An Overview on Locating of Chain Stores Construction by using of Analytic Network Process in Geographic Information System Environment

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Abstract- Place distribution is as one of the most important elements of Marketing Mix and is important strategically. Due to the uniqueness and not easily imitation can lead to a sustainable competitive advantage for economic firm.

The reason of focusing on chain stores is because these stores in compete with each other , with reducing the supply chain costs also kinds of overhead costs may reduce the final price of goods that this matter will help to both producers and consumers.

Present paper is as form of descriptive – analytical method and is conducted based on library studies also with providing a theoretical basis and documents explanation through Analytic Network Process and with using of geographic information system that its sharing spot with place element is in Marketing Mix, evaluates capabilities of the three fields such as Industrial Engineering, Geography and operations research order to locate the construction of chain stores.

Examining of conducted studies about using of Multi-Decision making models about locating of economic enterprises and especially the chain stores indicated variety of effective Criterions about customers' decisions in selecting of store and service providers.

The results of studying on spatial characteristics for construction of chain stores suggests that population settlement patterns, household income , their manner of movement and traveling in city and suburban, the main commuter routes and sufficient knowledge of traffic patterns ,shopping attractions and attention about costs are as items that can guarantee successfully of projects about locating of chain stores.

Keywords- Locating, Analytic network process, Geographic Information System, Chain stores.

I. INTRODUCTION

Locating consists of selecting the optimum place for one or more center with considering the current constraints so that is as optimal aim. This aim can be such as profitability, cost reduction, reduction of transportation, providing the equitable services to customers, gaining the largest share in market and so on. Researches of locating studies were combination of several fields and it requires Having expertise, such as: Operation research, methods of decision-making, Geography 'Geology and weather', Economy, Computer Science, Mathematics, Marketing, Urban designing, Urban planning and so on.

Exorbitant fees in order to establish economic enterprises and also attention to communications and easy accessibility is because of importance of correct locating and determining the appropriate location for Entrepreneurs, in way that provide easy and quick using for most citizens of these firms 'Aldajani, 2009'.

In order to lacking of enough attention to location in economic decisions in one hand has large costs for economic enterprises and on the other hand has large costs for consumers, so the location-based science wants to provide optimal methods and techniques about determination and selecting the location of enterprises. This matter will be important for those economic activities that act as branch form. 'Shahrodi, 2011'.

Place distribution is as one of the most important elements of Marketing Mix and is important strategically. Recently, urban planners most of the time use of GIS as a powerful tool in order to evaluate the urban various issues about locating studies and researches. This system can show geospatial data, along with descriptive information; also it can save and do the quick retrieval of this information and is able to help to its users.

In this paper, researcher want to introduce the subject of this paper to Audience, in first step with using of related resources, related concepts and key definitions about paper, means locating, GIS, ANP which is combination of three different disciplines such as Industrial Engineering, Operations Research and Geography and then with using of library scientific references, studies on conducted papers in Iran and other countries.

II. THE MAIN ISSUE OF RESEARCH

Place distribution is as one of the most important elements of marketing Mix and is important strategically. Due to the uniqueness and not easily imitation can lead to a sustainable competitive advantage for economic firm. On the other hand, selecting a place is considered as a long-term decision, risky, complex and costly and implies commitment of long-term Investment. Because by choosing a location due to its fixed nature unlike other marketing mix elements like price, advertising and product diversity, could not change it easily.

This matter when is more sensible that population growth and consequent urban growth , increasing of location's cost and not equal distribution of population in different parts of the city be considered, "Goli, 2010".

It seems that multiplicity, extraordinary diversity and plurality of trade units and retail small enterprises in country provide increasing of related costs with goods distribution and its multilayer, so that price differences between the costs of produced or imported goods and the selling price of that goods to the final consumer, reaches to more than 25 percent in some products.

III. RESEARCH OBJECTIVES

The purpose of this paper besides explaining the concepts of GIS and ANP analyzed current operation of chain stores and at the end of the literature review focuses on research and previous research experiences. Also researcher wants to emphasize on necessary to develop a model that could establish equilibrium between population, distance and income levels and other relevant criteria on locating of chain stores in different parts of city and the number of chain stores.

IV. IMPLEMENTATION METHOD OF RESEARCH

Present paper is as form of descriptive – analytical method and is conducted based on library studies also with providing a theoretical basis and documents explanation through ANP with using of GIS that its sharing point with place element is in Marketing Mix, evaluates capabilities of the three fields such as Industrial Engineering, Geography and operations research order to locating the construction of chain stores.

V. CONCEPTS

A. Geographic Information Systems

Nowadays, using of new technologies can affect on adopted decisions by managers about urban planning, establishment of industrial, commercial and servicing centers and can affect on other sectors at national, regional and local sections.

GIS is one of the systems that are able to provide extensive information about above mentioned contexts for administrators, planners and its users.
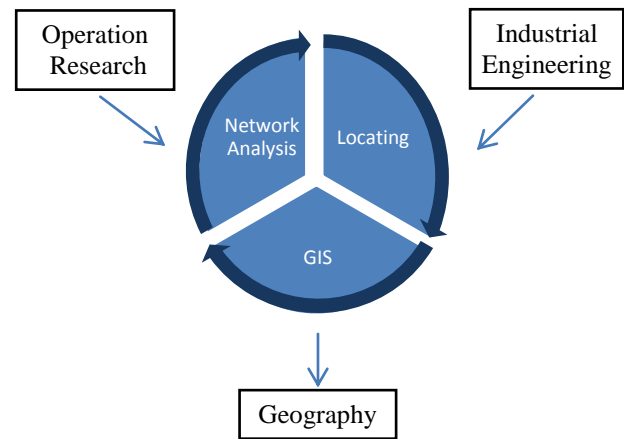

Figure 1 . Chart: The basis of present paper

GIS as science and management technology and analysis of spatial information is able to resolve many problems about locating with acceptable economic justification, 'Shad, 2009'.

A GIS is different information system that based on spatial and attribute data can create and modeling our around world.

GIS with helping of its powerful functions can cause to adopt accurate decision making and optimal management of resources and actions. It has business analyst, network analyst, spatial analyst, 3D analyst and many other tools for implementation and management of different integrated systems such as a complete business system, 'Taleghani,2011'.

