

# Explaining the Feasibility Criteria for Converting Streets to Pedestrian Areas in City Centers; Case Study: The Central Core of Babol

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Received 12 January 2020; Revised 12 November 2020; Accepted 08 February 2021; Available Online 22 September 2021

## ABSTRACT

Due to their special functional, social and cultural role, pedestrian areas are the most significant urban spaces for leisure and social activities. For this reason, the streets and open spaces of the city center have a high potential to become pedestrian areas. This study aims to explain the feasibility criteria for converting a street into a pedestrian area in the central core of Babol, which was first done by logical reasoning and based on theoretical foundations and global experiences, the necessary criteria were developed and after modification and localization by face validity, they were finalized and ranked. Then, in the center of Babol, via the obtained criteria and the Analytical Hierarchy Process (AHP), suitable streets to become pedestrian areas have been identified and prioritized. The research results reveal that two types of criteria are significant in the feasibility study of the pedestrian area : first, the necessary criteria, which include two criteria: "The dominance of the social role over the transportation and access role and the possibility of transferring the role of transportation and access to the surrounding streets (maintaining the continuity of the main riding networks)" and "the average longitudinal slope less than 5%" and their absence prevents the street from becoming a pedestrian area . The second includes the criteria of "existence of attractive edges in the street", "existence of voluntary and social activity in the street", "population and suitable number of pedestrians", "existence of important attractions inside or 500 meters away from the street", "existence of important permanent elements in people's minds, inside the street (visual sign and activity node)", "access to public transport station at a maximum distance of 500 meters from the street", "existence of public parking at a maximum distance of 500 meters from the street", "proper penetrability of the street", "vegetation on the street" and "living on or around the street", the absence of one of which prevents the street from turning into a pedestrian area . But their existence is very important in creating a successful pedestrian area and prioritizing them, and they can be strengthened or created after creating a pedestrian area with a good design. In the center of Babol city, Ayatollah Saeedi Street, due to having most of the mentioned criteria, is the most suitable street to become a pedestrian area and can be a suitable place to start the pedestrian area network.

**Keywords:** Pedestrian Area, Public Space, Urban Context, City of Babol.

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## 1. INTRODUCTION

The increasing number of vehicles has been the most important factor in reducing the quality of life in many cities around the world, and this has forced many to think about restoring quality, as a result of which the central fabric of many cities was dedicated to pedestrians. Nowadays, the pedestrian area is one of the main and highest quality public spaces in cities and a place of life in cities. In Iran, also, efforts have been made to build pedestrian areas in major cities, which are still increasing today. In the meantime, the central fabric of small cities, which are usually the core of these cities and have physical elements, important functions, and good population, have valuable potential to become pedestrian areas.

The purpose of this study is to answer the question: What are the necessary criteria for the feasibility study of turning a street into a pedestrian area? And what is the priority of turning the streets into pedestrian areas in the central part of the city of Babol?

Research on pedestrians and pedestrian areas can be divided into two general categories: theoretical research in line with the necessity and prominence of the presence of pedestrians and pedestrian areas, as well as field research to evaluate the success of these spaces (by Jan Gehl, Bates, Moeini and various evaluation and feasibility projects in Iran). Though, the current study is novel because it has extracted feasibility criteria by examining several successful samples that have undergone several processes over time and after localization in the study sample.

## 2. METHOD

In the first phase, this research has been conducted by the method of logical reasoning and has been accompanied by a kind of homogeneity with categorization and expansion of concepts. Initially, different dimensions of pedestrian space were identified and indicators were obtained to study the global pedestrian area experiences. In the following, pedestrian area experiences are examined and their most important key points are extracted. Then, by refining and combining the obtained key points, the basic criteria of the feasibility of the pedestrian area are obtained. In the next step, to localize and prioritize the criteria, the relevant experts were asked to confirm, remove and rank the criteria by face validity method. Lastly, using the average weight of the rankings, the criteria were ranked and finalized. In the second phase of the research, the criteria obtained in the center of

Babol city suitable streets were identified using the Analytic Hierarchy Process (AHP) and Expert Choice software, to become pedestrian areas.

## 3. THEORETICAL FRAMEWORK

Since the quality of the environment depends on the quality of the various dimensions of the environment, to attain the desired quality of the environment, its dimensions or components must be upgraded. Due to this fact, after defining the pedestrian area, to identify a suitable place to create a public pedestrian space, its various dimensions are examined.

### 3.1. The Concept of the Pedestrian Area

The term pedestrian area compared with the street, which is for pedestrians, has become more common. Different words such as the pedestrian mall, car-free zone, pedestrian zone, pedestrian promenade, and traffic-free zone are used in different countries (Moeini, 2011, p. 20).

"Pedestrian streets are mainly for pedestrian use, and motor vehicles are only allowed to enter to trash disposal, carry cargo, and in emergencies or at certain times," says Zeger. There are also pedestrian zones that are public transportation routes, such as buses and trams, which are referred to as "transit malls" (Bates, 2013, p. 9).

Zeger also names four types of pedestrian areas: Modified street (one block of the street is closed to vehicle traffic and reserved exclusively for pedestrian use), Plaza or interrupted mall (several blocks of a commercial street dedicated exclusively to pedestrians and the intersection is open to vehicular traffic), Continuous or exclusive mall (a multi-block area with street intersections completely transformed into a pedestrian area), Displaced sidewalk Grid (pedestrian areas created continuously between alleys, building entrances, or arched passages) (Bates, 2013, p. 9).

The pedestrian areas in this study are continuous, interrupted pedestrian areas and transit malls.

### 3.2. Dimensions of the Public Pedestrian Area

Many urban thinkers have commented on public space and its transformation into a place for the presence and life of people, especially individuals, and expressed the different dimensions of a successful public space and its transformation into a place. Canter, Panter, Golkar, Bates, and Jan Gehl (in the form of PPS group) have had successful theoretical and practical studies to express different dimensions of public space or create space (Table 1).

