J. Appl. Environ. Biol. Sci., 5(9)84-93, 2015
© 2015, TextRoad Publication
ISSN: 2090-4274
Journal of Applied Environmental and Biological Sciences
www.textroad.com

An Assessment of Where to Construct Suburban Passenger Terminals (A Case Study on Tabriz, Iran)

Sajjad Rajabi[a], Sobhan Roshanfekr Jourshari[b]

[a]M.Sc. Young Researchers And Elite Club, Mameghan Branch, Islamic Azad University, Mameghan, Iran
[b]M.Sc. Student, Department of Art and Architecture, Ajabshir Branch, Islamic Azad University, Ajabshir, Iran

Received: May 19, 2015
Accepted: July 12, 2015

ABSTRACT

In the wake of urban expansion due to population growth nowadays, it has become increasingly important to conduct optimal assessments and planning for more efficient consumption of existing resources. Optimal positioning of urban public facilities is one of the most important goals pursued by urban planning. The urban planners help enhance the citizen welfare through the allocation of land to various applications and providing necessary facilities such as appropriate access, health and safety standards. This study mainly attempts to assess the location of suburban terminals in Tabriz concerning the quantitative and qualitative criteria using Arc GIS, AHP models and Overlay Index, analyzing the available terminal through six standards in two categories of adaptability and desirability. The results of analysis indicated that the positioning of the existing terminals and the desirability and adaptation of the locations have not been considered sufficiently. At the end, there are several recommendations for solving the problems and improving the positioning model.

KEYWORDS: urban functions, location, suburban passenger terminals, assessment, Tabriz

1. INTRODUCTION

The rapid population growth as a result of migration from rural areas to urban centers and poor systematic planning in most Iranian cities have led to numerous problems. One of the main problems is the reduction of urban services per capita, including urban and suburban transport services. The transport function, suburban terminals in particular, is regarded the most important urban services and facilities where the spatial distribution is highly essential in terms of direct impact on the welfare of families, reducing the cost of travel within the city, proportionality and coherence of spaces, urban beauty etc. [1].At the very beginning of a new millennium, the phenomenon of urbanization in the world suggests the rebirth of an urban planet [2] since this phenomenon is associated with polarization and concentration, balance of settlement systems has been disrupted, demanding physical changes in the metropolitan systems [3]. The same trend has taken place similarly Iran with the emergence of capitalism and the collapse of traditional agricultural systems and the establishment of new oil income sources independently from agriculture and without the city-village link. The establishment and development of assembly construction industries and service organizations had led to large-scale migration of rural people to the cities especially metropolitans [4]. Sharp increase in population in the cities, especially large cities has gradually led to urban problems such as reducing service per capita, insufficient housing, slum expansion, rising unemployment, reduced urban welfare and general reduction in welfare, urban facilities and services. One of the most important urban services involves the suburban passenger terminals [5].

Although the first Iranian underground passenger terminal was operating in Tabriz back in 1968, there was little progress in this city and other region of the country until the beginning of the Islamic Revolution [6]. In a new approach, effort has been made to push terminals away from the cities and somehow dispel from urban texture. Nowadays, however, with the uncontrolled growth of cities, the terminals once far away from cities appeared within urban textures, thus leading to numerous problems. It is crucial to establish large terminals with various functions for many passengers flowing in and out of destinations every day. The same is true about providing facilities for the public comfort and refreshment along the traveled route. The certain issue is that location and position of the suburban passenger terminal in a city leaves a significant impact on the dynamics of the city. Similarly, passenger terminals are one of the urban infrastructures in the transport sector.They also are one of the most important portions of land use, the location of which constitutes one of the urban requirements today, which needs to be organized and optimized concerning the developmental urban texture and the increasing number of vehicles [7]. Tabriz is one of the major and highly populated cities in Iran. It has also been facing rapid urbanization and migration trends where people from rural areas moved into cities in recent decades. Furthermore, it is geographically challenged by certain disparities and inequalities due to exposure to a transit route carrying passengers and goods in terms of distribution of public services especially passenger terminals. This study intends to propose, through the GIS technique, an optimal distribution of suburban passenger terminals in the city, where there are 3 transport terminals and several stations for getting passengers in and out

Corresponding Author: Sajjad Rajabi, M.Sc. Young Researchers And Elite Club, Mameghan Branch, Islamic Azad University, Mameghan, Iran. sajad.rajabi63@yahoo.com

of cares which in turn highlights the performance of these areas as compared to main terminals. Finally having assessed the current function of terminals, there are a number of suggestions made to lift the insufficiencies and modify the transport patterns. With regard to the fact raised above, the research basic questions are formulated as follows:

- Are the intercity terminals in Tabriz properly located (criteria of compatibility and desirability)?
- Does the spatial distribution of intercity terminals in Tabriz follow a specific pattern?
- Is the current location of the intercity terminals in Tabriz adequately responding to the current urban needs?
- Is there appropriate access to terminals in Tabriz?