In the not too distant past, only geography students and planners used of GIS. But today, various institutions and companies attempted to design some software in the form of these systems which are used about commercial applications also have many applications in the retail environment, 'Olfat and Focardi, 2005'.

It provides the ability to analyze different data, possibility to create and use of georeferenced data as different from with previous years. This means that not only it is possible to combine different data sets but also can combine different methods with each other. This system can control accuracy of changes then it can update the related maps and tables. Thus, GIS users can have the newest information and can use of them according to their needs, 'Sanjari, 2009, 11'.

Nedovic and et al (1996), explained that the reasons of attention to GIS by governments are:

1. Presentability, large volumes of process able data by spatial-base data

2. Position of information as a basic source

3. Trying to find more efficient ways to improve performance, 'James P and Hall, 2004'.

Since, GIS is used for collecting of different large volumes of data from different sources and is used in geographic

coordinate system, considered as an important tool about spatial analysis.GIS can be combined and simultaneously can use of Several databases By converting them into a common set of databases, 'Pettit&Pullar,1999'.

Totally, GIS by providing display and analysis of different data with together enables users to work with various data as much broader and more accurate, while they are impossible with traditional and analog methods. So, according to GIS capabilities, this system can be use in the fields of urban planning, urban designing, crisis management, participative management and creating a spatial database in the field of urban management.

GIS has capabilities such as market analysis, customer analysis, competitor analysis, concentrated marketing (advertising), planning for development the activities, selecting of location for establishment of new branches, supervision on branches performance, customer relationship management and management of distribution system between branches so on, 'Jafrullah, 2003'.

1) Definitions of Geographic Information Systems

Usually each scientific field is characterized by a set of definitions, but in the case of GIS, definitions are not so clear. Therefore, over the years, different definitions are provided according to necessity, also it is not surprising that GIS can be defined in many different ways, because each definition depends on application type of GIS in specific field, 'Rostami, 2010'.

GIS stands for Geographic Information System.In a GIS, geographical term is defined as position of data topic, according to geographical coordinates 'length and width', and information term shows that data in GIS are organized not only as maps and color images but also are as statistical graphics , tables and display replies for providing useful knowledge in order to practical searches and the term of system indicates that GIS is made of several interconnected and dependent on each other parts for various functions.

Peter Burrows in his pioneering book has been defined term of GIS as powerful set of tools for storage and retrieving of data that through that change and show the spatial data from the real world for particular purposes, 'Rostami, 2010'.

According to Jack Estes and Jeffrey Star information system, GIS is defined as designed information system for working with data which their reference is specific spatial location or specific geographic coordinates.

Douker's definition of GIS is as one of the most enduring definition from the perspective of information systems.

Nick Chrisman explained that GIS is organized activity which people by that measured geographic phenomena then transferred these images into other forms, 'Rostami,2010'.

Also there are other definitions for GIS in some resources as follows:

-GIS can be defined as organized collection of hardware, software, geographical data and personalized designs to retrieve the stored data, updating, changing, analyzing and display all forms of geographic information, 'Wiley, 1995'.

-GIS is as powerful technology for visualization of spatial information for various applications, James P. Hall, 2004'.

-GIS is set of powerful tools to store and retrieve information in the future, transforming and displaying spatial data from the real world, 'Burrow, 1998'.

-GIS consists of organized collection of hardware, software, geographical data and skilled manpower which is designed and created in order to obtain, save, updating , processing, analyzing and presentation of all forms of geographic information, 'Shaali, 1999, 169'.

Huxhold & Oineshoven(1995) believed that GIS is a set of information technology, data, collection procedures, storage, analysis of maps and descriptive information about characteristics which can be presented on maps, 'James P . Hall, 2004'.

2) History and evolution of geographic information systems

History of new science of geographical information refers to many times before. There were multiple maps from centuries ago and in the last century thematic maps were created. Multi-purpose maps emphasized on topography, geological formation and complications related to transportation. While thematic maps provided information about phenomena such as geology, land use, census areas so on. Although both maps are used in GIS, but thematic maps guided cartography toward GIS, 'Rostami, 2010'.

Jecklin thyroid published a book with title 'urban and rural planning' in 1950 and was mentioned that for combining various data on a map then should draw a map in same scale for each characteristics of a map. Thus, despite previous efforts in this area score of synthesize technique of data layers was named as thyroid, ' Rostami, 2010'.

Waldo tobler published an article in Geographical Review in 1959 and presented a simple model for computer applications in cartography.

His model consists of three phases: map input, controlling and manipulating the map and the output of map, and these three steps be as first foundations which form stages of data analysis in GIS.

Over the years, many programmers have been done writing computer programs for mapping and the mapping operations foundations flourished by computer in the 1960s, 'Rostami, 2010'.

For the first time working on the first GIS began in the mid-1960s in United States. In these systems were used of aerial photographs, agricultural information, forestry, soils, geology and related maps. Also Canada GIS was developed in these periods. In the 1970s, with development of science and possibility of access to computer technologies and required

technologies for working with spatial data, GIS was formed for providing ability to analyze large volumes of geographic data.

Since the beginning of 1990s was conducted extensive development in the field of GIS analysis functions. Besides, the possibility to connect to other software was created about GIS products and modeling and programming facilities which there are in some programs, makes it possible to integrate the obtained analyzes with other areas, 'Haywood 2002,'.

In recent decades, due to expanding of computer technologies, GIS provides some facilities such as keeping up to date Geo-referenced data also provide possibility of combining of different data effectively. Nowadays, GIS is used for scientific investigation, management of resources and reserves, also development planning.

Nowadays with advent of internet and e-commerce, GIS is integrated with GPS and images with satellite power with very high resolution is converted as general and common reference for GIS data and many authors speak of a new era of trade geography 'G-commerce' which is built based on network's search features and displayed something far beyond a simple map, 'Rostami, 2010'.

National mapping agency was first center in Iran that began using of GIS formally in country which according to act of Parliament in 1990 was responsible for implementing this plan. In January 1993 the National Council of Users of GIS was established and its aim is policy, planning and coordination of activities about GIS, requirements analysis and utilization of scientific, technical and human resources capacities for creation and application of GIS according to task of country's mapping agency about establishing of national GIS. Also about GIS establishment project was started in April 1992 in the Ministry of industries and Mines and now this system is used widely associated with its activities. Tehran Municipality, Department of Housing and Urban Development, Ministry of Agriculture, International Institute of Seismology, Earthquake Engineering and Forest and Rangelands organization use of this system.