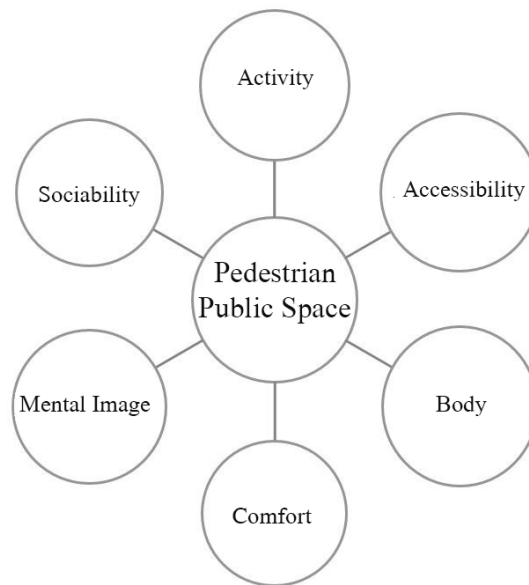
**Table 1. Dimensions of Public Space (Place) From the Perspective of Different Thinkers**

Name	Dimensions of the Public Space
Canter	Activity, Body, and Imagination
Panter	Activity, Body, and Meaning
Golkar	Activity, Body, Meaning, and Ecosystem
Bates	Function, Access, Design, and Comfort
Jan Gehl (PPS)	Activity, Access, Sociability, Comfort, and Image

(Golkar, 2000; PPS, 2019; Bates, 2013)

Consequently, considering the commonalities of the dimensions of public pedestrian space in the opinions of thinkers, it is possible to provide a basic

conceptual framework for studying different examples of pedestrian areas in the world (Fig. 1).



**Fig. 1. Initial Conceptual Framework: Dimensions of Public Pedestrian Space to Study Global Experiences and Develop Criteria**

### 3.2.1. Activity

For people living outside the city center, there must be a reason to go downtown, and for people living inside the city, there must be a reason to participate in city life. The best way to realize this is to have a set of attractions in the city center that are connected to public spaces (Alexander, Ishikawa, Silverstein, Jacobson, Fiksdahl-King, & Angel, 1977; Whyte, 1988). Jan Gehl says that in low-quality areas merely necessary activities (such as traffic) are carried out, and in high-quality areas, voluntary and social activities are also done. These activities take place when the city offers quality and tempting spaces. Likewise, the number of evening activities and their location are important factors for the vitality of the city and the perception of safety. If the number of activities in the evening is low, visitors feel the city is empty and avoid going out (Gehl, 2002, p. 41).

Buildings, along the main street and around public spaces, should not be for purely residential, office, or purely retail use. Rather, it should have a variety of uses to help create physical and economic diversity to foster active street life (Rubenstein, 1992; Jacobs, 1993; Crawford, 2002; Gehl, 2011; Gibbs, 2012; Speck, 2012).

### 3.2.2. Access

The Access of a place can be judged by its connections to its surroundings, both visually and physically. Access to successful passage through a public space should be easy and closely visible (PPS, 2020).

It is very significant for people to be able to access public spaces on foot, by public transport, by bicycle

or by car park nearby. While pedestrian, bicycle and public transport access is a priority, there should also be a parking space for those coming by car. There must be many entrances on public pedestrian areas and many nearby transport stations (Bates, 2013, p. 41).

### 3.2.3. Body

To create a vibrant and popular city, many of the street edges must be open, transparent, and pleasant to create a sense of safety and beauty to move around the city. Consequently, the streets that turn into pedestrian areas should have an attractive edge or at least a pleasant edge. "Attractive edge" refers to edges that have small units with many doors (15 to 20 units per 100 meters); various functions, no closed or passive units, attractive facades, quality materials, and elaborate details, and pleasant edges are those that have relatively small units (10 to 14 units per 100 meters), relatively different functions, a small number of closed or inactive units, the relative attractiveness of views and relatively good details" (Gehl, 2002, p. 36).

Another important issue in the physical dimension is the slope of the street. The tendency of people to walk on steep and long slopes is greatly reduced and the tendency to use cars increases. The appropriate average longitudinal slope in pedestrian crossings is 1.7 % and if it is more than this (maximum up to 5%), a flat space should be created for people to rest at 15-meter intervals (Pedestrian Crossing Path Design Guide in Urban Crossings, 1996).

### 3.2.4. Comfort

Comfort includes the amount of protection of people

from the weather and cleanliness in the space. Though, comfort also comes from the feeling that a public space creates in people. Feeling comfortable is important to create a safe and secure environment to be a pleasant place (Gehl, 2011).

Likewise, enough comfortable places to sit, that the chairs are in a comfortable place (in the shade or the sun) and that the spaces are clean and free of garbage are of the most important aspects of comfort in public space.

### 3.2.5. Image

Lynch names the five elements of the road, node, edge, sign, and area in the city as the elements that create the image of citizens. He also points out that roads are the most important factor in the image of citizens. Nodes are critical points, focal points, and foci that create the starting point and destination of motion. Signs are also numerical reference points that are easily recognizable visually (Lynch, 1960).

Bentley et al. indicate that to strengthen the path and the node, it should be highlighted and given a strong character that can be achieved by creating a continuous

wall and placing important elements and signs in them (Bentley, Akcock, Murrain, McGlynn, & Smith, 2003, p. 142).

### 3.2.6. Sociability

When people see their friends, meet and greet their neighbors, and feel comfortable interacting with strangers, they tend to have a stronger sense of place or belonging to their community. This is why it is so significant for cities and pedestrian areas that large numbers of people live in and around downtown areas (Whyte, 1988; Crawford, 2002; Speck, 2012; Jacobs, 1993). Similarly, the space that people use alone and in groups of different ages and genders is better than the space that only people use alone because in these spaces where there are places to sit with friends, socializing is more and it is fun (PPS, 2020).