2. Research hypotheses

- It seems that the spatial distribution of suburban terminals in Tabriz is undesirable or inconsistent with the standards of urban development.
- It seems that the current situation, the location of suburban terminals is not aligned with the needs of citizens.
- It seems that the location of suburban terminals in Tabriz is not compatible with the functions of adjacent lands.
- It seems that terrain roughness has not been taken into account in the site selection for suburban passenger terminals.

3. LITERATURE REVIEW

According to studies done so far on the assessment and positioning of suburban passenger terminals, little research has been carried out with the following results:

- The first type of resource available for location involves the applicable information and records. The first paper using the GIS for positioning the urban service centers was written by Akbar Parhizgar (1991) as a PhD dissertation at Teacher Training University). Using the mentioned system, he located several fire stations in Tabriz [8].
- The new suburban bus terminals serving to reduce access time (2005) was conducted by Afandizadeh, Afiunian and Jalali on the part of Tehran traffic and transport [9]. The main objective of this study was to develop new terminals in Tehran in order to increase citizen access and reducing the access time to terminal facilities and decentralizing the terminals in order to achieve the desired goal in a field survey as interview using the specified factors, where the data were analyzed in TRANSCAD with an innovative method.
- Nochian and Rafieian wrote a paper titled proposition of an appropriate positioning model for suburban terminals [7] (Mashhad Urban Management Conference), attempting to consider the current pattern of suburban terminals in Ahvaz concerning the new urban functions and interactions, stressing that the Analytic Hierarchy Process (AHP) should take into account the social, economic, traffic and weather requirements so as to locate the appropriate location of terminal functions.. At the end, they concluded that the suburban passenger terminals are not desirable in terms of the analytical model, not to mention the fact that several factors contribute to determining the final location such as tendency toward traveling between cities, natural factors, appropriate access to the main output arteries and compatibility with adjacent land uses.

4. Research objectives

- Analysis of the current status of suburban terminals in Tabriz
- Evaluation of the common criteria and standards at global and national levels for selecting the construction site of suburban terminals
- Understanding and introducing the optimal locations for the construction of new terminals in the coming years.

5. Theoretical framework

5.1 Definitions and concepts

5.1.1 Terminal and types of urban terminals

It is a transportation facility in the beginning or end of the public passenger or cargo transport services route used to stop public transport passenger or cargo vehicles or pick up passengers or unloading goods [10].

Terminals are generally divided into two categories:

- ✓ Passenger terminals

A kind of transport facility at the end of the route for public passenger road transport services served to stop public transport vehicles, picking up passengers and pedestrians and elimination of vehicles from the urban street traffic so as to reduce environmental pollution in the outskirts equipped with facilities for providing services related to passenger transport [11].

✓ Terminals for goods and cargo

A place aimed at organization of goods transport and services required by public transportation drivers, equipped with all the facilities to provide services related to the transportation of goods such as: institutions and companies in the transport of goods etc. [12].

5.1.2 Terminal capacity and size

As for capacity, area and other characteristics of terminals, there is no certain standard. These characteristics, particularly the capacity of the terminal, are determined based on traffic studies, demographics, infrastructure, etc. [13].

5.1.3 Terminal spatial organization elements

Constituent elements of the terminal space: The elements supporting the main function of the terminal in transporting the passengers include recreation and relaxing elements, service elements, communication and utilities element [14].

5.1.4 Terminal performance

Factors contributing to the performance of the terminal are investigated as different kinds of motion and the dynamic elements. These are presented in Table 1 as follows.

Table 1, the factors contributing to the performance of terminals

Dynamic elements	**Passengers (that are constantly moving)**	**Getting into the vehicle**
		Waiting for a ride (in this case the use of terminal facilities)
		Arriving at the destination (bus output, getting furniture, etc.)
		Arriving at the terminal and moving to the next destination (in this case, switching between the bus routes)
		Acquiring timetable information for bus departures and purchasing tickets
	Bus (navigated by the driver)	**At the entrance to the terminal**
		Stop for loading
		At entering and picking up a new passenger and departing through short stops
		Repairing and servicing or refueling
	Cargo	**Loading the bus**
		Ready for dispatching
Types of moti	**Arrival at the target**	
	Heading towards the target	
	Arrival and moving again to a new target	

Source: [15]

5.1.5 Functionality assessment of urban lands

One of the most important phases in the process of planning is the evaluation and selection of the most appropriate option from the various choices [16]. Assessment of the advantages and disadvantages constitute the core of evaluation [17]. This will be done through detection of the advantages and disadvantages (costs and income) and prediction of adverse effects of the project [18]. Evaluation of urban land uses primarily serves to ensure the reasonable establishment and compliance with proportion of both quantity and quality.

