



## Investigation of the Role of Land Imprinter Machine to Counteract and Reduce the Damages Caused by the Phenomenon of Dust

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### ABSTRACT

The rapid population growth has caused the food supply through the increased demand for agricultural products and particularly the development of the acreage. In other words, the needs of today's societies increased the pressure on renewable natural resources to the extent that it exceeded the tolerance range and created the contexts for the regression. Since Iran is one of the places influenced by dust and the damages caused by this phenomenon has entangled our country and annually bring enormous human and environmental damages, the issue of increased dust should be considered. In the present study, the dust and the importance of coping with it are reviewed. To counteract dust, the first step is to identify the exact source of dust. Then, the effective ways to deal with this destructive phenomenon should be adopted. Because prevention is better and easier than resistance and treatment, it may be time consuming and costly. One way to cope with dust is using the land imprinter machine that has been reviewed in this study.

**Key words:** dust, land imprinter machine, Poly lattice.

### INTRODUCTION

The rapid population growth has caused the food supply through the increased demand for agricultural products and particularly the development of the acreage. In other words, the needs of today's societies increased the pressure on renewable natural resources to the extent that it exceeded the tolerance range and created the contexts for the regression. However, in the last century, the phenomenon of soil erosion and its consequences was considered as a fundamental obstacle to the development of human society. According to the definition of the International



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Convention on Desertification, desertification is considered as the land degradation in arid, semi-arid and arid sub-humid areas resulting from various factors such as human factors and natural factors and is the third most important challenge for the international community in the twenty-first century after the two challenges of climate change and the lack of fresh water. So that, according to the reports of the international organization, three-quarters of the world's aridlands and one third of the total lands with the area of five million hectares in 110 countries are at the risk of desertification phenomenon. The threat of the destruction of 73% of the world pastures with an area of 3.3 million hectares, the reduction of soil production in 47% of arid regions of the world, 50 to 70 thousand kilometers of unusable fertile lands in the year and over 42 billion dollars in annual losses in agriculture products with extensive ecological effects of social, economic and environmental particularly the widespread poverty and degradation of basic resources are only a part of the global effects of the phenomenon of desertification. The movement of dust in the air that causes the air pollution is called dust. These dust can be moved hundreds of miles in the air and cause numerous injuries. These dust can cause enormous environmental damages as well as damages to human health. The destructive effects of dust include the damage to plants, the reduction of the quantity and quality of agricultural products, the economy and irreparable damages to the communities affected by this phenomenon. These factors reveal the necessity of dealing with this global challenge. (Ruhi, 1390). Climate change in which the human factors play an important role, the increase in natural disasters such as storms, tornadoes and the increase in air pollution in some areas are due to the increased warm winds. Degradation of pastures, decreased production of forest lands, destruction of wetlands, slope instability, devastating floods, loss of groundwater resources, irreversible environmental damages and finally the economic poverty and social instability in human communities is the clear signs of soil erosion in the production units of nature namely the watersheds. The purpose of this research is to provide appropriate and feasible methods to reduce the devastating effects of this harmful phenomenon.

**RESULTS AND DISCUSSION**

The first step in the control of dust is to identify its exact location. However, determining the precise location of the dust removal can be a great help in the selection of the control method. Due to the limitations on the direct sampling of air in the deserts which produce dust (the lack of facilities) and the lack of possibility of direct sampling of total dust thus the areas do not allow the sampling of dust with a diameter less than 30 microns and the indirect source routing methods were used to determine the source of the dust. (Wang, 2005). There are several methods for the source routing of dust storms. One of these methods is collecting the soil samples and analyzing them to determine the source of the dust (Wong, 2005). The samples collected from different areas were studied to determine the particle size, the percentage of sand, silt, clay, elemental constituents, carbonic constituents, and the emission potential of particles smaller than 2.5 to 10 microns. Using the elemental and ionic characteristic chart (profile) and the carbon frequency in collected samples, distinguishing between natural and artificial sources such as vehicles, incineration of plants, coal, combustion and industrial emissions are the advantages of this method.

Another method of source routing is the use of satellite images to determine the regions of production and the dust pathways. Using the ozone monitoring is done with available sensors through spectrophotometer and determining the aerosol index (10, 14). In a study in Sistan and Baluchestan using satellite images, the results showed that the main site for the removal of these dusts is located on Hamoon Lake. (2). In a study at the University of Iowa in the United States in the year 20 the chemical properties of the dust particles were collected from four different sources. The dust samples of Saudi Arabia and China contained Calcium mineral particles of calcium carbonate and dolomite. Thus, the properties of dust are different in various areas. China has the largest amount of calcium in the dust and even the types of calcium compounds is different. So that, calcium is made of gypsum in the dust of the Saudi Arabia coast (Kruger, 2004).



**Reza Goshtasby and Somaye Fazelikia****Two measures can be done to control the wind erosion**

First, we reduce the wind speed and do not let it to reach the erosion threshold (using a variety of barriers).  
Second, we enforce the surface subject to the erosion than the wind erosion (using a variety of mulches and soil covers).

**Land imprinter**

Another effective and inexpensive method which has many advantages is the use of land imprinter which will have much effect due to leading the solutions of the environmental organization towards the rain creation by ionizing the clouds. The use of this device was experienced in some countries such as America and even Syria and the experiments show its high effectiveness. A land imprinter device which is shaped like a stamping foot roller, is a roller which creates a pattern embedded in the ground with its wedge-like blades. With this action, the surface layer of the soil is crushed and a container is provided to store water. However, after a period of one year from land imprinting the land, a relatively hard layer is made under the patterns which stores the water and prevents the soil erosion. Some experiments also refer increasing water infiltration. In fact, land imprinter is a device that is placed in the category of no-tillage agriculture tools which makes the process of land imprinter by connecting to the back of the tractor. In other words, the mechanical technique of land treatment makes the soil crispy and causes the stabilization by shaping the geometric networks of patterns on the soil. Land imprinting preserves water (3 to 5 liters) to penetrate into the soil and the re-irrigation, organic matter and local seeds for the germination. This device was also determined to seed, manage the rainfall and control the erosion. Using the tractor hydraulic system, the operator can adjust the depth of wedges to fit the pieces of rock, soil structure and rotations. By designing and embedding a seedsman on it, while planting a good plant its effect can be increased and with higher efficiency its movement of soil erosion can be prevented.

Experiments conducted in the United States have shown that the lands changed from the arid and desert to the lands full of vegetation after the use of this device for one year.

One of the advantages of using this tool is its exploitation in slope lands, even with a slope of 30 degrees, which will be highly regarded by the organizations of natural resources in each country. Also, by selecting proper seeds we can increase the vegetation and the marketing of medicinal plants and also beekeeping. However, with land reclamation along with the placement fertilizer on the device the cultivation can be done and high profit will be earned with respect to the low costs of the device. Land imprinting brings the ecological and hydrological maintenance of soil and causes a fertile ground for seeding and erosion control. Low cost, single step, ecological and hydrological land reclamation, rehabilitation of roads, meadows, forests, areas affected by fire, soil erosion control, and dust control are the advantages of land imprinting.

**CONCLUSION**

With regard to the presentation of the issues and since Iran is one of the crisis centers of dust it is necessary to cope with this phenomenon which annually causes many disasters in the country with the help of all relevant organizations. The methods proposed in this study can be used to assess the precise features of the crisis in order to reduce the entered damages and provide the context for its development in these areas. For example, the land imprinter method can be used in many areas of the country which are affected by these dust and reduce the financial losses and damages to natural resources.





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**Figure 1. The effect of land imprinter on the ground (Rvhyklarlv,2011)**





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Figure 2. The appearance of land after using the land imprinter machinewith seeding (Rvhyklarlv,2011)





RESEARCH ARTICLE

## Examining the Effects of Badland Erosion on Quality and Degradation Soil Indexes in Darbe-e-Khazine Basin in Shoushtar, Khuzestan, Iran

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### ABSTRACT

This basin is located in the southwestern province of Iran, in Khuzestan province. The most part of this basin is located in Shoushtar and its terminal parts are spanned geographically between city of Masjed Soleiman and Ramhormoz. Randomized Sampling was done from depth of 30-0 cm of soil in the basin. Some of physical and chemical soil parameters such as pH, electrical conductivity, bulk density, porosity, organic matter, calcium carbonate and soil texture on the samples were tested. The results showed that erosion caused reduced the percentage of Organic matters. According to the obtained results from under study parameters in the two protected and erosional areas. It can be said that difference in average of organic matter was 27.5% and calcium carbonate was 42% and 20%, in bulk density and porosity in 22% in the protected area than eroded area, which if not proper management not applied, in near future this region will observe series crisis and, it will be a background to more severe erosions by wind and water, and soil quality will be seriously damaged.

**Key words:** erosion, eroding zone, conservation area, the physical properties and soil degradation.

### INTRODUCTION

Soil erosion history goes back to life of earth, but in the twentieth century due to population growth and overuse of the land, soil degradation had an increasing trend. Therefore soil erosion is considered has a danger against environment and human and, even to the life of human beings. In arid and semi arid regions, due to various reasons, such as heavy rains and showers, amount and intensity of erosion was high and generating almighty floods caused life and finance damages, such that ci in a short time, high volume of soil masses from surface of aquiferous basins





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were washed and carried to downward regions and it will lead to great damages. Overall, various factors party their role in outbreak and exacerbation of erosion, of which are of management aspects and can be avoided by adopting and enforcing scientific and partial policies and strategies. Therefore to control water erosion it is necessary to proceed to understand management factors, along with environmental ones, and by examining the level of contribution of each one of them, appropriate solutions could be offered to prevent erosion (Refahi, 2003)

In fact, the estimates close to reality for actual amount of erosion and sedimentation in an area has always been an important issue that the way to estimate it has been the focus of researchers. In most countries, lack of accurate statistics about the level of erosion and sedimentation, makes the use of models erosion and sedimentation estimation inevitable. However, such models are often region-based and in areas other than where they are developed, don't generate precise result. That's why we must take care so much to choose models and their applications. Various models are being modified gradually and their coefficients and factors, are examined and corrected by different research. For this reason, many models have been developed, each one are with a number of factors effective in the erosion in sediment. Each of models has some advantages and disadvantages and in certain situations have their best answer. (Refahi,2006).

Soil is one of the most important natural resources of every country. Today, soil degradation and decline threatened welfare and even life of human beings. By growth in population and increased demand, in one hand, resulted in increased utilization of land, and in another hand, farmers due to lack of Arable lands, perform cultivation in the land susceptible to erosion which have suitable vegetation, if continued, leads to destruction of renewable natural resources, so that the destruction of natural resources is considered as one of the challenges of the twenty-first century (Mohammadi et al., 2005).

## MATERIALS AND METHODS

This basin is located in the southwestern province of Iran, Khuzestan. Most parts of this basin is located in Shoushtar City and its terminal part is spanned geographically between city of Masjed Soleiman and Ramhormoz. The geographical location of the basin is in "48° 45' 58"-49° 18' 13"<sup>E</sup> in east longitude and 31° 37' 42"-32° 6' 6"<sup>N</sup> north latitude. Its area is 66,685 hectares, equivalent to 666.85 km<sup>2</sup> and this basin is located 45 km away from Ahvaz city (eastern part of the Shoushtar city) and in total, it is divided in 24 hydrological units (sub-basin). All the waterways of the basin are shed in Gorgor river (a branch of Karun). This basin lacks an outlet and its hydrographic network is such that each of sub-basins are terminated to multiple output. Its maximum height is 604 m and minimum height is 26 meters above sea level.

### Laboratory analysis of soil

Under-Study basin is divided into two parts: conserved or protected and protection-less, wherein protected area, a series of watershed activities have carried out, of which measures, the construction of terraces, restoring and distributing vegetation and dams can be Named. Since, under study region is located in a homogeneous unit in geologic and physiographic terms, the selected points are chosen close each other. The type of study is field one. The method and the way of its implementation is done through measurement and study some of the physical and chemical characteristics of soil such as (organics matters, soil reaction, tissue and etc.) in these two mention regions were, in line with it, the relevant tests were performed. In each of the two areas, two transects of 200 m length on each transect with 50 meters spacing were sampled. At first, the location of the pointed were specified with GPS device, then in each of points, using equilateral method (distances between the vertices of triangle, will be considered as ten meters) at a depth of 0-30 cm sampling was done. To sample disturbed samples, using agrology auger, sampling was done from each vertex of the triangle. Then the samples were mixed and will be selected as composite sample for each depth. To obtain undisturbed samples for determination of bulk density parameter



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sampling was done from the center of each triangle. Then, for computation, data analysis and graph drawing, software SPSS (20) and independent t-test were used at 5% level, and with the help of this software, presence or absence of significant difference in amount of the parameters with 95 percent probability was studied.

**RESULTS AND DISCUSSION**

Generally, erosion has affects on soil physical and chemical characteristics and therefore the quality and fertility will be under influence. The quality of the soil has two aspects: 1) the intrinsic quality, which is defined as the soil's natural ability to perform their duties (biological production, improving air and water quality and plant health, animal and human) and depends on soil-making, and the factors influencing it and is not influenced by soil management. The other one is dynamic soil quality which varies depending on the type of soil management. The quality of the soil is not directly can be measured. Instead it is met by measuring several index, which type of Used indeces depends on the scale and purpose of the study. Thus, according to assess the impact of badland erosion in the two regions of protected and erosion lands due to (thousand Valley) badland erosion, effective Chemical and physical indexes were selected and studied. Desired Characteristics are discussed in two parts of Chemical and Indicators of soil degradation.

As the results in the protected area show, the soils of this non-saline use (0.15 dS/m), has an alkaline reaction (1.7), silt loam texture, high organic matter (% 1.11) and low bulk density of 1.31 (grams per cubic centimeter) as the results in erosion region show, the soil of this usage is non-saline (0.24 dS/m), and has an alkaline reaction (7.3), silt loam texture, low organic matter (0.36%) and bulk density of 1.47 (grams per cubic centimeter).

**CONCLUSION**

Given importance of erosion issue and its impact on soil degradation, followed by the importance of watershed management operations, and their role and impact towards conserve soil, given that Iran is located in warm and dry and formation of soil due to specific climate conditions, is very slow, soil erosion should be placed under the control, if soil erosion exceeds it allowed limit, it will cause irreparable damages. That it not only impacts our lives, but also influences the ecosystem, therefore if some plan can be designed and formulated, which by massive government aids, all areas susceptible, particularly gully erosion and badland erosion which is the advanced type of gully erosion and unfortunately is extensively observable in study region, can be sampled, and the level of degradation in soil quality may be determined and its destructive conditions, could be evaluated, maybe with appropriate protective measures, we can reduce the severity of damage to the soil in Iran. This soil is a valuable legacy for future generations, that we must protect it. According to the obtained results of the study parameters in the both protected and erosion areas it can be said that the difference in average organic matter is 27.5 percent, 42% for calcium carbonate, 20% in bulk density and 22% in porosity, in the protected area compared to eroded area which if not proper management not applied, in near future this region will observe series crisis and, it will be a background to more severe erosions by wind and water, and soil quality will be seriously damaged.

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**Table 1. Descriptive statistics of some of Physical and chemical indexes in conservation (protected) area in the study area**

Index	Average	At least	The maximum	Deviation
Organic matter (percent)	1.11	1	1.2	0.07
Soil reaction	7.1	6.8	7.3	0.19
Electrical conductivity (dS m)	0.24	0.19	0.34	0.06
Clay (percent)	22.4	21	24	1.14
Silt (percent)	2.65	63	68	1.92
Sand (percent)	10.8	9	13	1.64
Porosity (percentage)	0.49	0.42	0.54	0.03
Bulk density (grams per cubic centimeter)	1.31	1.20	1.53	0.1

**Table 2: Descriptive statistics of some of the Physical and chemical indexes in the Study erosion region**

Index	Average	minimum	maximum	Standard Deviation
Organic matter (percent)	0.36	0.32	0.40	0.03
Soil reaction	3.7	6.9	6.7	0.27
Electrical conductivity (dS/m)	0.15	0.12	0.18	0.03
Clay (percent)	19.4	18	20	0.89
Silt (percent)	56.8	55	58	3.1
Sand (percent)	21.6	20	23	1.14
Porosity (percentage)	0.44	0.39	0.52	0.04
Bulk density (grams per cubic centimeter)	1.47	1.27	1.53	0.11





## The Effective Factors on Increase in Market Share of Mellat Insurance Company by Taking SERVQUAL Model (Case Study: Mellat Insurance Branches in Guilan Province)

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### ABSTRACT

The service industries play an essential and important role in economic growth and development of countries and among them there is no dispute among people over the role and importance of position of insurance industry as a supporting industry. The present research is intended to examine the effect of quality of services of Mellat Insurance Company on increase of share of market for insurance sector in Guilan Province at Iran. Thus, benefitting from SERVQUAL model, the impact of factors (tangibles, reliability, assurance, responsiveness, and empathy) in this model in market share of Mellat insurance Company has been analyzed. The statistical population of the current research includes the customers of Mellat Insurance Company in Guilan Province in which 321 participants were chosen by means of non-probable approachability method. The results have shown that all five attributes of insurance services (i.e. tangibles, reliability, assurance, responsiveness, and empathy) are placed at favorable level. Likewise, the results of testing hypotheses signify that the aforesaid elements affect on market share of Mellat Insurance Company in Guilan Province.

**Key words:** Market share, Insurance industry, Quality of services, SERVQUAL Model, Guilan Province



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## INTRODUCTION

The modern world is the world of competition among economic enterprises to capture the markets and attract the customers and the main axis of such competitions has been focused on employing the methods and strategies to attract the customers (Rabizadeh, 2007). The servicing industries play essential and important role in economic growth and development of countries and among them role and importance of position of insurance industry is not hidden for anyone as a supportive industry. On the other hand, rising competition in financial markets caused many directors in this industry to think about the solution for viable presence in the field of business. Therefore, they have to inevitably find the solutions to acquire further consent from the customers and their loyalty and commitment followed by them (Coviello & Trapani, 2012). The effective factors on market share for insurance can be divided into qualitative and quantitative factors. The qualitative factors are concerned with attitude, basis, and comments of customers of banks (Yonggui & Hing, 2003). But, the quantitative factors are the outcomes of financial performance that has been recorded in financial statements and they are not dependent on comments of customers or personnel. These factors are the key functional ratios of the system (Bahia & Jacques, 2006). Overlooking the management of any company toward these ratios will threaten the continuity of activity of that insurance company and under such circumstances even rising market share will not also lead to increase in wealth of shareholders and these performances will result in negative economic, social, and political consequences. While, quality of services is considered as an important and efficient factor in achievement of organizations. Hence, all organizations, especially the servicing organizations and including the insurance companies should try to increase the quality of services since the quality is deemed as an essential factor that can be followed by strong competitive coefficient for the organizations (Fariabi & Mahmoudi, 2013). The market share is proposed as a structural variable in market and the high mean market share of enterprises is observed usually in industries with exclusive structure and inversely we witness the lesser share market for enterprises in competitive markets. It is obvious that any factor that can create changes in size and market share of company may also exert change in market structure (Molayee & Dehghani, 2011: 56). As one of the financial institutions, the national insurance industry has especial position in economic growth and development in such a way that the efficient performance of this sector will act as an impetus for other economic sectors (Hossein Zadeh Eskandar, 2005). The market share that is usually defined as ratio of enterprise sale to sale of industry is assumed as one of the structural variables in markets and the effective factors on market share of enterprises has been deemed as the subject for important studies in economic field and industrial organization during recent years (Barthwal, 2007). Today, quality of service is considered as an important and efficient factor in achievement of organizations. Therefore, all organizations, particularly the servicing organizations, should tend to improve the quality of their services since the quality is seen as an essential factor that can be followed by strong competitive coefficient for the organizations (Bahia & Nantel, 2006: 84). Alternately, insurance services depend on efficient development criteria. In a country such as India, the illiteracy rate is at very high level and rural economy predominates over national economy. Possession of personal and non- personal development strategy is deemed as necessary. The adequate attention should be paid to selection of development tools for the agents and even for directors of branches and personnel in frontline (Sabzi et al, 2011: 33). If changes in market share provide some information for market regarding efficiency in the future and change in capability of enterprise for exploitation from opportunities for its growth then a relevant model to continuous and quick changes in market share will increase the existing information about current and future revenues. For instance, it can be implied that if the returns (profits) of market share are interpreted as parameter of further future profits or higher efficiency then an advanced continuous and quick model in market share will show the potential for corporate progress to conserve this profit and vice versa (Ahmadpoor et al, 2012). Overall, with respect to vital importance of insurance, particularly during future decades in the country, the insurance industry needs to discover better strategies to attract and maintain insured parties in insurance companies (Hassanzadeh et al, 2008). With possession more than 3.3% of national insurance market, Mellat Insurance Company has acquired the seventh rank in terms of market share. While, Iran Insurance Company possesses the first rank in national insurance market with over 46% of market share ([www.centinsur.ir](http://www.centinsur.ir)). Thus, it requires making effort to increase share of Mellat Insurance Company and identifying the effective factors on it.



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In this regard, latest related domestic and foreign studies have been carried out in an article written by Fariabi and Mahmoudi (2013) under title of 'Measurement of quality of services and analysis its relationship with market share based on SERVQUAL Model (Case study: Saderat Bank in Tabriz city) in order to evaluate the quality of given services by Saderat Bank in Tabriz city by employing SERVQUAL Model that is deemed as a tool for measurement of quality of services and identifying and analysis on the existing servicing gap between expectations and perceptions of customers. Similarly, during this investigation the relationship between the dimensions of quality of services and market share of Saderat Bank from the public sources or deposits was explored. The results came from this study suggest that there is a significant difference among the customers' expected services and the present services to them by Saderat Bank in Tabriz city except for the dimension of credibility and in other dimensions of service. In an article titled 'The impact of innovation on instability of market share in Iranian food and drink industries', Asgharpoor et al (2012) conducted some studies in this field. This study is mainly aimed at analysis on effect of innovation on instability of market share in food and drink industries with 4-digit code in Iran. Schumpeter's theory is assumed as the paramount theory in this regard that it considers the relation between these two variables in non-linear form and as reverse-U. To this end, out of related data in industrial workshops, 10 members of personnel and most of manufacturers of food and drink products with four-digit code were used with non-linear approach during 1995-2009 and the econometric model has been approximated by means of JMALT software and with LSTR non-linear technique (slight transfer of logistic regression technique).

The results of this study signify the existing non-linear relation among innovation and instability of market share (dynamism of competition) in Iranian food and drink industries.

In an essay called 'The studies on share market in railroad transportation based on sum of transportation processes, Shi et al (2014) carried out some surveys in this field. In their essay, they utilized a mathematical model to determine quantity of market share. They conducted their studies on remote road transportation in internal towns at China. In their studies, they concluded that as an average the speed of train depends on waiting time for loading cargoes and thus the size of container and transportation distance might affect on remarkable market share in railroad. They also found that the speed of train may averagely increase the volume of container as well as transportation distance and share market for railroad while the waiting time is reduced.

In an article titled 'Modeling market share in airline industry: plan of emerging market economy', Babic et al (2014) conducted studies in this regard in order to determine market share for airplane company in certain airport. They took traditional techniques and fuzzy logic in their model. Their model along with real data showed that how to use them for calculation of market share of airplane company. In their investigations, they concluded that the potential for accurate prediction of market share about their rivals (for airliners) in certain airport might be more important for efficient design of business strategy. Accordingly, this study is mainly aimed at effect of feature of qualitative services for Mellat Insurance Company on increase of its share in the market and the research hypotheses are as follows:

**Major hypothesis:** The qualitative performance of services in Mellat insurance Company affects on its market share.

**Minor hypotheses**

- The tangibles of services in Mellat insurance Company affect on its market share.
- The reliability of services in Mellat insurance Company affects on its market share.
- The responsiveness of services in Mellat insurance Company affects on its market share.
- The assurance of services in Mellat insurance Company affects on its market share.
- The empathy of services in Mellat insurance Company affects on its market share.





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In fact, the main subject of the present research is that following to entry of private insurance companies into the field of national insurance industry, the market share of the existing companies was going to decrease. Also, Mellat Insurance Company was not an exception to this rule so it should try to survive in the current competition market and identify the efficient factors on rising its share and make effort to strengthen them. Hence, we tend to interpret the effective qualitative factors in rising market share for Mellat Insurance Company in the current study. Benefitted from SERVQUAL Model, it has been tried in the present research to analyze the market share of Mellat Insurance Company and to interpret the efficient qualitative dimensions in increase of market share for this company.

**Conceptual and operational definition of variables**

**Market share**

When it is discussed about market share in banking system, market means the same as people's deposits before national banking system. The banking deposits denote sum of short-term, long-term, Qarzolhassaneh, and foreign currency deposits (Fariabi & Mahmoudi, 2013: 156). In this study, market share signifies the mean acquired scores from the responses given to 22-27 questions referring to this source. It includes dimensions of meeting customers' expectations, satisfactory services, customers' recommendation to their friends, customers' motive to buy and search for new services and customers' imagination from the given services in which Likert 5-scale spectrum and distance scale are used for measurement and evaluation of the aforesaid variable.

**Tangibles**

Tangibles suggest the physical shape of facilities, equipments, communication tools, and courtesy of personnel and mean of acquired scores from giving answers to questions 1-5 in source questionnaire in which Likert 5-scale spectrum and distance scale are used for measurement and evaluation of the aforesaid variable.

**Reliability**

The reliability means potential for presentation of the promised services reliably and accurately. The mean scores has been acquired from giving answers to questions 6-9 of source questionnaire in this study in which Likert 5-scale spectrum and distance scale are used for measurement and evaluation of the aforesaid variable.

**Responsiveness**

The responsiveness denotes tendency to contribute to customers and giving answers quickly to their questions and requests in this survey. According to the mean scores are acquired from giving answers to questions 10-14 in the source questionnaire where Likert 5-scale spectrum and distance scale are employed for measurement and evaluation of the aforesaid variable.

**Assurance factors**

In this study, assurance represents the awareness and courtesy and their potentials to create sense of trust and guarantee in customers. It is based on the mean scores acquired from giving answers to questions 15-17 in source question in which Likert 5-scale spectrum and distance scale are utilized for measurement and evaluation of the aforesaid variable.





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#### Empathy factors

The empathy factors express affection and personal consideration in organization toward its customers at this study. According to this factor, mean scores are derived from giving answers to questions 18-21 in source question where Likert 5-scale spectrum and distance scale are employed for measurement and evaluation of the aforesaid variable.

#### Methodology

The present method of the current research is of applied type in terms of objective and it is descriptive method in terms of nature and technique and it is classified in correlation group in terms of type and analysis. The research is of applied type because its results may be used for different groups of planner and directors in insurance companies for which it measures the behavior of buyers of insurance products and will cause acquaintance with strong and weak points in giving services so from this perspective it is of descriptive type that addresses the current processes and tangible and visible effects at present and identifies the status quo among variables. And the statistical population of this study is composed of customers of Mellat Insurance Company throughout Guilan Province (Iran).

Whereas, the population of is unlimited in this study and number of referents to Mellat Insurance Agencies is not known accurately throughout Guilan Province thus initially 30 questionnaire forms were distributed among target population to calculate sample size as well as their standard deviation where it was 0.4317. Then, the sample size was derived from following formula.

$$n = \frac{Z_{\alpha}^2 * \sigma^2}{e^2} = \frac{1.96^2 * 0.4137^2}{0.05^2} = 262.99$$

The given sample size is 263 out of which 254 items were returned to the researcher. The classified random sampling technique was utilized for sampling in this study. Whereas the statistical population in the present research includes completely certain and definable classes under title of insurance agency office thus the researcher has employed the given technique. As a result, number of samples per any town has been characterized proportional to quantity of insurance offices in any town. Then the respondents have been elected randomly in insurance agencies in such a way that the chance of choice is identical for each of participants. Similarly, the field study method has been utilized for data collection and the needed information in this investigation. In some cases, librarian study method was also used for better analysis of the acquired information. In order to acquire the needed data for testing hypotheses in this study, questionnaire was employed as main tool. So, it can be mentioned the questionnaire is one of the cost-effective and practical techniques for data collection in statistical population. The questionnaire is composed of two sections of general and exclusive questions. The section of general questions covers personal specifications of respondents. These questions include gender, age, education degree, income, and marital status.

The section of exclusive questions also comprise of the questions relating to research variables. Likert five-scale spectrum (ranges from very low to very high) has been used in design of these questionnaires. The research variables are given in Table (1).

In order to determine reliability of research questionnaire, primarily 30 questionnaire forms were distributed and gathered in statistical population. Then, SPSS software was used for calculation of Cronbach alpha coefficient.

The Cronbach alpha coefficient of questionnaire in this study is described in Table (2). Given that the values of calculated alpha are higher than 0.8 thus the research questionnaire possesses appropriate reliability.



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The data acquired from the questionnaires in this study have been analyzed by means of descriptive and inferential statistical methods. The frequency distribution tables were utilized in study and analysis of data in descriptive analysis relating to general specifications of respondents and research variables. The test of normality of data was examined by means of Kolmogorov- Smirnov test and also research hypotheses by the aid of regression.

**Description of research variables****Description of variable of tangibles**

With respect to Table (3), it is seen that the lowest and highest values of variable of tangibles are 1.17 and 4.50, respectively with mean (3.53), standard deviation (0.58), and its variance as 0.34. Given the mean value, it can be said that from perspective of customers of Mellat Insurance Company, the aforesaid variable is placed at favorable status.

**Description of variable of reliability**

With respect to Table (4), it is observed that the lowest and highest values of variable of reliability are 2.00 and 4.43, respectively with mean (3.54), standard deviation (0.511), and its variance as 0.262. Given the acquired mean value, it may be implied that according attitude of customers of Mellat Insurance Company, the aforesaid variable is placed at appropriate level.

**Description of variable of assurance**

With respect to Table (5), it is seen that the lowest and highest values of assurance variable are 1.83 and 4.33, respectively with mean (3.44), standard deviation (0.55), and its variance (0.31). Given the acquired mean value, it can be expressed according to customers' attitude that the aforesaid variable possesses the appropriate status.

**Description of variable of responsiveness**

With respect to Table (6), it is observed that the lowest and highest values of variable of responsiveness are 2.57 and 4.86, respectively with mean (3.81), standard deviation (0.566), and its variance as 0.320. Given the acquired mean value, it may be stated that according the viewpoint from customers of Mellat Insurance Company, the aforementioned variable is relatively at favorable level.

**Description of variable of empathy**

With respect to Table (7), it is seen that the lowest and highest values for variable of empathy are 1.25 and 5.00, respectively with mean (4.19), standard deviation (0.844), and its variance as 0.712. Given the acquired mean value, according to attitude of customers of Mellat Insurance Company, the aforesaid variable is relatively at appropriate level.

**Description of variable of market share**

With respect to Table (8), it is observed that the minimum and maximum values for market share variable are 2.68 and 4.43, respectively with mean (3.68), standard deviation (0.470), and its variance as 0.221. Given the acquired mean value, it may be implied according to attitude of customers of Mellat Insurance Company, the aforesaid variable is relatively at favorable condition.



**Alireza Rad and Hamidreza Alipour****Testing of research hypotheses**

We may define null hypothesis  $H_0$  and its opposite hypothesis ( $H_1$ ) by means of binomial test as follows:

$H_0$ : The qualitative performance of Mellat Insurance Company may affect on increase of its market share.

$H_1$ : The qualitative performance of Mellat Insurance Company may not affect on increase of its market share.

If a significant difference is revealed among favorable and unfavorable statuses at significance level of test, null hypothesis  $H_0$  is rejected in favor of  $H_1$ . As a result, the attributes of insurance services are at favorable status otherwise null hypothesis  $H_0$  is approved and it indicates that the characteristics of insurance services are not at appropriate conditions.

**Hypothesis I:** Tangibles of services in Mellat Insurance Services affect on increase of its market share.

$H_0$ : Tangibles of services in Mellat Insurance Services may affect on increase of its market share.

$H_1$ : Tangibles of services in Mellat Insurance Services may not affect on increase of its market share.

