they plan to visit.
5. *Cycling to make trips*: This group of bicycle riders makes use of bicycle for their long outskirt trips. They tend to make their trips in large groups (Center for Urbanization and Architecture Research, 2010).

Health Impacts on Walkable Communities

In case we change our regions into walkable arenas, we have managed to make a great contribution to vivacity and livability of our townships, the townships where walkability and application of bicycles are of evident representation (Arendt, 2008). Construction of a highway-based transportation system disregards this reality that uncontrolled growth of cities and increased congestion due to suburban trips aggravate conditions at these communities and townships. Accordingly, the path of budget allocation is derailed from inexpensive options such as sidewalks and bike routes into acceptable intersections. Short trips constitute the larger part of daily trips. When higher attention is paid to locations with higher popularity, then financial resources would be allocated to short trips. For centuries, short trips have represented the manner by which cities are organized and developed. In recent five decades, however, a diversion from this pattern has been evident. Short trips serve as building blocks which guarantee healthiness of a society. The locations to which children ride and in which they play are locations which are well responsible (Arendt, 2008). Designation of passage networks should be performed in such a way to provide responses to a wide array of needs, including: travels by passengers, encouraging compact and transport-based developments near surrounding lands, provision of services to pedestrians, bicycle riders, private cars, and public transportation systems. This is important to note that the principle of transportation in a dynamic society starts with responsibility to short trips and elimination of pedestrians' needs (ibid).

Analysis of Some Successful Countries in Application of Bicycle

It seems that the experiences gained by developed states in reduction of application of motorized vehicles and promotion of cycling culture can provide a key with Iranian officials. Currently, cities like Amsterdam and Copenhagen have managed to advance promotion propagandas, expand walking lines, cycling routes, and support volunteer citizens. Therefore, they constitute good examples of *bicycle-friendly cities.* Certainly, possession of relatively flat lands is a major reason for high rates of cycling in Holland and Denmark.
Of course, other cities of the world like Paris, London, Barcelona, and Montreal have started to benchmark Copenhagen in order to improve their bicycle riders' conditions.
Netherlands: The most important measures taken for improvement of bicycle riders' conditions in Amsterdam are as follows:
- *Safety*: Although application of helmet has confronted a lack of interest by citizens, it has deceased dangerous behaviors by both vehicle drivers and bicycle riders. Implementation of traffic regulations in accidents between vehicles and bicycles (vehicle driver would be responsible for such accidents, save for cases where bicycle riders violate applicable laws). A 40-percent reduction in accidents leading to injury from 2005 to 1985.
- *Limiting vehicles*: Imposition of limitations for vehicle drivers in getting access to city centers, imposition of one-way rules on some streets, allocation of *bicycle-only* and *pedestrian-only* rules on some streets, reduction of vehicle-specific parking lot spaces and increasing their price, alleviation of traffic by reducing max. Speed to 30 km/h.
- *Bicycle parking lot for better access to public transport system*: Implementation of plans such as *Park and Ride*, presentation of facilities for bicycle parking lots in urban underground stations, and construction of three-floor parking lots to meet increasing needs, construction of bicycle parking lots in 2,500 spots of the city that enables motorized vehicle drivers to park their cars in the outskirt and complete their trips using their bicycles.
- *Presentation of cycling facilities*: From the total 450 kilometers for cycling routes, a share of 200 kilometers is bicycle-specific routes, a share of 200 kilometers is routes along alleviated streets where maximum allowed speed is 30km/h, and, a share of 50

kilometers is routes along alleviated streets where maximum allowed speed is 50km/h. Highest expense for completion of infrastructures required for separate cycling routes.
- *Encouragement of cycling*: Presentation of cycling instructions to children at schools, free provision of bicycles to those who dispossess bicycles, and presentation of cycling instructions to children at their low ages (3 to 4 year-old children).