3) Necessity of using geographic information system

Today's world is the world of information and their optimal management. Since the vast majority of decisions by managers and planners in different civil and environmental projects are somehow related to a specific position and place in fact have Geo-referenced Nature. Existence of accurate, reliable and timely geographic information also its optimal management is as fundamental issues about successfully of these decisions and their implementation.

GIS as a system with possession spatial and descriptive data also powerful management of databases can do various analyzes on Geographical features and according to its graphic characteristics establish communication with its users, 'Rostami,2007'.

4) Components of geographic information system

Based on above definitions also according to researchers' idea the components of a GIS are introduced as follows:

Burrows introduced GIS combination of three elements, 'computer hardware, models of application software and appropriate organizing structure.

Geographic information systems are composed of five components which include hardware, software, organized information, specialist persons and methods of working, 'Parhizkar, 1997, 6'.

All these components must be in balance till system being successful and each part are related together till can be effective and efficient.
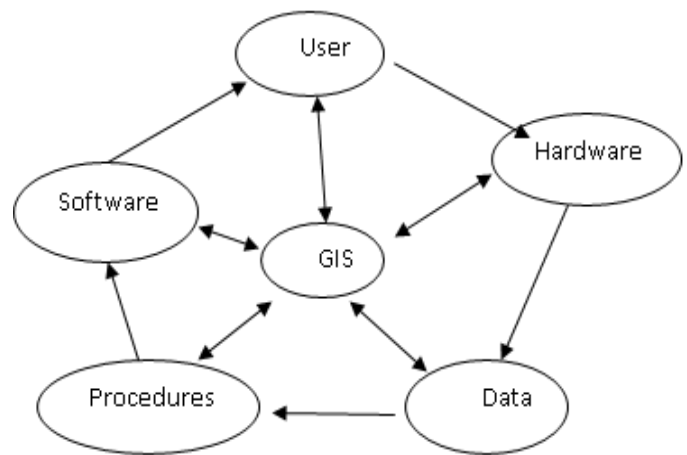

Figure 2 .components of a GIS

5) Variety of data in geographic information system

Magier 1989 introduced data as most important part of GIS also believed that virtually none of the elements like computer systems, data and processing tools did not operated separately in GIS and are important equally, 'Haywood ,2002, 13'.

The data consists of a set of symbols that are qualitative or quantitative, 'Wersing&Noling,1975'. Perhaps the maximum time and most expensive activity is creation of database in about creation of a GIS. The errors in the database could spend long time and high cost for implementation of GIS and have problems in conclusion of GIS analysis. Data must be relevant, timely and accurate.

Types of data in GIS systems can be divided into three categories:Spatial Data, Graphical Data and Attribute Data, 'Aghajani, 2012'.

6) Process of data analysis in geographic information system

GIS is a computer system that provides four basic capabilities in about Geo-referenced Data:

1. Data input.2. Data management.3. Data processing and analyzing .4. Data output

The following figure shows the relation of these components in the overall system.
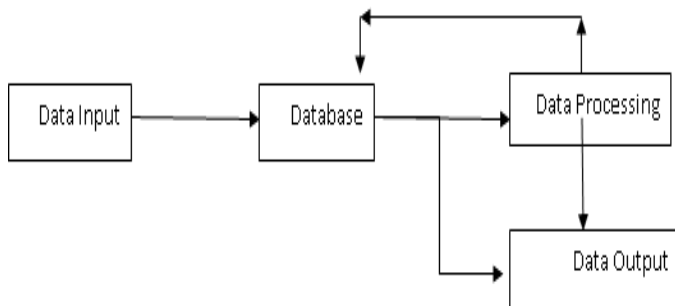

Figure 3 . relation between GIS components

7) Applications of geographic information system

In today's world, using of GIS has progressed that even before imagine that seemed difficult. In recent years it was said that wherever issues are in field of geographical then we need to GIS, but now we can see GIS application in about social issues, and even medical. It is obvious that cannot define specific application for GIS which determines limits and boundaries for using of GIS.

Existence of powerful analytical functions in GIS have caused this system be useful in various fields such as environmental, crime analysis, crisis management, transportation, demographic studies, management, commercial, urban planning and so on.

Nowadays apart from initial application of the GIS in geography which established the emergence of this system, other applications, such as determination of the best location for new commercial and service centers or the most appropriate location for a fire station, parking and buildings with different functions and so on that is achievable in GIS with using of locating analysis.

The other usages are mention in below:

a) GIS usage in urban management

Urban management is defined as management of city affairs in order to promote the sustainable management of urban areas and at the local level with considering national, economic and social and policy objectives.

Nowadays city managers are able to make decision easily with using of new information systems such as GIS, while decisions having very high confidence coefficient because it

supported by a very strong intelligent system. Hence, according to the capabilities of GIS , this system can be use in the fields like urban planning, urban designing, crisis management, participative management and creation of a location database in the field of urban management, Talebi,2011'.

b) GIS Applications in Marketing Management

The value of information technology and GIS about business and marketing industry never has been more significant than today. Equally, small and large businesses can consider GIS as essential analysis and inevitable tool about various choices, analysis of market areas, management of selling regions, clients, sales and services routing also codification of commercial strategies.

Businesses must manage a world of information and use them. This information includes a geographic location, an address, an area, service area, locations for selling and delivery paths which can be seen on a map and analyzed.

GIS can be integrate with trade, business, census data, geographic and customer data and thus creates programs that can be used across an organization completely via the internet. This system maximizes capital return on program that has and is about GIS applications which includes best sites, showing of customers' performance, analysis of markets range, updates and management of asset in real-time, embedding and creating services based on location for customers and has the following capabilities: customer analysis, market analysis, selecting of location and management of selling regions, 'Taleghani, 2010'.

c) GIS applications in transportation and distribution management

Today, GIS has many applications in transportation engineering trends. The correct and appropriate designing and planning about transit network of goods' transportation caused saving of funds also investment. Finding the shortest path or a path that is economically advantageous is as GIS capabilities. Also this system can help their users in data modeling of traffic, management of highway transportation and analysis of road accidents, 'Tamer Tash, 2007'.

d) GIS applications in Crisis Management

The role of spatial information and related technologies is well known about risks management around the world. Identifying the risks that exist in a region and parts of the areas that which have highest risk is very important. Because in this way can plan for preventing events that create a lot of damages that this matter can be easily done by GIS, 'Tamer Tash,2007'.

e) GIS applications in banking

The banks' successfully depends on data management and customer relationship management approach in today's competitive market. The Banks manage related info of customer. Therefore, banks can add a component called "location" to their database then they can gain numerous benefits in many areas, also planning with in combination with geographic modeling would result in tangible benefits for banks.