With respect to the given numbers in above table, out of 321 participants, 64 were determined in first group and 257 of them were identified in second group. The number derived for this proportion (ratio) shows inequality of two groups and it is visible that 0.20 % of participants are classified in first group and 0.80% of them in second group. Whereas decision criterion acquired in output (0.000) is smaller than 0.05 therefore the null hypothesis ( $H_0$ ) can be rejected. So, tangibles of services in Mellat Insurance Company may act as an efficient factor on market share for this insurance company in Guilan Province. Thus, first hypothesis may not be rejected.

**Hypothesis II:** The reliability of services in Mellat Insurance Company affects on increase of its market share.

$H_0$ : The reliability of services in Mellat Insurance Company may affect on increase of its market share.

$H_1$ : The reliability of services in Mellat Insurance Company may not affect on increase of its market share.

With respect to the numbers derived from above table, out of 321 participants, 54 were determined in first group and 267 of them in second group. The number acquired for this proportion (ratio) displays inequality of two groups and it is visible that 0.17% of them is classified in first group and 0.83% of them the second group. Whereas the given criterion for decision in output (0.000) is smaller than 0.05 therefore the null hypothesis ( $H_0$ ) may be rejected. So, the variable of reliability as one of specification of Mellat Insurance Company may act as an effective factor in its market share in Guilan Province. Thus, the second hypothesis may not be rejected.

**Hypothesis III:** The assurance of services in Mellat Insurance Company affects on increase of its market share.

$H_0$ : The assurance of services in Mellat Insurance Company may affect on increase of its market share.

$H_1$ : The assurance of services in Mellat Insurance Company may not affect on increase of its market share.

With respect to the numbers acquired from above table, among 321 participants, 68 members are classified in first group and 253 members in the second group. The given number for this proportion (ratio) signifies inequality of two groups and it is visible that 0.21% of these participants are classified in first group and 0.79% of them in the second group. Whereas the decision criterion acquired in output (0.000) is smaller than 0.05 therefore the null hypothesis ( $H_0$ ) can be rejected. So, variable of assurance as one of the features of Mellat Insurance Company may act an effective factor on its market share in Guilan Province. Hence, no one can reject third hypothesis.

**Hypothesis IV:** The responsiveness in Mellat Insurance Company affects on increase of its market share.

$H_0$ : The responsiveness in Mellat Insurance Company may affect on increase of its market share.

$H_1$ : The responsiveness in Mellat Insurance Company may not affect on increase of its market share.



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With respect to the numbers derived from above table, out of 321 participants, 40 were identified as first group and 281 of them as second group. The number acquired for this proportion (ratio) suggests the inequality of two groups and it is visible that 0.12% is classified in first group and 0.88% of them in the second group. Whereas the acquired decision criterion in output (0.000) is smaller than 0.05 therefore the null hypothesis ( $H_0$ ) is rejected. So, variable of responsiveness as one of the characteristics of Mellat Insurance Services may act as an effective factor on its market share in Guilan Province. Thus, the fourth hypothesis may not be rejected.

**Hypothesis V:** The empathy on Mellat Insurance Services affects on increase in its market share.

$H_0$ : The empathy on Mellat Insurance Services may affect on increase in its market share.

$H_1$ : The empathy on Mellat Insurance Services may not affect on increase in its market share.

With respect to the numbers derived from above table, among 321 participants, 46 members are identified in first group and 275 of them in second group. The number acquired for proportion (ratio) indicates inequality of two groups and it is visible that 0.14% of these participants are classified in first group and 0.86% of them in second group. Whereas the decision criterion acquired in output (0.000) is smaller than 0.05 thus the null hypothesis ( $H_0$ ) may be rejected. So, variable of empathy as one of features in Mellat Insurance Services may act as an effective factor in its market share in Guilan Province. Thus, no one can reject fifth hypothesis.

**DISCUSSION AND CONCLUSION**

With respect to descriptive statistics of research variables, it was characterized that all five attributes of insurance services including tangibles, reliability, assurance, responsiveness, and empathy are averagely at favorable level. Likewise, the results of testing hypotheses signify that the aforesaid variables might affect on market share for Mellat Insurance Company in Guilan Province. Therefore, the success of marketers in their impact on aforesaid variables may highly depend on proper perception on quality of their behavior with consumer. Similarly, therefore the marketing communication is very important and at the same time it may cause challenge in insurance. This is because of tangible nature of insurance services in which convincing of customers about the value of product can play definite role.

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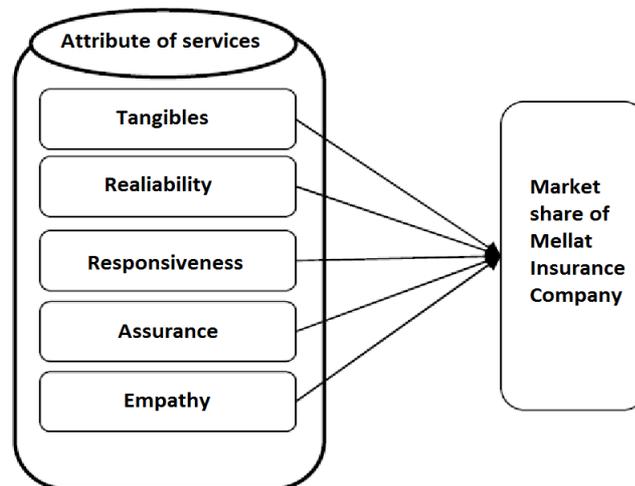
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**Diagram 1: Research conceptual model**





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**Table 1: The related variables to questionnaire**

Variables	Questions
Tangibles	1-5
Reliability	6-9
Responsiveness	10-14
Assurance	15-17
Empathy	18-21
Market share	22-27

**Table 2: The research main variables (Cronbach alpha)**

Row	Variable/ element	Calculated alpha	Result
1	Tangibles	0.871	Acceptable
2	Reliability	0.811	Acceptable
3	Responsiveness	0.901	Acceptable
4	Assurance	0.864	Acceptable
5	Empathy	0.8u93	Acceptable
6	Market share	0.818	Acceptable
7	Total questionnaire	0.912	Acceptable

**Table 3: Description of variable of tangibles (factors)**

	Quantity	Minimum	Maximum	Mean	Standard deviation	Variance
Tangibles	321	2.17	4.50	3.53	0.586	0.344

**Table 4: Description of variable of reliability**

	Quantity	Minimum	Maximum	Mean	Standard deviation	Variance
Reliability	321	2.00	4.43	3.548	0.511	0.262

**Table 5: Description of variable of assurance**

	Quantity	Minimum	Maximum	Mean	Standard deviation	Variance
Assurance	321	1.75	4.50	3.439	0.596	0.356





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**Table 6: Description of variable of responsiveness**

	Quantity	Minimum	Maximum	Mean	Standard deviation	Variance
Responsiveness	321	2.57	4.86	3.813	0.566	0.320

**Table 7: Description of variable of empathy**

	Quantity	Minimum	Maximum	Mean	Standard deviation	Variance
Empathy	321	1.25	5.00	4.194	0.844	0.712

**Table 8: Description of variable of market share**

	Quantity	Minimum	Maximum	Mean	Standard deviation	Variance
Market share	321	2.68	4.43	3.68	0.470	0.221

**Table 9: Test of hypothesis I**

Tangibles	Class	Frequency of any group	Ratio of two groups	Test prop	Decision criterion
Group 1	≤ 3	64	0.20	0.5	0.00
Group 2	> 3	257	0.80		
Total		321	1.00		

**Table 10: Test of hypothesis II**

Reliability	Class	Frequency of any group	Ratio of two groups	Test prop	Decision criterion
Group 1	≤ 3	54	0.17	0.5	0.00
Group 2	> 3	267	0.83		
Total		321	1.00		





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**Table 11: Test of hypothesis III**

Assurance	Class	Frequency of any group	Ratio of two groups	Test prop	Decision criterion
Group 1	≤ 3	68	0.21	0.5	0.130
Group 2	> 3	253	0.79		
Total		321	1.00		

**Table 12: Test of hypothesis IV**

Assurance	Class	Frequency of any group	Ratio of two groups	Test prop	Decision criterion
Group 1	≤ 3	40	0.12	0.5	0.130
Group 2	> 3	281	0.88		
Total		321	1.00		

**Table 13: Test of hypothesis III**

Empathy	Class	Frequency of any group	Ratio of two groups	Test prop	Decision criterion
Group 1	≤ 3	46	0.14	0.5	0.130
Group 2	> 3	275	0.86		
Total		321	1.00		





## Indigenous Model of Knowledge Management and Experts Experiences in Project-Based Organizations (Case Study of NirooGostar Expert Group)

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### ABSTRACT

NirooGostar Expert Group has long and outstanding background in implementation of various projects in water, oil and gas transmission lines in Iran and abroad which is also full of experiences and knowledge that it is highly valuable and continuous to maintain and keep these technical experiences and knowledge as well as documentation of them. That's why relocation and removal of directors from this group and lack of access to their experience and knowledge have faced them with certain challenges which look all required based on the speed of science and technology development in the world for improvement of the group performance and remaining in the competition with other contractors who are executive of transmission, collection, documentation lines and effective use of the managers and experts'. Therefore, in the current article, with the field researches and library studies as well as having interview with experts and professionals of the local model of knowledge management for documentation of experiences and registration of technical knowledge and preventing repetition in the projects have been submitted.

**Key words:** NirooGostar Expert Groups, knowledge management, transmission lines





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### INTRODUCTION

Institutes and sub-groups of Khatamolania Construction Camp due to expansion and variation of their projects in building water, oil, gas and petrochemical transmission lines as well as road, tunnel, dam and railway building and so on produce a huge number of technical knowledge that a number of them are registered in technical documents, instructions, reports and so forth. But another part of the knowledge which is also widespread remains hidden in the mind of managers and its experts in a form of experiences, skills and...

By exiting such people from the sub-groups of Khatamolania Construction Camp due to transfer, modification and retirement and so on, practically a huge and significant part of their experiences and knowledge departs the group prior being transferred to anyone else or being use. Therefore, among the groups and institutes of Khatamolania Construction Camp, NirooGostar Expert Group has various and widespread structure due to having different and wide projects and vital transmission lines inside or outside the country which often face insecure life and property conditions as well as being menaced by terrorists. It is required to provide documents, information and available experiences in the documented projects and necessary bases to transfer knowledge and share these information and lessons in order to meet the needs of other projects.

Moreover, the temporary nature of the projects leads to exiting the experienced and valuable manpower from the group which is necessary to be maintained as spiritual assets of the group. In general, the most significant benefits and advantages of the experiences documentation are summarized as below:

Creation of a proper basis to exchange experiences and thoughts through learners group (Mabey, 1995).

Increase of organizational effectiveness through consideration to documentation of the related criteria to efficiency, effectiveness and implementing them (Denton, 1994).

Creation of a common feeling and point of view due to documentation and experience transmission. (Thompson, 199).

Provision of bases for registration, expansion and training organizational culture to the next generations of employees and managers (Mardani and Nazarzadeh, 2009, p.490).

Reduction of repetitions and preventing mistake repetition in the organizations.

Submission of a proper knowledge at a suitable time to a proper person who needs the knowledge.

Access to the map of organizational knowledge, namely we must know which fields we have in each section of the organization and which experts we have there or who they are and where they are located.

### REVIEW OF LITERATURE

In order to recognize issue and phenomena, in addition of the field studies and identification of their available condition, we could exploit research, studies, documents and backgrounds in relation with the issue or phenomenon. (Elahi et al., 2005, p27). All the following attempts indicate Iranian organizations have found the importance of the managers' experience role in growth and development of the organization performance and they have started certain measures in this regard.





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In the recent years, a number of various theoretical and practical measures have been conducted in the country in documentation of the managers' experiences. Some examples of them are as below:

#### The conducted practical measures in this field include

Project of Managers' experiences documentation in Research And training Institute of the ministry of Energy

Outline and implementation of knowledge management in GhaemAjalalah expert group by Nedak engineering consulting company

Documentation Project of management experiences in Gharbeh Noah

Documentation Project of management and experts experience in National Iranian Gas Company by the Institute of International Energy Studies,

Documentation Project of management experience in the NPC,

Documentation Project of management experience in Karbala Camp

Project of Knowledge Management System in Research & Technology Petrochemical Company,

Master Plan of knowledge management and knowledge sharing system in the Ministry of Transportation (Department of Education, Science and Technology)

Master Plan for Knowledge Management in Razi Petrochemical Company,

Documentation Project of management experiences in Iran Water and Power Resources Development Company and ... (Power Research Institute, 1387)

#### A number of conducted theoretical measures are as follow

Knowledge management book in project-driven organizations.

Management experiences book by the Ministry of Energy in 2005.

National Book of Managers' Experiences of Iran" by entrepreneurial communications expansion Co. in 2007.

#### Research Stages

Recognition stage: in this stage, in order to document the knowledge as a project by study of the available organizational documents as well as conduction of recognition interviews with some managers and projects experts, objectives, needs and a range of each project of NirooGostar Expert Group and the related unites are implemented.

To do this, certain factors such as qualifying job conditions, project guidelines, executive methods, instructions and available maps are all studied as well as relations of NirooGostar Expert Group with other institutions such as consultants and contractors.

**Formation of Knowledge Management Group:** Knowledge management group is a team containing knowledge management experts, some managers of NirooGostar Expert Group and under-study people who are responsible for





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the group by throwing weekly meetings on the implementation of knowledge management in the group and deciding in remarkable fields of the project, approval of the introductions and related regulations to knowledge management including all rights and tasks of the group members in knowledge management and codification of the group awarding regulations as well as legitimizing knowledge management activities by obtaining the support of the senior management of the group.

#### **Formation of Data Bank for Experts**

Based on the number attachment, a complete data bank of under-study experts and professionals including knowledge indexes considering the personal knowledge questionnaire is outlined and implemented.

#### **Establishment of Knowledge Selection Room**

The members of knowledge selection room includes representatives of service cost per capita, managements of the knowledge management projects by approval of the CEO who gather every two or three months in order to study the registered knowledge and experiences.

The representatives study the departments and knowledge management of the registered experiences in the last two or three months passed and in case it is needed to conduct certain measures such as development of the executive methods and instructions, and changing work method is due to widespread registered knowledge, they decide in such room.

#### **Outlining Structure of Knowledge Tree of Staff and Projects of NirooGostar Expert Group**

In this stage, by interviewing the managers and the institution experts and projects as well as formation of the common meetings, the knowledge tree includes all classes and various knowledge fields and it will be outlined in codification stage of the interviews questions and knowledge coding which are highly significant and after approval of the knowledge management group, it will be ratified.

#### **Outlining Standard Questionnaire in Various Knowledge Fields**

By analysis of the questionnaire, the documentation status is studied in the projects and their weakness and strength of the knowledge management will be studied.

#### **Knowledge Extract Education from Experts**

After achieving the results of recognition stage, it is turn to train the experts in order to extract the knowledge. At this stage, to extract the knowledge out of the projects and employees, various methods are utilized through training workshops and seminar sessions. Simultaneous with the seminar sessions, the required training will be offered to the interviewers and knowledge editors.

#### **The stage of Knowledge Acquisition**

The main stage of knowledge management implementation is the stage of knowledge achievement from managers and experts which includes the following sections:

- Communication





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- Interview
- Implementation in papers

At the stage of establishment, based on the formed data bases, certain relationships are made with the experts and the relevant questions are offered.

At the interview stage, the knowledge management group chooses one of the experts and scholars of NirooGostar Expert Group in order to implement the interview process with each expert based on the knowledge tree. The interviewers' response is recorded at each session and they will be written next. The written contexts are edited literally and technically by the management experts and they are all put in specific coded papers.

#### Approval of the Knowledge Management in Settlement Form of the Employees

At the time of termination the cooperation with a group or retirement of the key experts, project managers, workshop manager and office administrator as well as senior managers, certain interviews are managed by approval of the CEO after receipt of the knowledge management approval in the form of the employees' settlement. The relevant questions to the interview are prepared by the knowledge management by cooperation and consultation of technical office of the project and senior managers and their responses are registered as the group processing capitals.

#### Motivation for Acquiring New Knowledge and Culture Building of Knowledge Sharing

Sparring the knowledge management and creation of the culture of knowledge sharing among the experts and managers of an organization is one of the controversial issues in this field which is possible to implement by codification of supportive and proper awarding guidelines. Such culture and submission of the experiences is formed in NirooGostar Expert Group as an article and book.

### CONCLUSION

Based on the significance of implicit knowledge and intellectual capital for the industry and its main appearance in valuable experiences of the managers and the experts of NirooGostar Expert Group, the experience documentation is one of the tools enable the group to make effective measures in dealing with similar problems as well as being protected against the past errors repetition and they move fast toward the organizational objectives, therefore it reaches a constant competitive advantage. The article has made an attempt to study and survey the method of documentation of the experts' experiences in NirooGostar Expert Group.

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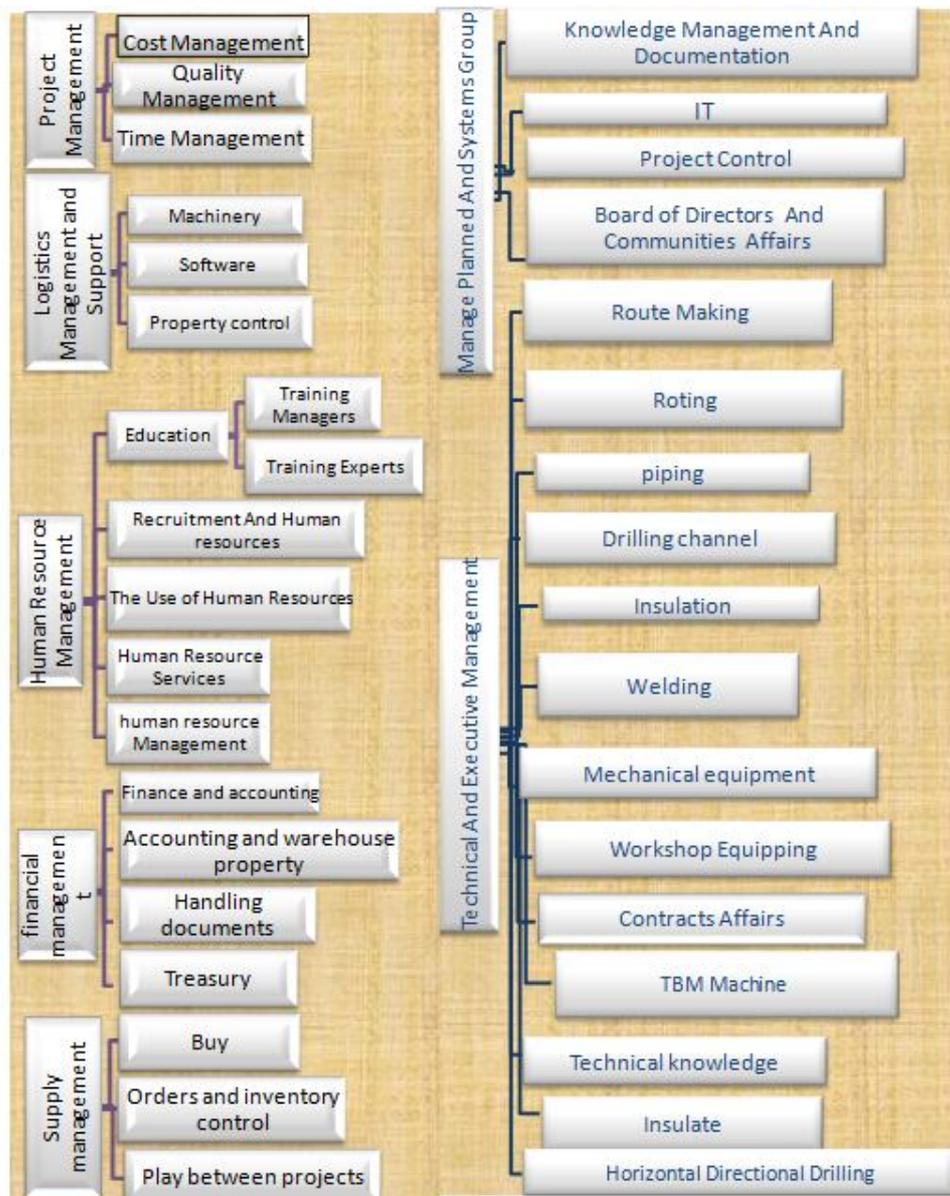
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**Figure 1 – Model of Knowledge tree of NirooGostar Expert Group**





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**Table 1 - Knowledge propositional code**

<b>Date:</b>	<b>Knowledge propositional code:</b>	
<b>Subject:</b>		
Subject description:		
Interviewee:	Interviewer:	
Knowledge field of fields:	Interview session:	
Descriptions:		
The remained questions:		
Registration value <input type="checkbox"/>	Executive value <input type="checkbox"/>	Documentation <input type="checkbox"/>

**Table 2- Questionnaire**

<b>PERSONAL INFORMATIONS:</b>
Full name:
Age:
Number of employees:
Present position:
Education:
<b>QUESTIONS:</b>
Name the most significant stages and positions you had in the projects. Please mention the number of years of activity in each position?
What have been the main challenges and problems you dealt with during the management of the projects in relation with the fields related to you and they could be registered as knowledge?
What are the key successes through your years of service, especially in your own working projects? ( Activities which have led to capabilities growth, financial profitability or saving in time and cost, improvement of working procedures, satisfaction of employees, employers and other beneficiaries, creation of innovation and so on?
Write down the main activities and measures done which were vein. Mention the reason of not achieving any results.
What are the challenges and problems that the managers of your business?
Will deal with in the future?
If you ever enter into other projects or expert groups as a new manager to develop and grow the group, which of the experiences and expertise gained today will you do? Or won't you do?
What methods do you use to prioritize the missions and projects of the management field?
What experiences have you gained to transfer and exchange the knowledge among the employees under your own management?
Which method do you use to evaluate employees' job performance?
Which sections have you promoted to develop the efficiency of your own company performance?
Which experiences did you have in budget adjustment?
How did you recognize the shortage and gaps in your management filed?





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What have you gained as experiences in order to reduce the costs in various managerial sections?
What do you suggest to prevent the errors repetition in your management fields?
What do you consider the reason of your success in management years of the small or big projects?
What are the obtained experiences in order to stimulate the employees' innovation and creativity?
What are your effective approaches to encourage loyal employees and punish badly-organized staff and what were the results?
Which unites involved in the project and the contractors do you suggest to implement the knowledge management in the projects of NirooGostar Expert Group and obtaining more knowledge?
What are your key successes through your years of service, especially in your own working projects in relation with contractors who were under your management?
If NirooGostar Expert Group implements a similar project in the future, which items will be effective including capabilities growth, financial profitability or saving in time and cost, improvement of working procedures, satisfaction of employees, employers and other beneficiaries, creation of innovation and interaction with contractors, consultants and so on?





## The Virtual Water Trade Strategy in Iran Compared to Persian Gulf Countries

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### ABSTRACT

Today, virtual water is considered as one of the subjects, which have been proposed regarding saving and management of water supplies throughout the world. Shortage of water supplies during the recent years has been accompanied with innovation of modern techniques for saving water in the countries, which suffered from shortage of water supplies. One of these modern methods is to notice concept of virtual water trade in management of water supplies. The concept virtual water trade is defined synonymously as sum of the needed water for production of certain quantity of a product. Accordingly, prevention from exportation of products, which may lead to exiting water from the country and emphasis on importation of water-bearing products, is considered as one of the strategies, which have been taken by some countries in management of their own restricted water supplies. This strategy means that the water supplies of countries should be employed for manufacturing of the products, which are followed by further income economically and the shortage of other products should be compensated via importation. Accordingly, the present research is mainly intended to compare the strategy of Persian Gulf Countries in using concept of virtual water trade. In this regard, the rate of hidden water in imports and exports of the aforesaid countries for time range (2001-2012) is explored. Analysis of these parameters indicates that Iran has not taken any certain defined strategy regarding management of water supplies by means of virtual water concept so that we witness serious reduction in rate of hidden virtual water in exportation during recent drought crises. The water supplies have been used to manufacture water-bearing products and exportation of them to other countries so their exportation has been stopped due to drought. In fact, self-sufficiency in manufacturing of agricultural strategic products has been deemed as the main strategy in management of national water supplies. Of course, this strategy has not been too stable due to overlooking the constraints of national water supplies as well.

**Key words:** Virtual Water, Virtual Water Trade, Hidden Water in Importation and Exportation.



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## INTRODUCTION

Management of water supplies and strategy of any country in virtual water trade, especially in arid and semi-arid areas, is crucially important. Due to low level of precipitations and its inappropriate temporal and spatial dispersion, Iran has been included in countries locating in dry to semi-arid countries of the world. In this course, Iran has inevitably use concept of virtual water trade (although without certain strategy) in management of national water supplies with importation of water-bearing products. The water shortage crisis in Iran has created essential problems concerning to water provision (particularly in agriculture sector) despite of the subsequent droughts. Under such circumstances, paying attention to management of water supplies and taking new and efficient strategies such as concept of virtual water trade will be especially important in this regard. The water that is consumed within different phases of producing a commodity is called virtual water stored in the given goods and world trade of commodities creates an international stream of virtual water [1]. The net exportation of virtual water to regions with lesser water supplies may reduce the stress exerted on water supplies in these countries. Thus, virtual water is assumed as alternative of water supply in the importing country. As a result, exchange of virtual water is suggested as a strategy to manage water supplies in arid and semi-arid countries [2]. The exportation of water physically to arid countries with lesser water supplies will be accompanied with a lot of problems and bottlenecks due to financial problems caused by great volume and heavy weight of these commodities; therefore, the subject of virtual water trade is suggested as one of the practical solutions.

Iran has been situated in a region where several other countries also encounter problem of water shortage. Hence, comparison of the strategies taken by in Persian Gulf Countries regarding virtual water trade may propose some strategies to improve management of water supplies in Iran. Thus, the present study is mainly aimed at comparison of virtual water trade strategy in Iran with Persian Gulf Countries. In this regard, the rate of hidden water in import and export of virtual water is compared in the aforesaid countries and finally by means of the index of ratio of imported virtual water to exported virtual water, strategy of Iran about using the concept of virtual water trade is characterized.

## MATERIALS AND METHODS

### Definition of virtual water trade

The virtual water trade is deemed as an essential criterion and tool in computation of water real consumption in a country. This concept was defined for the first time by Tony Allen as the water that is included in commodities or products [3]. Such a definition of virtual water refers to the water, which is consumed for a commodity or services during production process until it is completed and the quantity of this water is equal to sum of the consumed water in different phases of the production cycle from the beginning to the end. Simply, the virtual water may be defined as amount of water that needs to production of a commodity [4]. The virtual water content for any product directly depends on ambient and atmospheric conditions at its production place. Accordingly, Hoekstra (2003) proposed more perfect definition about virtual water. In this definition, virtual water is sum of the water needed to produce certain amount of a product (commodity) with respect to climatic, spatial, and temporal conditions of production and efficiency [5].

Since the time when Allen mentioned the subject of virtual water through the period it has been noticed by scientific communities it lasted for 10 years approximately. The first international conference about this subject was held in Delft (Netherland) on December 2002. But given that the virtual water will not remain as a product with fixed quantity and this rate highly varies depending on the region where it is produced; therefore, presentation of this definition will be also followed by concept of virtual water trade. As a result, different quantity of virtual water of a certain product in different zones may form this idea that if the rate of virtual water in Zone-1 for a product is lesser





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than virtual water of the same product in Zone-2, production of that product in Zone-1 and its exportation to Zone-2 may be followed with less amount of consumed water. As a result, virtual water input and output streams along with importation and exportation of various commodities and services will form in any country. These streams have been known as virtual water trade and over the time different countries (especially countries located in arid zones with water shortage) considered certain strategies for their own concerning virtual water trade.

#### Analysis of subject literature

Based on the objective in the present article in this regard, virtual water trade and strategies of different countries about this topic are explored. Many studies have been carried out among scientific sources regarding virtual water trade. Inter alia, many researchers have mentioned the concept of virtual water trade as a strategy to manage water supplies [6, 7, 8].

In their study, Dehghanpour and Bakhshoodeh (2008) showed that virtual water trade was considered as a basic criterion and tool for calculation of real rate of water consumption in a country. During recent 40 years, virtual water trade has been growingly increased permanently. About 15% of consuming water in the world is exported as virtual water. Thus, trade of agricultural crops is considered as main component of virtual water trade. 67% of virtual water trade in the world is related to world trade of farming crops and 23% of their trade is attributed to livestock products and the related commodities while only 10% of them is related to industrial products. During years (1995-1999), wheat product has exclusively devoted 30% of volume of virtual water trade among the countries of the world and it was followed by soybean and rice, which are ranked later with higher than 17% and 15% of this rate, respectively. In this investigation, they have implied that the negative consequences and positive outcomes of virtual water exchange should be measured in which one of these consequences is the cost of opportunity for the consumed water [9].

In their survey, Moosavi et al (2009) express that with respect to exacerbation of water shortage crisis in different countries in the world, the subject of virtual water will be crucially important due to the depth of its concept in planning and policymaking for water at macro level in the future. At present, also with exportation and importation of goods and products between various countries of the world, some calculations are also implemented about the amount of imported or exported water as virtual water. Accordingly, the given study estimates the amount virtual water for producing certain quantity of some products in Iran. Eventually, this study implies that with respect to restriction of water supplies, humans have noticed the choice of unconventional waters including treated wastewaters, water drainage zones, and desalination from sea water etc. the other alternative that has been discussed today to provide and store water, especially in arid and semi-arid countries in the world is water trade that is called virtual water trade [10].

In their investigation, Razavi and Davari (2013) implied that with respect to the existing sources and current demand, the existing water supplies will not responsive to the next generation for water provision. Thus, considering modern techniques for water supply is very essential. One of the prevalent techniques in the world is to notice virtual water and water-bearing canal of products, and virtual water trade. They mention the concept of reversible water and its proper consumption as the strategy for management of the given supplies since under current conditions the role of virtual water trade is unique in reduction of stress on water supplies. They assume the absence of the needed statistics and information about virtual water trade as one of the problems they encounter in this path [11].

In their study, Dehghan Manshadi et al (2013) have suggested a structure for analysis of the potential for use of virtual water in the destinations field in water transfer projects. They imply in this investigation that what it has occurred in some zones of the countries during recent years and caused drought and reduction of water supplies in rivers and springs have been due to overlooking the climatic assets in any zone and mismanagement of water supplies. The results of this study about project of water transfer from Soolgan to Rafsanjan indicate that rather than



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reduction of costs for transfer and hazardous consequences of water transfer for this region, using of virtual water concept will be also followed by a lot of profits fro cultivation and industry of Khuzestan [12].

In their research titled 'Virtual water exchange in order to improve productivity in water consumption (case study: Kerman Province)', Abolhassani et al (2014) have calculated the virtual water exchanges volume in this province. The results came from this study showed that Kerman Province was a virtual water- exporter and the size of exportation of virtual water has been estimated more than 64.2billion m<sup>3</sup>. This study indicates that pistachio and date are deemed as extravagant water-consuming crops and on the other hand other crops such as grains, fruits, and cucurbits are assumed as less water-consuming crops. With lower yield, pistachio includes higher rate of virtual water but date is place at lower rank with more suitable yield while both crops include higher rate of virtual water content than standard level [13].

In addition to analysis of international stream of virtual water trade their study, Hoekstra and Hung (2002) imply that if water is considered as a economic commodity, the problems of water shortage and surplus as well as reduced quality of water will be resolved in different parts of the world since exportations and importations of crops in the countries may create exchange of virtual water between countries. In this study, total extracted water in Iran has been mentioned as 72.6 billion m<sup>3</sup> per year, available water as 137.5 billion m<sup>3</sup>; the net importation of virtual water was estimated 5.8 billion m<sup>3</sup> with respect to farming plants and 1.02 billion m<sup>3</sup> given the livestock crops and the related products [2].

Verma et al (2008) have examined the virtual water stream caused by exchanges of crops within different states of India during period (1997-2001). The results of this study showed that the virtual water stream in India included more than 106 billion m<sup>3</sup> and or 13% of total volume of consuming water in this country [14].