Denmark:

Table 1: The most important principles for promotion of cycling culture in Copenhagen and measures to meet them

Planning for cycling traffic	Straight routes A comprehensive network of interconnected routes Connections among schools, parks, and work centers though green routes Bicycle services at important occupation centers Development based on dense pattern and mixed function Creation of two-way routes in one-way streets
Information-raising plans, campaigns, and social incidents	Safety and supporting campaigns Cycling-to-workplace campaigns Cycling-for-health campaigns Information-raising plans on automobile expenses Campaigns for children
Limitations for vehicles	Removal of outskirt parking lots and other spaces allocated to vehicles Reduction of maximum allowed speed in residential streets Reception of parking expenses
Safety of streets	Fining intruding vehicles and/or those parking along cycle routes Insertion of cycle route designs into street planning Supervision over safety of streets by related officials Redesign plans on unsafe spots
Efficient development	Arrangement of conferences on cycling traffics R&D Employment of experts
Planning for management of bicycles	Urban bicycle plans and other free-of-charge plans Cooperative cycling plans Plans for mobile bicycles Presentation of bicycle facilities in an exchange for investing in shopping centers
Creation of safer streets	Alleviation of traffic especially in intersections Suitable intersections for passage of bicycles, advanced brakes, and pre-greening traffic lights Attention to barriers such as bridges
Connecting cycle routes to public transport paths	Bicycles being allowed to enter underground and train stations Establishment of sufficient parking lots in transport stations
Maintaining streets	Flat areas with no bumps Clean levels Special maintenance in cold seasons
Increasing bicycle parking lots	Allowance for bicycle parking lots Construction of facilities such as roofed and lockable parking lots
Economic incentives	Reduction of tax for bicycle riders Reduction of expenses for departments which facilitate cycling opportunities

Source: M.Sc. Thesis by Asiyeh Ebrahimian / Bahraini, PhD

The fact that cycling is common even in Danish mountainous regions shows that cycling plays a significant role in Danish peoples' lifestyle.

Discussion

Cycling in Qazvin

Thanks to its suitable topographic conditions and absence of routes with sharp steeps, Qazvin City is well capable of being changed into a bicycle-friendly city. Presently, the first step in institutionalization of cycling culture in Qazvin City is construction of broad and continuous routes in the city, the issue which needs precise plans as it leads to wide participation of citizens to make use of these routes. Intended to reach at these purposes, Qazvin Municipality has begun initiatives. Unhappily, however, few routes are available for such objectives compared to extensiveness of Qazvin internal area. In addition to insufficiency of these areas, they are discrete and non-continuous and require in-depth investigations for designation of cycle routes considering applicable standards.

Currently, bicycles are used in Qazvin for following purposes:

- Economic saving for families;
- Application of bicycles by different individuals for traffics in short routes;
- Application of bicycles for recreational purposes at different age ranges;
- Application of bicycles by male students at secondary and high schools and, rarely, at elementary schools;
- Low pollution levels, having no need to fossil fuels, and easy traffics in traditional city parts due to slender alleys.

Table 2: Cycling routes in Qazvin that have been created in the city

No.	Cycling routes	Regions of constructed routes	Constructed parking lots
1	Bicycle-only route	Zone 3	N/A
2	Bicycle-only route	Zone 2	N/A
3	Bicycle-only route	Zone 1	N/A

Source: author

Introduction of Ferdowsi Street Range

Ferdowsi Street is one of the oldest streets in Qazvin, and it is introduced as one of the vital axes for cycle routes in the Qazvin Comprehensive Transport Plan. In the proposed cycle route network, this route starts from Sabzeh Meidan and terminates in Adl Sq. It exists in western side of the street.

