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Applying Spatial Planning In Organizing Entrances (Case Study: Southeast Entrance of Mashhad Metropolis, Iran)

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Abstract

This studyattempts to organize urban areas and assess thesuitabilityof SouthEastEntrance of Mashhad by applying spatial planning. Collecting data of the current situation is performed in both indirect anddirect levels of the studyarea. The study area, which is dividedinto threesequencesbased onenvironmentalsimilarity, is surveyed from six aspects of function,traffic,topography, slope, green space andenvironmentalpoint of view and then analyzed according to SWOTtechnique. In thenext step,each layeris evaluated based ona modifiedecologicalmodel. After creating factor maps, the final map of SuitabilityofSpaceis determinedbyoverlappingof alllayersin GIS, the appropriateapproachfor eachsequenceis determined. It seems thatapplying this method inurbanscale, help urban management useappropriate approaches in organizing urban areaswith regard to all of theinfluencing factors.

Keywords: Data Layers, Entrance, Planning Zoning, GIS

1. Introduction

City is not a confined and defined space like an architectural space, itssphere of influenceissodiverseandbroad that makes the city entrance different from any other kind of entrances. Also, change in the kind of entry andexit to thecityinmodern times, transforms any idea about the entrance of the city. City is a spatial system, entrance of which can be defined as: a placeor a combination ofplaces through which we feel that we belong to a city (Amiri&Manouchehri, 2006). City entrance is an interfacebetweencivilized anduncivilizedlife; the firsturban spacethateveryonewillfacewhen entering thecity (Pakzad, 2005). The entrance of a city is apath through which, the flow of entering the city(from outside to inside) is achieved. Thisarea which interfaces thenatural environment of out of the city and the

built environmentof inside it, not only has the property of both environments, but also owns an independent individuality (Ablaghi&Pourjohari). Entrancespacesinthepast alwaysincludedsuburbanareaslike gardens, farms, suburbs, fort andfence. Thus, suburbs played an important physical, visual roleincreating an imageof the city entrance for passengers. These placesconstituteone ofthe essential elements ofthe imageof the city and helped passengers visualize thekindof life inthe city (Moore, 1994). The first expectation of the entranceisto transform outside areas into inside areas slowly anddelicately, So thatpeoplecoming into the city be able to manage their behavior to coordinate with the events inside. Therefore, transformation is one of the most important features foreach typeofentrance. On the other hand, theareason either sides oftheentrance confluence and interpenetrate in the entrance. The design of the entrance should be such that the physical and mental permeability be possible and create a feeling of transformation for the passenger. In fact, it should induce the end of an area and beginning of another one. Spatial planning is one of thefundamentaldomains of function of applied geography, which often organizes and reforms the lack of spatial, national andregionalbalance. For this purpose, it is necessary to have an appropriate knowledge about the entire area and also consider the future of it. Spatial planning proposes issues like economic, social, cultural and environmental organization in order toachievethe desiredfuture (Jajarmi, 2009). Land management plans were not successful until the Second World War and afterwards. Thiswasa beginning for spatial planning or regional planningofland useesthroughassociation withnatureand exploits the land based on its capacity and also to fulfill economic and social needs according to the capacity of land and a balanced distribution of people and activities across the land (Jajarmi, 2009). Spatial planning determines land use, considering a sustainable efficiency and based on the quality and quantity of the capacity of land for different uses of people. Therefore, it reduces waste and theloss ofenvironmentalresources (Makhdoom, 2006). In factspatial planning is a science that considers use of land based on its potentialto eliminateinequalities andimbalances (Sarvar, 3185). Applied geography approach is a systematic approach in planning and this approach is a sign for relation of geography with other sciences. In fact, it can be stated that habitat areas cannot grow and survive without communication with other centers and coordination with the overall governing system and the distribution of activities in space. Therefore, spatial planning is based on a systematic and territorial biome approach with an emphasis on sustainable development (Estelaji, 2001). This approach can measure the capacity and potential of different areas for development and make decisions for these areas with a comprehensive planning. Using micro scaling of parameters and spatial planning in urban scale results in a combination of urban planning and spatial planning techniques that reveals the abilities of urban areas with a comprehensive study and overlapping different zones. Functional zoning and spatial planning are considered as two of the most common methods of sustainable environmental management in this area (Ahsani, et Al, 2007), which usually include a range of systematic methods in environmental management (Najibzade et al, 2008) and is often used in the form of systematic analysis, simulation and modeling (Gernet, et al, 2003). The most comprehensive method in zoning for tourism development evaluation is using multivariate evaluation methods, which better reveal the capacity of area from the ecological aspect (Makhdoom, 2006). However, sometimes there are differences in methods of spatial planning zoning, which is due to differences in models and the number of variables that are involved in the process of analysis of the data (MansouriDaneshvar, et al, 2012). Districtor regional zoning method has been considered in most studies that are related toland use planningandspatial planning, butthismethod isnot applied inurbanscale. In order to investigate theapplication ofthe principles ofspatial planning andGISin the development of Sorkhehesarwoods in Tehran,Ghasemi, et al (2003) have conducted basic studies, analyzedandoverlapped layers, and created environmental unit map of the area at the end. Behniafar and MansouriDaneshvar (2010) used spatial planning zoning todetermine zones with the capacity and potentialfor tourism developmentin Golmakanbasin ofthenorthern hillside of Binalood. MansouriDaneshvar et al (2012) have usedFunctionaland spatial planning zoningapproachfor theassessment of tourism development potential ofMashhad–Kalat route and theyidentifiedthree