Delbourg and Dinar (2014) have explored the effect of water demand and its efficiency on rate of virtual water trade at world scale. This investigation has been carried out about all the related activities to agriculture sector and during period (1994-2007). It is shown in this study that the countries with shortage of water supplies trade the nutrients and food products to compensate shortage for their water supplies [15].

In their survey titled 'The virtual water trade as a strategy for management of water supplies in Iran', Mohammadi et al (2014) have explored the relationship between exportations of virtual water with scarcity of water supplies in Iran. The results of this study show during period (2001-2008), Iran was dependent purely on water imports and the net rate of virtual water imports of Iran is averagely about 12.7 billion m<sup>3</sup> every year. Similarly, calculation of virtual water rate in the given products indicates the exported products need more water demand than imported products.

Analysis of these studies shows that the specific strategy of any country in using virtual water trade concept may play essential role in management of water supplies in that country so that it has been always emphasized and suggested the role of water as one of the key factors in producing extravagant water- consuming crops and products where the virtual water trade is employed as a strategy to provide water supplies in arid area with water shortage. Hence, application of virtual water trade concept in Iran may also be efficient in management of water supplies. Accordingly, in the following theoretical bases and method of estimation of virtual water trade is presented in this study and the by means of the given estimations, virtual water trade strategy in Iran is compared with littoral states in Persian Gulf region [16].

**METHODOLOGY**

The virtual water concept may be employed as a useful tool in calculation of real rate of water consumption in the country where if the rate of international exchanges of virtual water and exportation ad importation of different





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commodities is also considered thereby and with computation of water track schemata one could determine the real national water demand due to the people’s consumption pattern for world water supplies. Accordingly, it can be shown that whether domestic water supplies in any country will provide the water requirements for the current or future population of that country or not and or basically how much a country depends on water supplies of the exporting countries.

By definition, water productivity and virtual water are related inversely. Water productivity includes the quantity of commodity that is produced from unit of volume of water (How much product is produced from one cubic meter of water) and its unit may be usually defined as ton per cubic meter. But, virtual water consists of the consumed water for production of certain quantity of a product and its unit is liter per ton (cubic meter per ton). In other words, in productivity concept it is emphasized on amount of production from water so that as the amount of production from water is increased further, the productivity of the given product will be higher. But, in concept of virtual water it is focused on amount of the consumed water in producing one unit of that product. Therefore, with improving water productivity, the quantity of virtual water will be reduced in the given product or commodities and vice versa reduction in rate of the virtual water consumed for one unit of product denotes rising water productivity in that product. Thus, rate of virtual water for any product may be derived from the following formula [4]:

$$VW_{kj} = \frac{W_{kj}}{P_{kj}} \tag{1}$$

**Where**

$VW_{kj}$  denotes the amount of virtual water per unit of  $k^{th}$  product in  $j^{th}$  country.

$W_{kj}$  is total volume of the water needed in process of producing of  $k^{th}$  product in  $j^{th}$  country.

$P_{kj}$  is total production of  $k^{th}$  product in  $j^{th}$  country.

To compute the rate of virtual water trade in different zones, initially the orientation of virtual water streams should be identified. As it mentioned, exchange of commodities between different countries may be also led invisibly to exchange of the existing virtual water in those goods. Thus, the rate of exchange of virtual water should be separately calculated both in exportation side and importation side for goods and services. These two sides are separated because the amount of virtual water in any commodity will be different with respect to climatic, spatial, and temporal conditions of production and similar factors in any region according to definition of virtual water. Therefore, even though a country imports and exports the given products similarly the rate of virtual water per unit of the exported goods (with respect to climatic conditions of the exporting country) will be different from the amount of virtual water for a unit of the imported goods (with respect to climatic conditions of country of origin) at the same time. As a result, the amount of hidden virtual water in exportation of any product should be computed with respect to climatic conditions of the exporting country of the given product.

$$EVW_k^{ij} = VW_{kj} * EX_{kj} \tag{2}$$

**Where**

$EVW_k^{ij}$  denotes the amount of hidden virtual water in total export of  $k^{th}$  product from  $j^{th}$  country to  $i^{th}$  country.

$VW_{kj}$  denotes the amount of virtual water per unit of  $k^{th}$  product in  $j^{th}$  country.

$EX_{kj}$  is total volume of the exportation of  $k^{th}$  product from  $j^{th}$  country.





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Consequently, the rate of hidden virtual water in exportation of  $j^{th}$  country to  $i^{th}$  country is derived from the product of multiplication of the quantitative amount of exportations of  $j^{th}$  country to  $i^{th}$  country of each of these commodities to amount of virtual water in that commodity (with respect to climatic and cultural conditions etc in  $j^{th}$  country).

$$EVW^{ij} = \sum_k EVW_k^{ij} \tag{3}$$

**Where**

$EVW^{ij}$  denotes the amount of hidden virtual water in total export of  $j^{th}$  country to  $i^{th}$  country.

$EVW_k^{ij}$  denotes the amount of hidden virtual water in total export of  $k^{th}$  product from  $j^{th}$  country to  $i^{th}$  country.

$$EVW^j = \sum_i \sum_k EVW_k^{ij} \tag{4}$$

**Where**

$EVW^j$  denotes the amount of hidden virtual water in total export of  $j^{th}$  country to all countries.

$EVW_k^{ij}$  denotes the amount of hidden virtual water in total export of  $k^{th}$  product from  $j^{th}$  country to  $i^{th}$  country.

Regarding calculation of the amount hidden virtual water in importation of various commodities, this process will be done inversely. Namely, the rate of virtual water of any product in importing country of origin is considered as criterion for calculation of virtual water.

$$IVW^i = \sum_k IVW_k^{ij} \tag{5}$$

**Where**

$IVW^i$  denotes the amount of hidden virtual water in total import of  $j^{th}$  country from all countries.

$IVW_k^{ij}$  denotes the amount of hidden virtual water in total import of  $k^{th}$  product from  $i^{th}$  country to  $j^{th}$  country.

$$IE^j = \frac{IVW^j}{EVW^j} \tag{6}$$

**Where**

$IE^j$  denotes the ratio of the imported virtual water to exported virtual water of  $j^{th}$  country.

$IVW^j$  denotes the amount of virtual water in total import of  $j^{th}$  country from all countries.

If this ratio is greater than one (1), it can be said that the amount of hidden water in importations of that country is greater than the hidden water in exportation of the same country and as a result the given country has removed its limitation for water supplies practically by means of using water supplies from other countries. As this ratio is greater for a country, it indicates that the aforesaid country has been further tended to use concept of virtual water trade in management of its water supplies. It should be noticed of course that it is probably only due to limitation of





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water supplies unconsciously occurred in a country and because of absence of a certain strategy in this regard. But, in any case, greater amount of this ratio shows using the limited water supply of a country more appropriately in line with producing less water- consuming products and importation of water- bearing products.

## RESULTS

### Position of Iran in virtual water trade

This article is mainly intended to explore virtual water trade strategy in Iran in comparison to Persian Gulf countries region. Then the index of ratio of imported virtual water to the exported water is calculated by means of the extracted information. Using this parameter, the strategy of different countries about application of virtual water trade in management of water supplies may be relatively evaluated. The related statistics about rate of virtual water for any product code and the relevant standards have been formulated for assessment of the real volume of the water by Water Track Institute. The rate of hidden water in exportation and importation of any country has been computed by means of this statistic and separately based on six-digit codes of any commodity.

### Analysis on exportation of virtual water in Persian Gulf region

As it mentioned in the previous section, the rate of virtual water for any product of importing country of origin is considered as criterion for calculation of virtual water regarding computation of the rate of hidden virtual water in importation of different commodities. Therefore, in order to compute importation of virtual water in Persian Gulf region, firstly the rate of stored virtual water in any product should be identified with respect to country of origin and then with respect to size of importation in any country, the amount of hidden water should be determined in importation. Finally, the rate of hidden water in any unit of imported product can be generally calculated by dividing the amount of the virtual water accompanied to the importation to total volume of importation in any country.

Accordingly, the amount of the hidden water in importation of Persian Gulf Countries region has been computed for time period (2001-2012) in Table (1). Analysis of this table indicates that the maximum rate of hidden virtual water among countries locating in Persian Gulf in 2001 belong to Oman, Iraq, ad Saudi Arabia. In fact, the maximum rate of virtual water has been consumed per one ton of the imported product by these countries compared to other nations.

This issue indicates that importation of these countries has been mainly depended on water-bearing products and in fact with importation of water-bearing products, these countries have managed relatively to save in consuming their limited water supplies and used these supplies for producing commodities with higher value.

But in 2012, Iran is included in first three higher ranks in the hidden water in importation. In 2012, the highest amount of hidden virtual water in importation among Persian Gulf Countries belonged to Iraq, Saudi Arabia, and Iran respectively. At this year, Iraq has imported about 918m<sup>3</sup> of virtual water per one ton of imports in average. Also Saudi Arabia and Iran have imported about 800m<sup>3</sup> of virtual water per one ton imported products in average in this year. The minimum amount of hidden water in importation belongs to Bahrain. In 2012, Bahrain has imported only about 173m<sup>3</sup> of virtual water per one ton imported products. In fact, most of the imported commodities by this country included lesser amount of virtual water. As a result, in average the amount of virtual water along with any ton of the imported product is much less than in other countries of Persian Gulf region. This status has been much inappropriate during the period of analysis. As a result, the mean rate of the hidden water in imports is 89m<sup>3</sup>/ton throughout the studied period. Thus, it may not be implied that this country has taken the strategy for importation of virtual water to manage its water supplies.





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Comparison of the hidden water in importation during the first and final years of the studied period may show that the mean rate of hidden water has been almost increased in importation at final year in all of these countries. With respect to subsequent droughts during recent years, this indicates that Persian Gulf countries region have inevitably tended to virtual water trade due to lack of possibility for providing the domestic water-bearing products and they have tried to provide their domestic needs with importation of water-bearing products.

#### Analysis of exportation of virtual water in Persian Gulf region

Table (2) shows the rate of hidden water in exportation of littoral states in Persian Gulf region for time period (2001-2012). Analysis of this table shows that the maximum rate of hidden virtual water in exportation among Persian Gulf countries during 2001 has belonged to Oman, Iran, and Saudi Arabia respectively. In fact, compared to other countries, any ton of the exported products by these countries has included the highest rate of virtual water. This issue indicates that exportation of these countries have mainly relied on water-bearing products and these countries have really exited great volume of their limited water supplies virtually with exportation of water-bearing products.

In this year, Oman has exported virtually about 545m<sup>3</sup> of water in average per any ton of exports. Also in this year, Iran has virtually exported about 500m<sup>3</sup> of water in average per one ton exported product.

Also in 2012, Iran is placed at second rank in terms of parameter of virtual water in exportation. The maximum rate of hidden virtual water in exportation among countries at Persian Gulf region belonged to Saudi Arabia, Iran, and Oman respectively in 2012. The least rate of hidden water in exportation is related to Qatar and Bahrain. In 2012, only about 13m<sup>3</sup> of virtual water has been exported per one ton of the exported product by Bahrain. In fact, this country has often exported some products, which need to less water consumption. As a result, in average the rate of virtual water embedded in one ton of the exported product is much less than other countries in Persian Gulf. As a result, exportation has least effect on domestic water supplies in countries of Qatar and Bahrain.

In addition, comparison of the hidden water in exportation at first and final years of the studied period indicates that the hidden water in exportation has been extremely reduced in most of the countries. The subsequent droughts during recent years have caused the given countries to less be able to export the water-bearing products and consequently this index has been extremely decreased. In particular, the rate of this index has been further reduced noticeably for the countries such as Oman and Iran where their exportation has been mainly dependent on domestic water supplies. For instance, the rate of hidden water index in Iranian exportation has been extremely reduced from approximately 500m<sup>3</sup>/ton in 2012 to about 141m<sup>3</sup>/ton.

At last, comparison of hidden water indices in importation and exportation may show that the main policymaking of Iran has been implemented in the course of self-sufficiency in water-bearing products (especially the agricultural crops including wheat). But finally the incremental trend of hidden water index in Iranian importation along with extreme reduction in hidden water index for exportation signifies instability of aforesaid policy. This strategy is visible in many countries in Persian Gulf region. One can assume the main reason for taking such a strategy in the subjects regarding nutrient security and domestic providing of strategic products (including wheat). But, among them what it can present an accurate image of strategies of different countries in Persian Gulf region, is to calculate index of ratio of the imported virtual water to exported virtual water. If this ratio is greater than one (1), it can be said that the amount of hidden water in importation of the given country is greater than hidden water in its exportation and as a result the aforesaid country has practically removed its limitation for water supplies by means of water supplies from other countries.



**Mozhgan Moallemi****Analysis on ratio of the imported virtual water to exported virtual water**

The index of ratio of the imported virtual water to exported virtual water has been computed in Table (3). This parameter is greater than one (1) for all of the studied countries. This shows that particularly trade in these countries has been led to importation of virtual water inside them. But as this ratio is greater for a country, it indicates that country is more tended to use concept of virtual water trade in management of its water supplies. Comparison of this index among countries at Persian Gulf indicates that during the studied period, Iran has devoted the least index. This issue signifies that in comparison to other countries in Persian Gulf, the strategy taken by Iran in management of its water supplies has less relied on concept of virtual water trade.

The index of ratio of the imported virtual water to exported virtual water is about 1.7 for Iran. While, the given index is for the country such as Saudi Arabia is about 6.6, and about 9.5 for Qatar. Namely, in trade of commodities in Qatar, the amount of virtual water per one unit of the imported goods is 9.5 times greater than the rate of virtual water per unit of the exported product.

Of course, it should be noticed that the magnitude of this ratio may be achieved unconsciously and only because of limitation of water supplies in a country and there may be no certain strategy in this regard. However, in any case, increasing this ratio signifies using the limited water supplies more appropriately in a country in the course of producing less water-consuming products and importation of water-bearing products. This issue may finally lead to reduce stress on domestic water supplies to great extent.

**DISCUSSION**

This article is mainly intended to compare virtual water trade Iranian strategies and other countries in Persian Gulf region. In this course, using concept of virtual water trade in management of Iranian water supplies and their important and real position for fighting with water shortage problems were explored. To this end, the rate of hidden water in importation and exportation of countries in Persian Gulf region was computed during period (2001-2012). Analysis on rate of the given index in different countries indicated that these countries have not approximately taken any certain and predetermined strategy to use virtual water trade concept in managing their water supplies so that during recent years and with exacerbation of drought in these regions and lack of possibility to provide water-bearing products inside the country, importation of such products has been extremely increased. This issue has led to severe increase in amount of hidden water index in importation for most of countries in Persian Gulf region. Also regarding Iran, the main national policymaking trend has been directed in the course of self- sufficiency in water-bearing products (especially agricultural crops such as wheat). However, finally the ascending trend of importation of virtual water during recent years along with rising hidden water index in Iranian importation signifies instability of the given policy. This issue shows the absence of a certain policy regarding virtual water trade in Iran. In fact, virtual water trade has not been affected by certain policy and it extremely affects the existing fluctuations in precipitations rate and the created droughts within different years and rate of hidden water index in exportation and importation of Iran.

Analysis on index of ratio of the imported virtual water to exported virtual water also indicated that the rate of this index has been also greater than one for all of studied countries. This shows that trade in these countries has purely led to importation of virtual water in them. But, comparison of the rate of index of ratio the imported virtual water to exported virtual water among the aforesaid countries indicated the quantity of this index in Iran is much less than other studied countries. Small rate of this index signifies that Iran is less tended to use concept of virtual water trade than other countries in managing its water supplies. As a result, it is suggested to allocate special position to take this modern strategy regarding fighting against water shortage problems in managing national water supplies by giving information to politicians and economic planners about importance of virtual water trade concept. In fact, the virtual



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water should be exchanged with respect to interests caused by virtual water trade and unconsciously thereby the resulting economic benefits can be practically used. In this sense, change in cultivation pattern and paying attention to producing less-consuming crops may be assumed as one of the main priorities in strategy of managing national water supplies. Of course, it should be noticed that virtual water trade is proposed as a complementary strategy in managing water supplies. In fact, one of the important issues in subject of virtual water trade is to pay attention to the approach of nutrient security and self-sufficiency in strategic products. Therefore, the optimal amount of food and nutrient importation for different countries may vary with respect to possession of water supplies, farming lands, and other production sources as well as national food security policies. In any case, it seems that revision of policies regarding management of water supplies to develop virtual water trade based on relative advantage should be converted into one of the main preferences for national politicians and economic planners.

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**Table 1: The Amount of the Hidden Water in Importation of Persian Gulf Countries Region (m<sup>3</sup>/t)**

country	Year 2001		Year 2012		Total period	
	hidden water in importation	rank	hidden water in importation	rank	hidden water in importation	Rank
Iraq	888	2	918	1	879	1
Saudi Arabia	812	3	809	2	798	2
Iran	614	4	795	3	584	3
Oman	899	1	504	4	580	4
United Arab Emirates	350	5	354	6	322	5
Kuwait	244	7	357	5	309	6
Qatar	271	6	295	7	169	7
Bahrain	170	8	173	8	89	8

**Table 2: The Amount of the Hidden Water in Exportation of Persian Gulf Countries Region (m<sup>3</sup>/t)**

country	Year 2001		Year 2012		Total period	
	hidden water in exportation	rank	hidden water in exportation	rank	hidden water in exportation	rank
Iran	499	2	141	2	273	1
United Arab Emirates	251	3	89	5	168	2
Oman	545	1	116	3	148	3
Saudi Arabia	96	5	142	1	128	4
Iraq	80	6	106	4	106	5
Kuwait	97	4	64	6	73	6
Bahrain	24	7	13	8	24	7
Qatar	21	8	16	7	21	8





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**Table 3: The Ratio of the Imported Virtual Water to Exported Virtual Water of Persian Gulf Countries Region (m<sup>3</sup>/t)**

country	hidden water in importation			hidden water in exportation			ratio of the imported virtual water to exported virtual water
	2001	2012	average	2001	2012	average	
<b>Iran</b>	614	795	581	499	141	342	1/7
<b>United Arab Emirates</b>	350	354	327	251	89	183	1/8
<b>Oman</b>	899	504	716	545	116	260	2/8
<b>Kuwait</b>	244	357	322	97	64	74	4/4
<b>Bahrain</b>	271	295	113	24	13	23	4/8
<b>Saudi Arabia</b>	812	809	810	96	142	123	6/6
<b>Iraq</b>	888	918	883	80	106	102	8/7
<b>Qatar</b>	170	173	207	21	16	22	9/5





## Syncing Climate, Sustainable Development and the Environment by Architectural Design (Practical Case: Pariz Recreational – Cultural Complex in Kerman Province)

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### ABSTRACT

Different groups in the society need to be allowed to stay in places that they are familiar with and also have the chance to participate in different social groups and not be solitary people. Nowadays, urban spaces can perfectly play the role of collective living centers, in these places people would be able to meet up. By having a glance at the places and spaces of the city regarding their frequency of use, unfortunately, we would notice that they are very crowded during days, but at other times, they are abandoned and unused; we could hardly find a place in the city that has a modest vitality during the day and night. Therefore, it is necessary to design such a complex that the lack of it, is also evident. One of the reasons for choosing this complex in Pariz region is its proximity to important industrial regions of the country (such as Mes-e Sarcheshmeh and Gol-e Gohar Iron Ore in Sirjan), that could be a tourist attraction. The share of income from this industry, as one of the main economic branches in many countries in the world, is an undeniable matter; therefore, it is necessary to pay more attention to the fact that in recent years, the non-oil revenues have formed its basis of economic policies. Specifically, Kerman City has a variety of cultural and historical attractions and by creating appropriate welfare and recreation programs, a base for attracting more tourists and improving the prosperity of this industry will be provided.

**Key words:** leisure and recreation, culture, climatic architecture, sustainable development





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### INTRODUCTION

The purpose of creating a recreational space, is to get rid of the illness caused by monotony and daily tasks in workshops, factories, mines, and offices and monotonous work that causes exhaustion and boredom.

Given the current development of cities and population growth, it is important to create places for rest and recuperation, recreation, play, having solidarity with the community, and achieving peace of mind.

Since Pariz City is close to Gol-e Gohar Mines in Sirjan and Mes-e Sarcheshmeh, its climate is like an industrial city's climate, and its society members (man and woman, young and old, and children) work without a break, the lack of such a multi-purpose space (recreational – cultural complex) is quite evident.

Moreover, the world and its developed countries are moving to a direction that in spite of the mechanization of everything around them, they are trying to spend their daily, weekly, monthly time on healthy recreational and cultural activities. The most innovative aspect of this project is the contrast of the nature of this city; it has a cold and mountain weather, and a desert sky full of stars and moonlight, therefore, this project has created an inseparable reality through a combination of these opposing concepts. By providing a place to watch the stars at night, we will have a lively and vibrant atmosphere during the night – just like during the day – in the heart of this complex. Moreover, by designing this complex, we will create a space that communicates with a person's mental reserves – from his independent experiences to culture and traditions.

### METHODS

Library studies in the field of the entertainment and leisure nature, recreational centers, their consistent with the culture and traditions of villagers, and methods for designing recreational spaces in Iran, other countries and different climates

An investigation and analysis of available samples via the Internet or library studies  
Collecting design standards and design criteria through library studies or websites  
Learning how to design through the study and review of projects accomplished in this area or close to it  
Understanding people's customs and culture, as well as their needs and deficiencies by living in their area

#### Design phase

A good designer is a public designer who works for civil society, a designer cannot imagine a place without people and their behaviors and activities. Since he looks at the space as a container for diverse contents, he tries to create a consistency between form, function, and the meaning issued by the space, also, he is looking to 'create space'. The designer looks for a space that its size and form would be appropriate to its current social life.

In such a design, space is not only for admiration, but it should be able to handle the most vibrant events daily, weekly and yearly, and does not look like a deserted, abandoned and infinite place. This space should not be too small and tiny, or very luxurious and overwhelming! It should be appropriate to personality and human dignity. However, the more space communicates with its audience, interact easier, be more coordinate with their habits and behavior patterns, and meet their memories, expectations, and wishes, the more the person attaches to it.

In the design of this complex, we more tried to follow the sustainable development principles, because we know on this planet, we are facing the shortage, or to be more accurate, the end of fossil fuels. Hence, any designer is





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responsible for designing buildings that preserve the environment and society in general, and strengthen them basically, especially this project is located in a mountainous area.

#### Architecture derived from needs

Architecture is usually being (designed) and realized (made) in order to respond to the current situations. The nature of these situations might be a simple respond to varying degrees, or a reflection of social, economic, political and even emotional issues and idealistic objectives. Either way, it is assumed that a series of current conditions (i.e. problem) is not acceptable, and new conditions (i.e. solution) is required. After creating the architecture, the function is problem-solving process or design process. (D.K.Ching, 1998)

#### Climate

The law of causation of climate in the form of construction is widely accepted in architecture as well as human geography, however, human geography has recently considered this issue on its own agenda without any rush. It is useless if we deny the determinative influence of climate in the creation of form. Therefore, the causation theory of climate is preserved in architectural form; this theory suggests that creating a shelter was the first engagement of the early man and as a result of climate algebra, the form was determined.

#### Mountains

With reference to Moein and Dehkhoda dictionaries, we will realize "Mountain" is said to be a place with high altitude and in it, there are very mountains. Presence in the mountains, brings people the privilege to think, analyze, live, etc. Because of its beautiful nature, the chance to think about what we need to be aware of, will be provided. Mountain is a generous enough to accept an individual and allows him to come back to his life happily and painlessly.

#### Desert

According to Dehkhoda Dictionary, "Desert" is a broad, unrequited, anhydrous, and salt marsh land. Iran's deserts are ancient and dried seas and some individual strands of the surrounding mountains are in some parts of them that create very dry mountain areas; due to the very dry climate of this area, the temperature difference between night and day is more sensible.

Sky is desert people's entertainment and the only free and prosperous resort of desert. (Shariati, 2004)

#### Using natural elements in architecture

Different climatic conditions have made various tribes who live in this territory to consider some policies in order to use facilities and deal with changing and more inclement climate conditions, sometimes they are noteworthy and considerable. Structuring elements of climatic conditions include sun angle, latitude or distance from the equator, the intensity and direction of winds, the presence or lack of height above sea level. Inhabitants of this land had been trying to conduct the environmental conditions and deal with bad climatic conditions in the vast majority of the country for a long time, and to maximize the use of natural resources to deal with the natural difficulties, they have been employing specific arrangements based on the utilization of existing resources in the environment; the three elements of earth, water and wind have played an important role in architectural structure.





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### Sustainable development principles

Since most of the Earth's fossil energy resources are reducing and in some cases, they are being disappeared, perhaps by relying on nature and natural energy sources, we could imagine a brighter future for ourselves. Due to the steady increase in population, countries are facing energy shortages more than ever, it threatens human life. One of the main causes of air pollution in the world and especially in our country, is the consumption of fossil energy in residential spaces – for preparing hot water and heat for living.

This growing air pollution is because of the negligence of building designers and builders to the climatic conditions of each region. (Watson, Lob, 2003)

Therefore, due to the different climates in this broad country, we are dealing with multiple different building systems. To fight against the outside environmental conditions, valuable experience in the design, construction and selection of material lies in traditional buildings in Iran, but unfortunately, at the present time, with a wrong interpretation of the architecture of the West, all the knowledge and experience of our predecessors are forgotten and by an imperfect imitation of international architecture, we are constructing fertile lands of the country. May we receive messages about Iranian traditional architecture and use more climatic design methods and passive solar energy (clean energy).

### Design of Pariz recreational – cultural complex

#### Design process

In the design process of this complex, a maxim is located on this basis in order to create a deeper connection between the element, nature and historical values of the site based on its important features and parameters, and eventually, to create an entity called man; the design carried out should be in accordance with the natural environment (regarding general contents and characteristics). On the other hand, due to the dynamic nature and flexible spirit of these complexes, a series connected with its environment will be created that dynamism, fluidity, and mobility are its outstanding features. In the design process, statistics, site and its basic idea, matters such as the general position of design area, view and prospect, lines, axes, and personnel of the site, and complications and ruggedness will be analyzed in order to have an appropriate basis for the designing, locating elements of the complex, and offering design ideas.

#### Site layout and land use regulation

According to the analytical issued so far, the layout of land uses are identified in Figs. 1 and 2 as follows:

Stars showcase: it is tried to have a beating heart in this complex to cause vitality at night as well as day, and this beating heart is nothing more than a stars showcase. It is a dome covered with glass that due to the reflection of the sky in the day and beautiful lightings in the night has a special attraction. The space is located in the highest point of the site, thus, it is in the highest point of Pariz City and it has a very good view from all parts of the city. It is intended to locate this place as the same level as its surrounding mountains and not grind them. In terms of visual, it has reflection of mountains and due to the reflecting images of sky and earth, it creates an image of the desert in minds; it is the main hub of the complex and a symbol of Pariz's natural beauty. (No. 1)

Temporary residence: the location of the residence (resort hotel) is so far from the congestion and noise of the city and cars on the streets, it is almost at back of the site to have a proper view in regard to the space and its surrounding mountains. (No. 2)





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**Restaurant:** it is located in an area of the complex that in addition to its proximity to residences and other places, it has a special visual position regarding the rest of the site and its surrounding area (the surrounding mountains). (No. 3)

**Service areas:** some service areas such as staff lounge, prayer room, ablution room, and health services are located in a place to be close to all the site's parts while not block other views. (No. 4)

**An outdoor amphitheater:** the location of it is at a part of the mountain range and with its bowl-shaped form, it is suitable to the amphitheater structure. This part of the site surrounds a good visibility and it is away from the noise of cars and even the site itself. (No. 5)

**Multi-purpose hall (cinema):** because of the approximate difference of its usage with other parts of the site, it is located in a place close to the outdoor amphitheater and it is almost at the end of the site. (No. 6)

**Fitness center:** this place is close to park and to create a space between this and studies section, there is a covered path between these two parts. (No. 7)

**Studies section:** it is tried to locate the studies section in a place far away from the noise of the sport center, the outdoor amphitheater, and even the stars showcase, however, it can have a linear relationship with exhibition and museum that pose a special peacefulness. (No. 8)

**Museum:** in fact, the aim of the design of this complex was to create amusement and entertainment and to be familiar with the culture of this region of Iran, therefore, museum is the best place for this operation. It can be located at the main entrance of this site, therefore, an individual in despite of its modernity, feels it is derived from the culture and customs of the people and it would associate memories for Pariz's residents and increase their willingness to use this complex. (No. 9)

**Parking lot:** for this complex, parking lots have been allocated in such a way that not only they have the best service for the elements in the site, but also the hierarchy of accesses to not disturb other complex's relationships has been considered. (No. 10)

**Fountains:** In addition to their visual beauty and elegance, fountains can also be a place to store the required water for gardens. Moreover, since one of the important elements of the Pariz City is its river, a fountain in this place could bring Pariz's residents closer to itself. (No.11)

Generally, the design of the primary lines is inspired by the concept of "boiling" and then skyline form of Pariz, spaces are in a way to guide winter winds out and have a strong south side to use sunlight in the winter optimally. Volumes are derived from desert architecture, continuous and internal spaces to provide suitable climate and also evoke the memories of Pariz's residents.

## CONCLUSION

Due to its dry and semi-arid climate, population growth, and the expansion of mining and industry activities, Iran is among the countries that have more important environmental issues and it requires environmental arrangements and sustainable development conditions. This achievement is possible through different methods, such as climatic architecture that is in line with sustainable development. Meanwhile, the design must progress in line and consistent with the culture; the culture should be able to control, direct and expand science and technology and its changes in



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the direction of modernization and cultural revitalization. ([www.iauba.ac.ir](http://www.iauba.ac.ir)). Nowadays, environment and methods to protect it are in the center of attention of international institutions. Environmental law and its related subjects, create the third generation of human rights after civil and political rights as the first generation and social and cultural rights as the second generation in the country. Our architecture as the inheritor of an original and traditional architecture that reflects different architectural accents and languages, is rich of glorious Islamic civilization; by relying on Iranian rich culture and identity, it can utilize art, culture, etc. capacities and be the vanguard in protecting environment in the international arena.

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**Fig. 1: The southern view of the complex**





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Fig. 2: The northern view of the complex





## Productive Model Entrepreneurial Graduates in Architecture, Islamic Azad University

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### ABSTRACT

The remarkable population of the architecture graduates who often focus on academic knowledge are unable to enter the labor market On one hand, and the necessity of the modern society to art and architectural engineering as well as undesirable status of the architectural projects in most residential applications one the other hand requires finding a solution to solve the issue of expertise usage and professional skills of the architecture. It is obvious that in addition of the professional knowledge, having proper skill and attitude which are both acquisitive is required in order to succeed in the labor market based on self-employment and entrepreneurship. We know the university plays a potential and real role in various countries economic development. The method the universities use knowledge and science in this matter depends on the nature of their own entrepreneurial education. The Islamic Azad University has abundance of capacities and potentials and its graduates are active in various departments of the country including economic, social and cultural ones. It is noteworthy to mention that it should be applied in order to advance the programs and national goals materially or spiritually. Moreover, the architecture graduates are considered as a major part of this university graduates and national assets. Therefore, the necessity of centers or organizations which act as a thinking tank as well as creating interaction and relationship seriously between the university and graduates is evident. The employment of Azad University graduates is the main preoccupation of the society and families and the graduates must participate in conduction of the projects outside the university. By implementation of the economic





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researches by economic and entrepreneurial centers, the universities are forced to make a relationship with the externalized environment, as well as increasing their own condition, legislation and accessibility to the public sources. Thus, knowledge transformation to economic productions is encouraged by the public organizations, private sectors and universities.

**Key words:** entrepreneurship, graduate, architecture, Islamic Azad University, empowerment

## INTRODUCTION

Bachelor of Architectural Engineering is a professional course which aims fostering of creative talent, transferring public professional knowledge and skills of architecture and achieving public effectiveness in this field. Along with such goal, it has been attempted to value architectural designing projects and technical and theoretical courses about it as much as possible.