A) Quantitative assessment: This assessment is based on available land per capita, compared with the standards or the current and future needs of the area under study.

B) Qualitative assessment: At this stage, the certain qualitative characteristics and their relations to each other are discussed based on the following four matrices: The compatibility matrix, desirability matrix, capacity matrix and dependency matrix [19].

After the necessary information was obtained about the current land uses, they need to be evaluated so as to identify the problems related to the land establishment in the area under study. To this end, the four matrices are used, which have been explained below [18].

✓ Compatibility Matrix

The functions established in one area should not be interfering or hindering other activities. Accordingly, the functions might in terms of compatibility entail the following modes:

A) They are fully compatible with each other, i.e., both have common features and the activities are consistent.

B) Relatively consistent, so that both functions are of the same type, but differ in details.

C) The relatively incompatible, meaning that the conflict between the two functions is greater than their compatibility.

D) Completely incompatible, i.e. specifications of the two functions are not at all consistent and contradict each other [1].

✓ Desirability Matrix

In this matrix, compatibility between function and location is assessed so as to state that each function suitable for a certain region based on its special features [1]).

✓ Capacity Matrix

Each urban activity entails a scale, just as the structure of a city has different levels in physical terms. If the two scales are compatible, each function will have a good performance and every level of the urban structure will effectively benefit from services. If not consistent, there will be numerous problems for both phenomena [6].

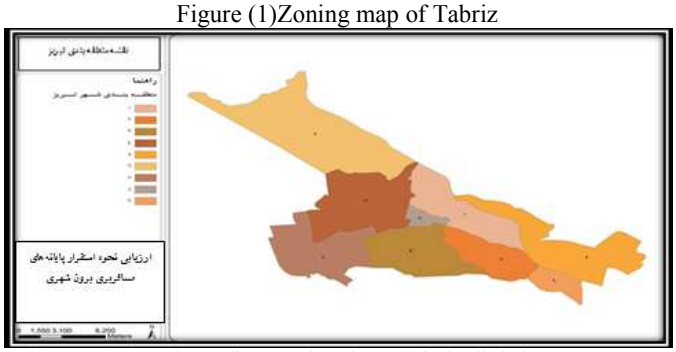
- ✓ Dependency Matrix

Sometimes the activity of a function depends on the activity or activities of other functions; For example, a residential neighborhood is incomplete without educational services, health and trade. Other urban centers are similarly related to activities in the city. In this matrix, therefore, the interdependency of functions and the necessity of their land proximity is investigated [1].

6. Scope under study

In scope of this study encompasses all terminals in ten districts of Tabriz in a detailed plan as follows:

Figure (1)Zoning map of Tabriz



Source: Authors adjustment based on Tabriz detailed plan, 2015

7. METHODOLOGY

The objective of this study is fundamental-applied, which mainly involves the theoretical principles in urban land uses and spatial expansion, and at the same the theories and regulations focus on location in urban centers and more specifically the intercity terminals. In terms of research methods, this is a descriptive-analytical study drawing on a system and geographical-spatial theory. The data were collected and analyzed through GIS software, while the maps of the suburban terminal distribution were developed. After these stages, the composition of layers was obtained along with analysis of the status quo, so as to propose the most ideal location for construction terminals.

7.1 Materials and methods

The statistical block layer is first digitalized composing a geographical database along with the descriptive data. At the next stage, according to local standards and characteristics of the region (such as population density, etc.), the access radius convenient for each terminal at the district is obtained followed by all the service functions applied in the land use planning matrices for assessing the position of the terminals; These matrices include compatibility matrix , adaptability matrix, capacity matrix and dependency matrix, three of which have been applied in this study according to the objectives concerning each terminal. At the next stage all the scores are evaluated and the subject layers are prepared in the form of desired output maps, while the analytical functions are used to select a number of fitting locations for terminals. For this study, the basic maps were first produced and edited in *Autodesk map*. In the next step, the maps were imported into the Arc Catalog (Arc GIS) in order to define the topology and then the descriptive data were inserted in the database attributed to the terrains. As such, the databases for geographic information systems are prepared. After the information bank is completed, the geographical and descriptive data are integrated and the data are analyzed in GIS environment so as to yield the output maps. This study involved the analytical functions, such as overlap, buffering, spatial analysis etc.