environmentalareas along the route and stateda general vision for their development. Using geographic information system, all indicators were simultaneouslyanalyzed byoverlayingdata layers in this study. Geographic information system (GIS)is considered asa powerful toolinanalysisof capacity of the land. Spatial planning models can be adjusted for one period of planning and in any levels of places in order to be used in GIS. In summary, its application is based on transforming vector maps into net maps (Makhdoom et al, 2007)

2. Research Question

Thefirstfundamental question for introductionof thisstudyis whether we can turn the study area into a systematic and set up zone by using spatial planning approach and data layer zoning system to benefit from the existing opportunities toward a desirable place or not. The hypothesis of this study is thatthe finalzoningpatternforspatial planning of the lands around thesoutheastentrance ofMashhad(Neyshabur route)would bea good modelforurban development that can be considered as a the Strategic Plan in both scales of urban planning and urban design. Southeast areaofMashhadincludeslargegreenspacesin the formofgardens and artificial forests. It also includes large-scale land usesthat have urbanfunctionalong with factories. This area should be organized in order to have interaction with theurban fabric.

3. The Study Area

The study area in this research is an area of 3278 Hectares, including parts of South East area of the city of Mashhad as well as a wide field of protective zone of the city.The studyisfocusedonthe entranceof the city andtheinfluences of the mentioned areas on its qualityand performance.In order to achieve a better study and analysis of the area, itis dividedinto threesequenceswithsimilar characteristics (Figure 1). The firstsequenceis a part of the citywithmostlyresidentialfabric. The secondsequence includes parts ofthe endzones of thecity with vastgreen spaces and of large-scale land uses. The final sequence isoutside thecity with naturalareas that are connected tothe city. The urban upper hand document that is used in this research is the detailed plan of South East area of Mashhad by MehrazanConsulting Architectures (1993).

Figure 1: sequences of the southeast entrance of Mashhad

Source: Authors

4. Research Methodology

In this paper, the method that was used for organizing the south east entrance of Mashhad was based on ecological model for the assessment and classification of the land. This model begins with making criteria for each type of land use in terms of ecological models. Then, the ecological characteristics will be analyzed and evaluated in Land units, relative to ecological model of each type of land use. In fact, the ecological model is a measure of capacity of land for specific land uses, which identifies the rate of desirability of establishment of the land use in the region. Itshouldbe notedthat themethod ofecologicalevaluationmodelis consideredas atypicalmodel that certainlywiththeScrutinizing witheachlocalarea, some of itsparameterswillchange. The tool for this research is GIS software. Valuation of layers is adapted from the ecological model for evaluation of land which is mentioned in the book: "Underpinnings of spatial planning" by Dr.Makhdoom (Makhdoom et al, 2007). According to the ecological approach in spatial planning, the valuation of parameters with consideration to ecological method was performed in a way that has the most compatibility with the aim of the project. This means that in any of data layers, each item with a higher opportunity to organize the entrance of the city received higher score. Scores ranged from 0 to 10 and asmentioned,eachindexwith more desirablityfor thepurpose, receivedmore scores.