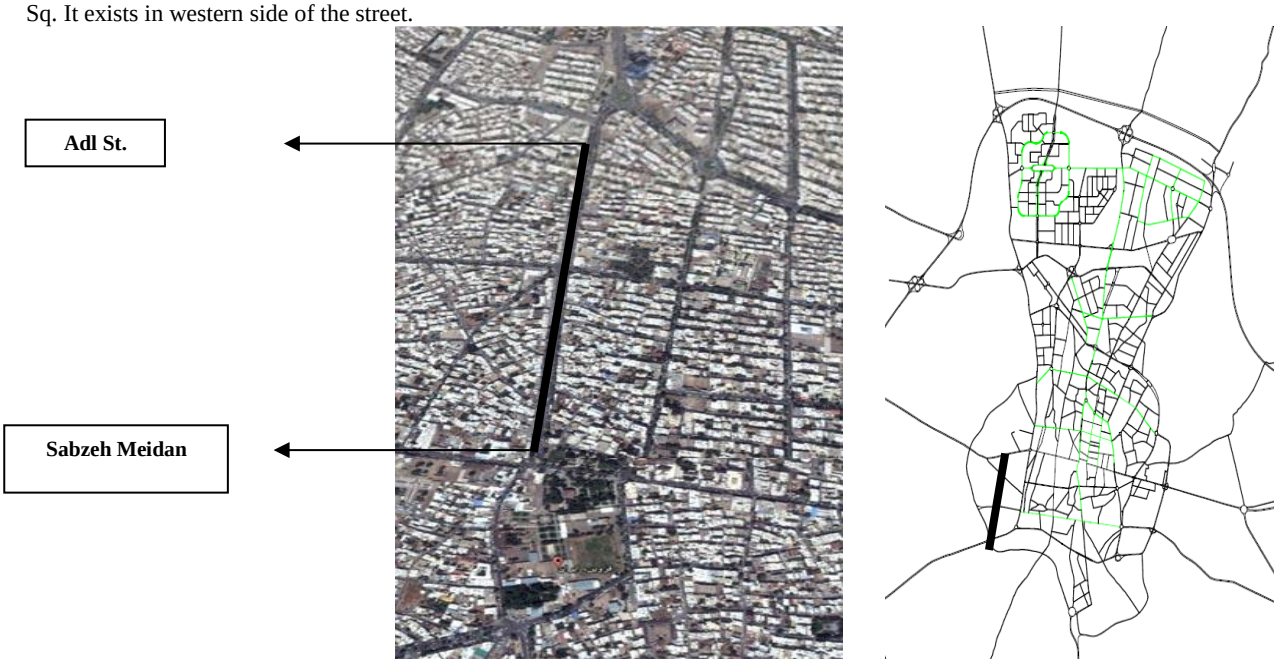

Figure 2: Location of Ferdowsi St. in the continuous network of cycle routes in Qazvin (source: Qazvin Comprehensive Transport Plan)

Table 3: Indices affecting promotion of cycling in Qazvin and solutions to meet them in Ferdowsi St. range