The offered syllabi in this major are a set of principles, bases, regulations, criteria and attitudes in technical and cultural fields, specifically the ones related to the architecture. It is expected that the student's action quality will be effective while making a design decision. Long scientific experiences and studies in the field of learning refers to the fact that learning the bases and principles of each science at the time of using them, namely when those principles are visible in their own alive and dynamic current, it could enable the learner's mind to use them in various future situations.

<< Bachelor of Architectural Engineering lasts for at least four years. Before the course starts, one prerequisite semester is offered which is not considered as the educational years, but eight units of them are regarded as the course units. The graduates of this bachelor study could continue their education in discontinuous master course>> ( General specifications, program and syllabi of Architectural Engineering Bachelor Course, Art group, approved by the 365<sup>th</sup> Session of the Higher Council for Planning, dated 1998, 15,11).

What the students learn in this course are all based on the subjects that an architect must learn everywhere around the world, but lack of harmony among academic teachings and the items related to the graduates requested and required by the society and market lead to bewilderment of the students and even graduates in choosing the university majors. The society demands are mostly based on the taste, society culture, regulations and laws of the engineering system organization and municipality.

The students mostly learn the architectural and urbanism design at universities by consideration of the society culture and most of those designs are implemented based on the cultural and climatic needs whereas the regulations and laws of the engineering system organization are all equal throughout the country and in various climates and cultures. Therefore, such regulations could be somehow considered "international" (to some extent which is in accordance with the Islamic Law). The international design also follows minimalism and these minimalisms are incompatible with the design based on the recognition of human and environment.

The graduates from the architecture enter the business world after learning this major during a limited time of four years and they are usually aware of the designing principles and unaware of the designing regulations ( the required skills for having activity in the architectural filed if the working world). Actually, it causes the students look for internship in various corporations after graduation in order to just carry the name of design and architecture and unfortunately the instructions of such graduates are never been used in most cases.





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The point which is one of the most lasting problems and failures of the architectural education, namely “lack of a lively mutual relationship between theoretical subjects and designing work at universities and needs of the business environment” which should be considered is the fact that the graduates are unable to make a significant relationship between academic teachings and syllabi by considering the expectation they have from the society and others. As if each of these is an independent story per se.

What is required is that the institutions and centers related to the architecture (professional and legislative) could create mutual effects and relationships between them which are the main requirement and specifications of a successful implementation in architectural education programs based on the market needs. Relationship chain in case of conduction could either increase motivation of learning architectural business skills in the students or assist in effectiveness of the syllabi as well as enhancement of the projects quality (General specifications, program and syllabi of Architectural Engineering Bachelor Course, Art group, approved by the 365<sup>th</sup> Session of the Higher Council for Planning, dated 1998, 15,11)

**How could we design an effective entrepreneurial model for the graduates of Islamic Azad University in architecture?**

The studies show the human being has been always looking for finding value creation and changing factor since the beginning of his history and the scientists of the economics first considered the entrepreneurship. “Entrepreneurship” was translated in 1848 by “John Stewart Mill” into English; he believed the entrepreneur’s function and action included guidance, monitoring, control and risk-taking and he presented the distinguishing factor of “management” and “entrepreneurship” as risk-taking. “Schumpeter”, a member of the German school of the economics, introduced “entrepreneurship” as an engine of economic development.

Peter Drucker says:” Entrepreneurship is an attitude not a specific feature in personality of the entrepreneur. He also claims that entrepreneurship is the application of management techniques concepts.

Competitiveness in the global economics is dependent on technological and innovative capabilities. It consists of the capabilities in development of new productions and accessibility to modern markets, application of new technology, implementation of the best management patterns in firms and development of skill levels in a wide range of work forces. Universities could play a significant role in all those fields.

Consequently, increasing research and technology capacity in the country depends on the universities entrepreneurship in order to transfer academic achievement and technological findings into industrial, commercial and employment creation. Therefore, the dominant approach on educative, research and consulting activities is an approach in deal with the organizations outside the university.

The available structures at the universities of the country have been formed with the aim of expertise education to the students and the entrepreneurial enhancement and education in the students have been less regarded, so that the actual graduates of the universities are not often familiar with the basic concepts of the entrepreneurship.

In addition to the weakness of the universities education system in teaching entrepreneurial concepts, it is possible to mention lack of complementary structures as other weakness of the system in order to create physical infrastructures to develop the sense of entrepreneurship in the students.

A large number of the university graduates could lead to saturate the public and even private organizations in terms of the required personnel and a high percentage of the universities graduates are unable to be recruited by these organizations.





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Such issue results in immigration of the university graduates to other countries and the graduates' unemployment will become a major problem in the country.

In order to solve the problem, a number of solutions have been experienced in today's world. Most of these methods have been experienced in two complementary categories such as educational structures and creation of the required entrepreneurship bases like the Business Incubators.

Completion of the educational structures created for making the students aware of the business as well as training and strengthening the entrepreneurship spirit aims psychological preparation of the graduates in order to enter the economics.

The entrepreneurial development bases are provided in order to supply the required physical conditions to make the entrepreneurial graduates enter as well as aiming the economic careers. Examples of the structures which have been experienced in most countries for this issue are commercial and technological business incubators.

A review over the higher education centers in various countries demonstrates these centers have considered one of these solutions based on the actual economic and social situations or they have started certain educative courses under the name of "Entrepreneurship" or they made action in creation of a business incubator at universities. In most cases, these two approaches have been simultaneously used. Prediction of the required mechanism in exploiting as a complimentary for each other is an example of those issues which have essential role in effectiveness of such solutions. The higher education system of the country has highly considered the issue of enhancement and development of the entrepreneurship morale in the student and it has made action in conducting the basic investment in implementation of these two solutions.

Creation of the courses and entrepreneurship centers as well as issuance of a permit and support in establishment of more than 15 centers are the examples of executive measures made in this filed. In order to take more advantages of these two movements which have been conducted independently, it is required to place the whole function of the established complex in the agenda of higher education managers.

Today, the entrepreneurship education has become the most significant and widespread activities at universities. For instance, the entrepreneurial education has been highly considered in university courses and by specific institutions.

Certain countries such as Canada and some Asian countries including the Philippines, India and Malaysia have made essential measured in order to support the entrepreneurship. Such supports include submission of practical guidance, consultation, submission of financial facilities and holding specific courses in the field of the entrepreneurship inside or outside the universities (Kape, 1990).

Considering the conducted studies in U.S.A, the number of the universities which include the entrepreneurial courses in their own educative programs reached more than 130 universities from the late 60s by 1987. In 1980, the number of those universities reached 163. From 1980 to 1985, namely during five years, by increasing 90 other universities offering the entrepreneurial majors, the number reached to 253. Most of the universities start the entrepreneurial major standardly including all projects and case studies, studies and speeches held by guest "designing newly-made companies" or professors.

In 1990, the number of the entrepreneurial universities reached to more than 500 universities. Therefore, four major categories were formed by 1990 through entrepreneurial courses:





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**The first category:** programs for awareness and orientation toward the entrepreneurship

**The second category:** educational programs to develop newly-built companies

**The third category:** certain courses for growth and survival of novice entrepreneurs and companies

**The fourth category:** the development of entrepreneurship education in a way that professor and teacher could be aware of their own modern roles (International Labor Organization, 1992).

Education and training of the entrepreneurs in our country higher education system was considered by Ministry of Science, Research and Technology after a delay of 20 years comparing to the developed countries in the late 2000. Based on the third development project of the country, “Karad” project was modified and its implementation commenced in 12 universities of Iran by the supervision of Management and Planning Organization as well as Ministry of Interior Affairs. It is noteworthy to mention that the responsibility of its follow-up, implementation and staff affairs was assigned to Education Measurement and Evaluation Organization in the late 2000 by Ministry of Science (Karad Secretariat Report, 2002)

The entrepreneurship education and the researches related to it have faced different challenges as below:

- Challenge in creation of research methodologies to measure the entrepreneurship effectiveness
- Challenge in content and methods of teaching entrepreneurship
- Challenge in quality of entrepreneurship educators
- Challenge in acceptance of the entrepreneurship education at various universities comparing to the business

It has been ages that “entrepreneurship” has been used as a solution for development in the articles and speeches, but after many years, this word hasn’t reached yet to the scientific areas, planning and action yet. Maybe that is why no university of Iran is teaching it officially and academically. The same story exists for “Innovation” and “Creativity”; there is not even one syllable for them at universities. Therefore, it is illogical to expect the university or vocational centers graduates providing a constructive activity or business where innovation and creativity are the key factors and password of the survival in the modern competitive markets.

The main problem which leads to the economic growth and development is changes in the quality of education and attention to the quality of human resources. If we intend to take the subject of entrepreneurial serious in the country, our educational system must follow a path in which brave forces could be fostered and all proper bases for innovation must be supplied there. The entrepreneurship brings two main achievements for the policy makers: Employment and welfare.

What is necessary in the current situation of our society is considering “entrepreneurship of the university graduates” because undoubtedly the entrepreneurs based on their outstanding properties are capable of providing all required bases for products and human sources as well as creating employment and new business. It has been years that the outbreak of entrepreneurship has passed, but unfortunately its reverberating echo from oratory areas, journalism and policy hasn’t reached yet to the area of science, planning and action.

After many years, the word of entrepreneurship is not induced its real concept to the public and the country politicians and officials still use this word in their speeches and articles as a solution to solve the problem of unemployment. If it has been set to have a successful economy,, it seems the entrepreneurship must be more considered in the country but whether at policy-making or education-research level, we have not conducted any systematic measures in this matter.

In the late 50s, the first country which acted classically in the field of entrepreneurship education and role of academic centres as well as promoting the entrepreneurial culture from the high-schools was Japan. The





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entrepreneurship has entered the universities in Japan. From 1970- 1992, more than 96% industrial innovation was conducted which could change the situation of Japan into an outstanding and superior status in the global economics. The entrepreneurial education is a policy which directly affects the quality and quantity of the entrepreneurship in a society. That is why in most countries, especially in developed countries, the obstacles and problems have been solved as much as possible and the governments are engaged in flourishing people's potentials. It is significant to teach to the small producers. By implementation of this policy, we could continuously fulfill various goals such as opportunity identification and how to exploiting them, identification of technology, new technical knowledge and how to apply them as well as new scientific methods in management and trade. Moreover, education could be long-term ( such as education from high-school) or short-term ( such as periodic speeches).

Considering the given information regarding the entrepreneurship, the proper base to grow and develop the entrepreneurs is as follow:

- Education of creativity from elementary school to university level even in Doctorate level for all majors, especially architecture
  - Revise the educational system, teaching method, students' evaluation and measurement in order to intensify and develop the creative spirit of the educators
  - Increase of the necessity to cultivate people by direct and indirect educations
  - Education of entrepreneurship and identification of the entrepreneurs annually by the experts as well as introducing, encouraging and supporting them throughout the country and province through the Mass media plus prize granting by high-ranking officials of the country
  - Formation of an Entrepreneurship Association for connection, consultation, collaboration and cooperation of the entrepreneurs with each other
  - Promotion of the entrepreneurial culture through cultural institutions and the mass media
- Establishment of entrepreneurial development centers for planning, education, research and consultation regarding the entrepreneurship. The management with focused decision is mostly against the entrepreneurial spirit. The entrepreneurship grows where there is not comprehensive focus. Today, the entrepreneurship education is being offered to the young. Everyone is encouraged at high-schools. It seems you will defeat without having the entrepreneurial knowledge and skill just because you have an idea without having the required knowledge. The initial organization of the entrepreneurship depends on following the below directions:
- Identification of proper and inhibiting factors for entrepreneurship and practical solutions for removing the obstacles
  - Identification of proper and inhibiting factors for entrepreneurship and policy making in order to use the aforesaid opportunities
  - Encouragement of the talented graduates of the educative institutions toward entrepreneurial activities
  - Development of small businesses in order to create generative employment
  - Foster a group of the talented entrepreneur youngsters

It is possible to teach and learn entrepreneurship through experiencing and transferring it, but it is not easy to promote it. Most determining specifications of the entrepreneurship including application of new opportunities, trust attraction, creation of working networks as well as implementation of project works are all invisible features which are not easily understood and transferred into advice or instruction. Today, a large number of the young who are studying at universities and academic institutions of Iran are hopeful about finding a job in the "Business Market" after graduation. The business market term is a sensitive term that the young people consider it as the most effective factor on the country future. In the minds of the students of the country, business market is defined as a series of





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predetermined positions that the society expect them but the entrepreneurial attitude over the employment will highly decrease the students' problems.

Such attitude could be gained in the layers of the required cultural changes for development of the entrepreneurship in the country. It has been believed that our educational system for entrepreneurship must go toward a direction where brave forces are fostered in decision-making. When we inform the graduates of industrial majors to use legal facilities in their own technical majors, a kind of lack of self-confidence is usually seen in them. On the other hand, they are not courageous enough to use the legal benefits and facilities for their own or other people and they often look for a job opportunity with a good wage. In case we intend to take the entrepreneurship issue serious, the educational system must be guided toward the fact that the graduates must have the features for an entrepreneur and maybe the educational system has the key role in bachelor or higher levels. We must provide motivation for the university graduates in order to have creative thoughts. The establishment of entrepreneurial centers and training institutions for lifestyle in difficult economic situations such as education of positive and problem solving attitude, staying away from negative thoughts, determination and creativity in order to remove the available obstacles and to achieve the required skills are all examples of the thoughts which must be considered.

We hope that certain institutions will be established at the level of the managers and students and if the governments create the required space, the potential power for the people will be recognized and we could create proper basis in order to create essential bases for their education and it receive higher speed toward the entrepreneurship. The government role in supplying a proper base for the entrepreneurship is a significant issue and the most remarkable measure the government could make in regard of the entrepreneurship and employment are as follow:

Producing information regarding opportunities, promoting entrepreneurial culture, revising working culture and empowerment of work forces. Due to the complexity and growing competition in the world today, which is along with rapid changes of the international environment and the transition from an industrial society to an information society as well as changes of the national economy to the global economy, entrepreneurship is considered as the driving force of economic development. Because it could lead to our country's growth and development, increase in productivity, employment and social welfare.

**The Research Objectives**

**The Main Objective**

Generalization of the projects and consideration of the student to all aspects and effective factors on the design on behalf of the project associate professors could affect demonstration of the knowledge hints submitted in various courses and the factors and designing elements which must be focused on each project should be considered by the cooperation of the relevant teachers in the process of guiding and judging the project.

Accordingly, it is really easy to comprehend interdisciplinary nature and comprehensiveness of the architecture that the students will face in the future professional life.

**The Specific Objectives**

In order to compensate lack of preparation of the graduates resulting from inconsistency of the university educations and the ones which lead to return decrease, it is required to anticipate a course as an internship. The course plays the role of pre-organizing in education which is practically facilitating factor in the process of learning various skills.





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The objective of the course is to provide a general overview of the society needs for the students as well as preparing them for enter into the business world which is naturally different from the university educations.

Adjustment of syllabi timetable and relationship and cooperation of the colleagues of each designing projects and the courses which are related by specific goals (for instance, syllabi related to the structure along with the designing projects which intend to focus on the relationship between the structure and architecture) are all examples of the certain measures used by the group managers, even by the synchronizers of the timetable units at executive universities.

Generally, integration of the program by the group managers could be the basis and nature of the creative strategies in this field.

A student must understand that as a designer, he or she must organize gradually his own specific method to design. Understanding of the fact that each designing issue has no unique answer (Unlike mathematical problems), but the method of reaching the answer is not embedded in a unique design could increase the required self-confidence in the student in order to focus on the natural creativity, knowledge and their own acquisitive experience. Achievement of such self-confidence which is required for flourishing of the creativity may be considered as the main task of the designing projects in the syllabi of the architecture course (General specifications, program and syllabi of Architectural Engineering Bachelor Course, Art group, approved by the 365<sup>th</sup> Session of the Higher Council for Planning, dated 1998, 15, 11). Actually, submission of the modern solutions of the entrepreneurship by the aim to promote and develop the entrepreneurial culture, creativity and innovation has supplied a basis for the graduates' employment as well as creation of an interactive and cooperative space between the activists of various society levels are the examples of this projects goals.

## METHODOLOGY

### Measurement Tools and Population

Unemployed and employed graduates and students in the jobs related to architecture on one hand, and the employed unrelated to the said major and a number of active private companies along with a number of experienced instructors on the other hand will form the statistic population of the research in the field of architectural services.

The research method applied which has an applied aspect is survey-descriptive and the measuring tool of the research is interview and a questionnaire on "reliability and validity" made by the researcher. Moreover, documents and library data will be collected as well. In fact, the population of the research includes three categories as below which will be implemented by the use of "Stratified sampling".

- Graduates and unemployed and active students
- Professors and teachers of architecture at universities
- Business owner experts and the companies which offer architectural services

### Data Analysis

After summarization of the collected data, data analysis and distribution will be implemented. Parametric analysis and quantitative data analysis have been used in this research. We will also estimate the given parameters as well as exploiting descriptive and deductive statistics such as mean, variance and Standard Deviation as well as point or distance estimation.





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## CONCLUSION

In conclusion, the research findings and the proposals which are suitable to be offered will be pointed in detail as a result of the data analysis as well as all the studies. Accordingly, the model and method of empowerment and preparation of the Islamic Azad University graduates will be introduced and modified in a way that they could offer technical services demanded by the society, acceptable by the companies and the organizations offering them in the late undergraduate years and after graduation. Based on the presented model, the students and graduates of architecture will grow after gaining the required trainings as well as receipt of the necessary consultation in various period of time in three terms of knowledge, technical expertise, skill and attitude, so that it could easily meet the market need.

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## Green Pepper Production Functions under Single Water, Salinity and Nitrogen Stresses

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### ABSTRACT

Frequent droughts in arid and semi arid climates such as Iran's not only reduced the amount of available water for agriculture but also lessen the quality of water and soil nutrients. Today, considering the environmental and climatic situation, using saline water along with deficit irrigation in order to maximize the productivity is a trendier than ever. The objective of this research is to assess the effects of water, salinity and nitrogen stress on green pepper (*Capsicum Annum*) yield through crop production functions. Regarding the objective, the experiment schedule conducted for green pepper as complete accidental blocks in a green house. The experiment was implicated in a 42 days period for 144 pots in 2014. In this experiment 4 irrigation treatments, three irrigation water salinity treatments and three nitrogen treatments were designed. After harvesting, the amount of yield containing fruit, foliage and roots was weighed for each pot and then the amount of produced dried matter was measured. At the end, single crop – irrigation water, crop salinity and crop – nitrogen production functions were



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conducted. Resulted crop production function can indicate the quality and quantity of environmental stresses on crop yield.

**Key words:** unconventional water recourses; deficit irrigation; green house cultivation; randomized complete blocks pilot experimental; produced dry matter

## INTRODUCTION

Considering the population growth and ever increasing need to food, the agricultural products' enhancement is the most important goal in this section. For Iran, with the population of over 78 million, which is constantly increasing, providing more food sources is inevitable. Regarding to the arid and semiarid climate of Iran, this country faces water shortage all the time. This challenge is not only about the amount of water but also is about the quality of it either; so many farmers have to use unconventional water resources. In the other hand, water deficit not only reduces the amount of crop yield but also affects the quality of soil. For instance, in northern parts of Iran, less precipitation and more water harvesting from aquifers caused see water progress into the plate. This in combination with irrigation with saline drainage water put crop yield under the effect of water deficit and salinity stresses [1]. Considering the fact that this is not a regional problem but is almost international, in many parts of the world, the irrigation water is saline or soil and irrigation water both are improper. In this regard, many researchers assessed the crop yield under water stress, salinity stress or both [2],[3].

In order to reduce the effects of water deficit and salinity and produce more yields under stress conditions, farmers use chemical fertilizers. Application of fertilizers especially Phosphates can improve the quality and quantity of agricultural products [4].

Crop production functions are being used in order to determine the quality and quantity of water, salinity and fertilizer stresses on yield. Crop production function is an applicable integrated equation. Production functions can express the relationship of crop to water, soil, fertilizer, energy and other productive factors. Since water resources scarcity is the most important factor of water policy making in farms, crop production functions are usually define the crop yield as a dependent variable to irrigation or evapotranspired water [5].

Different crop production functions have been suggested by: De wit [6] equation which is based on yield and separated evaporation and transpiration; Cole and Mathews [7] and the Mathews and Brown [8] linear relations based on evapotranspiration; Arkley [9] equation which is based on vapor pressure deficit and crop transpiration; Jensen [10] equation which is based on crop sensitivity towards different phases of growth; Hanks [11] equation based on crop transpiration and yield; Minhas et al. [12], Stewart et al. [13], Doorenbus and Kassam [14] equations which are based on relative relation of evapotranspiration deficit and yield; Hanks and Rasmussen [15] equation which is based on water stress; and finally Maas and Hoffman [16] and Maas [17] introduced an equation in order to determine the relative yield under salinity stress.

Generally, crop production functions are estimated with two methods. The first method is using theoretic and empirical models which are extracted from unique crop – water reactions. Principally, the quantity of parameters in this method is being determined by straight observations and measurements. The second method is based on statistic methods and observations such as yield fluctuations, quality and quantity of applied water and soil salinity [18].

Van Genuchten and Hoffman [19] and Van Genuchten and Gupta [20] studied the effects of single and conjoined water, salinity and nitrogen stresses. In this regard, Van Genuchten and Hoffman [19] introduced an equation in order to simulate crop yield under salinity. Generally, when crop is stressed by salinity, water deficit does too exist.



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Water shortage is inevitable due to the moisture fluctuations during the growth period. It is obvious that the crop will be more affected by conjoined tensions than single ones. Homaei[21] and Homaei and Feddes[22] discussed the mutual or additive characteristics of these tensions in detail. Kiani et al. [1] were also observed the effect of conjoined water and salinity stresses on wheat.

At the presence of salinity, nutrients deficit happens [23]. In Saline soils, the conjunctive effect of soil salinity and fertility is of vital importance from maximum production point of view. Karimi et al. [18], [24], [25], showed that the efficiency of nitrogen, phosphate and potassium increase as the amount of applied water rises. In other hand, Esmaili et al. [26], studied the conjoined effect of salinity and nitrogen stresses. In addition, the conjoined effect of salinity and phosphate stresses was studied by Hosseini et al. [4].

The objective of present research is to determine the crop production functions under single water, salinity and nitrogen stresses. Specifying the crop production function under different climatic and environmental circumstances can improve the optimal cropping pattern and help choosing the best irrigation system and treatment.

**MATERIALS AND METHODS**

To achieve the objective, the experiment was implicated in a greenhouse for 144 pots in 2014. In order to put the crops under tension, considering the crop maximum endurance threshold, four irrigation treatment: 100%, 70%, 50% and 120% of crop water requirement; three irrigation water salinity treatment: 0.5, 2 and 4 (ds/m) and Three nitrogen treatments: 100%, 70% and 50% of crop fertilizer requirement were considered as a randomized complete blocks pilot experiment. The cultivated crop was green pepper (*Capsicum Annum*) which were first cultivated in storage and then transferred to pots. Every pot contained 1 crop and the crops had 20 centimeters distance from one another. The length of experiment from beginning tensions to harvesting was 42 days. Picture 1 shows the experiment site.

After the completion of the growth period, the fruits, foliage and roots were harvested and measured along with total dry matter. Then the crop production functions under water, salinity and nitrogen were specified by Sigma Plot software.

**RESULTS AND DISCUSSION**

Tables 1 to 3 show the crop – water; crop – irrigation water salinity and crop – nitrogen fertilizer respectively. In these tables, W1 to W4, S1 to S3 and N1 to N3 show the irrigation treatments, salinity treatments and nitrogen treatments respectively. In production functions “y” represent the yield as dry matter (kg/ha) and “x” shows the irrigation water amount (m<sup>3</sup>/ha), irrigation water salinity (ds/m) and nitrogen fertilizer (kg/ha) respectively.

As it can be seen in table 1, crop – water production functions are second degree polynomial functions. Considering the shape and the parameters of these functions it can be said that raising the irrigation water amount will increase the yield which stops after getting to a maximum amount of water. The results also indicate that increasing the applied irrigation water at the presence of salinity and nitrogen stresses, can partially improve the yield and lessen the effect of salinity and nitrogen deficit. As the salinity and nitrogen stress rises, increasing the irrigation water amount can even have reverse effect on yield and growth.

Table 2 shows the crop – salinity production functions. These functions are usually linear type. The negative gradient of these functions declare that rising salinity will decrease the yield directly. The results also show that salinity effects can be lessen by adding more irrigation water but more saline water will just improve the volume of foliage and roots and fruit production can even be stopped.





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Table 3 shows crop – nitrogen production functions. These functions are linear types which declare the direct relationship of crop yield and nitrogen deficit. As the nitrogen decreases, the crop yield must decline either. The results show that at the presence of water stress and salinity, adding more nitrogen not only increases but also decreases the crop yield. For instance when the water and salinity stresses are at their highest, adding nitrogen will have no results (W3S3Ni). In addition, water logging along with salinity can decrease nitrogen absorption (W4S3Ni).

## CONCLUSION

As a general conclusion it can be said that crop production functions are applicable tools to determine the quality and quantity of water deficit, salinity and nitrogen tensions. Determining the optimal crop production functions can improve cropping pattern, irrigation system selection and irrigation water amount for each crop in different climate and environment. These functions can show the effects of environmental stresses on crop yield so, it is recommended to defy them under single and conjoined tensions in order to determine the final profit.

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**Figure1: The experiment site**



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**Table 1: Crop – water production functions under irrigation water salinity and nitrogen fluctuations for green pepper (Capsicum Annum)**

Water Treatment	Production function	Correlation Coefficient
WIS1N1	$y = -5.93x^2 + 16.2x - 6.81$	$R^2 = 0.52$
WIS1N2	$y = -1.2x^2 + 4.9x - 0.97$	$R^2 = 0.92$
WIS1N3	$y = -6.41x^2 + 17.6x - 7.17$	$R^2 = 0.91$
WIS2N1	$y = 1.73x + 1.36$	$R^2 = 0.88$
WIS2N2	$y = 5.7x^2 - 10.15x + 7$	$R^2 = 0.99$
WIS2N3	$y = 4.74x^2 - 9.45x + 7.06$	$R^2 = 0.99$
WIS3N1	$y = 1.9x^2 + 6.5x - 3.6$	$R^2 = 0.97$
WIS3N2	$y = 3.56x^2 + 5.1x - 1.8$	$R^2 = 0.99$
WIS3N3	$y = 5.93x^2 - 9.1x + 3.4$	$R^2 = 0.99$
i=1,2,3,4		

**Table 2: Crop – salinity production functions under irrigation water and nitrogen fluctuations for green pepper (Capsicum Annum)**

Salinity Treatment	Production Functions	Correlation Coefficient
W1SiN1	$y = -1.21x + 6.9$	$R^2 = 0.99$
W1SiN2	$y = -0.74x + 4.1$	$R^2 = 0.82$
W1SiN3	$y = -0.77x + 5.33$	$R^2 = 0.79$
W2SiN1	$y = -0.38x + 2.83$	$R^2 = 0.27$
W2SiN2	$y = -0.97x + 4.01$	$R^2 = 0.82$
W2SiN3	$y = -0.50x + 2.69$	$R^2 = 0.90$
W3SiN1	$y = -0.85x + 3.0$	$R^2 = 0.02$
W3SiN2	$y = -0.6x + 2.88$	$R^2 = 0.52$
W3SiN3	$y = -0.65x + 2.2$	$R^2 = 0.68$
W4SiN1	$y = -0.81x + 5.11$	$R^2 = 0.99$
W4SiN2	$y = -0.6/x + 5.44$	$R^2 = 0.96$
W4SiN3	$y = -0.6/x + 5.44$	$R^2 = 0.96$
i=1,2,3,4		





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**Table 3: Crop – nitrogen production functions under irrigation water and salinity fluctuations for green pepper (Capsicum Annum)**

Nitrogen Treatment	Production Function	Correlation Coefficient
W1S1Ni	$y = 0.18x + 2.32$	$R^2 = 0.7$
W1S2Ni	$y = 0.04x + 2.8$	$R^2 = 0.16$
W1S3Ni	$y = -0.03x + 2.7$	$R^2 = 0.05$
W2S1Ni	$y = -0.14x + 4.6$	$R^2 = 0.91$
W2S2Ni	$y = 0.1x + 1.23$	$R^2 = 0.84$
W2S3Ni	$y = 0.08x - 0.93$	$R^2 = 0.84$
W3S1Ni	$y = 0.06x - 1.6$	$R^2 = 0.36$
W3S2Ni	$y = 0.05x + 3.5$	$R^2 = 0.84$
W3S3Ni	$y = 0$	–
W4S1Ni	$y = -0.1x + 5.21$	$R^2 = 0.99$
W4S2Ni	$y = 0.08x + 1.9$	$R^2 = 0.32$
W4S3Ni	$y = -0.23x + 6.44$	$R^2 = 0.95$
i=1,2,3,4		





## Comparative Study Promote Consumerism Mobile Operators

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### ABSTRACT

Some words on a system of "values" are and yet another system may be "anti-values" are considered, consumption and consumerism and actions, including actions that can fit on this topic, consumerism that are trusted to enhance the production of some economic systems from the perspective of other systems for waste and ingratitude, is condemned, this article expresses the views and features in the Islamic state and the capitalist system the issue of current practices promote consumption of mobile technology in the country investigated and analyzed and after the implementation of the current performance of mobile operators with the criteria of any of the Islamic regimes and capitalism, notes that the current situation with one of these systems more consistent and compliance with the current system governing our society, what is in the end and after the conclusion presented proposals to change the status quo.

**Key words:** consumption, consumerism, waste, the Islamic system, the capitalist system, mobile phone

### INTRODUCTION

Values and anti-values are relative terms and the relativity of values related to elements of creation, these factors are influenced by the ideology of the society and the culture and tradition in it so it may be worth a governance system, yet the same issue in other anti-values system considered or may change over time some of customary values and anti-values, or vice versa to be converted and in any case feature relativity is the lack of stability but apart from comparison with other systems in the Islamic system are relative value and change over time.





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An important issue that has been controversial in the world economic system and particularly in the Islamic economic system and economy based on capitalism is disputed consumption and consumerism is that against temperance and moderation in consumption and consumption have been optimized. In one with great promotions for its consumption from economic growth factors considered and other excessive consumption and wasteful called and denounce it.

Stimulus consumption production and generate of economic growth and economic growth is the main cause of public welfare that governments wish. The cycle starts with the consumer and he goes, revolves around consumption and perhaps this is the importance of consumption.

Consumerism is one of the economic phenomena that after the Industrial Revolution flourished significantly. including the effects of this phenomenon include the limitation of resources, environmental pollution and social distance and personal and social resonance wrong behavior such as "lavish" noted. The basic question is:

- Why is our society's tendency to consumerism?
- Why consumerism is for some kind of honor?
- Is there a relationship between consumerism and economic underdevelopment?
- How can we reduce the tendency to consumerism in the society?
- How can people take the lead in the right direction?
- What barriers exacerbate the problem of consumerism?

Consumerism of a glance within the meaning of is offbeat consumption that does not relieve a person's physical needs, but also, the individual or individuals providing false needs that sometimes created to imitate the others, advertising, financial conditions or changes in the structure of society consumerism, is rooted in the social structure and not just one of the social institutions such as family, politics, economics or culture responsible for this situation introduced.

Consumerism in particular between industrialized countries and developing countries have largely gained after the war. government and industry in the industrial countries and in developing countries, a man considered as a consumer machine. and Through this means to achieve their economic goals, which is the steady increase profits; So consumerism, guarantor anything but false needs in the service industry and industrialized countries are. The man also in terms of mental preparation for indolence, luxury and even distinguishing themselves from others by taking charge more goods and services to bridge the gap abetween themselves and other groups in society created Is hereby And this gap is to stabilize their social situation.

#### Problem

New technology has created new needs, needs that are often a false, unnecessary and sometimes harmful. The temptation to profit from providing these needs, sometimes people and even some of the government's It led to the trampling of the principles and values, lead generation steal from another. In recent decades Saw an increase in usage of mobile technology with various applications to it. Applications that in addition to numerous advantages, also have disadvantages disadvantages damaging that everyone, even its creators on their harmful, are admitted. of the damage, in addition to the physical health of people in the field of social issues is palpable.