GIS can help to banks through supporting in decision making and strategic planning in areas of market analysis,

customer analysis, competitor analysis, centralized marketing, business planning, locating new branches or ATM, monitoring the performance of branches, supporting the decision making for strategic planning, management of bank asset, retail banking services, constant monitoring of cash at ATM, fleet management of money supplying to banks,'Asadi, 2010'.

f) GIS applications in military

Today, the importance of weapons in developed countries is based on technology and information technology. In this period, production, conversion, transmission of information also their management while it is considered very sensitive and important matter, are very complex and difficult. So that Persian Gulf War was forces' technologies War against each other. One of the main tactics is intelligence operations and against it of their own forces and enemy forces that should be updated, fast, and correct and interpretation. Because has essential role in successfully of a battle. Modern weapon systems will be able anticipate the time of enemy attacking and provides accurate details for own forces. This matter lead to victory over the enemy with less cost which shows importance of proper spatial information and level of their application in order to planning and martial operations command, 'Rafei, 2007'.

8) Advantages of using GIS

1. High quality of data analysis and ability to analyze them with advanced methods

2. Management and rapid change bout large amounts of data in various fields

3. Better and newer methods for preparing different maps

4. The possibility of between different complications and connection of large volumes of data in information tables

5. Reduction of time, cost, materials, labor and its money-making

6. Widespread using of geographic information systems in various sciences

7. Managing and organizing a wide range of geo-referenced data

8. Quick updating and collecting scattered information

9. Possibility of reviewing the methods

10. Modeling, hypotheses, experiment and prediction

9) The structure of spatial models in GIS environment

In a GIS its model is very important. A data model consists of collection of constructs in order to describe and introduction part of real life which are selected for surveying.

In GIS environment to display variety of models such as point, line and Polygon should use of one of the Vector model, Raster model and Triangular Irregular Network ,to show related complications to the real world. Each of these models has advantages and disadvantages that are selected based on the nature of spatial effects, the ultimate goal of researcher and software facilities, 'Rostami, 2007'.

B. Multi-criteria decision-making models

One of the reasons of some people or organizations' successfully is using of suitable methods for decision making. All persons at different their times about working or individual and social life, always consciously or unconsciously decide to choose one option among several options, although this kind of decisions is not so important because of its normality, but if domain of decision be enter into the management scope of an organization, so it will be so important and the smallest decision can cause great results, good or bad for any organization.

Using of Multi-criteria Analysis and evaluation in management sciences particularly in strategic planning has relatively long history and its techniques while is various also is developing.

From 1980s onwards using of techniques such as Decision Analyze, Multi attribute utility theory, Multi Criteria Decision Making , Social Judgment Theory, Multi-criteria Decision making have considered in science planning and regional development, 'Tofigh, 1993'.

Models of Multi Criteria Decision Making are divided into two general categories:

- Multi Objective Decision Making: Generally, Multi-objective models are used to design options.

- Multi Attribution Decision Making:In these models, are considered selecting an option from among the options .Totally, Multi-criteria decision making is refers to special decisions like evaluation, priority setting or choosing from the available options.

The main difference between multi-objective decision models with multiple criteria decision making models is that first model is defined in continuous decision-making space and second is defined on discrete decision-making space.

1) Analytic Hierarchy Process

Analytic Hierarchy Process   is one of the most popular techniques of multi-criteria decision making that for first time invented by Thomas L.Saaty in the 1970s.This method is using when we are on decision-making while it is face with several competing options and decision criteria. The mentioned criteria can be quantitative and qualitative. The method of decision-making is based on paired comparisons. Decision maker starts by providing a hierarchical decision tree. The decision hierarchy tree shows comparison factors and competitor options in a decision. Then a series of paired comparisons is carried out. These comparisons determine weight of each factor in order to competitor options. Finally the logic of AHP combines resulting matrices of paired comparisons with together which will achieve to optimal decision, 'Memariani, 1995, 22'.

AHP method has the following three principles:

1) Analysis principle: It is necessary to divide issues to its smaller components.

2) Comparison principle: The constituent elements compare with together.

3) Obtaining the relative importance :relative importance of affecting factors on issue will be achieved through a matrix of paired comparisons. After that relative importance of these factors merged with each other, till the weight of available options are determined, 'Olsen, 2008'.

2) The analytic network process

The analytic network process is as one of the newest techniques for multi-criteria decision making. It is developed technique of AHP technique, which make it better with replacement of "network" instead of "hierarchy", 'Azar, 2002'.

The ANP was proposed by Saaty as a viable alternative for AHP in 1996. This model is able to management and control interdependence status between the components and within network, 'Lee, 2005'.

Over the years, ANP method is a comprehensive and multi-functional about decision-making that is widely used in solving complex issues of decisions-making.

Now can refer to some applications of this method such as deciding about America's war with Iraq in 2002, Strategic Planning, Technology Management, Economics and Finance, Forest management, Civil Engineering and Highway Planning. This model consists of control hierarchy, clusters, elements, relationships between these components .Hierarchical of controlling network analysis model is as important criterion for comparing any type of interaction in network. In the process of network analysis measuring the relative importance amount is done like AHP with paired comparing also with helping range of 1 to 9 that 1 shows equal importance between two elements and 9 shows extreme importance of one factor over another factor, 'Faraji Sabokbar, 2010'.

a)   The difference between analysis network process and analysis hierarchical process

Each of the methods that are used in multi-criteria decision-making models have certain characteristics and limitations and cannot use of them in all issues about decision-making. Some of criteria for selecting the appropriate method are impact or lacking of impact of these indicators on each other, being qualitative or quantitative of these indicators, being positive or negative effect of them, access or lacking of access to relative weight of indexes, necessity or lacking it to obtain information from decision maker during solving process.ANP is used for solving problems where the parameters are not independent. This method can overcome on one of the AHP limitations 'independence criteria Assumption', 'Faraji Sabokbar, 2010'.