5. Research results and findings

5.1. Preparing operation plans and valuation of layers:

According to the method that was mentioned, Six layers of functional, environmental, traffic, topography, slope and green space data and six factor maps were prepared based on spatial planning values. The valuation pattern for parameters of data layers was based on spatial desirability factors that best identify the entrance of the city. In another words, each data layer is valued so that it best represents the role of the entrance of the city. For this purpose, data layers were prepared at first and theirscoreswere assignedto them in GIS. Differentzonesbased onenvironmental effectsandin agreementwith the purpose oforganizingthe entranceandecologicalapproach are valued due totheir compatibilitywithecologicalcriteria in the factor map(Figure2). Gardenand green space land useshavethe most desirability and manufactories and polluting industries have the least desirability. The classification of the existing topography has been carried out by GIS software (figure 3) and 4differentlevels were determined according to the aim of using opportunities for creating identity of the entrance. The higher levels are more desirable, However as the valuation of slopes was carried out, slopebetween5 and 15degreeshasthemaximumdesirabilitybased on definedcriteria (figure 4). This range of slope is suitable for creating diverse spaces and land uses that are related to the entrance, but greater slope is inappropriateforurbaninterventions. Slope ofbelow 5degrees has a medium level of desirability, due to lackoflevel differenceandfrom urbanaesthetic point of view. The green space is valued according to ecological approach as well and gardenandfarmland uses have the maximum score. Formedpart of thecityhas theleastdesirability due torigidnessand lack of flexibility forintervention (figure 5). In the operating trafficplan,the mainarteriesare known to bemore valuable, due to coordination with suburban roads and also compatibility with the aim of the project which is organizing the entrance (figure 5). Environmental valuation is carried outbased on ecologicalcriteriaand the amountof pollution in Figure7. Mentioned scores and values are briefly listedin Table 1.

Table 1: valuation of layers and data classes

Data Layer	Class	value
Function	Abandoned, Watercourse, Storage	2
	Facilities and infrastructures	3
	Office	4
	Industrial, residential and storage	5
	Military	6
	industrial and agriculture	7
	Agriculture, ،transportation, Higher Education	8
	garden	10
Topography	1000 – 1050 meters height	2
	1050-1100 meters height	5
	1100-1150 meters height	7
	1150-1200 meters height	10
Slope	Less than 5 degree	5
	5- 15 degree	7
	More than 15 degree	2

Green Space	Residential areas	3
	Riverbed	4
	Dry land Agriculture	5
	Semi-intensive pastures	6
	Rock outcrop	7
	Irrigated agriculture and Gardens	8
Traffic	Freeway	9
	Highway	9
	Arterial road A	6
	Arterial road B	3
	Areas directly exposed to routes	4
	Lands outside of the effect of road	2
Environment	Compost factory	2
	Areas exposed to Waste Leachate (Olfactory pollution)	4
	Industries without spatial organization	3
	Industries with spatial organization	7
	Natural areas without settlement	8
	Residential areas	6