New applications of this technology, ways and forms has penetrated deep into people's homes and Privacy and does not recognize nationality and religion and so on. it is a big challenge because of the lack of planning in order to control the growing cancerous. incentive to maximize profits by any means, it is suborner as though given the potential risks of this technology is forgotten.





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Consider incentive packages, operators in various designs and with different names that encourage and support more consumption in less time incentives for excessive consumption has increased several equal to properly reflect the promote the spirit of consumerism in this field. encourage consumerism it is increased in this area that value or ant-ivalue of it, has been in doubt. The use of this technology due to its high cost, less people in the population covered today, thanks to extensive advertising and suborner, generalized, So that the use of it, the specific application and essential commodity to commodity use unnecessary and luxury is changing. Unnecessary and a false use of it, in addition to the high financial costs, due to the lack of culture, sometimes irreparable social costs also have followed (damage to social networks).

Widespread use of mobile phones or properly done or may be applied unreal and any case of excess and extravagance in the use of this technology, your damage will follow. This indulgence can be considered from two aspects:

1. Improper use that leads to physical injury, psychological and social;
2. Use the the correct and necessary that leads to some real needs;

Regarding use leads to physical injuries, psychological and social, without the need for research, consensus opinion of experts and different systems, unacceptable and undesirable practical; but the extravagance and indulgence and its proper use, need to be examined different perspectives.

#### Consumerism and Islamic teachings

Look consumerism religious scholars in the same literal meaning is use extravagance and any tendency useless, excessive and extravagance waste as they know. Imam Ali in this regard said: "Be aware of spending unjustly, squandered and excessive"

Book Quran in verse of 141 of Anamsura modify consumption patterns and tips on optimum use of the said: "And when to bear fruit sits eat and the right to the time of harvesting to pay and Do not Squander squander God are not Squander " Almighty Allah says in verse 34 of SuraGhafr: "This species, God Makes astray the prodigal incredulity"

In the Holy Quran the word "waste" and its derivatives are used frequent But in twenty-three of the term "waste" used in each case, the particular concept. In most cases, the purpose of wasteful aspects of moral, ideological and exceed the limits of God. And in four cases of financial and economic (verse 141 of Sura al-anaam, verse 31 of Sura al-earaf. Verse 67 of Surah al-Furqan, Al Israa verses 27 and 28) are included which two verses of "wastefulness" is six verses.

#### Note the following verses

1. This species actions squanderers were ever to ornament is given (SuraYunus, verse 12).
2. obeyed not command prodigal (Surashoara verse 15).
3. Allah does not guide prodigal liar. (SuraGhafr verse 28).
4. Pharaoh indeed superiority (and flooding) Valid in the ground, and he The wastefulness users. (SuraYunus, verse 83).

Imam Sadiq (Peace be upon him) that the wealth of the Lord. Which is entrusted with people and let them said: Eat and drink in moderation, and moderation, and dress and marriage, they have horse riding And surplus believers give to the poor And thereby eliminate class differences And dispersion repair And a person who acts in this





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way, What he eats and drink, His actions and his marriage is permissible and is halal use of his vehicle And who exceeds the limit will be are unlawful for him then said Do not the lavish that God does not like the prodigal.

Of the Holy Imam (Peace be upon him) that says: "Otherwise, it is forbidden." (Commentary Burhan, 2/10) Respect the lavish is clearly revealed. And when moderation and determined that it is stipulated in the Hadith Sharif, was raped. Leads to sanctity.

And because these traditions or because the Koran explicitly forbidden extravagance and wastefulness of a privacy breach and rebel against the Lord and considered a great sin.

Imam Sadiq (Peace be upon him) said: Including those that are not answered their Dua: It is a tax and it has lost, Says: Lord, give me the revenue! He says: Are you the economy of moderation and moderation in spending, did not command and if you did not command correction in the property?

So in general Improper and abusive consumption and waste of divine blessings, Deprive society from that is a blessing, As the Holy Koran refers to various cases stated: "God does not love squanderers ever" (Sura al-anaam, verse 31) And "can lead squanderers ever not very liars" (Surah Ghafr, verse 38), And "not rescued from ruin and error" (Sura Anbiya, verse 9) And "people of doubt and suspicion, and illusion" (Sura Ghafr, verse 34) "People of Fire" (Sura Ghafr, verse 43) And "can not follow." (Surashoara, verse 151) The verses and hadiths Sharifa Indulgence and consumerism, we can see that action is unlawful and reprehensible.

#### Consumerism and culture Iranian

Our literary books filled with poems and proverbs that reflect the higher value of Iranians To prevent waste and that upholds the God's blessings as passages and signs of recognition and love is God.

Esteem blessings, the more blessings you Ingratitude, destroys your blessings

The low and high pass that is incomplete Pull the moderation is perfect. (Mawlawi)

Mohammad Vfy in communities Alhkayat writes:

Every part of the nature of the Iranian point of view are not only regarded as a consumer resource, But examples of mercy, power and tact of God are considered. And in the Cognition of God leaves Notebook. For this reason, Iranians to salt that is apparently the most abundant and least significant natural resource swear, Not kicked bread And Contaminated water knows sin. However, at some point of time in spite of the nature and direction of intellectual, material values been spread for various reasons and spiritual values your overshadows.

#### Consumerism and economic strength

**Capitalism:** Capitalism is an economic system in which the central capital bases of an economic system of private ownership of the means of production on the economy and in the hands of private owners and to create competitive markets is of economic benefit; that in this system, called freedom of private property; which means, the production and distribution of goods and services with a focus on high consumption in order to earn more profit. Adam Smith said, "use a unique destination and purpose of production activities." the profit system is in use as far as the upper limit or ceiling is not intended for consumption and even for those expensive ads using some techniques and some





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themes and content that the expansion of consumerism in society is also looking, done. the capitalist system will not be able to survive without consumerism, the search for consumer markets in other countries to put on the agenda.

**Criteria consumerism**

Waste criteria can be found at the right cost whosoever and when it passed the subject is lavish,So consumption and living expenses can be divided into two types, actual expenditure and false expenses and judging by the customs and society. As judge the permissibility of and respect for the law is, everyone on the basis of faith and his life according to Islamic justice must adjust their position in society. Of course this does not conflict with the implementation of Islamic equality, because of this difference on the basis of proportional Bashrt, talent and effort of everyone and different stages of people.

So that part of the expenses and costs associated with social status and dignity of human life and is compatible agree economy and cum livelihood and what the limit is exceeded, is wasteful and extravagant. the exact criteria for determining the amount of waste is difficult. as lavish concept that individuals and different communities and different things differently and have different meanings.

**Some of the causes outbreak and spread of consumerism in society**

In stemming the spread of the culture of consumption and stroke incidence in a community, interpersonal and intrapersonal various factors may be involved; knowing that they are the appropriate strategies to improve consumption patterns of a society achieved. some of these factors include:

1. psychological complexes;
2. status of a consumer culture;
3. Branding;
4. The values of the revolution;

In addition to the above other factors such as uneven distribution of income and wealth in society and the accumulation of capital in the hands of a particular group, imitation, conspicuous consumption and government properties and ... Can, in the creation or expansion of consumerism in society have an important role.

**The evils of consumerism**

Luxury as a social phenomenon, cultural and economic,harmful consequences for the individual and society followed. Some of these adverse effects, as follows:

1. Increased dependence on foreigners, luxury, society will lead to the expansion of consumption patterns, exogenous or foreign. this will lead to a community association. when broad social strata in society, to great use, regardless of the domestic production facilities, walk and the quantity or variety of commodity, consumer demand that any material object is within the country, will be forced to import goods, which, it will be more dependent testator. this dependence on such a society will pave the way for foreign cultural domination because part of the foreign culture, transmitted through the importation of goods into the country. Of course, many factors are involved in origination of exogenous consumption patterns, one of which can be a luxury. in discussing the reform of the pattern of consumption, it is necessary, in addition to considering the reform of consumerism to modify consumption patterns of exogenous and endogenous change it to receive some attention.this is, in several ways, including the establishment of national self-confidence, enhance the quality of domestic products or through anti-consumerism followed.





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2. The spirit of greed; "Edward Flatau" American author and scholar, acknowledges as a result, according to recent research, lavish consumer purchases, they can stimulate the spirit of materialism. This study shows that more consumers buy do more, think they need to buy and consume more. So a vicious circle costly, in greed and greed arises.

3. Depression, based on accepted economic theories, spend more, increase the satisfaction and joy to follow. However, the human in the past fifty years, While the over the whole of human history is consumed, but still not have enough to consent, increasingly depressed and the number of depressed world is added. I have to say, Luxury-oriented human consumption, changes in fashion and trying to change the means of subsistence, always lived in mental stress and anxiety; as the insatiable greed of achieving to luxury, he caught the grief and depression.

4. Increase class differences, one of the social evils of consumerism, increasing class gap in society.

5. Weaken the family system: As consumerism, extreme harvest any person of Rare and scarce family resources, this will inevitably lead to numerous pressures on families.

**RESULTS AND OFFER**

Consumerism and waste in the teachings of Islam and the Iranian rich culture is an abomination and the strength of economic policies it is also not justified So any kind of propaganda in the field, regardless of the pathogenic aspects of it in terms of promoting consumerism is indecent, immoral and anti-Islamic and Iranian values, And according to the criteria of the systems studied, we can say that the current advertising practices and performance service provider of mobile operators, which encourages greater consumption in less time, Western practices and model and for the capitalist system, Without regard to waste of resources, consumption further into value for the benefit of manufacturers consider in this case, follow these kinds of patterns that are un-Islamic patterns in contrast to the words of leader who said: 'Consumption patterns, to be truly wisely, justly and be Islamic. "

Modify consumption patterns, that means that resources and commodities, appropriate and necessary measures to be applied. and to be used optimally and with maximum efficiency. This category does not Consumption and not even necessarily to the concept of low Consumption.

And does not contradiction with the Supply needs of the individual and society in various aspects. Some steps and strategies to control and modify consumption patterns in these areas must be addressed by policymakers and planners and incumbents are:

1. Shift Telecom and operators of "spending money" to approach "cost of service"
2. The general supervision or enjoining the good and forbidding the evil,
3. Advertising and correct model in accordance with national standards of Islamic Iran
4. The legal and practical collision decisively with the prodigal instead encourage the use of its unnecessary
5. Increase public awareness about the Consumption and consumerism;
6. Strengthen the entrenched religious beliefs and moral values;
7. Avoid extensive advertising in connection with unlimited use;
8. Restrict advertising of goods and services, with its disadvantages;

The modified consumer behavior, none of the institutions are not independently responsible. But rather the result is collaborating the structure and social functions on condition the trend towards rationality, they can open the knot of the problem of consumerism.





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## Iran and Green Taxes: Pros and Cons

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### ABSTRACT

Environmental or green taxes are one of the economic instruments which have attracted the attention of economists in the past few decades. Green taxes are implemented on a cost basis, and compared to other kinds of taxation, have the least economic inefficiency. Green taxes can be preventive measures against development and spread of polluters beyond social optimum level; they play an important role in reduction of environmental pollution. Considering the importance of the issue, in this paper the theoretical aspects of environmental taxes are studied; advantages and disadvantages of green taxes in Iran are identified and potentials of environmental taxes are discussed.

**Key words:** green taxes, environmental taxes, sustainable development.

### INTRODUCTION

Nowadays, sustainability has become a well-known concept among intellectuals and common people. Various points of view and insights into the concept of sustainable development have been proposed. Simply put, the idea of sustainable development acknowledges the right of every generation to have the same share of natural resources as the generations before. Environment is considered to be one of the most important pillars of sustainable development. Economical and social sustainable development is realized only in a functional and sustainable environment. For that purpose, economic policies should consider reallocation of resources toward sections which pose a lesser threat to environmental resources; economic policies should also encourage environment-friendly technologies and efficient consumption pattern [Amin Rashti & Siami Araghi, 2011]. Today, environmental developments in international scales and expansion of processes which damage the environment have made planners, decision-makers, and policy-makers to focus on the issue of environmental protection. Environmental taxation is an economic instrument for protection of environment which has attracted the attention of economists in



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the past few decades. In many cases, implementation of these taxes seems crucial since it prevents development and spread of polluters beyond social optimum.

**Green tax**

Environmental taxes were first introduced by Pigou. He proposed a model based on which taxes were imposed on polluters. He believed that this kind of taxation can internalize the external costs, reform resource allocation and consequently improve efficiency and welfare in the society. After introduction of this idea, a group of economists acknowledged this kind of taxation as the fastest and the most effective way to reduce pollution and improvement of environmental conditions. Meanwhile public sector economists proposed the double dividend hypothesis. This group of economists argued the revenue-neutral green taxes improve environmental conditions as well as maintain government's income by cutting distortionary taxes. This way, by reducing distortions of taxes such as labor and capital income, efficiency of tax system is increased and employment is boosted.

**Types of environmental taxes**

Green taxes are generally categorized in to three groups. Figure (1) shoes types of environmental taxes.

**Direct environmental taxes (Pigouvian tax)**

By increasing the costs of pollution through increasing social costs, direct environmental taxes make polluters to confront personal and social damages of their actions. This kind of taxation has a definite rate per each unit of pollution or damage to the environment. The tax rate is not explicitly set equal to social marginal damage. Companies can achieve social optimum of when the final benefits of preventing pollution equals final costs of pollution emission. This type of taxation is used only in a limited scale mostly in European countries [Shemirani & Shabani, 2008]. For instance in countries such as Australia, Austria, Belgium, Denmark, Finland, France, and Norway taxes are imposed on waste disposal; or in some countries like Germany and France tolls are charged for noise pollution caused by planes.

**Indirect environmental taxes**

Indirect taxes are the taxes imposed on production institutes or consumer goods which harm the environment. This kind of taxation employs a pricing mechanism that aims to encourage producers and consumers to change their polluting behavior. These taxes are imposed on industries or consumer goods whose use damages the environment. While not very popular in developing countries, this type of taxation is widely applied in developed countries, e.g. taxes on beverages in Canada, Denmark, Finland, Norway, and Sweden, or taxes on chemical fertilizers in the Netherland, Sweden, Finland, and Austria.

**Environmental regulations in other kinds of taxation**

Environmental goals can also be achieved by regulating other kinds of taxation. Environmental legislations are considered in implementation of income taxes imposed in individuals or companies, fuel tax, general sales tax, and road tax. These regulations have a similar effect to that of indirect environmental taxes. For instance incentives to invest in pollution reduction technologies are similar to indirect environmental taxes in that they consider only one aspect of pollution reduction.



**Zahra Ghorbani****Goals of green taxes**

- Protection and improvement of the environment
- Controlling pollution emission and reducing its negative impact
- Creating revenue to control or compensate for damages to the environment
- Changing public opinion by promoting efficient consumption pattern and employing clean production procedures and preventing the consumption of goods which are associated with environmental pollution
- Reducing social costs of environmental pollution by encouraging the industries to procure high-tech devices which help that cause

**Advantages and disadvantages of green taxes**

Today, green taxes are known as economic instruments which contribute to market efficiency, optimized resource allocation, and reduction of social costs of economic activities. Environmental taxes have become prominent in many countries and have presented governments with good revenues. However, despite economic advantages, green tax has its disadvantages as well. Identification of its weaknesses and strengths can help purposeful implementation of environmental tax. Table 1 shows pros and cons of green tax.

**Efficiency and inefficiency of green taxes**

Efficiency or inefficiency of green taxes can be discussed only when economical structure of the country in which they are going to be implemented is correctly studied. Implementation of direct environmental taxes in a country dealing with large economical instability would be pointless. That is because direct environmental taxes have determined rates, and an economy with high or fluctuating rate of inflation limits the efficiency of these taxes; Inflation quickly reduces the true value of tax rates which in fact reflect social costs [Pourghafar, 2014: 145]. Also inflation reduces and undermines the incentivizing impacts of discounts anticipated by environmental legislations and regulations. Implementation of indirect environmental taxes would as well be difficult in an unstable economy because high or fluctuating rate of inflation neutralizes the effect of price signals. Involvement of governmental companies in the economy especially in third-world countries is another factor that contributes to ineffectiveness of environmental taxes. There is always the possibility that governmental organizations such as heavy industry or energy industry which happen to be major environmental polluter might not respond to price signals sent through environmental taxes. It must be noted that despite the lack of suitable structural and economical conditions in some countries, green taxes are still imposed. The reason for that is to create a balance between goals of environmental policies and other policies such as employment, economic production and development, international competition, and justice in the tax system.

**Green taxes in Iran**

Islamic Republic of Iran's 20-year vision plan emphasizes on healthcare, welfare, food security, social insurance, equal opportunity, just income distribution, freedom from poverty and corruption, and clean environment for all Iranian citizens. Therefore implementation of green taxes can assist the government in approaching the objectives designated in the vision plan. Currently Iran uses a penalty system, which is very different from taxation. However it is possible to provide legal backgrounds and carry out economic research and investigations in order to scientifically plan for environmental taxation. Yet the use of any economic instrument should be done with regard to social considerations. Therefore decision-making on the course of environmental economics should be concerned with social costs and benefits; external impacts of economic activities should be identified and polluters must be required to compensate for the damages. The following are examples of legal infrastructures for implementation of green taxes in Iran.



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- Act on Protection and Improvement of the environment, 18/6/1974, consisted of 21 sections
- Act on preventing air pollution, 21/6,1995, consisted of 36 sections
- Environmental policies and programs in 1<sup>st</sup> development plan (1989-1993)
- Environmental policies and programs in 2<sup>nd</sup> development plan (1995-1999)
- Environmental policies and programs in 3<sup>rd</sup> development plan (2000-2004)
- Environmental policies and programs in 4<sup>th</sup> development plan (2005-2009)
- 20-year vision plan for economical and social development of Islamic Republic of Iran
- Act on waste management, 2004
- Environmental considerations in budget planning (2004 & 2007)
- Islamic Penal Code, Tazirat
- Act on assessment of taxes on different types of vehicles

**Civil law**

There are no discussions in the tax law associated with green tax. The only instance might be the tax pardon granted to companies and institutions that transfer their industry from large cities to less developed areas. Another problem caused by the absence of environmental legislation rises when multiple institutions see it as their responsibility to carry out the same tasks. Commonly known as parallel work, this issue would lead to waste of national capital and further damages to the environment. Also contradictory laws concerning environmental issues in our country have destructive impacts on the environment. Legislation of acts, bylaws, regulations, and environmental standards are among other problematic issues. Regarding the existing legal infrastructures and despite legislative problems in our country, green taxes still have great potentials in different sectors. These potentials are summarized in Figure 2.

**CONCLUSION**

As the concept of sustainable development has gained popularity in the present era, green tax as a new form of taxation has become prominent. Beside its benefits for sustainable development, green tax creates good revenues for the government as well. It is fair to say that green taxes are one of the most effective policies concerning environmental protection. However it must be noted that awareness of positive and negative impacts of environmental tax is necessary for its purposeful implementation. Efficiency or inefficiency of green taxes can be discussed only when economical structure of the country in which they are going to be implemented is correctly studied. As far as direct or indirect environmental taxes are concerned, although direct taxation have more theoretical appeal, yet we see that in practice indirect taxes are more widely implemented. Currently Iran uses a penalty system, which is very different from taxation. On the other hand there are several problems concerning legal infrastructures for legislation of environmental taxes. Yet, considering their great potentials, green tax can become a major economic instrument to assist our country in its path towards growth, sustainable development, and social justice.

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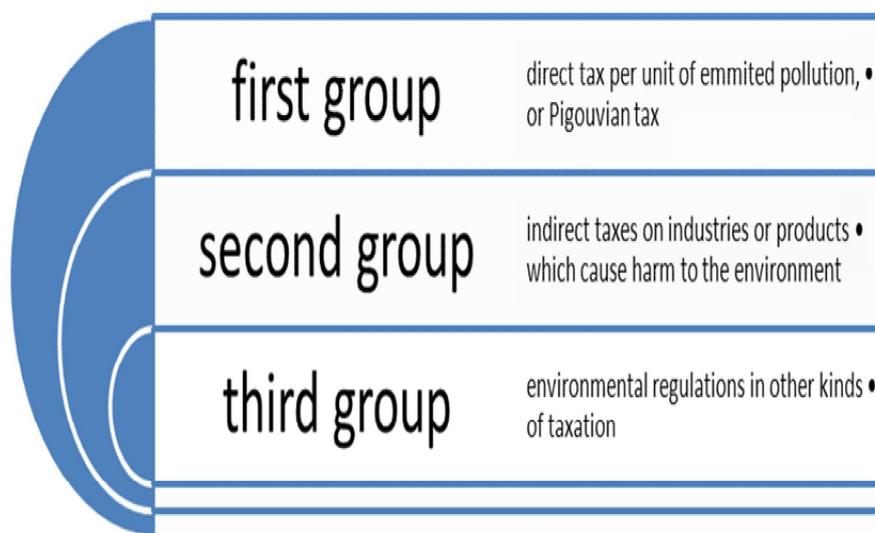
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**Figure 1: Types of environmental taxes**

**Table 1: Pros and Cons of green tax**

<ul style="list-style-type: none"> <li>- Coordinates financial policies with the concept of sustainable development</li> <li>- Motivates industries and consumers to cut costs and consequently reduce pollution emission</li> <li>- Increases market efficiency by internalization of costs</li> <li>- Creates revenues for different intents and purposes</li> <li>- Works as an incentive for innovation in economic entities</li> </ul>	<ul style="list-style-type: none"> <li>- By increasing total costs for economic entities weakens their international competitive advantage</li> <li>- Causes the transfer of industries and economic institutes –or in other words capital escape- to the countries which impose less energy taxes</li> <li>- Causes undesirable effects on income distribution by increasing prices and reducing production of goods and services</li> <li>- Reduces the efficiency of economic entities which rely heavily on energy consumption by increasing their costs</li> </ul>
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Zahra Ghorbani

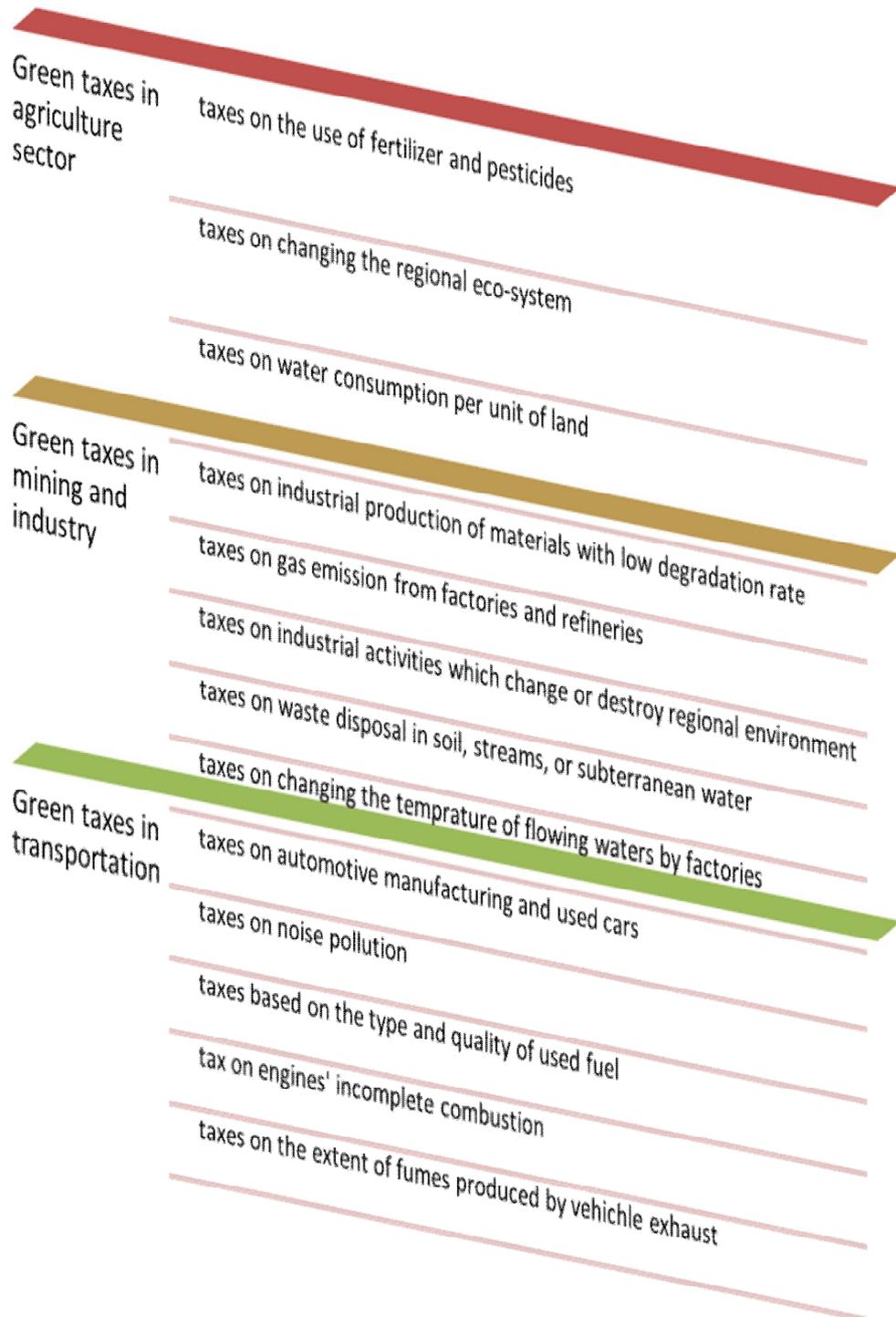


Figure 2: Potentials of green tax in different sectors





## Identify and Prioritize Risks of E\_Business by using Analytic Hierarchy Process

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### ABSTRACT

Advances in information and communication technology in recent years have a significant impact on human lifestyle and changes in the areas of economic, social, cultural and etc. One of the significant areas, commercial areas with the help of information technology, during the past decade has experienced fast growth and e-commerce as one of the most efficient and effective approaches to economic development is introduced to the world. As noted above, the Internet has created new customers and the opportunity to provide market development, but also the potential of these tools and assets make e-commerce with more sources of risk. Risk recognition and its importance as part of forming the strategy is responsibility and management task and it is important that management be aware of what is that risk and its effect. In the case of e-commerce identifying the risk is even more difficult because the technology is commonly change and new vulnerabilities known. In this article we highlight the risks of using e-commerce by help of experts and also discussed to classify them by use of AHP in order to help e-commerce organizations be successful in better management of e-commerce risks.

**Key words:** e-commerce, e-business, risk management, analytic hierarchy process



**Mohamad Reza Sanaei and Farzad Movahedi Sobhani****INTRODUCTION**

In 2011, the market share of e-commerce in the field of Internet businesses, amounting to 763 billion dollars for the first time in 2012, this figure exceeded 1 trillion dollars, which is a growth of about 21.1 percent over the previous year. These statistics show an upward growth trend of online shopping and more fortunate consumers to meet their needs by using the Internet platform. The BCG group studies in 2012 showed that the share of e-commerce is about 5 percent of gross domestic product, the number in the United Kingdom 8.3% South Korea 7.3%, China 5.5% and Japan 4.7 percent, respectively. Despite the success, many e-commerce companies since 1999 have failed. This means that e-commerce is not just a word and concept. Moving to e-commerce consist of so many failed companies that have not fulfill its obligations. Due to Business and market pressures and economic, social and environmental pressures and technological pressures are. In addition, e-commerce has limitations, including the national and international standards and regulations which are important factors.

As noted above the result of these pressures are uncertainty and instability which faced The organization with various risks and message is for the organization following the old answers in today's competitive business environment are not effective and we need new response (Turban, 2003). One of these responses, the strategy that enables organizations to increase their market share, negotiates better with your suppliers or prevents entry into their territory. In this changing environment is also very important to have a strategy in accordance with these terms and classical approaches to strategy, do not have ability to respond quickly and appropriately to the needs of organizations (Ioannis K, 2012) and in the strategic planning process, uncertainty plays important role (Baricelli, P, et al. 1996) and by changing internal and external environment, these approaches will lose their efficiency. All classic approaches are based on certain predictions of the future to develop strategies. Forecasts and analysis of the current situation and past experiences and future trends used to plot the course of events.

The more turbulent environment and the rate of change is faster, higher is the probability of realization of this forecast thus providing a method that can solve this problem seems necessary (Belt, et al. 2000). Risk analysis as part of a strategy formation is very important and necessary. The first is where the risk of collision is where the threats are identified and then when the strategies are formed and arrangements for identification, risk analysis can be done traditionally. In general, a risk analysis company has identified all potential hazards, risks and costs in the case of evaluation measures to protect against its benefits (Turban, 2003).

**Risk identification**

Risk Identification is a function of three variables: criticality, vulnerability and threat ( Bass and Robichaux,2001).

Criticality is the importance of an infrastructure to the organisation. Vulnerability is the areas in which an infrastructure could be compromised, damaged or destroyed. Threat is the possible existence of an entity-person or process who or which could exploit the vulnerability. Risk is greatest when all these three variables the fundamental reason for risk identification is to minimise the impact of threat and vulnerabilities. Having identified the risk, it is important to manage the risk and its exposure, cost-effectively. Identifying and managing risk involves operational cost in terms of human, training and fiscal resources. In the process of identifying risks, it is important to understand the different types of risks and the approaches to handling them.

**Types of risks**

Risks can be classified based on the areas they affect (Culp, 2001; O'Brien, 2002). They can be:





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**Business risk**

Incorrect implementation of e-business strategies could cause loss of reputation and goodwill from customers and vendors. Business risk results from lack of flexibility and agility of an organisation in adopting either new partnership collaborations or taking advantage of productivity enhancing software packages (O'Brien, 2002). Different types of business risks when compared to a SME involved in publishing and printing. In terms of strategy formation, business risk could affect future revenue sources through loss of customers or intellectual property (Witty, 2002). Business risks are those that the organisation must bear in order to operate its primary business. Business risks are related to business operations and decision making.

**Financial risk**

Financial risks are those risks or situations in which a randomness facing an organisation can be expressed in Terms of specific numerical probabilities. Culp (2001) opines that since financial risk can be quantified, they can be managed. Hence financial risk is a risk that organisations can avoid. It is a constant dilemma on the decision to invest in high spending infrastructure costs relating to e-business when the returns are not known (Witty, 2002). It is for this reason, any spending needs to be backed by a Return on Investment (ROI) analysis (Sowa, 2001). Financial risks occur where there is direct loss of revenue or an unexpected expense because of improperly timed hardware or software upgrade.

**Legal, regulatory or compliance risk**

Legal risk is the uncertainty regarding the possibility that a contract will not be enforceable (Culp, 2001). Unexpected changes in laws and regulations can expose organisations to potential losses. Legal, regulatory or compliance risks are common in the following scenarios (O'Brien, 2002):

- Software piracy.
- Non compliance with software licences.
- Copyright infringement.
- Improper dissemination of personal information or sensitive information.
- Illegal business practices.

**Operational risk**

Operational risk results from an unreliable infrastructure (loss of power, air conditioning, system failure, attacks by virus, etc). An unreliable infrastructure can also increase the risk of an organisation achieving its business or financial goals due to operational difficulties (Govekar, 2000).

**People**

The human element is an important link in developing, adopting and maintaining an e-business initiative (Napier, Judd, Rivers and Wagner, 2001). A project initiated by member countries of the European Union to benchmark e-business policies for SME's (Hesselman, 2002) found that most of the SME's had very little resources for experimentation and could not afford to make costly mistakes. Lack of skilled personnel and resources for experimentation and could not afford to make costly mistakes. Lack of skilled personnel and external consultants to meet skill shortage are some of the safeguards SME' can employ to manage these risks.



**Mohamad Reza Sanaei and Farzad Movahedi Sobhani****Risk factors affecting e-business infrastructure**

**Reliability of technology risk to e-business** :In e-business, uncertainty arises from reliance on new technology and vulnerability to rapid changes in technology (Gefen 2002, Moscové 2001).