AHP cannot measure dependency between factors. Because this method considers factors completely independent about each other and it not appropriate for assessing the impact of internal factors. But the ANP method is able to measure dependence between factors so well, 'Najafi, 2010'.

Although scale of relative measurement based on paired comparison is used in ANP method, but like AHP method does not impose hierarchical structure to issue, while it model decision with using of Systematic view with showing feedback. 'Saaty, 2007'

Designing of network in ANP model is much more complex than designing of hierarchy in ANP, because domestic and often bilaterally between the criteria and options should be considered carefully and identified.

There are some differences between ANP and AHP, although both of them adopted priorities by doing paired comparisons. The first difference, AHP is a special case of ANP, because ANP considers interdependence and external dependence. Another difference is that ANP has non-linear structure. Generally, model of AHP is as framework for decision making which considers unilateral and hierarchical relationship among decision levels. But ANP does not need this hierarchical and public structure, 'Alam Tabriz, 2009'.

It should be mention that network designing frequency depends on experience and designer understanding of issue and complete knowledge about various aspects of that issue plays an important role in designing process. While in designing the network can use of experts' comments.

b)   The model of analytic network process
ANP comes from a combination of four main steps:

1) Establishing the structure of the model and issue

2) Forming paired comparison matrix and Priority vectors

3) Super matrix formation

4) Choosing the best option

c)   Relation and correlation in analytic network process

This stage makes up the most important part of decision making of network analytic. After determining of network categories they must be connected to each other that this connection will be based on the relationship between their internal elements.

The logic of ANP is based on this matter that could enter the relationships and impacts of criteria and categories on each other into the issue. In this step should determine each element within a group to other elements which are effective either within the same group and the other groups and attach origin element to those elements.

Generally, can be existed two types of primary dependence in any network:

1. Dependency among clusters so that each cluster can has interaction relation with other cluster in each level of decision making.

2. Dependency between clusters of elements such that each element in each cluster can has interdependence with all the elements in other clusters also elements of a cluster can have interdependence each other.

d) Consistency in judgments

In this model there is possibility to determine the reasonableness level of conducted comparisons. In other words, with calculating an adjustment rate can evaluate consistency rate of conducted comparisons on elements. If the compliance rate be less than 0.1 so comparisons are accepted as consistent comparisons, 'Azar, 2002'.

C. Locating Theory in Geography

Find the most optimal place for business, is a broad area in Geography that is done many research about it. Many of the basic ideas and presented theories in this respect belong to before 1900. Central Place Theory forms foundation key for Urban Economic Research.CPT   indicates that way for detection of spatial structure of an area is considering to important features such as size of place, traffic levels, economic activities, size, shape and spatial arrangement of the market area.

1) The concept of locating

Locating is as an activity that analyze capabilities of a region about appropriate and sufficient land and   its relationship with other items in urban for selecting an appropriate location for specific application,'Karimi, 2003, 9'.

Locating in earth sciences, is operational that specialists by providing needs , objectives and available data such as traffic, economy, sociology, psychology, geography, geology, meteorology, biology to experts and collecting them in about his comments and objectives seeks to achieve the best selection of available options for considered application, 'Fazelnia, 2010'.

2) The importance of locating

From the end of the last century, civilized man realized that for economical and continuous exploitation about land, it is better implement exploitation process in a planned framework, 'Makhdom, 2008, 15'.

The planning of facility which is as an important issue in industrial engineering and industrial management contains two main parts such as placement and designing. Decision making about location of manufacturing or service institute is one of the most important organizations' decisions that can has important role about strategic orientations of organization and affects on organization's profitability in the long-term. So that if appropriate investigation does not consider in about selecting the location, it is possible reputation or structure of organization be threatened in the long term, 'Amiri, 2010'.

3) Locating in Chain and big stores

Chain store is called a set of shop units which supply much of the public needs with reasonable prices with managed relationship by using a single management, 'Mahmoudi, 1996'.

Chain stores refer to stores which supply goods to customers with under the centralized management in several stores. The minimum area for selling in multifunctional center

shops or chain stores in cities is about 1000 square meters and other shops is about 300 square meters.

The big stores refer to shops which supply a set of product groups which are needed for all people in large-scale and suitable space. The minimum area for selling in large stores in cities such as Tehran, Mashhad, Isfahan, Shiraz, Tabriz, Ahvaz, Rasht and Karaj is 500 square meters and in other cities is 250 square meters.

The history of establishment of modern chain stores in the world is about the mid 19th century and in United States of America. In 1859, first branch of chain stores A&P was opened in America. At the same time the chain stores extended from retail stores and Arzaq to other areas and quickly formed about sectors such as distribution of tobacco, drugs and restaurant.

The main reason of chain stores' lucky was not great variety of goods or services that can be presented, but their lucky was relatively low prices of goods in this shop that was acceptable to consumers. Because of that, the chain stores attempt to establish storages and distribution networks and their packaging units for maintaining its competitive advantage means low price. Until with integration of goods supplying could reduce the costs and increasing in competitive power about prices, 'Farhat, 2011'.

Growthing of chain stores began in the early twentieth century in developed countries. Also in developing countries was formed movement as the "supermarket revolution" from early 90's that actually refers to establishing and expanding a variety of modern retail includes chain stores in various forms such as supermarkets, hypermarkets and other retail stores.

4) The Current theories in locating

The locating theories attempt with extraction of general rules which based on influence factors and variables on locating of existing structures explain locating of industrial and commercial activities and introduce the best places.

a) System theory

Any functional in the city and region requires certain space. The mode of this spatial arrangement of these functions should be as form till has maximum efficiency and minimum adverse effects on the environment, because the purpose of this arrangement and spatial distribution is achieving to desirability stage and justice or in fact can be three principles of urban planning, comfort, beauty and health. A city or an area can be assumed as system that consists of several subsystems and there are relationships among it.

Urban planning finds these relationships between systems and sub-systems and their effects on each other for desirable planning for future of these spaces. So to achieve this goal, any planning should have systematic vision to city and urban issues.

b) Actors theory

According to this theory, groups that their idea is important about service place and are defined as Beneficiaries are

considered and based on their comments the value of factors is determined, 'Babapour and et al, 2010'.

c) Theories and models of locating

The gravity center of locating theories refers to Germany. The oldest locating model belongs to 'Safel' in 1878 that presented his theory based on gravity model.