8. Findings

8.1.Evaluation of land use compatibility with terminals in Tabriz

The functions established in one area should not be interfering or hindering other activities. Accordingly, the functions might in terms of compatibility entail the following modes:

A) Fully compatible with each other, b) relatively consistent, c) relatively inconsistent, D) incompatible, and E) indifferent [16]. The land use compatibility matrix to the terminals in Tabriz has been examined in the following:

Table 2, land use compatibility matrix to the terminals in Tabriz

Completely adaptable ⊗

	Large Dams	®
Industrial	Light industry	©
	Heavy Industries	©
	Nuclear reactors	®
	The remnants of chemical waste	®
Leisure time	Children Park	®
	Neighborhood Park	®
	Walking park	®
	Regional and zonal park	®
Production	Farms and gardens	®
Outdoor space	Urban open lands	⊗
Transportation Network	Slow neighborhood passenger	®
	Fast passenger	⊗

Relatively adaptable ©
Adaptable ⊕
Inadaptable ®

Guide

Use		Adaptability
Residential use	Low density	⊕
	Average density	®
	High density	©
Commercial	Daily-weekly	©
	Local	©
	Regional	©
	Bank	©
Educational	Kindergarten	©
	Primary school	©
	Elementary school	©
	High school and college	©
	University	©
Religious	Takyeh and Hosseinieh	©
	Local mosque	®
	Jameh mosque	®
Medical and health care	Public bathroom	®
	Independent medical unit	®
	Health Center	®
	Hospital	⊗
Administrative and military	Municipality	®
Culture - Sports	Sports ground for children	®
	Gyms and stadiums	®
	Public Library	®
	Cinema, theater, cultural center	®
Critical facilities	Oil and gas area	®
	Road integrated network	®
	Fire stations	⊗
	Airport and public transporation terminals	⊗

8.2 Evaluation of terminal adaptability

In this section, the compatibility of Tabriz terminals is evaluated with regard to various factors (good neighborhood adjacency). For this purpose, the coordination and compatibility of terminals with other urban activities are examined on the one hand, and the harmony between form and function of terminals is evaluated on the other. This is identified as consistency and compatibility with other land position adjacent to the terminals.

The mentioned items have been given in the tables below:

Table 3, Tabriz Central Terminal

Functions	Adaptability
Highway	**Adaptable**
Street	**Relatively adaptable**
Regional urban services	**Relatively unadaptable**
Residential complex	**Unadaptable**

Reference: authors, 2015

Table 4, Tabriz North-west Terminal (Azerbaijan)

Functions	Adaptability
Bus Unit Company	**Unadaptable**
Municipal Motor Organization	**Unadaptable**
Azerbaijan Square	**Relatively unadaptable**
Urban open lands	**Adaptable**

Reference: authors, 2015

Table 5, passenger railway station

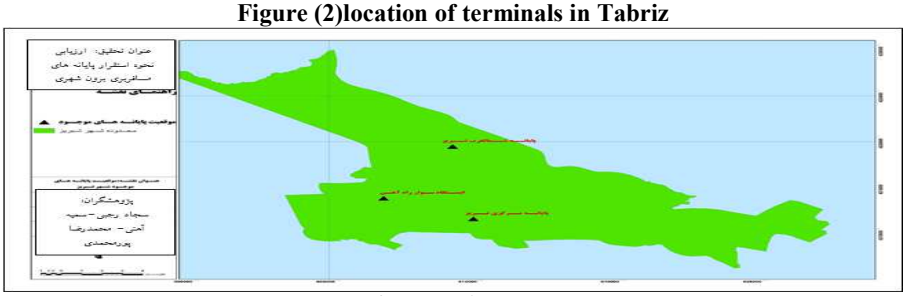
Functions	Adaptability
Abandoned factory	**Relatively unadaptable**
Commercial	**Unadaptable**
CNG station	**Relatively unadaptable**
Highway	**Adaptable**

Reference: authors, 2015

Map 2 displays the location of adjacent functions to the current terminals in this respect, the compatibility with adjacent land uses were evaluated and the factors playing a role in determining the compatibility or

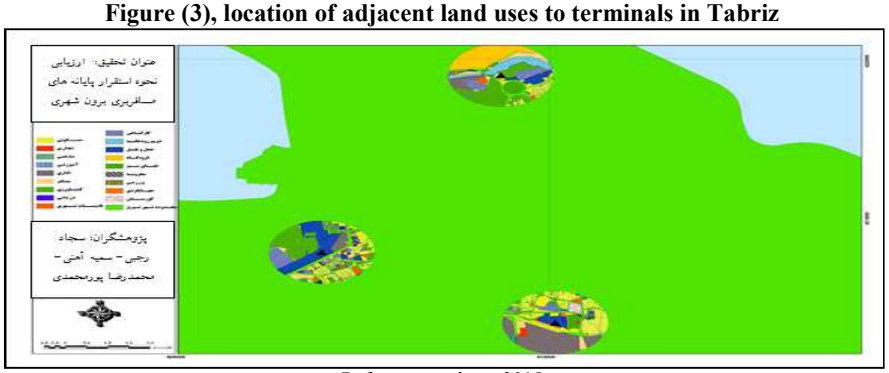
incompatibility are introduced. After importing the data in the GIS environment and determination of terminals (Map 2)
The location of adjacent uses to the terminals (Map 3), terminal compatibility map and places with greatest consistency have been illustrated (Map 4).