New, immature and constantly changing technology is often unreliable (Barki et al. 1993, Lyytinen et al. 1998, Willcocks et al. 1999, Schmidt et al. 2001, Scott and Vessey 2002). E-business is especially vulnerable to an inadequate infrastructure because of its complete reliance on IT for commercial transactions (Ettredge and Richardson 2001). Moreover, technical security architectures (Schlarman 2002) need to be robust enough to prevent theft of electronic data (Moscové 2001) and costly denial-of-service attacks (Sabo 1998).

**Expertise risks to e-business**

Uncertainty arises from a lack of experience in doing e-business (Rose et al. 1999, Kern et al. 2002). Belief in the competence of the e-business influences consumers' trust (Gefen 2002). In e-business, similar to traditional business, constant change leads to a shortage of expertise, which increases organizational risk (Barki et al. 1993, Lyytinen et al. 1998, Schmidt et al. 2001, Scott and Vessey 2002). Since skills become obsolete from a constant stream of new technologies, training and learning are critical.

**Dependence risks to e-business**

Entities outside the organization, such as customers, suppliers, software vendors, consultants, outsourcers and the government may provide needed expertise but put the organization at risk from over dependency (Willcocks et al. 1999). Management perceives uncertainty and a lack of control over

External risks (Keil et al. 1998, Schmidt et al. 2001, Scott and Vessey 2002), such as government Internet intervention (Ettredge and Richardson 2001) and application service providers (Kern et al. 2002). Public acceptance of e-commerce, e-advertising and e-products is also uncertain. Nevertheless, trust and control mechanisms such as privacy policies, supplier monitoring and service level agreements with consultants and outsourcers, reduce uncertainty and risk.

**Strategic risks to e-business**

Although operating risks such as technology failures prevent business from being conducted, strategic risks are even more severe since they result in a loss of market share and render the company noncompetitive (Smith et al. 2001). An organization's inability to understand its strategic needs puts it at Risk for internal conflict (Clemons et al. 1995). Several surveys reveal that strategic risks have been neglected in e-business (Saban 2001, Porter 2001). In 2001, a survey found 65% of respondents did not have an e-commerce strategy and yet were undertaking significant e-business activities (Ernst and Young 2001). Another survey found 24% of respondents did not have a written Internet business strategy, and 45% said such a plan was 'under development' (Potter 2000).

**Competitive risks to e-business**

The pioneers in e-business expected a competitive advantage. Their highest priority was "getting big fast", based on the theory of network externalities, which explains the growth of networks as a "winner takes all" first mover advantage (Amit and Zott 2001). As a network grows and achieves a critical mass, it attracts more participants and becomes more valuable to the extent that other smaller networks cannot compete. This theory has held for auctions



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and is illustrated by the spectacular growth and dominance of eBay. On the other hand, low switching costs usually negate the advantage (Porter 2001) and many dot-coms erroneously grew too fast, when there was insufficient demand to justify their strategy. For example, Webvan had overambitious plans for national expansion that it scaled back too late to prevent its demise. Organizations expected a competitive advantage from personalization that would lock-in their customers by raising switching costs (Amit and Zott 2001, Straub and Watson 2001). However, with a few exceptions such as Amazon, consumers usually switch quite readily to competitors' websites which are an easy click away. Furthermore the availability of software agents that compare products also discourages lock-in. The gold rush mentality was also exemplified by the attitude of "build it and they will come." Market research was either disregarded or ineffective. Many dot-coms assumed that any type of product would sell on the Internet, and that consumers would instantly change their shopping habits for products such as groceries and furniture. They ignored the uncertainty that consumers would feel about not experiencing the "look and feel" of such products and the perceived risk of buying large ticket items with variable quality such as furniture (De Figueriedo 2000). The survival rate of "brick-and-click" business models is higher than for pure dot-coms (Porter 2001). However, many start-ups did not see the need for an offline presence. They ignored the benefits of complementarities (Amit and Zott 2001), which explain the advantage for consumers of having a store where they can inspect goods and return products that are unsatisfactory.

**Profitability risks to e-business**

Profitability has been elusive for e-business, although eBay, priceline.com, Expedia and Travelocity.com are a few exceptions. The Internet alters industry structure often dampening overall profitability (Porter 2001). During the boom the start-ups ignored traditional business principles related to strategy and profitability. Because venture capital was plentiful, profitability was sacrificed for gains in market share. Free or low prices subsidized with advertising were used to attract customers. Although a free pricing Strategy is successful when it generates demand for another product (Kauffman and Walden 2001). Early banner ads were generally ineffective. When economic problems reduced expenditures in 2001, business models that depended on online advertising, such as that used by buy.com (Porter 2001), became unviable.

**Leadership risks to e-business**

Leadership needs to set the vision, oversee the strategy and allocate resources (Saban 2001, Willcocks and Griffiths 1997). Research shows that top management guidance facilitates strategic use of IT (King and Teo 1996). Several surveys acknowledge the importance of leadership in e-business. Leadership needs to take an active role in managing e-business risks. They should not delegate all of the responsibility to the CIO, because changing employee behaviors and attitudes that affect corporate security, for example, needs buy-in and leadership from top management (Straub and Welke 1998, Duffy 2000). Governance has always been important to business but was sometimes ignored by the start-ups (Weil et al. 2001). Controls tended to be lax and there are many examples of youthful dot-com "executives" who were technology savvy but lacked essential business experience and leadership Skills. Although effective leadership is just as important for e-business as it is for traditional business, a survey in 2000 found that e-strategies were developed without strong leadership and decision-making at the executive levels. The survey concluded that the lack of leadership and vision was handicapping successful Internet business strategies (Potter 2000).

**Reputation risks to e-business**

The risk of ruining an organization's reputation can be severe. Customer service failures can soon become common knowledge, exacerbated in a "24/7" e-business environment. Online firms try to establish a good reputation to gain trust and reduce the quality risk associated with limitations of the electronic medium (Palmer et al. 2000). However,



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customers who perceive business practices as using their personal information unfairly may engage in bad word of mouth and may defect (Culnan and Armstrong 1999). Angry consumers may post negative comments to online discussion boards causing harm to the firm's reputation and hampering its ability to attract new customers. In 2000, consumer complaints prompted the Better Business Bureau to delist Priceline forcing it to improve its customer service to regain certification. The failure to implement and monitor effective security procedures may threaten a Web site's information integrity (Camp 1999) and result in fraudulent use of information, adversely affecting corporate reputation. Reputation is also at risk because of loss of control when an organization is dependent on a third party or outsourcing such as with an Application Service Provider (Porter 2001).

**Culture and currency risks to e-business**

Organizations may have cultural problems in instituting e-business practices and ideas (Rose et al. 1999). Culture is particularly essential for global ebusiness. Organizations that go global must face issues such as cultural differences, currency conversion and the expertise needed for international transactions. Areas of diversity to contend with, include presentational issues, degrees of formality, payment methods, currency, regulation, governance, trading law, the meaning of contract, and semantics and lexicon language differences, both general and industry-sector-specific (Mitchener 2000). Differences in consumer privacy concerns and use of legislation may be associated with cultural values, such as uncertainty avoidance (Milberg et al. 2000). In the EU, specific consumer opt-in is required for the reuse of personal information specifying, or from which can be deduced, medical or health conditions, racial or ethnic origin, political opinions, religious or philosophical beliefs, trade union membership or the sexual orientation of the individual (De Lotto 2001). Although local currency is available in many global e-business Web sites, US dollars are sometimes used despite consumers' preference to know the price of goods in their local currency and the fact that currency conversion is relatively easy to automate.

**Identity risks to e-business**

In e-business, uncertainty arises from an unverifiable location and anonymity (Gefen 2002, Moscovice 2001). Transaction security needs guarantees of knowing to whom one is sending or from whom one is receiving data. Digital signatures, Secure Electronic Transaction (SET), and similar technologies can act as guarantors for the transaction, assuring interested parties that the signatories involved currently exist and are who they claim to be. Passport from Microsoft and the Liberty Alliance Project involving Sun and other companies protect against fraud by identifying customers. From a consumers' perspective, identity theft threatens personal credit and may involve long-term expensive litigation (Berghel 2000). Security risks to e-business Cybersecurity has become a national concern since the terrorist attacks. Security planning models help to cope with systems risk through deterrence, prevention, detection and remedies (Straub and Welke 1998). A framework can address the information cycle for the security process, by relying on information that is a combination of policies, controls for varying platforms, procedures, vulnerability alerts, regulatory standards, industry standards, information classifications, risk assessments, and technical security architectures (Schlarman 2002). There are two types of protection – passive and active. Passive protection examples include virus scanning, encryption, and firewalls, while active protection examples include vulnerability analysis and intrusion detection (Smith et al. 2001).

**Privacy risks to e-business**

Widespread use of data mining tools makes it relatively easy to compile a dossier about an individual from many different data sources, such as transaction records and records of an individual's click stream (Cranor 1999). Cell phones and other mobile devices can reveal an owner's location and enable marketers to send coupons for a participating merchant to the user while passing the merchant (Ghosh and Swaminatha 2001). Similarly, "OnStar" from GM will allow merchants to beam discounts offers when the driver is in the vicinity. Also invasive, is the



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collection of cell phone numbers for offline direct telemarketing. In March 2000, AT & T Wireless and Sprint PCS were sending users' cell phone numbers to the Web sites they had accessed (Ghosh and Swaminatha 2001). As more personal information goes online, the risk of disclosure increases.

**Legal risks to e-business**

Although the U.S. government's approach discourages e-business regulation (Dekleva 1999), there is concern about an ambiguous or hostile legal or regulatory environment (Rose et al. 1999), and perception that government Internet intervention is a risk largely out of firm's control (Ettredge and Richardson 2001). On the other hand, some individuals are more inclined to prefer government intervention (Milberg et al. 2000), expressing the opinion that self-regulation has failed (Hinde 2001) and that legislation and a publicly funded watchdog are essential (Clarke 1999).

**METHODS**

In this research, descriptive study is used to identify and describe the characteristics of variables for a situation. The purpose of the study is to describe the aspects of the phenomenon, the researcher or the views of individual, organizational, industrial and so descriptive studies used in the current situation and usually the results of these studies led to planning the future or that grounds for further studies, more accurate and provide better orientation (Khalil, 1378). In this survey method is that beyond a certain technique in data collection and its aim is exploratory, descriptive or explanatory, although mainly in the questionnaire, but other means such as structured interviews, to view analyze content, Using statistical techniques and can be used in this method (Khalil, 1378). According to the study includes data collection to answer questions about the current status of the study, a descriptive study and survey. Type of research is based on practical purpose. To study questionnaire included 54 e-commerce venture between organizations working in the field of e-commerce distribution and then were collected and prioritized work was done by using the AHP software.

**Validity**

In the final questionnaire, the designed questionnaire send it to six experts for confirmation of this effort was first introduced and then fully subject criteria statements that its ambiguity is at least possible plan. The meaning of terms to be clearly defined so that each term for all respondents has the same concept.

**Reliability**

In this study, Cronbach's alpha was used to spell the estimation of reliability that the results using spss software used, the amount of the questionnaire is 0.954.

**RESULTS**

Risk assessment results of 12 e-commerce is presented in Table 2. Ranking based on scores calculated using software. Rollover risk using the following general formula is obtained

**DISCUSSION**

As can be seen in Table 1. The main risk is strategic risk that is located in the first row and the security and privacy risks are second and third. Risk of dependence and leadership are located at the end of tables. the e\_commerc





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organization can manage their risk according to their importance. So those risks which have higher score should consider more and assign more resource to manage them.

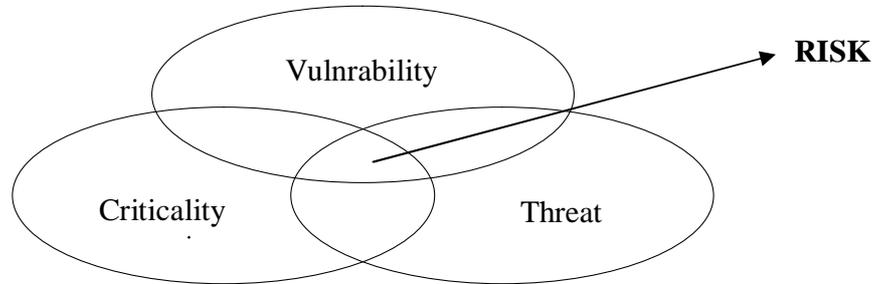
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**Mohamad Reza Sanaei and Farzad Movahedi Sobhani**



**Figure1. Risk identification model**

**Table1. Final score of risk index**

row	Risk index	weight	score	Final scor for each factor
1	Strategic risks to e-business	0.18	3.5	0.630
2	Security risks	0.091	4.1	0.373
3	Privacy risks	0.09	4	0.360
4	Identity risks	0.077	3.8	0.293
5	Competitive risks to e-business	0.096	2.91	0.279
6	Reliability of technology risk to e-business	0.092	3	0.276
7	Reputation risks	0.084	3.2	0.269
8	Legal risks	0.062	3.85	0.239
9	Expertise risks to e-business	0.087	2.25	0.196
10	Culture and currency risks to e-business	0.056	2.85	0.160
11	Dependence risks to e-business	0.07	1.6	0.112
12	Leadership risks to e-business	0.015	2.1	0.032





## Examining the Relationship between Human Resource Strategic Techniques and Innovative Performance with the Mediator Role of Information Management Ability (Case Study: Small and Medium Sized Companies in Industrial City of Kermanshah)

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### ABSTRACT

The present study investigated the impact of human resource strategic techniques and innovative performance with the mediator role of information management ability in Small and medium sized companies in industrial city of Kermanshah. The sample population is managers of Small and medium sized companies in industrial city of Kermanshah being equal 95 and all being selected by the census method. Questionnaires were used to collect the data; data were analyzed using statistical programs in both descriptive and inferential level by using structural equation modeling. Reliability of questionnaires with Cronbach's alpha coefficient was calculated and for questionnaires regarding human resources strategic techniques, information management ability, innovative performance respectively equaling .849, .788 and .879. All assumptions were confirmed in the .95 of reliability and the results showed that human resource strategic practices have a significant relationship with innovative performance. The dimension of performance assessment regarding the impact on innovation performance in the first and engagement in second, recruitment of personnel in the third-place, award in the fourth, education in the fifth, and finally information management capability has been ranked in sixth and final place.

**Key words:** Human resources strategic techniques, innovative performance, ability to manage information, Small and medium sized companies of Kermanshah.



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## INTRODUCTION

The world of today by some factors including extensive changes, increasing complexity and increasing the level of competition is creating a dynamic environment for the organizations, in a way that organizational success depends on harmony and correspondence with such an environment (Worthington and Britton, 2006). One of the strategies to achieve harmony and match is organizational innovation, which as a strategy to achieve competitive advantage and excellence in business, actually organizational innovation by development and continuous use of new sources of knowledge, supports the organization's competitive advantage. Perhaps for the realization of innovation, firms apply their human capital to develop organizational expertise creating new goods and services. But expertise was much more complex and basically that was the result of deliberate and intentional application of methods and techniques on duties in each work area (Deir al, 1984). As we said then, knowledge management may affect the relationship between human resource strategic practices and innovation performance. Getting information from the outside market and inside workers, create opportunities for combining current information and establishing new information. The required new information by Interaction with the existing information can alter corporate data storage and increase the breadth and depth of knowledge available to the company and thus increase the potential for new issues. An insight based on Knowledge suggests that information getting activities, increases the company's ability to carry out its role effectively. Companies with good ability to achieve internal and external information, to reduce the unknown .... And achieve further administrative and technological distinction. Therefore, this study shows that getting information is positively related to innovation operations (Dir al, 1984). Deliberate implementation of these methods requires that people want to do these tasks and try to improve performance. The firms can identify a set of human resource methods and apply the staffs' willingness and motivation to be engaged in performing these deliberate methods developing organizational expertise to realize their business purposes such as performance of innovation. So the aim of this study was to examine the effect of information management capabilities mediation between modes of human resources strategic methods and performance of innovation.

### Stating the problem

Strategic management resources consider the innovation in businesses to create value and sustainable competitive advantage in a highly variable environment being increasingly complex, a key enabler of these sets. Firms that is more innovative in response to changing environments and the development of new capabilities that provide them access to better performance, will be more successful (Dir al, 1984). Innovation projects heavily depend on the knowledge, expertise, and commitment of staff as key inputs of valuation process. From the viewpoint of knowledge, firms are illustrated as stores of knowledge and competence (Lodahl et al, 1965). According to this view, previous studies, knowledge and competencies of human resources due to factors related to history, social composition and circumstances of each firm are considered as the firm's valuable assets. Methods of human resource are of primary tools in which by using those firms can influence people's skills, attitudes and behaviors and shape them in a way that the work is done so and thus achieving the organization's objectives. Former Sources paid attention to the relationship between human resources and organizational consequences such as productivity, flexibility and financial performance, but this knowledge should be developed and should include innovation performance (Dir al, 1984). Thus this study tries to survey and present the relationship between human resources and firm's innovation performance regarding the innovation.

### Research background

Several studies in the field of human resources strategic techniques and its subsets are done. The brief stating the history of domestic and foreign studies regarding the research and its result and reviewing the literature and theoretical framework of research can help us obtaining the study objectives.





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### **The purpose of the study**

#### **The main objective**

Identifying the relationship between human resource strategic method with innovation performance

#### **Secondary objectives**

Identifying the relationship between hiring personnel with innovation performance  
Identifying the relationship between education with innovation performance  
Identifying relationship between partnership with innovation performance  
Identifying the relationship between performance measurements with innovation performance  
Identifying the relationship between reward with innovation performance

The ability to identify the effectiveness of information management on human resources strategic methods and innovation performance

## **MATERIALS AND METHODS**

Providing a conceptual framework, definitions and views.

### **Human resource strategies**

Human resource strategies are about decisions influencing the application and optimization of relations between management and their subordinates affectively and sustainably.

Philosophy of human resources strategy is to support the achievement of business strategy. Such support should be passive and future-oriented.

An iterative approach under ideal conditions is accepted where the authorities of human resource strategy have been future-oriented and passive, too. That is, while helping to form business strategy ensuring the fitness between business strategy and human resources strategy.

### **Human resource Strategic practices**

From the perspective of organizational learning, Curie and Crane (2003), using a case study approach (case analyzing) investigated the effect of " **human resource Strategic practices**" such as performance management, recruitment and selection, employee engagement and career development, on the increase in the knowledge sharing within the company. They acknowledge that human resources practices can improve sharing knowledge in enterprises having task-based structure and culture. In surveying the effects of "new human resource management practices" on corporate innovation in various sectors is contributing. This studies, intentionally, focusing on the effects of human resource strategic practices on innovation performance by influencing the knowledge management. In this study, those measures of old ones will be considered that have used the concepts of strategic and innovative methods of human resources (Lavrsn et al., 2003). As they have more relationship and dependency with debates about the interaction between human resource practices, knowledge management and innovation.





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**Hence, in this research five dimensions of**

Recruitment

Education

Contribution

Performance measurement and

Rewards are chosen in the structure of human resource strategic practices. In the following, each of these aspects will be discussed:

### **Meaning the ability to employ**

Central definitions of employability, includes all individual opportunities for success in various jobs in the labor market. In these definitions, the concept of employability includes only the capacities, desire and aspirations of the employee's, not position and underlying conditions. The broad definition of employability, in addition to the capacity and desire to succeed in a variety of jobs, also covers learning ability and all individual characteristics determining his future position in the labor market. The third category definitions, field factors and affecting conditions are added to the earlier definitions. Affecting Conditions are background and environmental elements that makes individual features easy or hard to impact on the employability, such as educational facilities being provided by the organization to him.

### **Education**

The staff's education and empowerment as a tool for competitive advantage is paid attention these days. Education and empowerment as well making as a sense of commitment towards the objectives of the organization in staffs, leading to increase job satisfaction and reducing the loss of human resources (Karam Asadi, 2003, p. 67) In order to run any kind of empowerment, managers must equip their employees. This equipment is education and information (Sanati, et al., 2007, p. 88). If the principles of empowerment in all aspects of education which is planned and presented become unified, education can be an important strategy to empower organizations (Dennis Kynla, 2004, p. 121). Hence the effective teaching is able to meet the goals of empowerment. The more you try to achieve educational goals, as well as the empowerment process will be successful. The first step is to start this process that managers have a positive attitude regarding the educating and empowering, creating this positive attitude among staffs and boost them. When managers and employees in an organization have a shared vision about education and empowerment they can perform them in organization successfully by cooperation and synergy.

### **Partnership**

Partnership is an Arabic word meaning participation. In Moein's dictionary it means participation, partnership and to determine the profit or loss of certain assets of two or more people who have business at specified times.

"Frenj laz" a French sociologist considers the participation as a current in which in it two or more groups have mutual effect on creating plans,policies and interactive decisions and this limits to those decisions having the future effect on decision makers and what is goingto be presented by them.In a general definition the participation means cooperation and handling an issue,activity,attending in a group or organization to discuss and to make decisions actively or passively and the responsibility of the person is unknown (Tabriz, 1994: 141).

Participation means cooperation and handling an issue,activity,attending in a group or organization to discuss and to make decisions actively or passively and totally,the main essence of cooperation should be found in the process of engagement,activity and effect(Alavi tabar 2000;15).



**Khosravi et al.****Performance Survey**

The staffs performance survey means to measure individual work systematically regarding the way of doing their job about assigned jobs and to determine the existing potential in them to develop (mir sepasi 2002). An organization's success criteria, is its staffs performance desirability rate. Historical study of performance management shows that in the traditional approach of performance management, any error shouldn't be treated to be punished. However, the purpose of evaluating the performance of employees, not to punish but to enhance their effectiveness. In this context, the relationship of traditional approach of performance management was unable to perform an appropriate role not upbringing accountable people to the organization. However in the successful companies today in which in them performance management optimal approach is common with on-punishing approach, reducing staff's reverence and disciplinary suspending resulting to non-payment, is a matter of the past and instead employees are responsible for their behavior and their commitment to the satisfactory performance as a condition of their continued employment. The biggest advantage of this approach is transiting the performance management responsibility burden of supervisors to employees. The employees can select one of two things: stay by changing them or leave. Performance survey has tight relationship with education, that is, they are two wings of a bird completing each other, this is due to this fact that performance survey mainly follows human source development and human source development has some processes including: examination, diagnosis, prevention and treatment. In the process of human resources development, training and performance evaluation work together. So that the evaluation of the performance does the examination performance and diagnosis and education handles the treatment and prevention through the establishment of required training (Soltani, 2004). A good performance evaluation system should also have five features, including simplicity and comprehensibility, especially from the perspective of employees, fairness, objectivity means that to prevent subjective judgments and tasteful evaluations as much as possible, being open and being open in a way that employees being aware of presence of evaluation indexes and criteria and being useful meaning that during the time and after doing one or two times of performing it results to improve your behavior (Abolalae, 2010).

**Reward**

Reward is dedicated to compensate individual effort in an organization, due to time and energy he spends in it gaining to organization's goals and also for his innovations and initiatives to find and apply better and newer working methods system in the organization, both on the one hand and the performance of a system based on specific standards and practices, rewards each employee is fit to work for them. The reward system includes both performance and is a system rewarding personnel based on special methods and rules. The reward system must be efficient and effective, in other words allocation and reward in organization must be organized in such a way that allows for maximum efficiency. As a first step in this regard, the system should be designed that rewarding be pertinent to the effective yield (the yield is operating effectively in order to achieve the objectives of the organization). Only in this way the use of bonuses is as a mechanism to encourage and motivate staff to work (Saadat, 1998). Behaviorist psychologists were among the first people in the field of scientific psychology, putting their focus on the preservation, development and maintenance of behavior, consequences and its results. Although the consequences of using such encouragement and punishment to change behavior, decrease or increase human behavior has long been considered, but far-reaching scientific research in this field in goes back to recent years (Soltani, 2004). A reward system can be defined based on organization's motivators, criteria for the payment of bonuses and the bonus distribution process. The reward system by determining the type of organization and person exchanging type, on the other hand by specifying the type of cooperation and expected effort of people and their expectation regarding their performance and on the other hand an organization values and norms, finally determining the relationship between people and organization (Saadat, 2000). In general, it should be noted that the bonus system of innovative organizations in terms of philosophy of rewarding, criteria and combining it is different, there is enough rewards to support all good people. The criteria of such a is based on risk and payment is of high flexibility (Soltani Tiran, 1999).



**Khosravi et al.****Innovation performance**

Innovation means offering new products and services resulting from the use of creativity in various fields working for the company. Innovation also means making use of creative ideas in the organization is (Jimenez, 2008).

**Human resource strategic practices and innovation performance**

Knowledge-oriented views wisdom as a valuable source of the firm. Knowledge hidden in human capital enables firms to upgrade their distinctive competencies and discover opportunities for innovation (Michie et al, 1999). When businesses develop new products and improve their management processes requiring human capital motivation and ability to generate creative ideas, develop innovative approaches, and explore new opportunities. Human resource management task can adjust and impress attitudes, capacities and behaviors of employees to achieve the organization's objectives and play a crucial role in creating the necessary conditions to guide and accelerate the development of innovation activities in order to develop innovation activities (Lavrsn et al. 2003). Firms can employ human resources strategic methods such as employment, education, participation, performance appraisal and compensation as a means to stimulate employee commitment and involve them in creative thinking and innovation. The topic of this research is based on this fact that human resource strategic methods will play a crucial role in influencing on innovation performance (Martynsans et al, 1995). Businesses in the development of innovation activities run into uncertainty more or less and more variability in the processes of innovation and need creative staff being are flexible, risk-taking, and are more tolerant in the face of uncertainty and ambiguity. Therefore, firms should put more emphasis on these characteristics in the recruitment process. When firms use capabilities and characteristics associated with creativity and innovation as recruitment and selection criteria, employees are likely to offer different ideas and to undertake further innovation. Through effective recruitment, staffs are an important source of new ideas in the innovative process of the firm. Training will facilitate the placement of workers exposed to a variety of knowledge and acceptance of innovative ideas. Firms provide Education and a wide variety of training for their employees to develop knowledge, skills and abilities of new and required innovative to perform the work. Businesses by training can extend their organizational expertise based on demand and content for innovation (Lavrsn et al. 2003). Investment in training can develop staff's expertise at all levels of organization that likely provides a potentially inexhaustible source of ideas for innovation. In addition, the innovation needs high level of involvement and participation of employees'. Firms may invite employees' to solve their problems and may get involvement and participation of employees (Lavrsn et al., 2003). A high level of participation, create the conditions to encourage employees for making new ideas and knowledge exchange in continuous innovation process, which in turn increases innovative consequences (Tannenbaum et al., 1994). Because the innovation process is often lengthy, uncertain and is multidisciplinary, firms must announce the value and importance of innovation as organization's priority and provide formal evaluation mechanisms to measure behaviors and outputs of innovation. The positive pressure of performance assessment, created a challenge and sense of success and a considered as key stimulus for the employees. Performance evaluation can motivate employees to engage in innovative activities and improved firms to reach good results in terms of innovation (Martynsans et al., 1995). In addition, verification and confirmation of the progress and achievements of employees and teams with compensation accelerates innovation. Rewards both internally and externally, are necessary to motivate employees for undertaking challenging necessary work and are team incentives for successful new product development and more creativity. (Lavrsn et al, 2003).

Topics aforementioned acknowledge that firms can use human resource strategic practices to influence the behavior and expectations of staff and create more value in the development of innovation. Businesses through strategic and effective methods of human resources in terms of employment, education, participation, performance appraisal and compensation can improve their ability to design products, services, and new management system and achieve better outcomes in innovation (Martynsans et al., 1995).



**Khosravi et al.****The ability to manage information**

Knowledge management includes all the ways in which organizations manage their knowledge assets, which include the collection, storage, transmission, use, updating, and creating knowledge (Rabytz and Vykrasasyng, 2007). University of management of Texas defines the knowledge management as follows: knowledge management, systemic and systematic process of finding, selecting, organizing, and summary of information, in a way that it improves people recognition in the favorite field. Knowledge management helps the organizations to get, knowledge and insights from their experiences, and focus its activities on storage and use of knowledge to use this knowledge to solve problems, dynamic training, strategic planning and decision-making. Knowledge management not only prevents brain and intellectual property deterioration, but also continuously adding to this wealth.

**Knowledge management ability and innovation performance**

Organizational innovation that requires the development of new products or services and new administrative systems, is known as an important source of sustainable competitive advantage. Innovation process including the acquisition, dissemination and use of existing and new knowledge. Innovation of organization with its ability to use of knowledge resources is closely tied. Knowledge management is an approach for active and effective use of knowledge and expertise to create value and increase organizational effectiveness (Klein et al., 1996). Firms that have a higher level of knowledge management can experience impacts of learning that can improve their ability to reduce waste works, rapid response to change, and develop creative ideas and innovation. Effective knowledge management facilitates communication and exchange of necessary knowledge in the innovation process and later, improves the innovation performance through the development of insights and abilities (Lin et al., 2010). Therefore, knowledge management can play a key role in supporting and enhancing innovation. Since knowledge management is complex in innovation process, this study focuses on those mechanisms that organizations use them to acquire, share and apply knowledge to new or improved varieties (Tannbam et al., 1994). The knowledge gained from external markets and domestic workers, provides opportunities for enterprises to combine or to remix existing knowledge and creating new knowledge. New acquired knowledge in dealing with the existing knowledge can modify storage of organizational knowledge, increase the breadth and depth of knowledge available to businesses, and thereby improve the potential of new innovative outcomes. Knowledge-based perspective acknowledges that knowledge acquiring activities increase the firms' ability to obtain a good external and internal knowledge, reduce uncertainty and gain more technological and executive differentiation. Sharing knowledge depends on mass beliefs or behavioral currents associated with the spread of learning between units or individuals within the organization. Previous research in this case and have shown that knowledge sharing can lead to an increase firm innovation (Klein et al., 1996). In particular, theorists have previously said the sharing of knowledge indicates a new combination of knowledge that there has been separately in advance, and likely lead to improve rhetorical processes or products. Because there is wisdom in different people in different levels of the organization, members of the organization it is necessary to share it in order to create mental new models and currents. Also, if the people tend to the exchange of knowledge they can create the collective learning and the benefits of existing synergies in knowledge and resources exchange. Innovations occur when members of the organization share their expertise and change it to a clear and explicit product or service. Hence, the firms being able to share knowledge among its members are probably more innovative (Lin et al. 2010). A wisdom affair in the knowledge management process is an important and focus component. From the knowledge point of view, the value of people knowledge and organization due to be tacit adherence and implicity of wisdom mainly goes back to its function. Innovation and new product development requires a function and combination of special wisdom of the very different areas (Klein et al, 1996). Deeper function of wisdom continuously enables the corporate to change their organizational expertise to real products. With the effective function of wisdom people might commit fewer errors and mistakes or improve their efficiency and reduce the waste works. After that, ultimately organizations can accelerate the development of new products and create more manufacturing and administrative innovative systems technologies (Lin et al, 2005). Therefore, in this study recommends that knowledge management ability makes a positive atmosphere to catch and share wisdom function





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in the firm so that innovation performance improves. Business through effective knowledge management will be able to change the wisdom to better innovative technical and administrative consequences.

**Research conceptual model**

Conceptual model of research is a theoretical based on relations between a numbers of factors that in the study that are of more importance. This framework while investigating the research background checks on the problem area flows in a logical way. The research has high position in mingling researcher's reasonable beliefs with the published study in order to create scientific basis of research to examine the issue. The logic of shaping this framework is based on the concept of investigating the relationship between the HR strategic practices and innovation performance with the role of information management ability mediator. As shown in Figure of conceptual model research on the right side is the dependent variable (Innovation performance) and left is the independent variable (HR strategic practices). The ability to manage information in the present study is considered as moderator variables.

**Data collection devices**

**Library:** In order to develop theoretical literature, especially the sectors related to the history and the research theoretical basics.

**Field study:** To gather required information from sample population, the questionnaire was used.

**Sample population, and sampling method and sample volume**

In this study, the sample population is the managers of small - and medium – sized companies in industrial zone of Kermanshah province that is 95 people In the present study regarding the low number of sample population the consensus method was used, in another word the sample population is the sample community.