Source: Authors

Figure2:Function factor

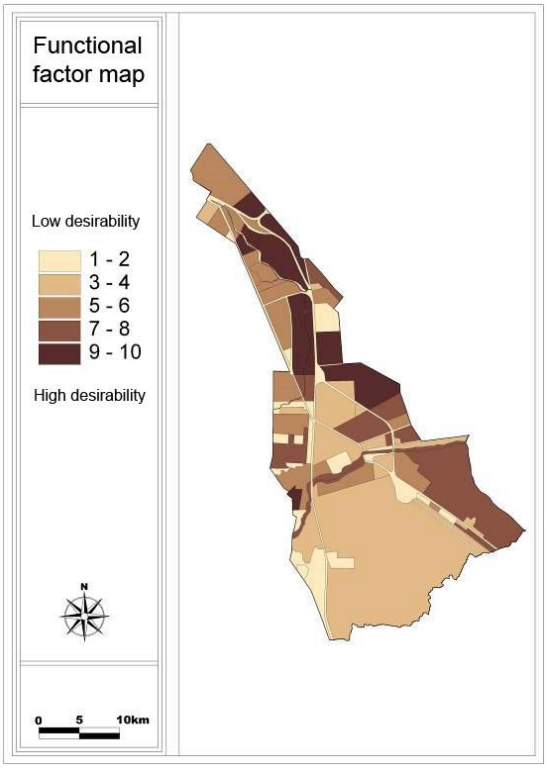


Figure 3: Topography factor

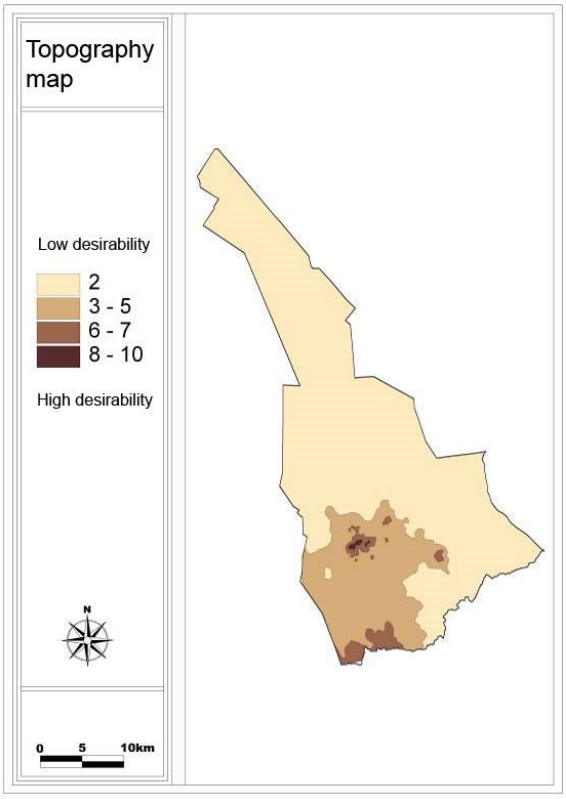


Figure 4: Slope factor

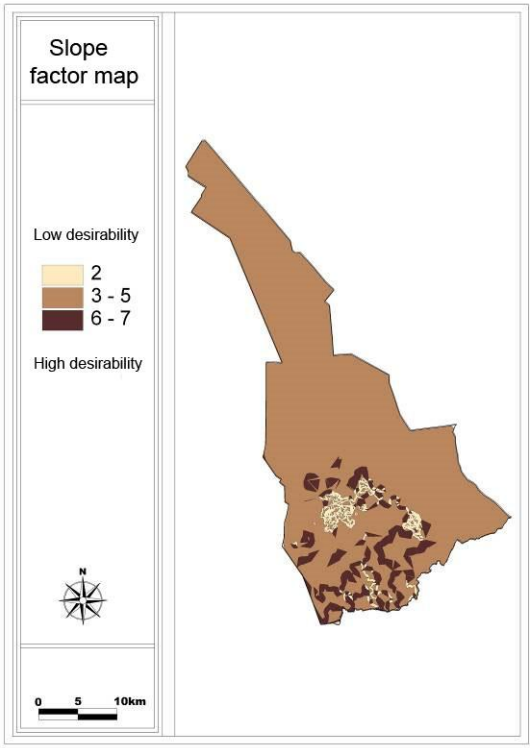


Figure 5: Green space factor

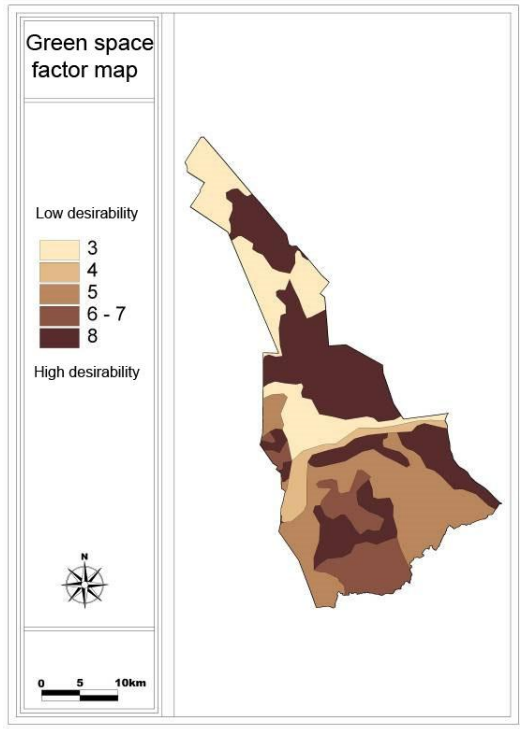


Figure 6: Traffic factor

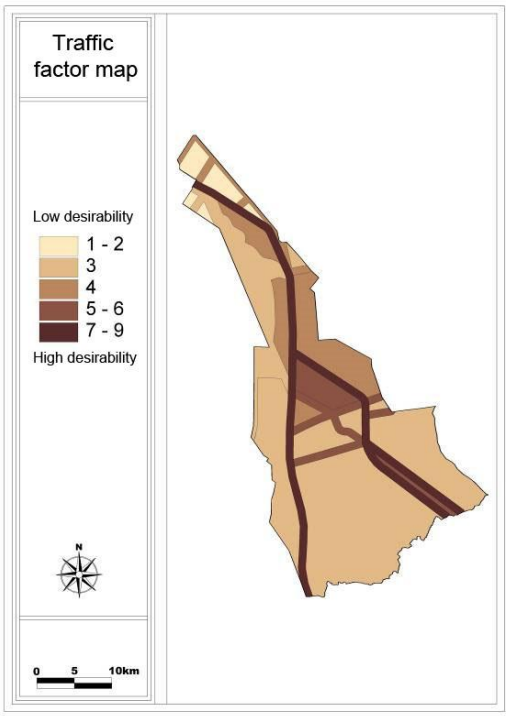
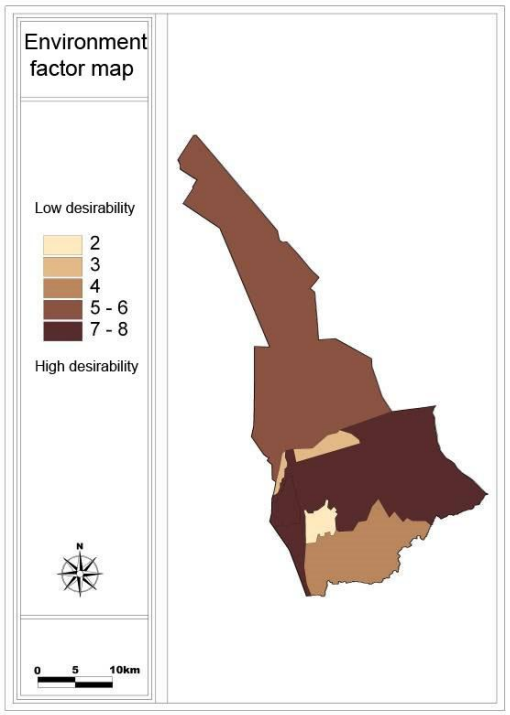


Figure 7: Environment factor



5.2. Preparing final zoning

Final results wereobtained after overlaying and combination of mapsin the GIS software. The finalmaps are spatial planning zoning of this project, which Indicate thedegreeof desirability of the study are to definethe entrance of the city (figure 8). These degrees range in 6 levels from lower desirability to higher desirability. The general conclusionofthe desirability of the study areaand the percentage of areas that require to be organized are presentedin Table2.

Table 2: area and percentage of degrees of spatial desirability in defined spatial planning zoning

Degree of desirability	Area (hectares)	Percentage
Low (1 and 2)	2142	**65%**
Medium (3 and 4)	1059	**32%**
High (5 and 6)	77	**3%**
Total	3278	100%

Source: authors

This table indicates that spatial planningapproachrepresentsa total spatial desirability of medium and high for 35 percent of the study area.In other words, only 35 percent of the spatial planning potentials of the south east entrance of Mashhad are currently being utilized, and 65percent of the area lacks the desirability of a city entrance. This shouldbe consideredin the production of spatial guidelinesfor

development. Theadaptationof the spatial planning zoning map withsequencing ofstudiesis presentedin Figure9.