### 3.2.7. Summary

The study of different dimensions of public space in the opinion of thinkers and professionals offers important points for the study of global practical experiences of the pedestrian area, which are shown in Table 2.

**Table 2. Key Points Taken From the Theoretical Foundations for Study in Pedestrian Area Experiences**

Dimensions of Public Space	Key Points
Activity	Important Attractions in Public Space Elective and Social Activities Evening Activities Mixing Commercial, Administrative, etc. Activities With Housing
Access	The Number of Ways to Access Space Transparency of Access to Space Public Transport Parking Slope of Space
Body	Attractive Edges in Space
Comfort and convenience	Protection Against Adverse Weather Conditions
Image	The Elements that Create the Image in Space (Node, Edge, and Sign)
Sociability	Number and Variety of Space Users

## 4. GLOBAL PRACTICAL PEDESTRIAN AREA EXPERIENCES

Pedestrian areas formed in different countries of the world provide valuable experiences regarding the causes of success or failure of this area. The studied

samples have been selected based on criteria such as the Good Practice Guide, comprehensiveness of samples, approaches, and different fields of urban thinking in mature, transitional, and indigenous countries (Table 3).

**Table 3. Examples Studied In Different Areas of Urban Thinking**

Fields	Sample
Mature	America The Tourism Hub of Third Street Promenade, Santa Monica, California Pearl Pedestrian Area, Boulder City, Colorado Pedestrian Area Main Street in Downtown Charlottesville and Virginia
	Europe Pedestrian Street Stroget, Copenhagen, Denmark Neuhauser, Kaufinger and Munich Pedestrian Areas, Germany
In transition	Non-native The Main Street of the City of Beyoğlu in Istanbul Native 15 Khordad St. and Tehran Tarbiat St., Tabriz

In this section, based on the key points extracted from the theoretical foundations of the dimensions of public pedestrian space, the selected pedestrian areas are studied and analyzed, and then the important features of the samples that have led to their success have been extracted. The key points obtained from the theoretical foundations have been studied and researched in the samples (Table 4).

## 5. FEASIBILITY STUDY CRITERIA

In this section, first, after reviewing, refining, and aggregation, the key points obtained from the study of global pedestrian area experiences, are introduced as the initial criteria for pedestrian areas feasibility study to be used as the final criteria in the research context after localization.

In articulating the criteria, it is important to mention that some characteristics of a good pedestrian area are obtained after creating a pedestrian area with good design and management or are a positive effect of pedestrian area creation. Consequently, in formulating the criteria, those that are needed in the feasibility study are considered and the characteristics that can and should be formed after the creation of the pedestrian area will not be considered. Hence, the following logic and analysis will help provide the criteria:

- In most successful examples, the main traffic grids pass vertically across the width of pedestrian areas at important intersections. This means that the main motorway grids should not be interrupted or that car traffic should be diverted to other streets.

- In all successful models, there was a good number of people in the pedestrian area, which also caused a variety of users in the space. Appropriate population means that part of the population that makes the street relatively crowded and looks crowded.

- Attractive edges that result from attractive activity and body can be seen throughout the pedestrian area and are one of the main reasons for their success.

- One of the important features of the pedestrian area, which is also present in many successful examples, is the various activities that exist in space. These activities are either selective (including the use of retail) or social (including various programs and festivals) that are excuses for people to be in space. Likewise, the presence of these activities at night (evening activities), does not empty the space and liveliness at night.

- On all successful pedestrian areas surveyed, the public transportation system acts as pedestrian support. So that pedestrians can reach a variety of public transportation in a short or convenient walking distance (maximum 500 meters).

- Numerous and sufficient parking lots around the pedestrian area, near the space entrances, and at a suitable walking distance (maximum 500 meters) can be seen clearly.

- In the inspected pedestrian areas, the existence of housing, especially on the upper floors or in the spaces around the street has been highly emphasized. This increases the use of space during the day and increases social monitoring and space security.

Table 4. A Review of Examples of Global Pedestrian Area Experiences

Name	The Dimensions of the Public Space	Characteristics of the Pedestrian Area Based on the Key Points Extracted From the Theoretical Foundations of the Dimensions of the Public Space	Key Points Taken From the Pedestrian Area Experiences
Third Street Promenade, Santa Monica, California	Activity	First, Business Activity Decreased and Empty Space Increased, Which Increased with the Construction of Cinemas and Entertainment Centers. There are Attractions Such as a Bookstore, A University, and a Church on this Street.	There are Important Attractions Existence of Selective and Social Activities
	Access	At Three Points of the Pedestrian Area, The Motorway Crosses It. There are Parking Lots Near the Pedestrian Area and the Cinema. It has Been Created in the Market along with Three Trade Blocks.	Maintaining the Continuity of the Main Cavalry Networks There are Parking Lots Around the Dominance of the Social Role of the Street Over the Role of Transportation and Access
	Body	There are About 200 Retail Shops on the Ground Floor of the Pedestrian Area.	Existence of Attractive Edges
	Comfort and Convenience	There are Trees to Create Shade and Beauty in the Pedestrian Area.	Existence of Vegetation
	Image	Creating Cinema in Space Led to the Presence of People and Its Success.	Existence of Important Permanent Elements in People's Minds (Activity Node)
	Sociability	Extensive Programs are Held in Space.	Existence of Social Activities