Figure (2)location of terminals in Tabriz



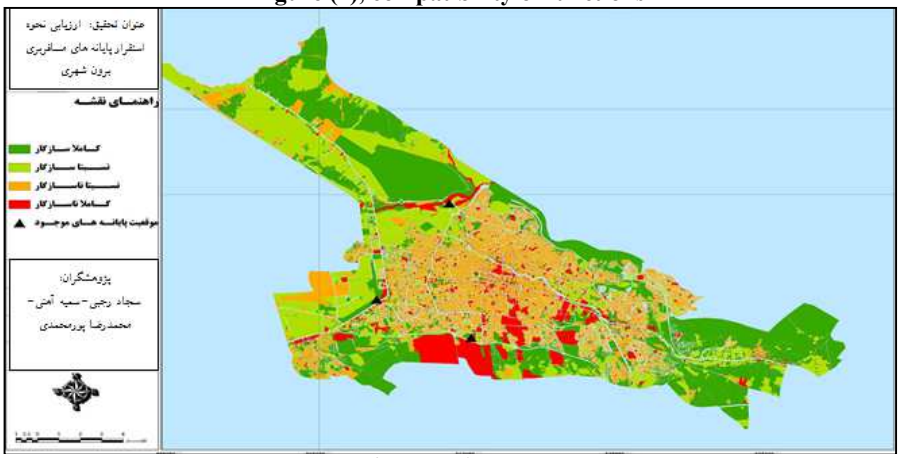
Reference: authors, 2015

Figure (3), location of adjacent land uses to terminals in Tabriz



Reference: authors, 2015

Figure (4), compatibility of functions



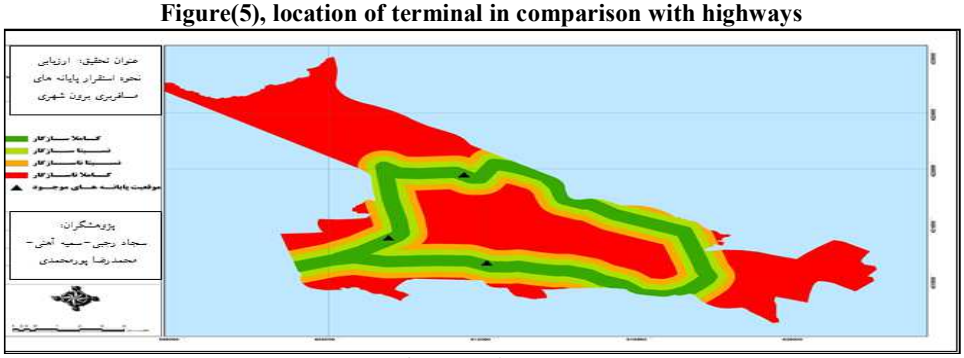
Reference: authors, 2015

After producing the terminal adaptability map, a few measures and factors contributing to the terminals have been examined as follows: Highways, performance scope of current terminals, travel attraction centers, fault and slope.

8.2.1 Highway

The transport function accounts for 2,334,702 square meters of total functions; even through the purpose of this study involve the highways as a supplementary function associated with the terminal. The terminal construction alongside the highway leads to base ease of access to the main road, and at the same time prevents the buses from coming into the city and main streets and consequently traffic. In this regard, the position of the terminal proportionate the city highway was evaluated and a suitable location was suggested for construction of terminals. Map (5) displays the location of terminal in comparison with highways

Figure(5), location of terminal in comparison with highways

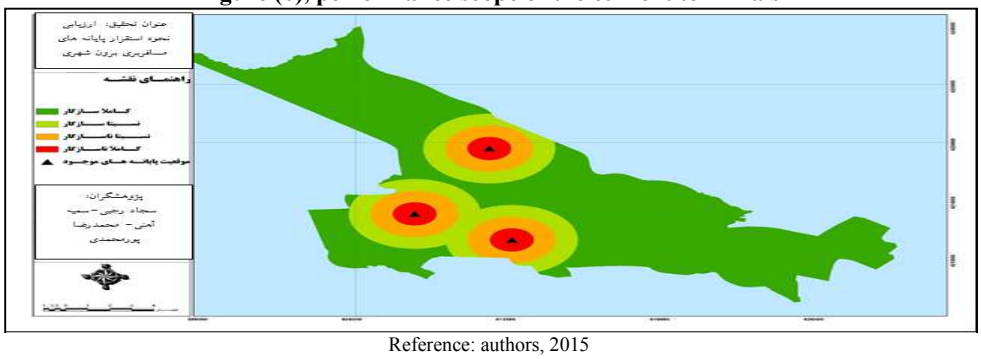


Reference: authors, 2015

8.2.2 Performance scope of the current terminals

In this section, the location existing terminal is evaluated. According to the urban need for terminal on the way to cities where service should the delivered, it is recommended that the new terminal be located at least 3,000 meters away from the existing terminals. Map (6) displays the performance scope of the current terminals