Index	Opportunity	Suggestion	Threat	Solution
Sociocultural issues			Prejudgment of common people about bicycle users	Some related officials and some special people like university men should become pioneers in using bicycles.
				Bicycle-riding campaigns should be formed.
				Promotions and acculturation
				Awareness-raising plans about advantages of riding bicycles should be advanced.
			Barriers for women's bicycle-riding	Security should be provided at all passages and at all hours of the day.
				Bicycles suitable for women should be designed.
				Multi-user bicycles should be promoted.
				Acculturation plans should be advanced.
Demographic structure	High number of youngsters due to existence of schools and educational centers in this area			
Urbanization issues	Congestion of region's structure that closes destinations together			
	Existing mixed functions in street body	Elimination of existing defects and improvement of land functionalities		
Easiness of using personal vehicle	Gradual elimination of fuel subsidies		Relatively low expense of fuel	Elimination of fuel subsidies and allocating them to public transport modes, walking, and cycling
	High cost of purchasing personal cars	Promotion of awareness-raising plans on expenses of purchasing cars and bicycles	Low expense of car parking lots	Creation of economic incentives for making less use of personal cars
	Ancillary expenses of owning personal cars compared to bicycle	Promotion of awareness-raising plans on high expense of personal cars compared to bicycle		
Expense to reach at public transport modes	Suitable cost of various public transport modes	Giving more facilities to main users of public transport such as one-day tickets		
	Existence of bus stations in Ferdowsi St. and getting access to Sabze Meidan	Provision of a space for parking lots and hiring out bicycles in Sabze Meidan bus stations	Weakness of bus stations between the two services and length of trip time	Codification of an in-depth and efficient time schedule for bus stations and obviation of problems thereof
Topography	Low steep along northern-southern passage	Location of passage along the steep		
Air conditions	Moderate weather in autumn and spring		Vehement radiation of sun in the summer	Application of sunhat and awning
	Low precipitation especially in recent years			
	Low number of frost days		Severe coldness in 36 days of the year	Suitable maintenance of passages in cold seasons
	Low number of cold breezes due to high trees			
Safety	Existence of Mehregan, Bouali, technical medical centers, and medical buildings		High speed and high number of cars in this region	Placing bumps and providing suitable floor boards at cycle and walking routes in the intersections thereof
				Regulation of precise rules for alleviation of streets
				Regulation of precise rules for drivers and bicycle riders
				Bicycle-riding training plans
				Issuance of bicycle-riding permits
				Technical control of bicycles
			Fearing from accidents	Suitable illumination at nights
				Ancillary facilities such as reflective lights
Security			Theft of bicycles and their components	Equipping bicycle parking lots with facilities such as locks and chains and appointment of guards
				Provision of anti-burglary parking lots
			Absence of security at nights for children and women	Provision of suitable illumination
				Vivacity of passageways until late in the night
				Identification of unsafe regions
Historical and cultural values	Presence of original and old residents in the region		Exhaustion of context and existence of timeworn buildings in the region	Conduction of rehabilitation projects and amelioration of valuable historical passageways and buildings as well as construction of buildings as homogeneous with texture of dilapidated buildings
	Promotion of bicycle-riding through tourism plans as the street is located in central and historical part of the city	Creation of infrastructures for promotion of tourism in the region and, thereby, increased number of bicycle riders		
		Amelioration of valuable historical passageways and buildings		
		Easy access of people to the region by means of desirable transport modes		

Source: author

Conclusions and Evaluation

In a general categorization, Ferdowsi Street's features whose results and consequences might affect measures taken for construction of cycle routes are presented hereunder.

- Suitable steep of the street for cycling purposes;
- Suitable height of existing edifices;
- Existence of diversified elements and functions along the street;
- Existence of functions like hospitals that might impact on suppression of noise in the street;
- Creation of a memorable trip to the street;
- Unsuitable condition of edifices as to their structures;
- Unsuitable condition of appearance of edifices and shopping centers in the street;
- Existence of abandoned cultural centers like Mellat Cinema;
- Ability of people to meet their daily needs in the street;
- Positioning in central part of the city and having access to stations and public transport modes;
- Absence of suitable urban furniture and facilities;
- Absence of covers for street brooks which are almost always dried;
- Existence of edifices with unsuitable appearance along the street;
- Getting access to public transport modes at two extremes of the street.

Table 4: Indices for improvement of environmental conditions at Qazvin's Ferdowsi St. using green transportation methods

No.	Principles, commonalities, and criteria	Indices at Qazvin's Ferdowsi St.	Developable indices at Qazvin's Ferdowsi St.
1	Reduction of the street's congestion		✱
2	Traffic congestion	✱	
3	Mixed usability	✱	
4	Relation of the street with walkable spaces	✱	
5	Congestion of civil, industrial, and commercial activities	✱	
6	Getting access to public transport modes	✱	
7	Provision of locations by schools managers for children's use of bicycles	✱	
8	Relation with a continuous network of streets to get access	✱	
9	Relation with a continuous network of cycle routes in the city		✱
10	Provision of services to pedestrians and bicycle riders to make independent the elderly and youngsters		✱

Source: author

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