Name	The Dimensions of the Public Space	Characteristics of the Pedestrian Area Based on the Key Points Extracted From the Theoretical Foundations of the Dimensions of the Public Space	Key Points Taken From the Pedestrian Area Experiences
Pearl Street In Boulder, Colorado	Activity	Located in the City Center and Near Boulder University. 80% of Small-Scale Commercial Activities Such as Clothing, Bookstores, Coffee Shops, Art and Food Shops; Most of the Buildings Were Mixed and the Ground Floor Was Dedicated to Shops and Restaurants and the Upper Floor to Residential and Offices. The Theater, Hotel, Market, Central Park, Town Hall, Public Library, and University Are Close to the Pedestrian Area.	There Are Important Attractions Existence of Selective Activity Existence of Living in Space
	Access	There are Six Entrances in the Pedestrian Area. Bus Access is Provided by Twelve Stations Around the Pedestrian Area. Riding Access is Via Intersecting Streets.	Appropriate Physical Penetrability Convenient Access to Public Transportation Maintaining the Continuity of the Main Cavalry Networks
	Body	The Bodies of Most Buildings have a Historical Character and Visual Appeal. 80% of Small Business Activities Such as Clothing, Bookstores, Coffee Shops, etc.	Existence of Attractive Edges
	Comfort and Convenience	There is Plenty of Shade Despite 100 Large Trees on the Street.	Existence of Vegetation
	The Image	Most Buildings have a Historical Character and Visual Appeal.	Existence of Important Permanent Elements in People's Minds (Visual Sign)
	Sociability	1473 to 2327 People Per Hour Use this Pedestrian Area. Regular Daily Routines are One of the Most Important Factors in Bringing People to Space and the Success of the Pedestrian Area.	Suitable Volume for the User Existence of Social Activities
Charlotteville -USA Main Street Pedestrian Area	Activity	Most of the Pedestrian Area Buildings have Mixed Uses, and the Upper Floor is Reserved for Residences and Offices. Hotels, Ice Parks, Cinemas, and Theaters are the Main Attractions of the Pedestrian Area. There are Open-Air Cafes on the Street Floor.	Existence of Living in Space There are Important Attractions Existence of Selective Activities
	Access	Access to the Pedestrian Area is Done with 15 Entrances. Bus and Car Access are Provided on Intersecting Streets. Three Car Parks and Empty Spaces on Adjacent Streets Were Intended for Public Use.	Proper Penetrability Maintaining the Continuity of the Main Cavalry Networks Access to Public Transport there are Parking Lots Around
	Body	The Ground Floor of the Street Was Dedicated to Shops and Restaurants. The Buildings have a Historical Character that has Added to the Charm of the Street.	Existence of Attractive Edges
	Comfort and Convenience	There are 100 Large Trees in this Street that Play an Important Role in Creating Shade.	Existence of Vegetation
	Image	Hotel, Ice Park, Cinema, Theater, and Municipal Building are the Main Attractions of the Pedestrian Area. The Historical Character of the Buildings has Also Added to the Charm of the Street.	Existence of Important Permanent Elements in People's Minds (Visual Cues and Activity Nodes)
	Sociability	Approximately 380 to 1250 People Use it Every Hour Depending on the Weather Conditions of the Day.	Suitable Volume for the User
Stroget - Denmark	Activity	On the Pedestrian Area, The Upper Floors are Dedicated to Housing and Offices. Important Places Such as the University of Copenhagen (76 Meters Away), The Promenade (152 Meters Away), The Copenhagen Public Library (229 Meters Away), and the Church are All Around the Pedestrian Area. There are Many Restaurants And Cafes in the Pedestrian Area.	Existence of Living in Space There are Important Attractions Existence of Selective Activities

Name	The Dimensions of the Public Space	Characteristics of the Pedestrian Area Based on the Key Points Extracted From the Theoretical Foundations of the Dimensions of the Public Space	Key Points Taken From the Pedestrian Area Experiences
Stroget - Denmark	Access	The Stroget Pedestrian Area has Many Access Points and Entrances, and There are about 150 Bicycle Parking Lots for this Street, Most of Which are Located at the Entrances. There is a Metro Station Near the Street, Which is Increasing for Better Access. Access is by Private Car and Public Transport (Bus) on Pedestrian Crossings. There are Four Parking Lots on that Street, Approximately 300 Meters From the Pedestrian Area.	Proper Penetrability Convenient Access to Public Transportation Maintaining the Continuity of the Main Cavalry Networks There are Parking Lots Around
	Body	The Length of Stroget Street is Approximately 1115 Meters and its Width is Approximately between 10 and 12 Meters. On the Pedestrian Area, The Ground Floor of the Buildings is Dedicated to Retail.	Existence of Attractive Edges
	Comfort and Convenience		
	Image	Many Social, Cultural, and Sports Programs are Held Throughout the Year.	Existence of Important Permanent Elements in People's Minds (Activity Nodes)
	Sociability	A Population of About 80,000 People Use it Daily.	A Suitable Volume of the User
	Activity	Upstairs Activities are Dedicated to Residential and Office Buildings. There is an Underground Shopping Center in One of the Squares, The Famous Municipal Tower, and a Public Market Nearby. Many Global Brands are Present in this Pedestrian Area.	Existence of Selective Activities Existence of Livingin Space
Neuhauser And Kaufinger - Germany	Access	Access to the Pedestrian Area with about 16 Entrances is in Squares, Streets, and Crossings Access to the Public Transport Hub was Provided by Metro, Bus, and Tram (Approximately 228 Meters Away). Five Parking Lots were Created Approximately 400 Meters From the Pedestrian Area.	Proper Penetrability Convenient Access to Public Transportation There are Parking Lots Around
	Body	The Historical or Modern Character of the Street Buildings Complemented Each other and Made It Visually Acceptable. The Ground Floor of the Buildings is Dedicated to Commercial and Dining Retailers.	Existence of Attractive Edges
	Comfort	There are Some Parts of Large Trees and Plants.	Existence of Vegetation
	Image	The Famous Municipal Tower and the Public Market are Nearby. There are Several Symbolic Buildings Such as the Church. The Street has a Valuable Historical Character.	Existence of Important Permanent Elements in People's Minds (Visual Cues and Activity Nodes)
	Sociability	Many Travelers Came to This Space and after the Creation of Pedestrian Areas, 49% was Added to the Space Users.	Suitable Volume for Us
	Activity	The Activity has Mixed Uses. Restaurants, Cafes, Retail Stores, Entertainment, and Cultural Activities Were Established. For More Vitality, Book Fairs, Music, Movies, and Theater, etc. are Held Regularly.	Existence of Selective and Social Activities
Beyoglu Main Street - Istanbul	Access	The Parallel Street of this Street Has Been Increased to Solve the Problem of Traffic and Access to other Urban Areas. There is a Multi-Story Car Park Around It.	Maintaining the Continuity of the Main Cavalry Networks Existence of Charms There are Parking Lots Around
	Body	The Pedestrian Area has Valuable Historical Buildings. The Ground Floor was Dedicated to Attractive Retail Uses.	Existence of Attractive Edges
	Comfort and Convenience	There are Two Rows of Trees in the Pedestrian Area.	Existence of Vegetation
	Image	The Pedestrian Area is Located in the Commercial and Historical Area of the City, which has Valuable Historical Buildings.	Existence of Important Permanent Elements in People's Minds (Visual Sign)