Figure (6), performance scope of the current terminals

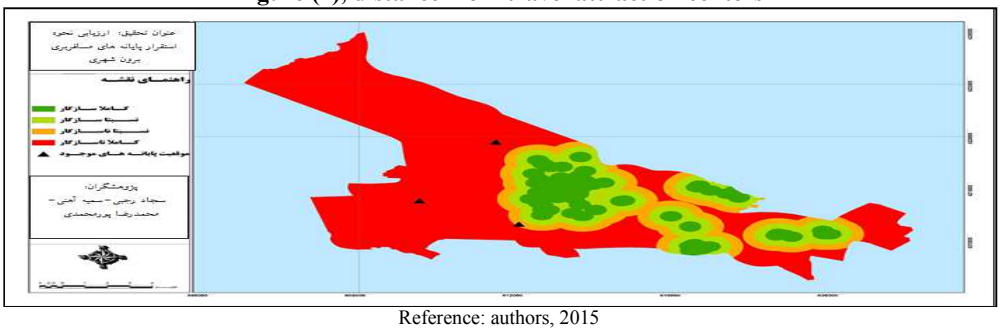


Reference: authors, 2015

8.2.3 Travel attraction centers

In assessing the current situation and the proposed terminal location for new terminals in this section, a few factors contributing to the detection of terminal locations are evaluated. In this respect3, the status quo shows several factors such as hospital, government headquarters, bank buildings, military and police commands etc. in the GIS map, where the location of existing terminals to the functions are examined. In the final map, one of the criteria involves access to these centers.

Figure (7), distance from travel attraction centers



Reference: authors, 2015

8.3 Desirability matrix

In order to examine the desirability of terminals, environmental conditions, access radius and access to communication networks needed are analyzed at this point.

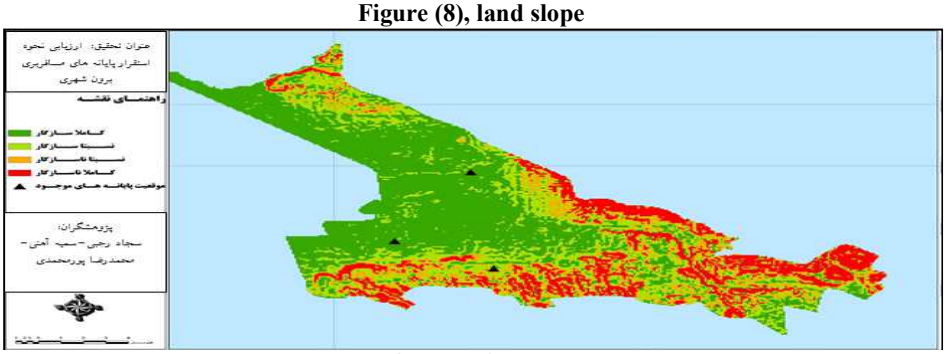
8.3.1 Status of terminals with regard to environmental conditions

The environmental conditions refer to geographic features, climate or natural, geology and topography of the region. According to the region under study which is extremely vast, there is a tremendous diversity of circumstances in terms of topography, slope and so on. Here we examine one of the factors.

8.3.1.1 Terrain roughness

For this purpose, the location of existing terminals is examined in a separate map against the slope so as to suggest the appropriate spots in terms of urban terrain roughness for construction of terminals [20].

Figure (8), land slope



Reference: authors, 2015

8.4 Capacity matrix

With regard to the mentioned concepts, there is no need to evaluate the capacity matrix for this function, since the terminals have been constructed at the city's entrance and exit gates.

8.5 Adaptability matrix of terminals

After the function layer were weighted through the AHP, all the layers are combined through command *raster calculator* in Spatial, Arc GIS to yield the compatibility matrix map of terminals, the outcome of which will be a map with positioning coefficients ranging from 0 to 10. The result from the combination of compatibility matrix layers entails 2 spectra. Coefficients (5-1) as inappropriate and totally inappropriate locations and coefficients (10-5) as appropriate locations perfectly suited for the terminals. In the sites with coefficients of (10-7) as places completely convenient are adaptable for terminals while coefficients (7-5) are suitable locations at secondary importance. In this section, the status of the terminals against the compatibility matrix is detected through assessment of the proposed items.