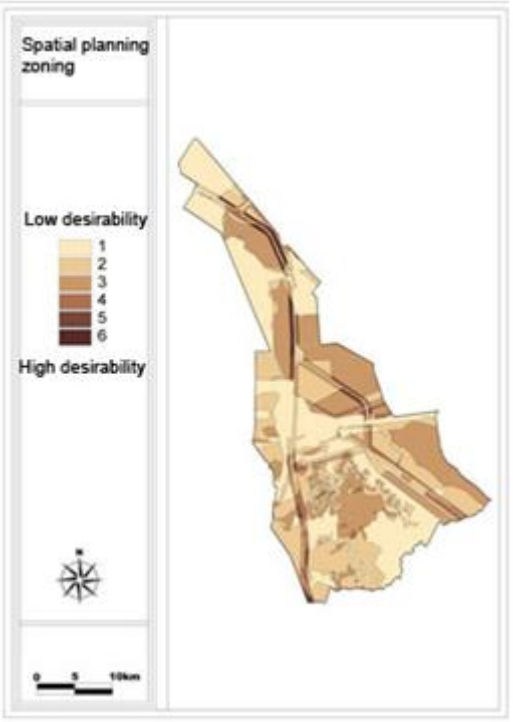
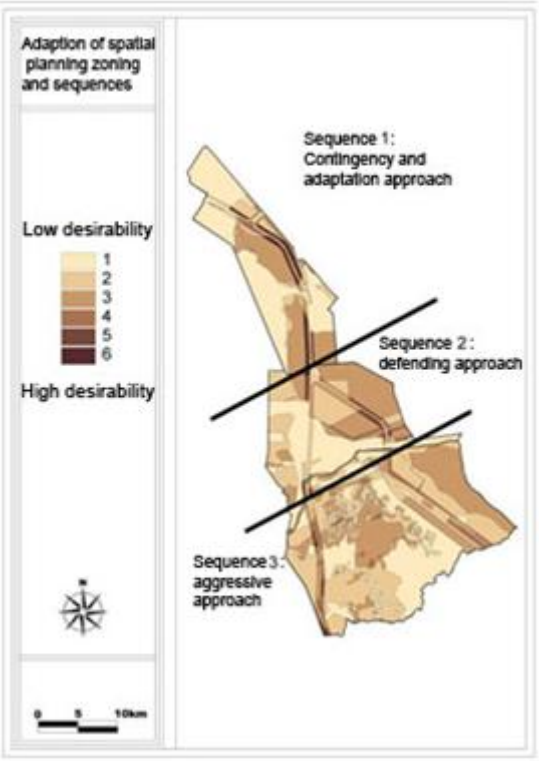
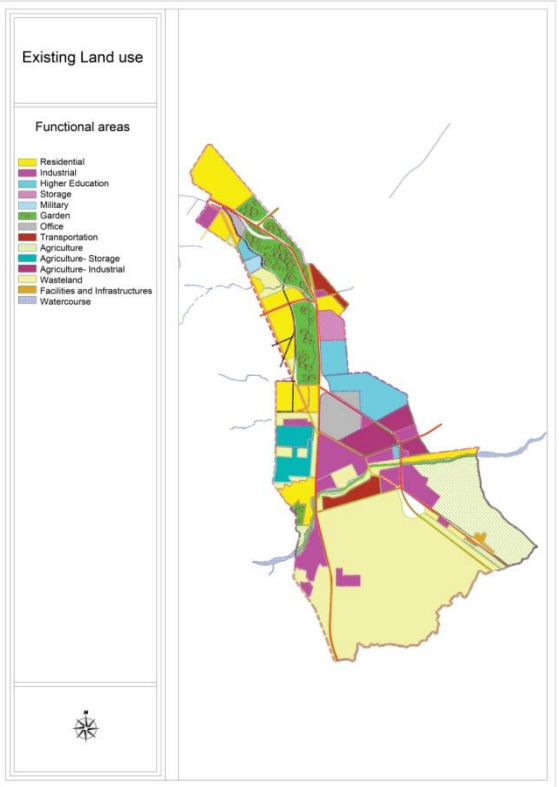
Figure 8: spatial planning zoning	Figure 9: sequencing of the results
	

Figure 10: existing land use



According to figure 9, the secondsequencehas the highestdegree of desirability, which can be explained, due to the great area of green space, shown in figure 10. The first Sequence has a less desirability because of residential areasand the problems for its organization. The thirdsequenceis locatedinthe third degree of desirability due to industrial and storage areas.