Name	The Dimensions of the Public Space	Characteristics of the Pedestrian Area Based on the Key Points Extracted From the Theoretical Foundations of the Dimensions of the Public Space	Key Points Taken From the Pedestrian Area Experiences
15 Khordad Pedestrian Area - Tehran	Sociability	Facilities were Created Such as Schools that Provide Pedestrian Flow for Pedestrian Success.	Suitable Volume for the User
	Activity	The Pedestrian Area is Located in the Commercial Area of the City Center. Sabzhamidan, in Front of Imam Mosque, Naser Khosrow St., Dar Al-Fonun School, and Shams Al-Amara, Roshan Palace, Imam Juma House and the Office Called the Golden Line Are the Historical Attractions Around the Pedestrian Area. There is a Wide Variety of Restaurants and Pedestrian Areas, but there are Serious Weaknesses in Leisure Use. There is No Accommodation in it and for this Reason, The Traffic is Very Limited after Working Hours.	There are Important Attractions Existence of Some Selective Activities Lack of Living in Space
	Access	Access to it is Provided by Subway, Bus, Bicycle, and Taxi, Which Due to Insufficient has Resulted in Average User Satisfaction.	Relatively Inadequate Access to Public Transport
	Body	The Pedestrian Area is Located in the Historical Area and the City Center. In this Area, Commercial Enterprises are Mainly Retail and have a Lot of Variety.	There are Attractive Edges in Most Places
	Comfort and Convenience	Trees and Shrubs are Planted to Provide Shade.	Existence of Vegetation
	Image	There are Many Historical Elements on and Around the Pedestrian Area	Existence of Important Permanent Elements in People's Minds (Visual Cues And Activity Nodes)
	Sociability	Up to 400,000 People Use it Daily and on Some Special Days, Up to 2 Million People Use It. Holding Cultural Programs and Celebrations on Some Special Days.	Suitable Volume for the User Existence of Relative Social Activities
Tariyat-Tabriz	Activity	The Pedestrian Area is Located in the Old and Commercial Context of the City. The Pedestrian Area Connects Two Very Important Points, Namely the Clock Square (Municipality) and the Old Bazaar. Clothing Stores, Bags, Shoes, and Decorative Accessories, and Food Created a Fresh and Refreshing Background. Incompatible Activities Such as Furniture Sales and their Loading and Unloading have Created Problems.	There are Important Attractions Existence of Attractive Activities
	Access	The Main Traffic Load Due to the Interruption of the Passenger Traffic From the Pedestrian Area is Concentrated in the Surrounding Auxiliary Axes. The Ability to Properly Access the Nodes and Main Routes of the City Made it More Permeable. Transportation is Available at the Beginning and End of the Pedestrian Area. The Multi-Story Car Park on the Surrounding Street is Intended for Car Parking.	Maintaining the Continuity of the Main Cavalry Networks Proper Penetrability Convenient Access by Public Transport There are Parking Lots Around
	Body	There are a Variety of Retail Outlets in the Pedestrian Area. Closed Shutters Make the Edge more Attractive During Shop Closing Hours	Lack of Attractive Edges During Shop Closing Hours
	Comfort and Convenience	Many Large Trees in the Pedestrian Area Provide Ample Shade in Warm Seasons.	Existence of Vegetation
	Image	The Pedestrian Area Connects Two Very Important Points, Namely the Clock Square (Municipality) and the Old Bazaar.	Existence of Important Permanent Elements in People's Minds (Visual Cues and Activity Nodes)
	Sociability	The Various Events have Led to a Large Presence of People in the Pedestrian Area.	Suitable Volume for the User

Taken from (Elahi & Ardaneh, 2011, p. 74; Fallah, Habibi, & Rouhi, 2012, pp. 51-24; Ghorbani Jam Kasra, 2010, p. 66; Mohammadzadeh & Fallahnejad, 2009, p. 87; Montazer al-Hajja & Mohammadzadeh, 2011, p. 92; Bates, 2013, p. 51; Dokmeci, Vedia, Altunbas, Ufuk, Yazgi, & Burcin, 2007, pp. 155-161; Reclaiming City Streets for PeopleChaos or Quality of Life, 2005; Project for Public Spaces INC, 2008, pp. 56-57; Nelson, 2012, p. 3)





**Fig. 2. Examined Examples of Pedestrian Area Experiences**

(Nelson, 2012, p. 3; Dokmeci, Vedia, Altunbas, Ufuk, & Yazgi, Burcin, 2007, pp. 157 & 160; [www.goscandinavia.about.com](http://www.goscandinavia.about.com); [www.business-on.de](http://www.business-on.de); [www.shahrimtabriz.blogfa.com](http://www.shahrimtabriz.blogfa.com); [www.speaklanguagecenter.com](http://www.speaklanguagecenter.com); [www.sangres.com](http://www.sangres.com); [www.speaklanguagecenter.com](http://www.speaklanguagecenter.com))

- The examined pedestrian areas have a large number of entrances that provide access for people all the way.
- In the studied samples, due to attracting a suitable population, the existence of important attractions such as cinema, bazaar, church, etc. on the pedestrian area has been highly emphasized.
- The presence of important and permanent elements at the beginning, end, and along the pedestrian area had caused a lot of visual and functional appeal on the pedestrian areas.
- In most pedestrian areas, vegetation is one of the main elements of the pedestrian area that has protected

people from the intense sun and greenery of the space.