**Ways and means of data analyzing:**

Given the model of the research questions, the best option is using spectrum Semi metric or the 0 to 100, which by using the AMOS software we analyze and express research output.

**Questionnaire Validity**

Since every three used questionnaire are standard , in which to measure the performance of the innovation standard questionnaires (Jimenez et al2008),Prajgo and sohl (2006) (as cited by , 2011), to examine the HR strategic techniques , standard questionnaires (2009) and Chen Hong, and also to examine the ability to manage information from standard questionnaires (Chen, Hong 2009) are used in which their validity in internal and external numerous studies have been confirmed , as well as in this study also are approved by teachers again .

**Research reliability**

Given that research related to social sciences and Cronbach's coefficient alpha more than 70 % is acceptable, it can be concluded that the questionnaire enjoys a high level of reliability.





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### Research hypotheses

#### Main hypothesis

- There is significant relationship between the HR strategic practices with innovation performance. (Sub-Hypotheses)
- There is significant relationship between personnel employment with innovation performance.
- There is significant relationship between educations with innovation performance.
- There is significant relationship between participation with innovation performance.
- There is significant relationship between performance evaluations with innovation performance.
- There is significant relationship between rewards with innovation performance.
- There is significant relationship between participation with innovation performance.
- The ability to manage information has significant impact on HR strategic practices and innovation operation.

#### Analysing the hypotheses

The descriptive statistics: Respondent's demographic characteristics: descriptive data of respondents is provided in Table 2.

#### Structural model of research (research main model checking):

Since in the present study Multivariate normality hypothesis is in order, to compare various models with the same data, as well as to choose the best one self-controlling can be used. Results of rejecting or accepting the hypotheses can be seen in table 3.

Table 4 shows the model fit indices.

According to the results and comparing it with the offered desired range in table we can say that all above's model fitness indices are placed in this domain and then the collected data fitness with the mode is desirable.

### CONCLUSION

In the present study all the relationships based on the test results of Pearson Correlation coefficient were confirmed. In other words, the HR strategic practices by a effect factor of .076 had significant impact on the performance of innovation and among the sub assumptions by the dimension of evaluating the performance by .078 on the innovation performance at the top, participation by effect factor of .063 on innovation performance in the second rank, the dimension of employment staff by effect factor of .058 on innovation performance in the third place, the reward by .052 on innovation performance as fourth, education by .049 on innovation performance as fifth and ultimately the ability to manage information by a .042 of HR strategic practices and innovation operation in the sixth and final. Based on the main assumption that showed that there is a significant relationship between the main HR strategic practices with innovation performance, and then it is recommended:

Creativity and innovation should be addressed; since innovation in human resources management, is as a key tool for capacity building and promoting it at the age of globalisation, that is what is necessary for the development of desired public management is a serious need for innovation in human resource management that acts as a capacity





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building for dealing with the challenges of globalization. Identifying the factors influencing the inter organizational environment on the ability to increase innovation capacity in the company. Willingness to accept responsibility or staff responsibility will be an important factor in promoting institutional innovation.

Based on the first sub - assumptions that showed there is a significant relationship between recruiting staff with innovation performance, then it is recommended:

In the selection of employees some issues like education fitness, personality and psychological characteristics of employees with mentioned jobs and businesses with regard to the abilities of their employees. Holding comprehensive tests during an interview, conducting the specialized interview pertinent to mentioned job , managers's more familiarity with the content of jobs when appointments and also while holding continuous in-service training courses seem necessary.

Based on the 2<sup>nd</sup> sub - assumptions that showed there is a significant relationship between educations with innovation performance, and then it is recommended:

In the company of training courses in connection with the company for employees should be held because it is important to note that holding high quality training courses, led to raise awareness, skill and strength of the workers, employees can address the problems and settlement of their work and stop their unnecessary transformations by doing their duties and responsibilities and it was a step in the direction of the development of the environment. Also with putting the required information in educational classes in the field of work environment, employees by being aware of the situation can have good performance.

In training courses some materials should be provided that are applied and be transferable to the working environment. A healthy working environment requires that mutual trust between managers and employees should exist, and organization should provide more favourable conditions for the development of the staff. For this purpose the necessary information should be provided for staffs regarding the organization's goals and performance in order to better accomplish the tasks. Also should be a good pattern for his staff by his desired performance, so that staffs are moralized in doing their tasks, treats each other fairly and fair and constructive competition should be in the environment of organization, in other words, honesty should be in all parts of the business units.

Regarding the training the sense of participation, in training classes some items including group discussion, conferences and seminars is necessary and in this regard necessary information and feedback should be provided so that staffs feel it most. Regarding the staffs joining in training courses it is offered that as much as possible the conditions of staff's attendance in different periods should be provide and facilitated so that personnel with more understanding of the issues and society, have a good performance in the organization and for customers.

Based on the 3<sup>rd</sup> sub - assumptions that showed there is a significant relationship between participation with innovation performance, and then it is recommended:

Toward interchangeable types of corporate management methods including the deployment of the proposals system, the reward system and create brainstorming, creating a sense of trust between managers and staff to authorize the personnel in organization and cultural bedding should be paid attention. Employee's participation in decision - making through paying more attention to their opinions and the creation of a communications department between managers and employees to reflect the views mutually.

Based on the 4<sup>th</sup> sub - assumptions that showed there is a significant relationship between performances measuring with innovation performance, and then it is recommended:





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Payments should be in connection with the performance of the employees and based on their merit and should be excluded from monotony, in which to implement this method having a codified evaluation system is also essential. Usually its employees compare their salary with other colleagues in the same companies. It is necessary that necessary investigations and studies in other similar companies or companies with the same mother company needs to be done so that justice in payments according to individual performance indicators should be considered in a better way.

Based on the 5<sup>th</sup> sub - assumptions that showed there is a significant relationship between rewards with innovation performance, and then it is recommended:

Reward payment to staff should be timely, so that the reward in the shortest possible time (immediately after the positive performance) is paid to staffs. As much as possible ways and the payments systems for staffs should be clarified and while observing the theory of expectation, discrimination - oriented payment procedures should be refused.

As in identifying individual performance indicators, individual skills factor is important, the Company in rewarding system should create a good scoring on this factor in the company. Payment system in company should have three features including attracting, maintaining and motivating employees. Company's payment system should be based on the indicators resulting from reviewed catching the three abovementioned elements.

Based on the 6<sup>th</sup> sub - assumptions that showed there is a significant relationship between ability to manage information with innovation performance, and then it is recommended:

Policies and regulations that limits people access to information and knowledge should be removed, and increase speed for access to knowledge and its exchanges in the organization, such as the use of office automation. Training should be given to workers in the field of their job and staff's related knowledge to their responsibility, so that they have authority to make decision in their job duties after the necessary training and their capability.

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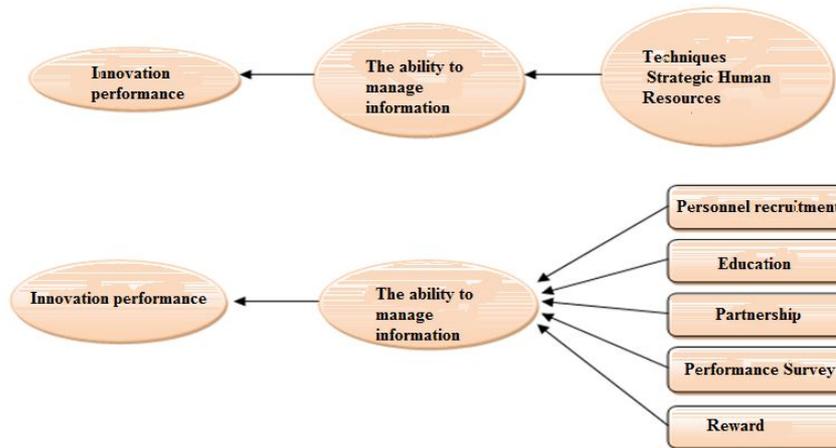
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**Fig1. The research conceptual model**

**Table1: A review of studies**

Row	Title	author / year	results
1	human resource strategic management	A. Salehi (2013)	Results showed that today to meet competitive challenges facing the organization and getting the objectives , survival and profitability in today's dynamic world of increasing success factors for organizations in current dynamic world one of the components increasing the success for organizations is to focus on human resource strategic practices. The purpose of the strategic management of human resources is the creation of





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			perspectives with which key issues related to the employee is determined.
2	Studying the Experimental theoretical role of knowledge management in innovation	Ashlyky servery (2012)	Results showed that knowledge management is a process that helps organizations to identify, select, organize, publish, and pass information and expertise without structure in which are part of the organization's memory
3	Surveying the Knowledge as a facilitator to improve innovation performance through a comprehensive quality management	Hong et al. (2010)	Results showed that innovation includes the formulation process, sharing and applying explicit and implicit knowledge.

**Table2. Descriptive statistics on the demographic characteristics of respondents**

demographic characteristics		Frequency	percent
age	Under 25	1	
	25-35	30	
	35-45	36	
	45-55	20	
	More than 55	8	
gender	male	80	
	Female	15	
Level of education	Under diploma	0	
	diploma	8	
	junior graduate	17	
	bachelor	44	
	Post graduate and higher	26	
Job experiece	Under 5 years	6	
	5-10 years	20	
	10-15 years	24	
	15-20 years	31	
	More than 20 years	14	





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**Table3. Checking the hypotheses assumption by using structural equation modeling.**

Hypotheses assumption		Direction route	Direction rate	T	Rank
Main hypothesis		Of human source strategic methods on innovation performance	0.76	4.53	-
Sub-hypothesis	1	Of personnel employment on innovation performance	0.58	5.04	4
	2	Of education on innovation performance	0.49	2.4	6
	3	Of participation on innovation performance	0.63	5.12	2
	4	Of performance evaluation on innovation performance	0.78	6.32	1
	5	Of reward on innovation performance	0.52	4.19	5
	6	Of information management ability on innovation performance	0.62	3.19	3

**Table4. Structural equations model fit indexes**

index name	type of indicator	range	Acceptable amount for the model desired fit	Amount for our model	result
Chi-Square	----	---	significance level of p is more than .05	Chi-square=345.30 P = 0.34	acceptable model fit
AIC	information criterion	no	Less than amounts of independence model	106.34	amounts of independence model 247/46 then acceptable
CAIC	information criterion	no	Less than amounts of independence model	162.38	amounts of independence model 387/62 then acceptable
RMR	information criterion	Betw een 0 & 1	less than .05	Standardized RMR = 0.013	acceptable





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GFI	comparative	Between 0 & 1	larger than .09	0.92	acceptable
TLI Or NNFI	comparative	Between 0 & 1	larger than .09	0.90	acceptable
CFI	comparative	Between 0 & 1	larger than .09	0.91	acceptable
Critical N	sample size capability	no	For different model	64	The sample size is 95 and was bigger then acceptable





## Solutions to Change the Traditional Approach to Electronic Taxation (Case Study: Office of Tax Affairs of Kermanshah)

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### ABSTRACT

One of the subsystems of e-government to modify the tax system is e-taxation, in which sometimes not only is a big step toward e-government, causing many savings in taxpayers time and money and to systematize the tax statements, to increase people trust in order to self-state, to reduce conflicts among taxpayers and tax agents to determine the actual amount of tax, to establish economic stability and organization and leading to this point that human tastes are removed fully and tax justice sets up. Anyway the evidences show that inspite of big investments regarding the IT its failures has been more than its success and organizations couldn't get their goals in this case. In the present study, which examines ways to change the traditional taxation to the E-tax after the explanation and interpretation of research done in other countries, commencing to interpret and analyze the data collected from the research community, in the form of analytic statistics and both descriptive and inferential ones. In Continue it investigates the relationships between the variables in the conceptual model of research and through proper statistical models, the study hypotheses have been examined. Passing from the above mentioned processes requires the use of appropriate statistical analysis methods and to ensure the accuracy of the implications, which in the study with high sensitivity, have been reviewed. The results show that some variables including technological facilities, perceived trust, legal matters, perceived ease of use, perceived Usefulness, social impacts have the highest importance and more effectiveness in influencing factors on stablishing electronic tax.

**Key words:** E-government, E-tax, Office of tax Affairs of Kermanshah, technological facilities, perceived trust, legal issues



**Jalilian and Falahati****INTRODUCTION**

Taxes have long and deep historical roots, and its life accompanies with the advent of the first governments and social management organisations. Only the type and amount of tax collection was different and the principle has never been abandoned. Special importance and high position of tax system in each country's economy is obvious for all experts in this field. So with regard to the weaknesses and shortcomings of the country's tax system, revolutionizing the tax system has been the subject of enthusiasts' attention from the public and private sector. The necessity of implementing this change in country's planning and upstream documents has been paid attention at times. Since taxes will play a significant role in economic development in advanced countries, e - taxation in terms of its applications is of manifestations of advanced and developed economies. Using of e-sites in the area of income tax statement by its taxpayers and tax collection play an effective role in promoting e – government's targets .

Accelerating and advancing government targets ensures some factors like speed and accuracy of affairs and reducing tax collection costs , saving time, tax collection facilitation and contribution to fiscal and budgetary discipline and the realization of the tax revenues, satisfaction of tax payers and tax organizations, building trust and transparency regarding economic activities and preventing tax evasion, like realizing the major objectives of e-government and like realization of tax revenues, fair distribution of income and wealth, economic and social justice and providing necessary fields for competitiveness and economic stability and optimal implementation of resources and environmental protection, protection of investors and creating jobs and economic growth and development the organisation's (tax site 2014).

It is evident that the deployment of e-tax system in any society requires the enjoyment numerous fields and preconditions and also requires observance of complex considerations in which one design and implement their complex within the framework of e - taxation comprehensive and indigenous model.

The present study,along with following up such a goal,tries to explore the E-tax adoption by the citizens and taxpayers by exploiting the E-tax practical experiences in other countries specially advanced countries in this case and analyzing the Iran's local E-tax compromising pillars and to present basic and practical approaches to exploite more and effectively.

**Stating the problem**

The number of organizations seeking change, continue to rise. The speed of continuous innovation in technology is of factors driving the changes in systems and organizational processes. Internet advent and epidemy making possible access to information and knowledge faster than before is considered as a basic factor and the need to use IT is felt in this time more than before. However IT in organizations and government agencies has failed to attain its rightful place in the effective application. Then, it didn't get its strategic advantages in which are differentiation and expenses Iradership, on the other hand using the official traditional methods associates with many outcomes including elongating the time of working, employees mistakes, registering significant expenses and archive documents, customer dissatisfaction, etc. (Shoji Shiba, 2008). Due to the effects of taxes leave on economic variables, the appropriate tax policies, in order to improve the system, is of extraordinary importance. To implement the E-taxation, using information technology and computerizing the tax system can satisfy the tax payers and increase convenience of gathering taxes. To identify tax capacities, to create internal and external data networks (the taxpayers) and also improve the efficiency of tax collection requires the use of new technologies and official mechanization in the implementation of E-taxation (AR Maleki Najafdar, 2012). Internet revolution has brought substantial changes in the methods of providing services not only to customers but also to the citizens and businesses that already is provided. A government around the world since 1990 launched the project aiming to provide basic services through electronic means (Torres et al., 2005: 26). The main concern of governments is to collect taxes properly. Since in addition to this



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point that tax is providing the government's financial sources to handle the affairs and their responsibilities and finally giving services to people, the way of collecting tax can have a serious impact regarding the country's development goals and strategic plans. Whatever the levy is of order, logic, strength, precision, speed and greater accuracy, finance of government will be with greater speed and accuracy and through information produced by this system more accurate decisions can be made to guide the public to move towards the development goals of country and optimal distribution of resources. It can also help to develop a sense of social justice (Mohammad Jafar Zadeh, 2009: 28). Comparing to other online services provided by the government, completing tax returns electronically is one of the most advanced and widely used services that are being used.

In the public sector with a move to online services, tax authorities tend to be a pioneer in the use of information technology (Connolly and Bannister, 2008). Tax office in order to apply e-tax system as one of the basic axes of e-government and also aiming to increase tax office efficiency and promoting taxpayers satisfaction, for the first time in 2010 has established the possibility to accept e-tax revenues and e-pay through the internet, terminal sale (pos), ATMs and mobile bank. But with an overview to this system process, it is seen that not only physical presence isn't removed but also more time is needed to do this process and taxpayer should refer to tax office to pay, calculate and registering it. Finally the calculated tax amount should be paid in cash. This causes problems impeded the adoption of this service. Regarding the abovementioned points, in the present study we try to investigate traditional taxation to e-taxation and by providing a suggestive the model independent variables on the dependent variable is investigated.

**Research background**

In this section shortly, some factors including inside and outside research and the application of the models on electronic tax declaration as a subset of e - taxation system will be surveyed.

**Research objectives****The overall objective**

Evaluation of shifting the traditional method of taxation to e-taxation.

**Applied purposes**

- Identifies influencing structures on the adoption of electronic tax.
- Measures affecting structures on the adoption of electronic tax structures.
- Ranking influencing structures on the adoption of electronic tax.
- Optimization Model for accepting electronic tax.

**MATERIALS AND METHODS**

Providing a conceptual framework, definitions and views.

**E - Tax system**

In today's world change, the dynamics and transformation is the basic principles and managers working in the bureaucratic organizations, must continually seeking ways to improve their organization. Innovation and change in products and services of industrial communities is so quick that takes the power to choose and purchase of many



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products and services from customers in a way that many commodities don't last for more than a month. Speed of change in goods and services and economic globalization, has revealed its influence in all enterprises and that culture of the people is affected by this changes. Societies and organizations that with don't match themselves the concerted changes, feel backward and enterprises in these communities are in front of destruction.

The task-oriented organizations can show flexibility hardly against environmental changes and be consistent with the environment. An approach process is an approach against duty approach being suggested to organizations. Business processes are those that are fully in control of one section and in fact they are limited in the task - borders (Shams, Abdel -Hamid, 2006-22). Tax concept of each country, is a strategic, infrastructural and dynamic concept that plays a pivotal and central role in realization of national development programmes in every country.

The tax affairs until the year 2002 consistent with administrative and economic policies , was central and focused , but following the profound transformation in manufacturing and economic policies in the first and second programme of the country's socio - economic development , top management and the Ministry of Finance and Economic Affairs to co - ordinate growth tone and prosperity of this organization with the current developments and in order to meet the present and the future needs of Iran, tried to make changes in the office structure in the executive structure with the implementation of a major policy of deregulation , in which the main feature of these changes is the establishment of an organization with independence relative action and managers have relative structure in decision - making .

An autopsy of country's tax system by relying on the performance figures and statistics, suggests that this system in terms of structural matters couldn't get the intended targets as desired. On the other hand, one of the most important factors affecting the tax system and tax rate is the complexity of the tax processes that has created a kind of red tape. The complexities in the tax processes causes difficulties in tax condensation and the implementation of the administrative procedures and lead to increase its costs.

Since the late 1990s, many governments in the field of e - government services made large investments to connect government networks, and to create a large number of regular infrastructure services providing a broad and active services. However, the low level of accepting this service by the users is called as a local issue for government policy - makers and e - government service providers. For example, the system for Online tax filing and payment system (OTFPS) is one of the most famous of e - government services in Taiwan. System of (OTFPS) began to work since the 1998 and Taiwan tax National Directorate has invested millions of dollars in its development. However, the rate of taxes e-pay adoption and registration system was low (15 /5 percent per in year2003 and 21/6 % in year 2004). In addition, the online tax rate in the United States was low (20 /11 percent per in year 2002 and 22/61 % in year 2003).

Therefore, the governments need to identify indicators of IT adoption by the user that by applying they increase the adoption of e - government services among users. Applying and use the Internet, in the government's performance is defined as informing the e - Governance (kuhen & amikeh 2002, Harris, 2002, jurgenson, Kabul, 2002). e - government services is an innovative goal in a review on the work of the government and improve the quality of exchange and the interaction between citizens and businesses through improved communication and better access, servicing equipped with high quality and better processing the systems. However e - government services has an implicit uncertainty (absolute uncertainty) to use the technology infrastructure to exchange through the novelty of communication media with the state - run network.

This issue indirectly increases time and place separation between the state and the citizens, doubt and anxiety to know more about the credibility of the absolute communication infrastructure of the Internet and the government. Generally, this abnormal difference accompanies an increase in citizen's uncertainty and reduction of the acceptance and the imposition of a barrier to the adoption of e – services of the e-government. From the perspective of



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technology, e- service as the use of information and communication multimedia technology in order to improve the delivery of public services and citizens, organizations and jobs are interpreted. And multimedia technologies to transform ( ICT) is one of the applications of e - government services from performance , efficiency , transparency, information accountability , exchange between the government and citizens. However, e - government services will be a gate to enter the administrative and business services. For example, e - government services in Malaysia as one of the strategies to achieve the vision for speeding up to enter to Malaysia's Multimedia Super Corrido (MCS) since 2020, and the (hallway) is above introduced multimedia information. Services being provided through a network are government's growth-oriented in helping to improve public delivery system. e - government was began in Malaysia in February 2006, 2004, the e – government's insight , is to alter the administrative process and delivery system through the use of the Internet technology(IT) and being multi - media . Malaysian government made a Web site to organize the services. Surely e - government issues include the composition of the legal system, making private security mechanism (confidential), eager and trust, technical issues and infrastructural, access and stability, social issues, usefulness, and other matters need to further study.

Therefore, in order to improve the efficiency, the tax system, needs facilitating processes by helping the e-taxation and simplifying the tax processes through administrative mechanization. By implementing these two Technologies together, increases the performance of the system tax. The use of information technology in the implementation of the e- taxation and tax mechanized system can improve tax payer's satisfaction implementation of the principle of being a pushover tax. Tax payers with the full implementation of mechanization enter a cycle, and a tax colleague in the e -tax affairs. Identifying the tax capacities, establishing information networks between organizational circles, as well as between tax payer and organization and as well as the improvement of the performance of the country's tax revenues collection, requires the adoption of new technologies in the field of implementing electronic taxes and administrative mechanization. The adoption of new information technologies in organizations is usually considered as a positive step for organizational activities. Successful application of information technologies in organizations will depend on its acceptance by users of technologies. Research shows that a lot of information technologies being established by spending time and high cost, because the user's unacceptance, usually remain idle. Tax system special importance and high position in a series of each country's economy is clear for all the experts of this field.

So with regard to the weaknesses and shortcomings of the country's tax system, the tax system revolution has been the subject of enthusiast's attention, including private and public sector.

**Goals of e - taxation system**

With the implementation of the e-tax system, the organization expects to achieve the following goals:

**Increased tax revenue**

By the way things such as the prevention of tax evasion, identifying new taxpayers and expediting the process of identifying and tax collection, include: Recording the main economic activities of economic activists through the establishment of a comprehensive network for tracking key exchanges. The use of Smart system and able to analyze requests of taxpayers and tax Auditors and also conducting careful examination on performance information of taxpayers, the choice of cases to survey is based on the risk and ultimately the implementation of auditing elected tax cases. Integration and relating revenues from different economic activities of any taxpayer. The implementation of the new kinds of taxes (VAT).

Improving and sublimity processes within the organization in connection with the identification, statement, evaluation, accounting, auditing, and addressing the claims, collecting and implementation. Reducing administrative costs of tax operation. Through spreading a culture of self - statement, optimal allocation of resources, devolution,





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outsourcing, increases the effectiveness and efficiency in duty and other related matters, including: Reducing tax collection costs and tax collection increasing through voluntarily condensation of taxpayers and facilitating their communication with organization. Presenting the administrative and applied solutions to meet the needs of taxpayers to persuade them to give a tax statement and information in electronic methods and the other methods of computer information exchange. To improve the performance of the organization through analyzing tax processes, and establishing necessary systems such as tax identification number, processing the tax returns, accounting, auditing and tax audit, recognition, implementation, addressing the claims, collecting and implementation and so on. Creating a management information system within the organization.

#### Increasing the owners of the interests's satisfaction

by the way things like, organization processes reengineering, using information technology facilities, creating tax justice and dissemination of tax culture, including:

The easy, fast, accurate, integrated and inclusive implementation of tax affairs to raise the taxpayers satisfaction, trust and veneration the framework of the law. Implementation the integrated tax system and the creation of the necessary institutional changes in the organisation. Improving services to taxpayers and also facilitating access to services by development of information technology application.

Presenting faster response to questions of taxpayers and, ultimately, the supply of services (Online) to its taxpayers. Presenting better information exchange and systematic data exchange with third parties. Tax accounting practices for all taxpayers individual of organization. Promoting job satisfaction for the organization staffs through reducing or eliminating repetitive and daily tasks, and as a result, opportunities for employees to address a satisfactory affairs and precious. covering the current costs of the state through tax revenues.

#### Research conceptual model

In the study which is a exploratory - functional research is to assess approaches of changing traditional taxation to electronic one and finding factors effective in establishing e - taxation system of research and former theories including acceptance unified theory and the use of technology and acceptance unified theory and use of UTAUT technology being a combination of eight models, TAM model, the TPB model, DOI model, MM motivational model, using a computer model MPCU SCT and the theory of social cognition SCT and hybrid model of TAM TPB - and also exchanging in - depth views and interviews with IT professionals and tax expert experts, the General tax affairs Kermanshah province has been used.

#### Data collection devices

**Library:** in order to develop theoretical literature, especially the sectors related to the history and the research theoretical basics.

**Field study:** to gather required information from sample population, the questionnaire was used.

#### Sample population, and sampling method and sample volume

In this study, the sample population or the main community in which sample representative or indicator sample has been obtained, is the Kermanshah taxpayers, which due to its size, the size of this society almost, according to the conducted inquiry from the information technology agency about 110.000 taxpayers is unlimited. The volume of the sample or the same set of or a group of elements of a population that are chosen when sampling to measure, in fact





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all the qualities of society, especially those qualities that in terms of the research question are important must exist in the sample exist correspondently and the results of that could be generalized to whole society. In this research from the understudy population, a sample as big as 384 people using cookran sampling method and by simple random sampling has been chosen.

$$(1) \quad n = (N \cdot p \cdot q \cdot S^2) / (N \cdot d^2 + p \cdot q \cdot S^2)$$

#### Ways and means of data analyzing:

Given the model of the research questions, the best option is using spectrum Semi metric or the 0 to 100, which by using the AMOS software we analyze and express research output.

#### Questionnaire Validity

To ensure the validity of the questionnaire, the following measures have been taken place: exchanging views and in - depth interviews with IT professionals and tax experts , the General authority of tax affairs of Kermanshah Province studying theories and issued research in the field of e- tax statement acceptance observing e- tax returns systems and get acquainted with the performance determine effective components on acceptance of e - tax in Iran according to cases mentioned formulating questionnaires through observation process of and e - taxation ,previous research and similar to this issue and the necessary reforms through consultation and discussion with tax experts.

#### Research reliability

Given that in research related to pure and social sciences, Cronbach's coefficient alpha more than 70 % is acceptable, it can be concluded that the questionnaire enjoys a high level of reliability.

In Table 2 using Cronbach's alpha test and exploratory factor analysis the reliability of the questionnaire is confirmed.

#### Research hypotheses

**Hypothesis1:** perceived usefulness has meaningful and direct impact on the establishment of electronic taxes.

**Hypothesis2:** perceived ease of use has meaningful and direct impact on the establishment of electronic taxes.

**Hypothesis3:** perceived trust has meaningful and direct impact on the establishment of electronic taxes.

**Hypothesis4:** legal issues have meaningful and direct impact on the establishment of electronic taxes.

**Hypothesis5:** social impact factor has meaningful and direct impact on the establishment of electronic taxes.

**Hypothesis6:** technological facilities have meaningful and direct impact on the establishment of electronic taxes.

**Hypothesis 7:** demographic characteristics have meaningful and direct impact on the establishment of electronic taxes.

#### Analysing the hypotheses

The descriptive statistics respondent's demographic characteristic is provided in Table3.

Structural model (model checking the main confirmed of research ): Research Since in the present study Multivariate normality hypothesis is in order, to compare various models with the same data , as well as to choose the best one self-controlling can be used. Results of rejecting or accepting the hypotheses can be seen in table 4.





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**Table 5 shows the model fit indices.**

According to the results and comparing it with the offered desired range in table we can say that all above's model fitness indices are placed in this domain and then the collected data fitness with the mode is desirable.

#### Table5-Structural equations model fit indexes

Figure 2 shows the impact of the independent variables (perceived usefulness, ease of understanding, perceived trust, legal issues, social effects and technological facilities) on a dependent variable of establishing e- tax. As results indicate Independent variables respectively have the impact of the 21, 21, 23, 22, 21 and 27 % on a dependent variable of establishing e- tax.

## CONCLUSION

According to the results of this research and in light of the results of the analysis of data and hypotheses, for the success of the best and most in implementing the e-tax system, in addition to arguments raised in the results, it is recommended: As in the process of implementing an integrated e - taxation system, according to studies, scenario of the current situation and desirable scenario is also forecast. So removing the present gap and eliminating restrictions on the plan is very important.

As in the Global bank and the Economist institute report, respectively based on the importance, six indicators of the adoption of the system by users and companies, technical and communication infrastructure, politics and the outlook for the government, social and cultural environment, the business environment and legal environment, are presented as economic indicators of digital economy and unfortunately in our country all of these indicators don't have favorable situation. It is worthy by relying on youth scientific and technological strength and and national and gifted wealth, paving the way of traditional taxation to e-taxation. Especially as it is seen, indicators of more importance coefficient exactly are in the scope of government and the tax affairs authority, therefore delaying implementation and lack of attention to these indicators can be unforgivable sin in mind for the future regarding our performance. Throughout the world research, theories and models of different and partly similar are presented and investigated in which results taken with regard to the many differences in terms of cultural, social , economic and infrastructural location and ..... Have close affinity with each other and it shows the accuracy and the popularity of the e-tax system in public opinion as well as tax and government officials' .Regarding the research carried out domestically and monitoring and controlling over the effective identified factors in the stablishment of e- tax by offering a strategic planning. Offices of taxation activate consultation Units and within the framework of a specific plan, in accordance with its taxpayers scattering and type of activity, do the consultation services in the form of formulating brochures or other methods. With the application of this method a part of a lack of ability and adequate skills in the use of the Internet is compensated. Of taxpayers satisfaction factors contain the satisfaction of its taxpayers, improving services to taxpayers and also facilitate accessing to services with the development of information technology user, providing faster response to taxpayers' questions and ultimately supplying on line services and the process of reengineering. So providing service beds such as the presence of equipment, the development of a high - speed optical fiber infrastructure network, removing infrastructure constraints, applying the number of people to do things for the development of the service, it is essential that deserves attention to this matter.

Organization should work for the awareness of the amount of progress in all stages of the implementation of the integrated e-tax system, with frequent and progressive measurement of taxpayers satisfaction and the owners of the interests of his performance to be measured. Paying attention to staff's satisfaction is a necessary and pre condition for its taxpayers satisfaction , so it is recommended that the tax affairs before any action to pay tribute to its



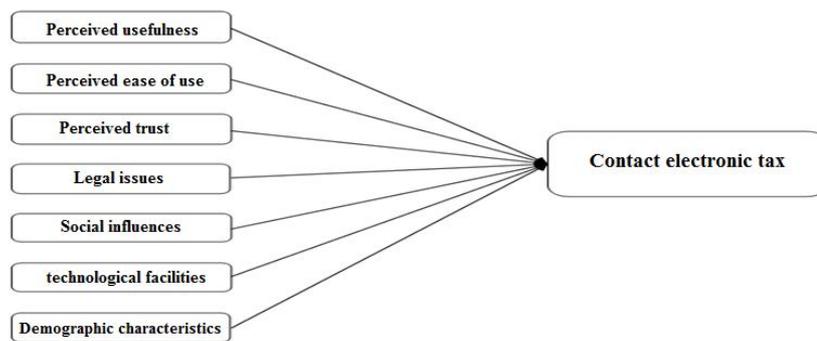


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taxpayers pay special attention to this issue and use their administrative staff opinions and proposals as a strong arms implementation of this approach to the optimal use .