Thethirdsequencewhich precedestheentrance should be consideredfor moreaggressive strategies in the next step since currently, it hasnatural and environmental potentialsto be an appropriate entrance. The approach to the secondsequence should be moreconservative and defensive because it has more desirabilitydue to gardens and greenspaces. Contingencyand adaptationpoliciesshouldbefollowed in thefirst sequence, which is moreintegratedwiththe city'sresidential areasand there is a less possibilityof intervention.

5-3- Development guidelines in the planning sequences:

Finally, after surveying, analyzing, and attaining the level of desirability in different parts of the study area, some solutions can be offered to improve the favorableness of the space. These solutions are proposed in three distinct sequences.

Sequence one:

Considering the zoning map, the strategy used in this Sequenceis expediency and adaptive. Changes, based on this strategy are more moderate, and emphasize on preserving the current situation. According to the surveys, we have the lowest level of pollution, and the greenest environment in the whole of the area in this sequence. We have some proposals for this sequence:

- Creating some elements in some parts in order to increases the favorableness of the space and improve the legibility, and also strengthens the identity of the place. The necessity of creating elements becomes bolder, considering that the elements are placed at the entrance of the city.
- Increasing the existing green space and improving its role as a promenade results in developing these areas.
- One of the strategies, which can help with the boldness of the green space and lowers the pollution of highways, is creating a green line starting from the inception, placed at the third sequence of the study area, and ending at the woodland. This line can fortify the entrance and its desirability. Moreover, it increases the security of the residential area around the highway and decreases its air pollution.
- One of the most significant and required changes in this sequence is moving the storage of National Iranian Oil Company, which decreases the security of urban environment.

- For solving the problem of irrigation and the shortage of water supplies, traditional systems of irrigation must be omitted and replaced by advanced methods of irrigation such as drip irrigation, which reduces the amount of squandered water.
- For the shortage of water supplies, the sewage of rural areas can be recycled, and in case of being economically feasible, the sewage of the compost plant can be recycled to provide the required water.
- Growing drought resistant plants can help with the problem of water supplies.

Sequence two:
Proposed solutions in this sequence are based on defending policy, which are derived from the spatial planning zoning point of view.

- According to the land use-zoning map, this sequence consists of educational land use that preservation of it results in improvement of urban environment.
- Preserving the green environment, around the airport is another proposal for this sequence.
- Reorganizing the industrial spaces and reducing their pollution can improve the quality of urban environment.
- Creating equilibrium between industrial land use, and natural circumference is proposed.
- Reorganizing residential area and its vicinity.
- Intensifying the role of Police Station and its supervision on the roads will improve the safety of it. The necessity of doing so is that the highway is along the urban area. Consequently, increasing security and reducing the speed limit would result in more compatibility between the road and urban area.

Sequence three:
Considering the unpleasantness of this sequence, there is a tendency for a greater number of changes and eliminations in land uses of this part.

- The third sequence is placed at the conjunction of urban and suburban areas. As a result, creating equilibrium between the natural and built environment of the city is necessary.
- Creating visual land marks at the entrance of the city; and land uses, which are in accordance with the identity of it, can improve the legibility of the city from the passengers' point of view.
- The primitive road of Neishaboor is the access rout of some mines. According to our data, transportations of heavy vehicles reduce the security of the rout. So, a different road should be replaced for transportation of rocks and mine facilities.
- Converting the land use of the farmlands on the right side of the area to woodlands can have a positive effect on the air and visual quality of the route.
- The Torogh Canal is placed in the third sequence. Organizing its body and vicinity, building bridges, and developing green area around it are some of the solutions of this sequence for improvement of the urban area.
- Preventing the city from suburban development and informal settlement
- Changing the pattern and scale of industrial areas to organized industrial complexes and cleaning the visual pollution of unorganized industrial manufactories.
- Visual emphasis on marginal barrows and creating natural views to regulate visual pollutions.

- The compost factory in this sequence needs to be moved and its land use should be changed for future development.
- Utilizing cultural heritages and elements as an attraction at the entrance of the city such as Nader Hill.