- In all examined pedestrian areas, there is no significant longitudinal slope. However, the criterion of “average slope of less than 5%”, which is derived from existing and mandatory laws in the country, should be considered for any pedestrian area in Iran.

Consequently, regarding the key points taken from the world experiences, which are the investigation of the key points obtained from the theoretical foundations in the studied samples, the initial criteria for the feasibility of turning the street into a pedestrian area can be developed (Table 5).

**Table 5. A Basic Feasibility Criteria for Converting a Street to a Pedestrian Area**

Dimensions		Criterion
Access	Criterion 1	The dominance of social role over the role of transportation (transit) and access and the possibility of transferring the role of transportation and access of the street to the surrounding streets (maintaining the continuity of the main networks of carriage movement)
Sociability	Criterion 2	population and the appropriate number of pedestrians
Body	Criterion 3	Existence of attractive edges in the street
Activity, Sociability	Criterion 4	Existence of voluntary and social activity in the street
Access	Criterion 5	Access to public transport station within a maximum distance of 500 meters from the street
Access	Criterion 6	Existence of public parking at a maximum distance of 500 meters from the street
Access	Criterion 7	Proper street penetrability
Activity	Criterion 8	Living in or around the street
Activity	Criterion 9	Existence of important attractions inside or at a distance of 500 meters from the street
Image	Criterion 10	Existence of important permanent elements in people's minds, inside the street (visual sign and activity node)
Comfort	Criterion 11	Existence of vegetation in the street
Body	Criterion 12	Average longitudinal slopes less than 5%

The significant point that has been gotten from the study of theoretical foundations, world experiences, and the expert study of the authors about the criteria is that: “two criteria 1 and 12 criteria are necessary. This means that if they are not on the street, the street cannot be turned into a pedestrian area; because if it is stepped, the tendency of people to walk is greatly reduced (criterion 12) and the continuous network disrupts movement and access (criterion 1). But if other criteria are not in the street, though the street can be turned into a pedestrian area, their success and quality will be reduced. As mentioned, the criteria in the table above are the basic criteria that must be localized and ranked for use in the sample. To this end, regarding the method

of face-to-face narration, from twelve urban planning and urban design specialists who have a history of familiarity with the city center of Babol (lived in that city or carried out an urban planning project, or are urban planning teachers or work in urban management institutions) and have had sufficient scientific and professional level, have been assisted (Table 6) and have been asked to review, remove the criteria provided or, if necessary, add new criteria to them and prioritize them. Likewise in the criteria ranking questionnaire, the point that “criteria one and twelve are necessary criteria; therefore, they are in the priority,” has been mentioned, and experts have been asked to prioritize the other ten criteria if accepted.

**Table 6. Characteristics of the Respondents in Prioritizing the Criteria**

Number of Respondents	12 people
Education	Ph.D. in Urban Planning (5 people) Master of Urban Design and Planning (7 people)
Position	University Faculty Position and Working in Consulting Engineers (4 People) Working in Urban Management Organizations and Departments (3 people) Working in Consulting Engineers (5 people)
The Average History of Familiarity with the Place	19 years

The average weight of the criteria in the ranking of specialists in SPSS software (Table 7) reveals that the two criteria 1 and 12, which were stated as the necessary criteria by the authors; have been approved by other experts and have been placed in the priority of the criteria. Furthermore, only one expert has eliminated one of the criteria, which has been approved by 11 other experts.

## 6. APPLICATION OF RESULTS IN THE FIELD OF RESEARCH (BABOL CITY CENTER)

In this part, the results of the previous section (feasibility criteria) are used in the study area, which is the streets in the central texture (old texture) of the city of Babol (Fig. 4). Lastly, the efficiency of these criteria in practice and the research environment, as well as the best streets to become pedestrian areas were determined.

**Table 7. Final Criteria for Feasibility of Converting Streets to Pedestrian Areas in Priority Order**

Dimensions			Criterion	The Average Weight of Criteria	Priority of Criteria
Activity, Sociability	Access	Criterion 1	The dominance of the social role over the role of transportation (transit) and the access and possibility of transferring the role of transportation and access of the street to the surrounding streets (maintaining the continuity of the main networks of carriage)	11.00	1
	Body	Criterion 12	average longitudinal slopes less than 5%	9.50	1
	Body	Criterion 3	Existence of attractive edges in the street	9.00	2
	Activity, Sociability	Criterion 4	Existence of voluntary and social activity in the street	8.33	3
	Sociability	Criterion 2	Population and the appropriate number of pedestrians	7.54	4
	Activity	Criterion 9	Existence of important attractions inside or at a distance of 500 meters from the street	7.41	5
	Image	Criterion 10	Existence of important permanent elements in people's minds, inside the street (visual sign and activity node)	6.66	6
Access	Criterion 5	Access to the public transport station within a maximum distance of 500 meters from Street	6.25	7	

Dimensions			Criterion	The Average Weight of Criteria	Priority of Criteria
Access	Criterion 6	Existence of public parking at a maximum distance of 500 meters from the street		5.75	8
Access	Criterion 7	The proper penetrability of the street		5.75	8
Comfort	Criterion 11	Existence of vegetation in the street		4.91	9
Activity	Criterion 8	Living on or around the street		4.50	10

To achieve this goal, all streets should be ranked and weighted according to criteria, for which an appropriate multi-criteria evaluation method should be used. In this research, due to “simplicity, flexibility, the ability to apply qualitative and quantitative criteria

simultaneously, the ability to adapt to judgments and the superiority of this method over many other methods”, AHP method is used (Zabrdast, 2001, pp. 13-14) (Fig. 3).