The table below shows the total weight of the composition of entire layers and determining the importance and priority of each.

The following formula shows the general calculation method:

$$SI = \sum_{i=1}^{N2} \{RIW_i^2 \sum_{j=1}^{N3i} ((RIW_{ij}^3) \times 100$$

SI = suitable option

N2 = number of specified factors at the second level.

N3i = number of the third level factors that directly correlated with factors determined by (i) at the second level.

$_i^2$ RIW = first relative weighted importance among the factors determined (i) at the second level.

RIW_{ij}^3 = relative weighted importance of the third-level factors (i) at the second level [21]

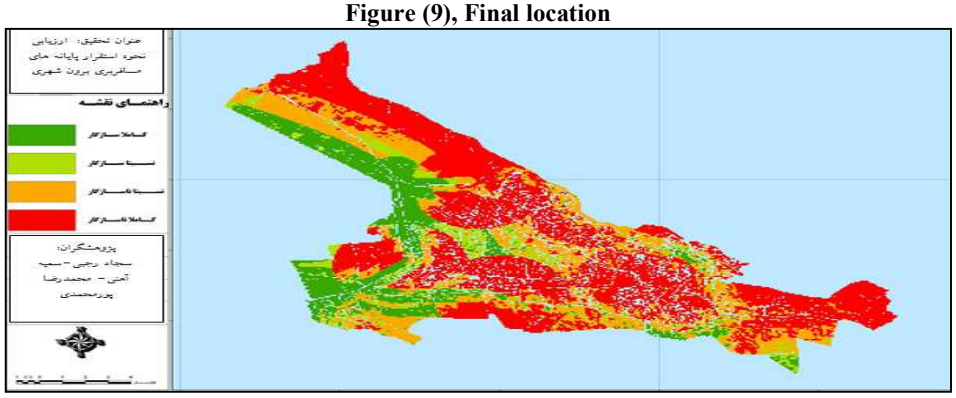
Table 6, the final weight of each layer in combination with other layers based on the model (AHP)

Strata	Highway	Terminal performance scope	Fault	Slope	Function adaptability	Travel attraction centers	Estimation
Highway	1	3	5	5	6	7	0.446
Terminal performance scope	$\frac{1}{3}$	1	3	4	4	5	0.242
Fault	$\frac{1}{5}$	$\frac{1}{3}$	1	2	3	4	0.142
Slope	$\frac{1}{5}$	$\frac{1}{4}$	$\frac{1}{2}$	1	3	4	0.096
Function adaptability	$\frac{1}{6}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{3}$	1	3	0.058
Travel attraction centers	$\frac{1}{7}$	$\frac{1}{5}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{3}$	**1**	0.034

Reference: authors, 2015

Based on the table above, the incompatibility factor is desirably 0.07. The following map depicts the optimal areas for construction of terminals. As the map shows, the desirability of locations for terminals has been divided into four categories of completely inappropriate, inappropriate, appropriate, and completely appropriate.

Figure (9), Final location



Reference: authors, 2015

9. Conclusions:

In recent years due to the rapid growth of urbanization on the one hand and the lack of a regulated system of planning in Iranian cities, the urban services have faced numerous problems. As vital functions of any city, terminals are similarly encountering with problems such insufficient distribution and inappropriate to individual needs, poor establishment in desirable locations and inadequate predictability and futurism required for such urban spaces [22]. Therefore, it was necessary to make a comprehensive assessment of the proper planning aimed at improvement of the quality and quantity of terminals.Since the study on urban land uses especially in urban location of services entail certain basic principles in terms of compatibility, desirability and capacity, the relevant literature review revolves mainly around such functions particularly positioning of terminals. Similarly, this research highlighted those principles, making an effort to examine the Tabriz terminal based on the three criteria, employing all the factors especially in the assessment of terminal adaptability through the weighting AHP method. In this respect, the terminals in Tabriz were evaluated in terms of quality criteria and then appropriate locations were selected through overlap index and AHP. In short, the terminal evaluation, qualitative evaluation through compatibility matrix and desirability matrix were done through slope and fault. Evaluation of functional performance of terminals suggests the fact that the terminals are adequately distributed, but there are other spaces and locations in the city where new terminals can be constructed

The first hypothesis indicated that the spatial distribution of suburban terminals in Tabriz were not desirable or in accordance with the standards of urban development, i.e. the location of terminals under study were not assessed in terms of passenger access to travel attraction centers and there is insufficient passenger service, thus forcing the passengers to travel a long distance across the city to reach the services, shich has been depicted in map (7).