Generally, governing principle in locating theories is determination of optimum location based on less cost approach. That is location where gain most benefit from cost reduction.

Lanhart is founder of this kind of attitude. He tried to show the manner of optimal locating in simple condition with using of two sources, raw materials and a market. He believed that optimal location is a place which on it the total costs of transportation of raw materials, produced goods and fuel sources be minimal. Alfered weber was as first person who had helpful and complete studies about theory of industrial locating. His main idea was that the owner of enterprise will select a location that minimized production cost. Also he believed that three factors are effective in locating, the cost of transportation, and the cost of labor and forces which causes concentration or dispersion. He named two factors transportation and labor costs as area's general factors and third factor as local factor. He said that his opinions basis is cost minimizing.

After the Second World War , some theories were raised which relied on the market. Market area analysis is as one of these theories. Because buyers scattered in the country and density of customers is different from one place to another, therefore, industries will be deployed where have more applicants. For this reason, some experts consider market factor as main factor in industrial locating. August losch German economist found that optimum location for industries is a place which has most usefulness, where incomes are higher than the costs. Losch is as those who know an optimal location as a function of market demanding.

Minimum , Maximum theories are third process in locating theories and its inventor is Green hat .He belives that optimum location for the establishment of industries is a place that costs and revenues are farthest from each other. In process of studying on locating theories, we consider substitution analysis .It means that with recognizing the production factors can do replacement of these factors with aim of minimizing these factors. Also in this process, we can see using of linear programming in locating which evaluate industry in different locations and will select the best, 'Tolaei, 2000'.

5) using of geographic information systems in locating

By using of GIS can select suitable location for facilities and urban equipments or others in way that with minimum cost, obtain to maximum utilization of available resources. GIS is designed for discovering appropriate or inappropriate places. Actually, GIS is very effective about management and planning of service centers.

Retail organizations need to plan for complex consumption market, prediction and rapid response to competitors in a dynamic and uncertain environment. This competitive nature of the retail organization has led to use of GIS and its applications in about strategic decisions, 'Davies and Clark, 1994'.

The experience of United States suggests that effective use of geographic databases, and development of decision support system is becoming an important source of competitive advantage for some retailers that discover provided information opportunities by GIS technology for its business methods than others. Then, they combine simultaneously obtained data from different sources to improve the decision support system, 'Birkin, Clark and Clark, 2002'.

6) GIS Methodology for studies of retail locations

Currently, several technologies are available and usable widely to analysis the spatial structure of retail activities with location information in small-scale. These technologies are Probability Density Function, Decision support system, Spatial interaction models, Hough Network model, Analysis of Variance, Matching algorithm, Evaluation of Industrial Site ,Integrated model of space – time, Retail travel expenses and so on, 'Duggal, 2007'.

Probability Density Function of Retail stores used for analysis of retail space. Sadahir investigated validity of this method by using its test also with location data of retail stores in Yokohama.This method helps to measure density level, spatial patterns, the relationship between size and performance of the retail, analysis of the spatial structure of the retail density, 'Duggal, 2007'.

Hough Network model is formulated based on a network with shortest distance for retail expansion, according to the Euclidean distance,' Okabe&Okunuki, 2001'.This method is used for estimation of retail stores demanding on a street network in a GIS environment. The advantage of this model is ability to significant dividing of studied area in a series of commercial areas for supporting business retail operations.

Evaluation of industrial Site is a decision support system according to knowledge-based also according to decision tables that can be use by industrial decision makers and planners to evaluate the suitability of spaces potential,' Witlox, 2003'.

Witlox explained that a relational approach can be implemented for modeling the proper concept of site also he is trying to find all possible locations in responding to the requirements of spatial Production based on Enterprise's features.

Urban and economic geographers' growing interest in using of KBDSS and Integrated Systems largely attributed to development of computer Systems. Computers are able to save, organize, processing large amounts of data also availability and specific knowledge in the field of space issues.

Wit lox has been identified three major categories of effective locating factors that have greatest influence on decision making.

Three conditions such as site environmental conditions, investment and considerations are operations that form decision tables of MATISSE.

D. The Process of a project implementation

Comprehensive processes of a project implementation in GIS environments are as follows:

1) First step: Identification of goals
At this stage, the following questions should be considered:

1. What is the problem which can be solved?

2. How this issue should be solved?

3. Is there any way to solve this problem by using GIS?

4. What is the final product of this project?

5. Who is the audience for this product?

6. Can use of data for other purposes?

This step is very important because it determines answer to these questions about project and its implementation.

2) Second step:. Creating of project database
Creating of a project database is vital and time consuming activity. Precision, accuracy and adequacy of used data in the analysis determines the accuracy of results.

Database designing includes identification of needed spatial data based on analysis requirements, determination of required characteristics of complications, determination of studied area and selecting a coordinate system.

Standardization of data includes digitization or converting data from system or other formats to usable format, data recovery and evaluation the accuracy of data finally data correction. The database management includes evaluation of coordinate systems and annexation of adjacent layers.

3) Third step: Analysis of Data
Data analysis in GIS is providing of map till creating complex spatial models. The model is used for simulation of a process, prediction of results or analysis of issue. Spatial model includes using of one of the three main functions of GIS on spatial data. These functions are:

Geometric modeling functions including distancef calculation, buffer production and calculating the area and perimeter

Adaptation Modeling Functions include overlapping of data for finding locations that amounts are coincide on each other.

Exposure modeling functions include resource allocation, routing and segmentation

4) Fourth step: Showing the results
In this part, the final product must be able to communicate well with the audience and transferred results to him. In most cases, the results of GIS analysis can be displayed on a map. Charts and reports are others methods for presenting the results. Charts and reports can be printed separately or can be placed on the map.

VI.   RESEARCH BACKGROUND

Locating is done from the beginning of deployment of intelligent people on the ground for better access to food sources, finding a ambush place about hunting and war, providing shelter and workplace, but using of modern and scientific methods in the past century, especially after World War II with progress in mathematics and advent of computers has become more development,' Hadizadeh, 2011'.