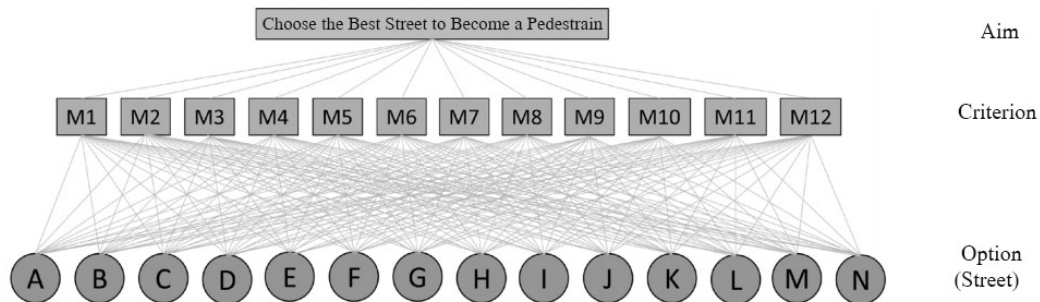


Fig. 3. Hierarchical Structure of Feasibility of Turning a Street into a Pedestrian Area

In this method, first, the criteria are compared based on priority and importance (Table 8).

Table 8. Matrix of Pair-Wise Comparison of Criteria

Criteria	M1	M12	M3	M4	M2	M9	M10	M5	M6	M7	M11	M8
M1		1	3	3	5	5	7	7	7	7	9	9
M12			3	3	5	5	7	7	7	7	9	9
M3				1	3	3	5	5	5	5	7	7
M4					1	3	3	5	5	5	7	7
M2						1	3	3	3	3	5	5
M9							3	3	3	3	5	5
M10								1	1	1	3	3
M5									1	1	3	3
M6										1	3	3
M7											3	1
M11												1
M8												

Then, the streets are compared in each of the criteria and the appropriate weight is taken from 9 to 1 (Table 9). Of course, the criteria in each street have been

quantified as much as possible based on different field methods and techniques (Fig. 4).

Table 9. Matrix of Pairwise Comparison of Criteria

Criteria Option	M1	M12	M3	M4	M2	M9	M10	M5	M6	M7	M11	M8
A	7	9	3	1	7	1	5	1	9	5	1	5
B	7	9	5	1	7	3	5	3	9	7	1	7

Criteria Option	M1	M12	M3	M4	M2	M9	M10	M5	M6	M7	M11	M8
C	-	9	7	3	1	7	5	5	1	9	7	9
D	7	9	9	7	7	7	7	5	7	9	1	5
E	5	9	5	1	5	5	9	7	1	1	5	5
F	9	9	9	7	9	3	9	7	9	7	9	7
G	-	9	5	3	1	7	3	3	3	9	1	7
H	7	9	3	7	7	1	9	7	7	7	1	3
I	9	9	7	9	9	1	9	5	7	7	1	3
J	7	9	5	7	7	3	9	7	1	5	3	3
K	7	9	1	1	7	1	9	1	9	7	1	5
L	7	9	9	7	7	7	7	5	1	9	1	7
M	-	9	5	3	7	7	5	5	3	9	5	5
N	-	9	3	1	1	9	1	3	5	5	1	5