6. Conclusion

A comprehensive research is one of the most substantial tools for reducing errors in all kinds of studies. In urban management, this procedure can specify the level of intervention and reduce the time and cost by lowering the amount of errors and satisfying the requirements of each part for making the best decision, regarding the urban regulations. All of the influencing aspects should be considered in a way, which after a detailed analysis, a comparison between influencing factors could be possible. In this way, not only the parameters are evaluated, but also their interactions are studied. Spatial planning includes holistic analysis method with which, the capacity of the land can be studied, considering its characteristics.
Various layers of information and level of space desirability were obtained using this viewpoint. In all kinds of urban planning and designing, studies are conducted in various layers, but the method used in this research is based on uniting various layers and creating a comprehensive data map, which can be a pattern for all kinds of interventions. In this way, we can get to this point that holistic analysis and holistic planning view can be useful in small scale urban analysis as well as large urban scales. In this research, the mentioned method was used for organizing the South East area of Mashhad. After analyzing 6 required data layers, and evaluating them, the final desirability map was prepared. Finally the guidelines for development of the South East entrance of Mashhad were proposed based on each of the sequences.

References:

Ablaghi, Alireza; Pourjohari, Amirhossein (2006), City Entrances, Abadi journal, No. 53: 66-75

Ahsani, N et al (2007), Introducing an Approach to Sustainable Land Management Practices Based on IUCN Criteria in Kurdistan, Journal of Grassland and Desert Research of Iran, Volume 14, No 4:539-558

Amiri, Shahriar; Manouchehri, Kourosh (2006), History and Culture Gate of Shiraz Project, Master's thesis in architecture, university of Tehran

Behniafar, Abolfazl; MansouriDaneshvar, Mohammadreza (2010), Spatial Planning Zoning with Multi-Agent Evaluation Approach and Applying AHP Model for Tourism Development in GIS (case study: Golmakan Basin), Environmental planning journal, No. 9: 1-18

Estelaji, Alireza et al (2001), Introduction to Management and Regional Planning, JahadSazandegi publications, 1st edition, page 65

Ghasemi, Ali (2003), Woods and Green Spaces Development Around Tehran, based on Spatial Planning and using GIS, MS Thesis in Forestry, Islamic Azad university, research and science branch of Tehran

Grant.v,Peterson.a,marin,s (2003) EcologyandNatural Resource Management, Systems Analysisand Simulation,translated by mohammadrezaee.sh,askafi.f ,aiizh publications,1th edition, page: 328

Jajarmi, Kazem (2009), Spatial Planning, International university of Chabahar, 1st edition, page 10-65

Jean-Pierre Moore(1994), Urban space, design, implementation, management, translated by Rezai.h, Public Relationsand International office ofTehran Municipality publication, 1th edition, page: 165.

Makhdoom, M (2006), Spatial Planning Fundamentals, Jahaddaneshgahi publications, 7th edition, page: 289

Makhdoom, Majid et al (2007), Applying Geographic Information Systems in Environmental Evaluation and Planning, University of Tehran publications, 3rd edition, page 240

Malachowski.yacht(2006), GISandmulti-criteria analysis, translated by parhizgar.a,ghafarigilande.a, samtpublications,1th edition.

MansouriDaneshvar, Mohammadreza; Mohseni, Naser; Rezaie, Mehri (2012), Evaluation of Development Capacity in Mashhad- Kalat route Based on functional zoning pattern and Multivariate Method by Using GIS, Journal of Applied RS and GIS Techniques in Natural Resource Science, No. 2: 41-57

Mehrazan Consulting Architectures, (1993), Detailed Plan of Southeast area of Mashhad

Najibzade, M et al(2008), Ecological Capacity Evaluation for Grassland Land use by Applying ERAMS and GIS (case study: YekeChenar in Marave Hills area), Journal of Grassland and Desert Research of Iran, Volume 15, No. 2:200-214

Pakzad, Jahanshah (2006), Urban Space Design Guidelines in Iran, Ministry of Housing and Urban Planning, 2nd edition, page 9

Sarvar, Rahim (2006), Applied Geography and Spatial Planning, SMT publications, 2nd edition, page 20