Locating theory for the first time invented by "wantonen" in 1826 AD in the field of agricultural activities. The first scientific framework of this theory introduced formally by Alfred Weber in 1909.He studied on locating a warehouse unit with purpose of minimizing the total distance between warehouse and set of customers.

Dasken and Owen (1998, 1999), offered an overall assessment of facilities locating models that had great similarity with the work by Daskin 1995 and Drezner 1995.

Over the past three decades, major developments have done in about spatial data analysis, data storage, retrieval and mapping,' church, 2002'.

In recent years, many researches in the field of spatial analysis or locating are done which are found as in the form of books, articles, theses, master's and doctoral also include many issues in different parts, installations and urban equipment, training centers and treatment centers which generally are classified in six areas such as: Manufacturing, Industrial, Commercial, Financial, Entertainment – Sports, administrative, Cultural and service. Although locating of chains stores is running in developed countries based on an undeniable principle by investor organizations, so that there was not much research regarding locating of retail centers by referring to credible foreign databases over the past 5 years. And it seems that this issue has become as an axiomatic in advanced societies. But unfortunately, there is not any considerable research about locating of chain stores in Iran, just there is one research with title 'space – spatial performance of chain stores in Tehran' that conducted by Dr.Ali Mohamadi in 1996.

It should be noted that during reviews on previous researches was observed that using of multi-criteria decision making techniques and GIS software in researches about locating of sporting venues, parking, service centers, banks, library, landfill centers, fire stations and so on are performed in Iran over the past decade that this matter shows attention of researchers about using of this technique in these areas.

Ghodsi Pour and Obrin in a research presented a nonlinear programming model of Mixed Integer for solving selection of

supplier in the case of multiple sourcing which considers the total cost of logistics.

Kumar and et al used of Fuzzy goal programming to solve the seller selection with multiple objectives and fuzzy parameters.They applied of real-world data to demonstrate the effectiveness of the proposed model.

Klimberg and et al (2007), studied on developing and testing a method for modeling of locating issues which used of envelopment analysis data DEA and performance criteria for finding an optimal location and comparison of performance of different places. The authors argue that considering the DEA efficiency criteria with other purposes and locating models creates a very efficient and powerful method also multi-objective for locating matters.

anut and Soner (2007), presented a model of fuzzy multi-criteria decision making in order to select optimum location of transport equipments. They argue that is presented various multi-criteria techniques for locating matters which only with using of definite numerical values do the options ranking and consider on qualitative and subjective aspects of decision-makers about these kinds of issues very less. They presented a fuzzy multi-criteria decision method with using of TOPSIS and AHP techniques which by using of linguistic variables are considered subjective preferences, qualitative criteria of decision makers during solving the issue.

Chou and et al (2007) provided a new fuzzy multi-criteria decision method for selecting location of manufacturing facilities. This method ranks the options in condition of group decision-making with considering both quantitative and qualitative criteria. The proposed method considers importance coefficient about each members of group.

Nozick and et al (2001), presented a model for optimizing the location for holding the stock for certain products in multi-product and two level systems. Proposed model integrated and coordinated above decisions for analyzing the locating of distribution centers.

Rodriguez and et al (2007) provided a model for locating the centers in the marine transportation matters. The studied centers were limited about capacity in the proposed model. And therefore, the cost of increasing workload of activity centers is mentioned in the model.

Rivoli and et al (2007), presented a locating model for reducing the number of required facilities centers that wanted to minimize the amount of missing share of market.

Fernández, D.S and et al (2010), conducted a research with using of combination method of GIS and Multi criteria decision analysis for zoning about flood dangers in urban areas of Tucuman in Argentina.

Tims Willem, (2009) had comprehensive study for development of comprehensive plan about land use in Rwanda with using of GIS and AHP model.

Taleai M and et al (2009), developed combination approach as other form about matters of Geology in 2009 with using of GIS and AHP combination approach with SWOT technique.

Hossain, M. Shahadat, (2009) comprehensively used of GIS and analysis of multiple criteria for development of urban areas in 2009 in Bangladesh.

Chen, Y.; Yu, J. and Khan, S., (2010) used of Multi Criteria AHP in order to analyze the spatial sensitivity and GIS for evaluation of making the land appropriate.

Vahidinia and et al, (2009) studied on locating the hospitals in urban areas with using of Fuzzy AHP and GIS.

So, there are some domestic and foreign researches about Commercial- financial area as the table:

TABLE I.   SUMMARY OF FOREIGN RESEARCHES

Findings and conclusions	Methodology	Title	Name of researcher	Year
Criteria such as location, visibility, the area of location etc is considered	This store focused on locating in order to develop its branches	Locating laws of Hallmark	HALLMARK GOLD CROWN	2008
He did locating on that center by using of locating appropriateness indexes, accessibility, cost, compatibility, and so on	The researcher proceed about spatial analysis and locating the regional economic center	locating the region's economic center	Hovee & company LLC	2007
The researcher believed that about environment which is changing, selecting of a place can has important role about success or failure of a retail store.	The researcher stated that used of genetic algorithms methods and Veron chart in order to select a location for development of new stores. Most recently is used of GIS in about decision-making process of retailers.	Assessment of retail space	A. B. Mendes	2004
The researcher stated: Factors such as population, economy, competition, access to the shopping center and cost are effective in determining the location retail stores.	Empirical evidences that were presented in Portuguese about Forty-Third Congress of the European Regional Science Association	Macroeconomic factors in selecting of retail place	J. Cadima Ribeiro and et al	2003
The researcher believes that although the analysis techniques that are available about 50 years but most retailers do not use them.	He pointed out that locating techniques can be divided into two categories: scientific and artistic	The art and science of decision-making about selecting of retail location	TONY KERNANDEZ and et al	2000
The researcher stated that selecting the place is very important about its retail due to high investments and long-term which are needed. The results in this model show that the proposed system is able to provide a very good solution both in accuracy and speed for senior executives.	This study was adjusted in order to develop a decision support system with using of fuzzy theory which was done by AHP for location of new store.	A decision system for locating of retail	R.J. Kuo	1999
Researcher divided the locating theories for retail into three categories and believes that MCDM technique which was used for locating then as only is not efficient enough, so used of combination of GIS and MCDM for locating.	In a research, based on retail site selection by Using MCDM technique in GIS studied on Jewellery Precious and ornamental in Toronto	Retail locating with using of GIS, MCDM technique	Shawn M. Kates	1997
The researcher believed that using of information from databases and GIS as helping in retailers' strategic decisions is effective.	This research conducted in 1995 with a questionnaire consisted of key criteria in retail from a stratified random sample. The questionnaire was sent to 110 companies that 33% of respondents answered the questions.	Retailers using of Geographic Information and other data sources	Lisa O'Malley and et al	1997
The researcher stated that customer prefers, instead of buying just in a shop, buys from several different stores by spending more time and more distance. So shopping from different shops is very attractive for customers without any consideration about time and distance.	In a research with title 'supermarkets locating in UK, divided the locating theories are in four categories: Central place theory, spatial interaction theory, Theory of land value and The principle of minimum differentiation.	Locating of supermarket in England	Richard M. Clarkson and et al	1996