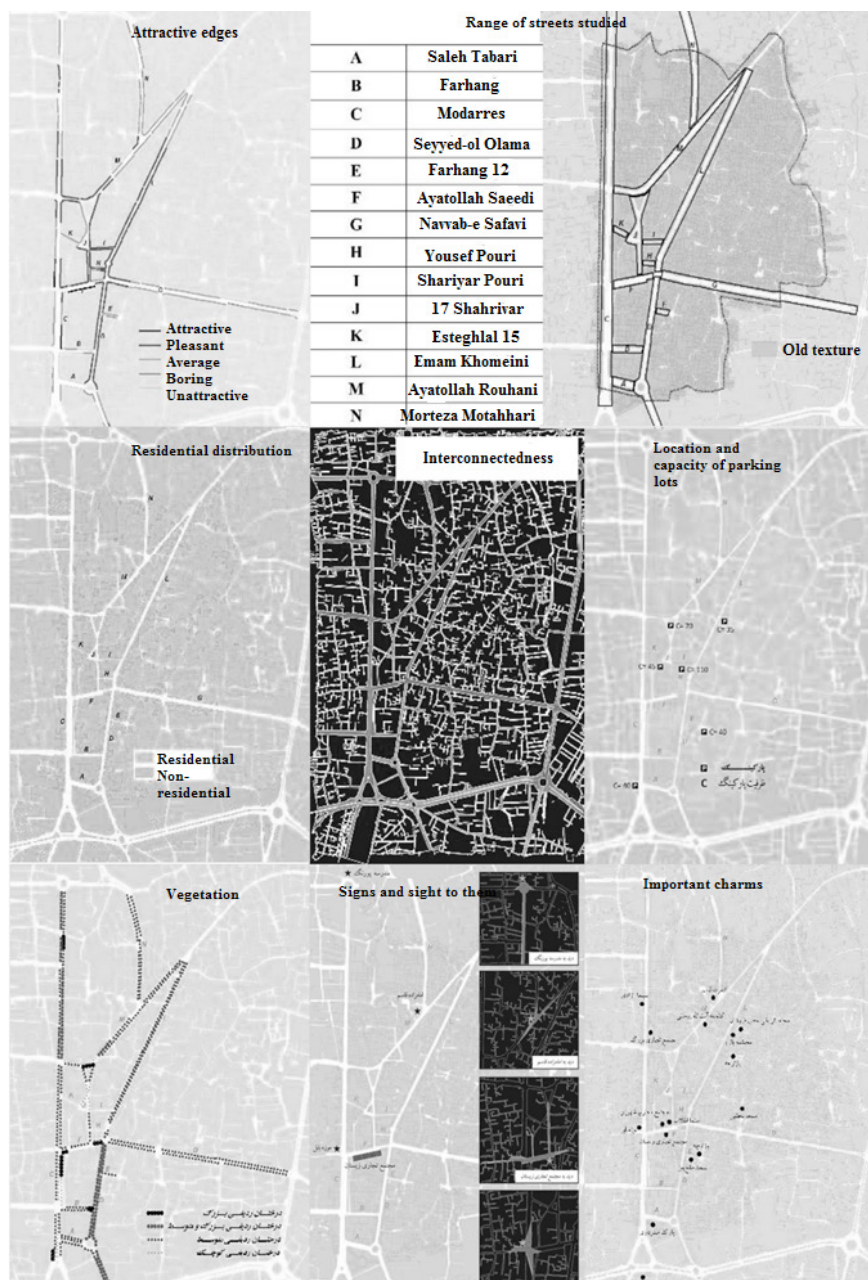
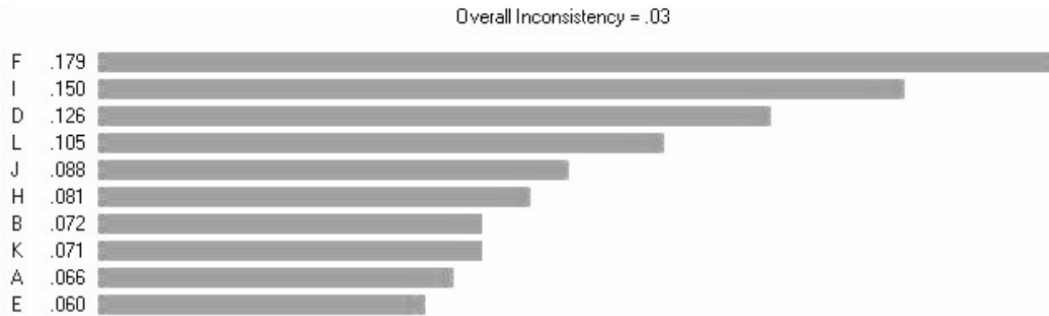


Fig. 4. Scope of Study and Support Maps to Quantify and Examine the Criteria in the Streets (Using the Land Use Map of the Detailed Plan of the City of Babol (Naghsh e Piravash, 2006))



As mentioned before, first, all streets should be examined in terms of two conditions “slope less than five percent” and “the possibility of transferring the role of movement and access to surrounding streets” so that in the absence of these two criteria, they should be removed from the feasibility study process and the feasibility study should be performed on the rest of the streets. According to the studies, the slope of all the streets is in the best possible condition. Though it is

not possible to transfer the role of transportation and access to the surrounding streets in C, G, M, and N streets and they cannot be turned into pedestrian areas. Consequently, the best streets are selected to become pedestrian areas among the remaining streets. Finally, the result of weighting and ranking of streets according to the criteria in Expert Choice software is shown in Figure 5.



**Fig. 5. Priority of Streets with Potential to Become Pedestrian Areas Based on Their Final Weight**

## 7. CONCLUSION

This research aimed to formulate criteria and a method for the feasibility of converting a street into a pedestrian area in the central part of Babol. In this study, after examining the various experiences of creating pedestrian areas in different parts of the world, criteria were developed to measure the feasibility of turning urban streets into pedestrian areas, and then the possibility of turning pedestrian areas into different streets was investigated and finally, the best possible option was introduced. The results of this study reveal that two types of criteria can be considered in pedestrian area feasibility studies. The first category of necessary criteria, which include two criteria 1 and 12: “Dominance of social role over the role of movement (crossing) and access and the possibility of transferring the role of movement and access to the surrounding streets (maintaining the continuity of the main equestrian networks)” and “Average longitudinal slope less than 5%” and their absence prevents the street from being turned into a pedestrian area. The second category includes criteria 2, 3, 4, 5, 7, 6, 8, 9, 10, and 11 (Table 7), the absence of one of which does not prevent the street from being turned into a

pedestrian area; But their presence is very important in creating a successful pedestrian area and prioritizing street conversion for the pedestrian area. Also, these criteria can be strengthened or created with a good design after the street becomes a pedestrian area. So, regarding the two categories of criteria mentioned, in the study sample (Babol city center), streets C, G, N, M cannot be turned into pedestrian areas due to lack of necessary criteria. Ayatollah Saeedi Street (F) due to its high penetrability, access to very convenient public transportation, attractive edges across the street, optional activities, the large volume of users, with valuable historical landmarks at the end of the street (Babol Museum), and more suitable vegetation, has been chosen to become a pedestrian area. Streets I, D, L, J, H, B, K, A, and E are in the next priority of becoming pedestrian areas due to the lack or weakness of some criteria. Finally, it can be said that to create a pedestrian area grid in the center of Babol, it is necessary to select and design more suitable axes that can create heads of the final network with more confidence and lower cost and this process should continue gradually and with the addition of other axes until the completion of the pedestrian area grid.



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#### HOW TO CITE THIS ARTICLE

Aghajani, H., & Pendar, H. (2021). Explaining the Feasibility Criteria for Converting Streets to Pedestrian Areas in City Centers; Case Study: The Central Core of Babol. *Armanshahr Architecture & Urban Development Journal*. 14(35), 193-207.

DOI: 10.22034/AAUD.2021.215404.2089

URL: [http://www.armanshahrjournal.com/article\\_135477.html](http://www.armanshahrjournal.com/article_135477.html)



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