The second assumption is that the current situation indicates the location of suburban passenger terminals inconsistent with citizen needs, which implies that the terminal should be in the route to cities where there is available services, i.e. the passengers wishing to travel to Khuy, Tesuj or Azarshahr and else have to get onto a bus at Tabriz Central Terminal. An establishment location has been specified in the map because some passengers have to travel a certain distance from the mentioned cities before they arrive at the city center terminal en route to Tehran.

This third hypothesis indicated that the location of suburban terminals in Tabriz is not compatible with the functions of adjacent lands. In order to prove this hypothesis, all the compatible and incompatible functions were scored against the terminals in Tabriz so as to eventually overlay each function and yield the adaptability matrix map. Map (3) three represents the fact that Tabriz central terminal and the northwest terminal are within incompatible land uses, while the the rail station is almost compatible with the neighboring land uses.

The fourth hypothesis states that the selection of construction sites for suburban passenger terminals did not take into account the natural terrain roughness, for the approval of which considering map 8 and 9, it can be concluded that the northwest terminals in Tabriz (Azerbaijan) and railway station have been on a suitable slope. However, Tabriz central terminal has been constructed at locations with 2 and 3 degrees of slope, and it is has been positioned on an appropriate site in terms of distance from faults, whereas the northwestern terminal in Tabriz is near the fault boundary.

REFERENCES

- [1]Pourmohammadi, M.H. 2003. Urban Land Use Planning.1st edition. Tehran: SAMTpp:1,110-116
- [2]Albert, D & et al.2005.GIS and Remote Sensing Application and the Health Sciences; Chelsea: Ann Arbor Press. pp:54
- [3]Piran, P. 2002.Still on informal settlements (case study: Shir Abad Zahedan). Haft Shahr journal. No.4.pp:12
- [4]Ziyari, K.A. 2003.Planning New Cities, 3rd edition, Tehran: SAMT.pp:78
- [5]Rabani, R. 2006.Urban Sociology.2nd edition, Tehran, SAMT in cooperation with the Isfahan University. pp:218
- [6]Azizi, M. M. 2004.Density in urbanism: the principles and criteria to determine urban density.2nd edition, Tehran: Tehran University.pp:16
- [7]Nuchian, A. 2005.Proposition of an appropriate positioning model for suburban terminals (case study: Ahwaz). MSc thesis, Supervisor: M. Rafieian, Tarbiat Modarres University in Tehran.pp:25
- [8] Parhizgar, A. 1991.Providing GIS for positioning the urban service centers. PhD dissertation. Supervisor: M. Shakoui, Tarbiat Modarres University in Tehran
- [9]Afandizadeh, Sh., Afiunian, M. and Jalali, A. 2005.Locating new suburban bus terminals in order to reduce the user's access time. Tehran traffic and transport studies Websitewww.SCRIBD.com
- [10] Road Transport Statistical Yearbook. 2003.1st edition.pp:25
- [11]Road Transport Statistical Yearbook.2002.1st edition. Transportation and Terminals Organization of Iran information and technology office.pp:5
- [12]BLM (USA).2005.Land Use Planning Handbook-, Washington:(USA Department of the Interior Bureau of Land Management); BLM Manual
- [13]Saaednia, A. 1999.Green Book of municipalities (Volume VIII), Tehran facilities and utilities - Center of Studies and Planning of the Ministry of Interior, publisher the Iran's municipalities. P:38
- [14]The World Resource Institute et al., 1996. World Resource: A Guide to the Global Environment; the Urban Environment; Oxford University Press.p:69
- [15]Pasargadae Consulting Engineers, passenger terminals studies, Organization for Passenger Terminals of Shiraz Municipality, 2003.Volume II, Shiraz Municipality
- [16]Pourmohammadi, M.H. 2010. Urban Land Use Planning. 1st edition. Tehran: SAMT pp:105
- [17] Qrazguzlu, Z. 1986. Introduction of translator on the book of "The role of evaluation in the process of urban and regional planning and common techniques". Lichfield et al., 1st edition. Tehran: Housing and Building Research Center (Ministry of Housing and Urban Development).
- [18]Bahraini, S.H. 2003.Urban Design Process. 2nd edition. Tehran: Tehran University.p:192
- [19] Razavian, M.T. 2002. Urban land use planning, 1st edition. Tehran: Monshi pp.109
- [20]Rustayee, Sh and Jabbari, I. 2007. Geomorphology of urban areas.1st edition. Tehran: SAMT.p:125
- [21]Church, R.& Alan M.2009. Business Site Selection, Location Analysis and GIS; Hoboken - New Jersey: John Wiley & Sons. p: 69
- [22]Wang, X. & Rainer, V.H. 2007.Research Methods in Urban and Regional Planning, Beijing: Tsinghao University Press & Berlin: Springer.P:540