TABLE II.   SUMMARY OF DOMESTIC SIMILAR STUDIES

Findings and conclusions	Methodology	Title	Name of researcher	Year
They stated that being in suitable place and attraction for visitors are as necessary factors for successfully of shopping center and in the next step they introduced access, sales potential and growth potential of the region as effective factores.Also they believed factors in the designing of commercial place, advertising are important about successfully of shopping center.	In this paper, the first part is about the concept of shopping centers and a variety of shopping centers then presented necessary conditions for successfully of shopping center	Designing of shopping centers	Shirazian,M - Rohani,S- Kamranpour,N	1994
Research announced chain stores in Tehran have random distribution and distance variable does not consider about their locating. There is no equilibrium especially in eastern regions of Tehran, Distribution about population, area and number of stores.	He studied on correlation between the number of chain stores in each of the areas due to population and area of regions with providing a model that represents the relationship between population, distance and level of income of Tehran's twenty regions	Space – spatial performance of chain stores in Tehran	Mahmodi,A	1996
The researcher concluded that the distance between successfully of a desirable and successful stores and current status of chain stores of country is partly large. It means that authorities should pay more attention to this field till could have an active role in about product distribution.	In this paper is explained some of chain stores' main features in comparison with normal retailers also their social benefits.Aftar that is described factors and conditions that provide growth and success of these distribution institutions.	Chain stores, advantages and disadvantages	Mortazavi, M	2001
The results indicate that Isfahan as one of the five largest cities in the country is lacking of fruit and vegetable markets that be locating as scientific basis. And day markets of this city do not distributed due to population and zoning of Isfahan. The current markets only provide 10% of needs of population in Isfahan. So 42 market days are predicted proportional with needs of the population in Isfahan.	She used of AHP for locating day markets and appropriate locations for market day of Isfahan were determined.	Analysis and locating of fruit and vegetable markets in Isfahan	Bande ali, M	2008
A plan was presented for identifying the location and Construction of multi level parking in Qom, in order to answer to needs of citizens and travelers which is usable in the Department of Planning and Architecture and Department of Traffic and Transportation of Qom, Department of Housing and Urban Development of Qom	In this study, the effective measures in about locating of parking prioritized by weighting method of ANP, overlapping of layers was done with using GIS and final analysis for achieving to goal is done in ArcGIS software environment till reaches to final map of parking locating in Qom.	Locating of multi level parking in Qom with using of Multi-criteria analysis	Zamani,V	2009
In this study, cost and benefit of each of the proposed places was calculated with using of Goal programming model. And the most appropriate locations and number of devices was determined for coverage studied area.	This article as a practical research with using multi criteria decision and with using of AHP and spatial analysis, presented a new framework for locating ATM machines in district 10 of Tehran.	Locating of ATMs with using of AHP	Focardi, R	2009
Decision criteria were extracted according to similar studies and these criteria ranked by experts of banking industry, experts of Tejarat Bank of Ardabil and Hierarchical process technique. Then areas were classified in order of priority by using of spatial modeling by GIS.	This research presented new model for locating ATM in the city of Ardabil by using of AHP and spatial analysis.	ATM location by using of combining the AHP and GIS	Shahrodi	2011

VII. CONCLUSION

In recent years, several papers were presented about need to establish and development of chain stores, but while in developed countries retail manner is as common matter, unfortunately, it seems that in Iran, addressing this issue has not yet started and it seems that the issue of construction the chain stores is solved in the country but it isn't.

It is clear because of weakness of the balance between the number of stores or even places for establishment of chain stores, on the other hand there are very rare academic researches about different aspects of chain stores such as selling, classification, consumer behavior especially localization of this type of retail enterprises during past 20 years.

Examining on the conducted studies in using of MADM models in locating of economic enterprises, especially chain stores, represent variety of effective criteria in customers' decisions about location and service providers.

The results of studying on demand spatial characteristics for construction of chain stores represent that population settlement patterns, household income, manner of their moving in city and suburban, the main routes of traffic ways, proper understanding of traffic patterns , shopping attractions and cost considerations are cases that can guarantee successfully of locating plans of chain stores in a long-term.

Based on foreign conducted studies by Halmark Company, Inc. Howe, A. B. Mendes, J. Cadima Ribeiro, Tony kernandez, Richard M. Clarkson, JAY LEE and domestic studies such as Shirazian, Mahmodi can classify criteria and effective factors as below table with considering the similarities and differences in about the civil service.

TABLE III. FACTORS AND EFFECTIVE CRITERIA ON LOCATING OF LARGE AND CHAIN STORES BASED ON THE RESULTS OF EXISTING STUDIES.

Group	Features
Demographic characteristics	Population, economy, jobs, income, household and so on
Proximity and adaptability	Compatible stores, distance to customers' home, entertainment centers , central areas of city
Traffic system	Accessibility, Position of crossroads, squares, highways, boulevards
Competition	Competing stores, selling potential, growth potential
Attraction	Position of location, visibility, attractiveness of location, interior designing
Cost	Be appropriate according to location, capital

VIII. SUGGESTIONS FOR FUTURE RESEARCH

In this paper is used of ANP method for determining the weights of effective criteria on locating of chain stores that in the future, researchers can use of fuzzy analysis network process which is more advanced and more accurate of ANP.

-Researchers can focus on explanation of concepts for operational definition of presented criteria in their researches.

- Researchers can study and identify the other parameters that are not included in this study and use them in their researches.

- Researchers can conduct a profound research about locating models for collecting the related contents about these models in a systematic and specific framework.

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