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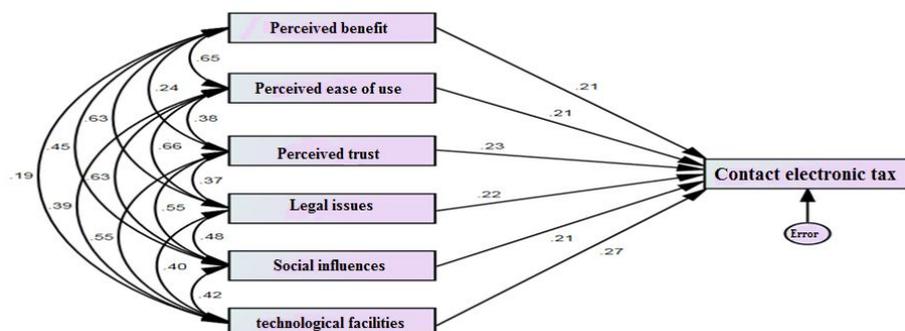


**Fig1. The research conceptual model**





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**Fig2. Structural equation model in standard estimate state**

**Table1: A review of studies**

Row	Article title	Author/year	results
1	reviewing obstacles and problems in implementing e- taxes	Barati,Namamia n,2014	According to the index attitude, mental norms and controlling the perceived behaviour in this research and its subsets, identification and ranking the impact of each of them in the adoption of e - taxation system in this research is done properly and the results, in its kind are very significant and reasonable.
2	reviewing effective factors in accepting e- taxes	Mehdi Iskandari, 2011	Research results show among the factors affecting the willingness to use e-tax return, effort expectation factor had the most important influence factor among other factors. This indicates that the ease of use of e-tax return software for the Iranian people is of paramount importance. According to the model technical- infrastructure issues factor also has an important impact on effort expectation factor.
3	empirical study of the system application and information quality measure in assessing the Web sites of e - services	Parmita saha, 2012	These findings have caused this point that this study focusing on the necessity of existing factors beyond providing a satisfactory service to citizens. A tool that developed for this study will provide a good insight that can be seen as a reference point in the definition of reliable quality standards and website and influencing on the people who use much more online services for filing their tax returns.





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**Table2. The results of Cronbach's alpha validity and reliability of the questionnaire**

variable	Cronbach alpha
social effects	0.716
Perceived ease of use	0.769
Perceived usefulness	0.847
Perceived trust	0.880
technological facilities	0.773
legal issues	0.735
Total	0.820

**Table3. Descriptive statistics on the demographic characteristics of respondents**

demographic characteristics		Frequency	percent
age	Under 25	16	4.2
	25-35	192	50
	35-45	108	28.1
	45-55	56	14.6
	More than 55	12	3.1
gender	male	264	68.8
	Female	120	31.2
Level of education	Under diploma	8	2.1
	diploma	20	5.2
	junior graduate	20	5.2
	bachelor	220	57.3
	Post graduate and higher	116	30.2
Computer experience	I have no experience with computers	0	0
	Less than one year	24	6.3
	1-3	72	18.8
	3-7	108	28.1
	More than 7 years	180	46.9
internet experience	I have no experience with internet	0	0
	Less than one year	52	13.5
	1-3	108	28.1
	3-7	136	35.4
	More than 7 years	88	22.9
The use of the Internet rate	Every day	224	58.3
	Once a week	112	29.2
	Once a month	20	5.2
	Every few months	28	7.3





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Access to a computer at work	y	380	9
	n	4	28
PC connection to the internet at work	y	288	75
	n	96	25
Experience using electronic tax system	y	376	97.9
	n	8	2.1
Place of using e-tax system	home	72	18.8
	Office	148	38.5
	Internet Cafe	80	20.8
	Tax Administration	40	10.5
	Post Office	36	9.4
The reason for using e-tax system	convenience	52	13.5
	Save time and money	60	15.6
	Tax Administration guideline	124	32.4
	All items	140	36.5
Spent time to send e-data	less than 15 minutes	72	18.8
	Between 15 to 30 minutes.	92	23.9
	Between 30 to 60 minutes	148	38.6
	More than 60 minutes	64	16.7

**Table4. Checking the hypotheses assumption by using structural equation modeling**

Research main and sub hypothesis	Effect rate	Significance level	Assumption result
Perceived benefit has a significant impact on the establishment of electronic taxes	0.21	0.000	Approval
Perceived ease of use has a significant Impact on the establishment of electronic taxes	0.21	0.000	Approval
Perceived trust has a significant impact on the establishment of electronic taxes	0.23	0.000	Approval
Legal issues have a significant impact on the establishment of electronic taxes	0.22	0.000	Approval
Social influences has a significant and direct impact on establishment of electronic taxes	0.21	0.000	Approval
technological facilities have significant impact on establishment of electronic taxes	0.27	0.000	Approval





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**Table5.Structural equations model fit indexes**

	Result	Desired range	amount	Index title
Chi-square	Model approval	$\chi^2 / df < 5$	1.644	$\chi^2 / df$
The root mean square error of approximation	Model approval	RMSEA < 0.05	0.041	RMSEA
The root mean of square residual	Model approval	RMR ≥ 0	1.526	RMR
Goodness of fit	Model approval	GFI > 0. 9	0.980	GFI
Modifies goodness index	Model approval	AGFI > 0.85	0.949	AGFI
Normalized fit index(Bentley Bonet)	Model approval	NFI > 0.90	0.988	NFI
comparative fit index	Model approval	CFI > 0. 90	0.995	CFI
Incremental fit index	Model approval	IFI > 0. 90	0.995	IFI





## Quantum Computers Cryptography

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### ABSTRACT

There are various classic encryption methods but the best classic encryptions are decrypted after a while, thus, we can choose quantum mechanics due to its unique features as superposition, interference, Entanglement, non locality and non clonability for making an unbreakable code. Quantum cryptography or quantum key distribution applies one of the properties of quantum mechanics to transfer a secure key between two databases. Finally, the security of two protocols of four-state and six- state quantum k key distributions are introduced. Bennett and Gilles Brassard (1984) developed four-state quantum key distribution. This protocol has two bases X, Z and each basis has two states. Six-state quantum key distribution is proposed by Lo-Chau and has (X, Y, Z) bases and each basis has two states. Six-state quantum key distribution is much more secure.

**Key words:** Quantum cryptography, Four-state quantum key distribution, Six-state quantum key distribution, Key security.

### INTRODUCTION

Computer is only a part of the world we call digital world. Machine processing of data in any form is based on digital and classic computations. The best method to process information is based on quantum mechanics. Quantum computers aren't limited by the binary nature of the classical physical world, quantum computer is a system (Quantum computer, 2002) as making a physical phenomenon based on quantum physic rules as unique to detect a new state of information processing. Indeed, the best method for information processing is based on quantum



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physics. Ordinary computers should understand zero and one and manipulate it. The information from numbers and letters to the status of your modem or mouse is all represented by a collection of bits in combinations of ones and zeros. These bits correspond very nicely with the way classical physics represents the world. Electrical switches can be on or off, objects are in one place or they're not. Quantum computers aren't limited by the binary nature of the classical physical world, quantum computer is a device making a physical phenomenon as unique based on quantum physics to detect a new state of data processing. The best and strong method for data processing is based on quantum physics. Thus, quantum calculations are raised as a new and efficient method. Some important phenomena in quantum physics separate it from classic items as superposition, interference, Entanglement, non locality and non clonability. To evaluate the effects of these phenomena in this new method, it is required to introduce quantum data unit at first. Each calculation system has an information basis representing the smallest information, processes or raw. In classic computation, this structural unit is called bit as "binary" as it can keep only one of zero or one. In other words, each of the values in classic computation is the smallest data as displayed. Thus, the systems in this model should present this concept. In quantum calculations, a basis is introduced as qubit or quantum bit. Quantum bits or qubits that might represent a one or a zero, might represent a combination of the two (at the same with zero and one values, "superposition") "or might represent a number expressing that the state of the qubit is somewhere between 1 and 0. Based on quantum mechanics, we cannot determine the presence or absence of a fine particle. By probabilities and statistics, we can determine the possibility of these particles at definite time and place. There is no way to know definitely whether the particle exists or not as we haven't seen it directly. The valuable aspect in quantum computers is probabilities. Quantum computer theory was raised in 1982 as Physicist Richard Feynman for the first time proposed that calculations should be transferred from digital world to quantum world. Also, he stated how quantum computer worked. This design didn't receive much attention since 1990 and in 1985 Deutsch found that Feynman statements can lead to quantum computer emergence and he published a paper to model each physical process with quantum computers. Finally, Peter Shor (1994) fulfilled this desire. When some key problems of ordinary computers were shown, quantum computers could do the calculations outside classic copies and they had high efficiency compared to ordinary computers. He published a paper for a method to use quantum computers in solving a complex problem in value theory as finding factor. He showed how a set of math operation as designed for quantum computers can enable such device to find factor of numerous values with high speed of classic computers and by this invention, quantum calculations were turned from a curiosity to a global attention. Since then, research groups in the world started a match to be pioneer in construction of a practical system. Thus, a new relationship was between information theory and quantum physics and now it is called quantum calculations or Nano Computing

Quantum computing eliminates the past problems and create new horizon. The great power of quantum computer as the result of quantum balance can allow a mechanism to perform, high, frequent calculations at the same time. This is the great difference with classic computers that only can perform an operation once and rapid. As there are various classic encryption methods, the best classic encryptions are decrypted after a while, thus, we can choose quantum mechanics due to its unique features to make a code unbreakable.

**MATERIALS AND METHODS**

**Quantum cryptography:** Quantum cryptography is based on the fact that light is moved in the form of small packages as photon with specific features. Quantum cryptography or quantum key distribution applies quantum mechanics features to transfer a secure key between to databases.

Generally, a cryptography protocol is a set of math relations providing the combination of cryptography algorithms and using them to present a specific cryptography service in a specific application. Quantum key distribution protocol (cryptography) was raised for the first time in 1984 and various versions of it have been presented since then. Despite conventional methods of cryptography, no limitation is considered for processing power of eavesdropper. There is a sender (Alice) and a recipient (Bob) and an eavesdropper (Eve). The eavesdropper





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eavesdrops the communication channel and puts himself in transfer way. The sender and recipient need quantum channel for communication by which they can exchange quantum bits or qubits. Although there are various ways to implement a quantum path, one way of qubit is optical fiber channel in which by photon pack transfer, communication is done and in an ideal channel, each qubit sent by sender is received without error by recipient and the receiver doesn't receive any packs not sent by sender. There is no such a channel in practice and the channel can avoid the transfer of qubits to recipient or change them and this leads to error. Thus, to generate a shared key, the error in channel should be less than definite limit. In this communication, we need a classic channel. This classic channel is optical fiber, internet or computer network cable. The eavesdropper can eavesdrop classic channel but cannot change it. To trace whether eavesdropper has achieved information from message illegally or not, the sender and recipient should authenticate the other party and they should share a secure key. Thus, quantum key distribution protocol stages are as follows.

1. Raw key generation: By quantum channel, a string of bit is shared between sender and recipient as only a part of string of sender and recipient is equal. The length of it depends upon many factors as type of protocol, channel features and whether Eve eavesdrops or not.
2. Purification: Omitting most of string bits not equal for recipient or sender. This is used to eliminate imperfect bits without transferring any information about the bits on channel. Then, the string length available to sender and recipient is reduced and this reduction size depends upon the features of channel and eavesdropping.
3. Error correction or key recovery: Based on the type of protocol, by omitted bit in the previous stage or sacrifice of some or remaining bits, error correction operation is performed and by estimation of bit error rate, they define whether eavesdropping is performed or not. If bit error rate exceeds determined bound, the sender and recipient guess eavesdropping is done and the previous stages should be re-done.
4. Privacy amplification: If bit error rate is less than definite limit, it is possible the eavesdropper achieves a part of information and sender and recipient by sacrificing another part of bit string can reduce the knowledge of eavesdropper information.
5. Authentication: The first step of each stage is authentication for sent messages on ordinary channels to be sure the eavesdropper didn't change the information on ordinary channel. To do this, the sender by the key generated of the bit string of previous stage can create an authentication ID for message and this ID is sent with message. Then, the applied bits in this key are discarded. On the other hand, the recipient by the same method can generate a similar key on the shared bit string and sent authentication ID is evaluated by the sender. If the sender authentication is confirmed, the message is recognized as real message of sender and key bits return to bit string. Otherwise, if the sender is not authenticated, eavesdropping is recognized and the stage should be repeated.

We introduced two protocols of four-state quantum key distribution and six-state quantum key distribution. Four-state quantum key distribution was proposed by Bennett and Brassard (1984). This protocol has two bases of X, Z and each basis has two states. Six-state quantum key distribution was proposed by Lo and Chau (1999) and it had three bases (X, Y, Z) and each basis had two states. The comparison of key generation rate in six-stage protocol compared to four-state protocol

When we evaluate Entanglement purification protocol carefully (modified Lo and Chau protocol) (Lo, 2001), we can find in this protocol, the key idea is "commuting observables. For those observables, it is consistent to assign probabilities to their simultaneous eigenstates. In such a description, one only considers the diagonal entries of the density matrix





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With respect to the Bell-basis. Furthermore, in the large N limit (where N is the number of pairs of qubits), by random sampling, one should only be concerned with the average density matrix. Therefore, one can reduce the whole problem of purification of a general N-pair state in QKD to the problem of purification of an ensemble of N identical Bell-diagonal states. In what follows, we will see that the four entries in the density matrix have interpretations in terms of the probabilities as:

- a) no error
- β) a bit-flip error, but no phase error
- c) A phase error, but no bit-flip error
- d) Both bit-flip and phase errors

Let us denote the effective density matrix by:

$$diag(a, \beta, c, d) \tag{1}$$

In Lo and Chau protocol, Hadamard transform in on the second half of each EPR is applied if b=1 and if b=0, identity permutation I on second half of each EPR pairs is used. If b=0, main elements of density matrix are as:

$$diag(a, \beta, c, d) \tag{2}$$

If b=1, due to Hadamard transform, phase flip error is turned into bit error and vice versa. In density matrix, c is converted to β and β is converted to c and a,d remain unchanged. Density matrix is as:

$$diag(a, c, \beta, d)$$

(3)Average density matrix is as follows:

$$diag\left(\frac{(a + a)}{2}, \frac{(\beta + c)}{2}, \frac{(c + \beta)}{2}, \frac{(d + d)}{2}\right) = diag\left(a, \frac{(\beta + c)}{2}, \frac{(\beta + c)}{2}, d\right) \tag{4}$$

Based on average density matrix on d (as both phase flip error and bit flip are occurred), no constraint is performed. It means that in four-state protocol, if in a qubit, phase-flip and bit-flip are occurred simultaneously, Hadamard transform is not useful to identity phase error signs (bit). This shows that in four-state protocol, phase flip and bit flip errors are independent and we should act separately to detect and correct these two errors. If we know the signs of bit error, we have no information of phase error and knowing one of the errors is not useful to detect another error. In six-state protocol, it is proved that phase flip and bit-flip errors are dependent and if we know the bit errors signs, we can easily detect phase error. It gives us information about phase error.

Owing to the symmetrization created by Hadamard operator in four-state protocol between x,z bases:

$$HXH = Z, \quad HZH = X \tag{5}$$





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We can define an operator establishing symmetrization between three bases X, Y, Z for six-state protocol (D. Gottesman, 1998) and this operator is called T.

$$T = \frac{1}{\sqrt{2}} \begin{pmatrix} 1 & -i \\ 1 & i \end{pmatrix}, \quad T; X \rightarrow Y \rightarrow Z \rightarrow X \tag{6}$$

For Six-state protocol, density matrix is like four-state density matrix:

a) No error; b) bit-flip error, but no phase error;

c) Phase error, but no bit-flip error; and

d) both bit-flip error and phase error. Thus, the elements of main diagonal density matrix are shown as followings:

$$diag(a, c, \beta, d) \tag{7}$$

Based on Lo and Chau for six-state protocol, we saw that if t=0, identity permute I on second half of EPR pairs is applied and if t=1, T permute on second half of EPR pairs is applied and if t=2, T2 permutation is applied on second half of EPR pairs and we have:

If t=0, density matrix is as:

$$diag(a, c, \beta, d) \tag{8}$$

If t=1, density matrix is as:

$$diag(a, d, \beta, c) \tag{9}$$

If t=2, density matrix is as:

$$diag(a, c, d, \beta) \tag{10}$$

Thus, average density matrix is as:

$$\begin{aligned} &diag\left(\frac{a+a+a}{3}, \frac{\beta+d+c}{3}, \frac{C+\beta+d}{3}, \frac{d+c+\beta}{3}\right) \\ &= diag\left(a, \frac{\beta+c+d}{3}, \frac{\beta+c+d}{3}, \frac{\beta+c+d}{3}\right) \end{aligned} \tag{11}$$





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In average density matrix, constraint is performed on  $d$  and this indicates the relationship between phase flip error and bit flip error in six-state protocol, it means that phase error (bit) gives information about bit error (phase). This relationship reduces conditional entropy of phase error and reduction of conditional entropy is equal to the increase of generation rate of confidential key. At first, we show that phase error and bit error relationship can reduce conditional entropy of phase and after that we show that conditional entropy reduction is equal to the increase of confidential key generation rate in six-state protocol. To show conditional entropy reduction, we apply Shannon entropy. In this section, Shannon entropy is explained as:

**Shannon entropy:** Suppose there is  $\mathcal{X} = \{\chi_1, \chi_2, \dots, \chi_n\}$  random variable with probabilities  $P = \{p_1, p_2, \dots, p_n\}$ . To this random variable, a function is attributed as:

$$h(\mathcal{X}) = \sum_{i=1}^n p_i \log_2 \frac{1}{p_i} \tag{12}$$

Suppose a person tells us  $\chi_i$  event is occurred. Thus, we can ask how much information is given to use and how much of non-awareness is reduced. Intuitively, the highly probable the occurrence, the lower the information achieved, we are interested highly of its occurrence and our information is increased and this function is called Shannon entropy. As  $P \log_2 \frac{1}{P}$  in the distance  $P \in [0,1]$  is a positive function, thus,  $h(\mathcal{X})$  is positive. If we gave two random variables of  $\mathcal{X}, \mathcal{V}$  not being independent from each other, entropy function is defined as followings:

$$h(\mathcal{X}, \mathcal{V}) = -\sum_{i,j} P(\chi_i, \nu_j) \log_2 (\chi_i, \nu_j) \tag{13}$$

We consider two random variables  $\mathcal{X}, \mathcal{V}$  as their distribution is defined by  $P(\mathcal{X}, \mathcal{V})$ . Assume that the value of one of the random variables,  $\mathcal{V}$  is considered and this value is equal to  $\nu_j$ . Thus, random variable distribution  $\mathcal{X}$  is changed:

$$P(\chi_i | \nu_j) = \frac{P(\chi_i, \nu_j)}{P(\nu_j)}, \quad \sum P(\chi_i | \nu_j) = 1 \tag{14}$$

In this case, entropy of random variable  $\mathcal{X}$  is as:





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$$h(\chi|v) = -\sum_{\chi_i} P(\chi_i|v_j) \log_2 P(\chi_i|v_j) \tag{15}$$

Thus, averagely by knowing  $v$ , entropy  $\chi$  is as:

$$\begin{aligned} h(\chi|v) &= \sum_{v_j} P(v_j) h(\chi|v_j) \\ &= -\sum_{v_j, \chi_i} P(v_j) P(\chi_i|v_j) \log_2 P(\chi_i|v_j) \\ &= -\sum_{v_j, \chi_i} P(\chi_i, v_j) \log_2 P(\chi_i|v_j) \tag{16} \\ &= -\sum_{v_j, \chi_i} P(\chi_i, v_j) \log_2 \frac{P(\chi_i, v_j)}{P(v_j)} \\ &= h(\chi, v) - h(v) \end{aligned}$$

$h(\chi|v)$  is considered  $\chi$  entropy, on condition we have  $v$  and this entropy function is not symmetrical, it means that:

$$h(\chi|v) \neq h(v|\chi), \quad h(\chi, v) = h(\chi|v) + h(v) = h(v|\chi) + h(v) \tag{17}$$

If  $v, x$  are completely corrected, we expect:

$$h(\chi|v) = 0, \quad h(\chi, v) = h(v) \tag{18}$$

The mutual information in two random variables  $v, x$  is defined as followings:

$$I(\chi : v) = h(\chi) + h(v) - h(\chi, v) \tag{19}$$

This quality is symmetrical to two variables  $v, x$ . Based on previous equations, it is written as:





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$$I(\chi:v) = h(\chi) - h(\chi|v), \quad h(\chi|v) = h(\chi) - I(\chi:v) \tag{20}$$

Before we know the value of  $v$ , entropy  $\chi$  is denoted by  $h(\chi)$ . By knowing  $v$  value this entropy is reduced to  $h(\chi|v)$ . Thus, the difference of these two values indicates the information of  $v$  about  $\chi$ .

**RESULTS AND DISCUSSION**

In this stage, in Shannon entropy equations, instead of two random variables  $\chi, v$  not independent, we put two variables of phase error  $e_{phase}$  and bit error  $e_{bit}$  not independent in six-state protocol. Thus, we have:

If  $e_{phase}$  is phase error rate and its results are denoted by  $\{e^{1_{phase}}, e^{2_{phase}}, \dots, e^{n_{phase}}\}$ . If in  $i$ th qubit, phase error is occurred, entropy function, thus:

$$h(P(e^i_{phase})) = \text{Log}_2 \frac{1}{P(e^i_{phase})} \tag{21}$$

If in sent qubits,  $N$  times phase flip error is occurred, phase error entropy is as followings:

$$h(e_{phase}) = \frac{1}{N} \sum_{i=1}^N NP(e^i_{phase}) \text{Log}_2 \frac{1}{P(e^i_{phase})} = \sum_{i=1}^n P(e^i_{phase}) \text{Log}_2 \frac{1}{P(e^i_{phase})}$$

bit error rate, if in qubit, there are phase error and bit error, entropy function is as followings:

$$h(e_{phase}, e_{bit}) = - \sum_{i,j} P(e^i_{phase}, e^j_{bit}) \log_2 P(e^i_{phase}, e^j_{bit})$$

By knowing one of bit flip errors, for example  $e_{bit}$ , phase error distribution is changed and is as  $P(e^i_{phase} | e^j_{bit})$  and the followings are always established.

$$P(e^i_{phase} | e^j_{bit}) = \frac{P(e^i_{phase}, e^j_{bit})}{P(e^j_{bit})}, \quad \sum P(e_{phase} | e_{bit})$$

Thus,

entropy of phase error rate as we know  $e_{bit}$  bit error is occurred is as followings:





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$$\begin{aligned}
 h(e_{phase} | e_{bit}) &= \sum_{e_{bit}^j} P(e_{bit}^j) h(e_{phase} | e_{bit}^j) \\
 &= - \sum_{e_{phase}^i, e_{bit}^j} P(e_{bit}^j) h(e_{phase}^i | e_{bit}^j) \log_2 P(e_{phase}^i | e_{bit}^j) \\
 &= - \sum_{e_{phase}^i, e_{bit}^j} P(e_{phase}^i, e_{bit}^j) \log_2 P(e_{phase}^i | e_{bit}^j) \\
 &= - \sum_{e_{phase}^i, e_{bit}^j} P(e_{phase}^i, e_{bit}^j) \log_2 \frac{P(e_{phase}^i, e_{bit}^j)}{P(e_{bit}^j)} \tag{25} \\
 &= h(e_{phase}, e_{bit}) - h(e_{bit})
 \end{aligned}$$

As in six-state protocol, there is a correlation between bit error rate and phase error rate. Thus, mutual information of bit error and phase error is as:

$$I(e_{phase} : e_{bit}) = h(e_{phase}) + h(e_{bit}) - h(e_{phase} | e_{bit})$$

If we put conductional entropy equation as proved, this equation is simplified as followings:

$$I(e_{phase} : e_{bit}) = h(e_{phase}) - h(e_{phase} | e_{bit}), \quad h(e_{phase} | e_{bit}) = h(e_{phase}) - I(e_{phase} : e_{bit})$$

Before we know bit error rate  $e_{bit}$ , phase error entropy is equal to  $h(e_{phase})$ , by knowing  $e_{bit}$ , this entropy is reduced to  $h(e_{phase} | e_{bit})$

Thus, the difference of these two values is the information carried by  $e_{bit}$  regarding  $e_{phase}$ . The higher the dependence of phase error and bit error, the higher their mutual information and lower the conditional entropy.

If we take a look at article (2004 -Gottesman and Lo and Lütkenhaus and Preskill), the formula of confidential quantum key generation (G) is as followings:





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$$G = n_{sift} [1 - H(v) - H(w|v)] \quad (28)$$

Where,  $w, v$  are the variables not independent from each other. In six-state protocol, bit error rate  $e_{bit}$ , phase error rate  $e_{phase}$  are correlated. We can see  $H(w|v)$  is the same as  $h(e_{phase} | e_{bit})$  and the lower the  $h(e_{phase} | e_{bit})$ , quantum generation rate (G) is increased.

## CONCLUSION

To be sure that our message is not eavesdropped by another party, based on specific features of quantum computers, cryptography protocol, and quantum key distribution is used. Here, Lo-Chau claim regarding that six-state protocol quantum key is more secure than four-state protocol was investigated. It was shown that six-state quantum key distribution protocol as with corrected phase error and bit error reduced conditional entropy and by placement of phase error and bit error in Shannon entropy, we proved that conditional entropy is reduced.

Thus, to create a secure quantum key distribution protocol, this protocol should be as bit error and phase error are correlated as the higher the correction, by awareness of phase error (bit), we can achieve little information about bit error (phase) and after a short time, we can detect the error occurred in the path by eavesdropper or other things or it is also corrected.

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## The Effects of Differences between Actual and Projected Earnings per Share on Trading Volume of Companies' shares Listed in Tehran Stock Exchange

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### ABSTRACT

A large number of stocks and bonds are traded daily on stock exchange and their prices are fluctuated. How to price transaction securities is one of the most important issues in examining and exploring patterns and rules of market. Investors use financial variables of companies especially their earnings per share when deciding to invest in stock. This study aims to evaluate the effects of differences between actual and projected earnings per share on trading volume of companies' shares listed in Tehran Stock Exchange. Spatial scope of research includes all companies listed on Tehran Stock Exchange as well as time scope of this investigation begins from 2008 until end of 2012. The study method is descriptive and correlation. It is in the range of applied research in terms of aim. The study reasoning method is deductive - inductive. Descriptive and inferential statistics are used in this study in order to analyze the data. We use Durbin-Watson test in order to examine the independence of errors hypothesis for hypothesis testing, then we examine the relationship between independent variables and dependent variable using simple linear regression. We use Mann-Whitney instability test in order to examine third hypothesis. The results of this research confirm the relationship between actual and projected earnings per share and its effect on trading volume of companies' shares listed on Tehran Stock Exchange.

**Key words:** actual earnings per share, projected earnings per share, trading volume





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## INTRODUCTION

A large number of stocks and bonds are traded daily on stock exchange and their prices are fluctuated. Therefore, how to price transaction securities is one of the most important issues in examining and exploring patterns and rules of market. In 1990s and before, the majority of transactions in financial discussions focused on rational economic actors and market efficiency. The researchers faced with exceptions that theoretical models were not able to explain them in the form of modern financial theory or were not compatible with efficient market theories. Financial scientists tried to explain and find reasons of above cases during the last decades using other sciences such as behavioral, social and physical. Thus, interdisciplinary areas were formed quickly entitled financial econometrics and financial mathematics. Studies were spread in this field quickly and could partly explain the phenomena. The integration of economic theories with psychological theories entitled "behavioral finance" was presented and it was accountable for uncertainties on issues related to efficient market hypotheses.

Empirical studies have shown that many behavioral patterns of investors are in conflict with paradigm of neoclassical assumptions. One of the most serious and prominent patterns is investors tendency towards sale "winner stocks" and holding "loser stocks". Shefrin & Statman (1985) Statman (1985) were the first ones who examined the potential effect of investors' behavior on capital markets and called it Disposing Effect. Disposing Effect attracts our attention to investors' reference point, because winner or loser asset recognition by investor depends on comparison of property prices and mental reference levels. That is why knowing the way of forming reference point in the minds of investors is much more important. While in previous researches evidences of reference point that affect the investor decisions are obtained using whole market data but it is not clear that factors are formed in which circumstances. Researchers' behavioral explanation for Disposing Effect includes their views on loss aversion (Kahnman & Tversky (1979) and Tversky & Kahnman (1992)) in the form of developed theoretical framework of behavioral model that is provided by Shefrin & Statman (1984). Four factors contribute in analysis of behavior; Prospect Theory; Mental Accounting (Taler 1985); Regret Aversion and Self Control. Generally, Disposing Effect reflects holding mental account of each share investment; according to prospect theory, maximizing the value function of "S" shaped is based on reference level of mental account. Regret aversion explains the reasons of ambiguity in profit and loss detection by investor and self control rationalizes the ways which investor uses in order to create behaviors and detect losses. The concept of reference point psychology is fully known and discussed in economic literature. The reference point formation mechanism has not been seriously studied. Substantial empirical research simplifies assumptions and considers the purchase price and maximum and minimum price of 52 weeks as a reference point. The study aims to test the hypothesis whether or not firm specific events trigger investors to update the reference points and change their behavior. "Firm Specific event" that is used in this study includes seasonal earnings that announces stock prices of day after earning announcement (Event Day) as an indicator of potential reference point. In this study, we try to review prices and differences between actual and projected earnings per share and trading volume considering the behavioral finance theories. Previous studies offer evidences on early sale hypothesis of winner stocks compared to loser stock but these studies are generally incapable of distinguishing between behaviors of investors' motives. According to prospect theory, investors may avoid sale of loser stocks due to behavioral reasons or due to wrong return to mean prices and then sale their own winner stocks. There may be legitimate reasons for this: 1. Investors who do not hold market portfolio, sale them in order to balance the portfolio of certain increase of stock prices (Lakronish and Smith, 1986); 2. Investors who have purchased shares with adequate information may hold it when they feel that available information is not reflected on share price after the price increase (Lakronish and Smith, 1986); 3. Since trading costs of shares is more for shares at low prices (According to calculation method of trading costs on foreign countries stock), investors may avoid sale their loser stocks in order to avoid paying more costs at lower prices (Shefrin 1988). In study, eager to sale winner stock and holding loser stock were observed despite controlling the above three cases. The effectiveness of this behavior on stock market prices depends on the activity of other market traders such as professional and institutional traders. If Disposing Effect is





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reviewed cumulatively, it can identify a direct relationship between price and defined trading volume by Lakronish and Smith (1986) and Ferris et al. (1988).

## **MATERIALS AND METHODS**

### **Hypotheses**

Hypothesis is an oriented question that human suggests on an issue and has already been chosen in order to check whether or not rules on issues are reliable or to obtain new laws, relationships or offer new experiences (Zeinab Ramezani Chahardah, 2012).

All research processes are done in order to prove or reject the hypothesis. Considering the importance of hypothesis, research hypotheses are formulated as follows.

1. There is a significant relationship between deviations of actual and projected earnings per share and trading volume.
2. There is significant difference between deviations of actual and projected earnings per share and trading volume when company's share price is increased and decreased.
3. There is significant relationship between deviations of actual and projected earnings per share and changes in reference point from investors' prospect.

### **The research scope**

Research domain in terms of time, spatial and subjects is as follows:

#### **Subject domain**

This study examines the effects of differences between actual and projected earnings per share on trading volume of companies' shares listed in Tehran Stock Exchange. This research is in the field of financial management.

#### **Spatial domain**

Spatial domain of this study includes all companies listed on Tehran Stock Exchange. Selecting companies listed on Tehran Stock Exchange as spatial domain provides more homogenous data due to access to company's information and observing the same rules. Meanwhile it is the only place where stock is offered.

#### **Time domain**

This study includes a 5-year period from the beginning of 2008 until the end of 2012. Since trading volume has experienced the greatest fluctuations during this period compared to other periods, the period is selected as time domain.

#### **Research mathematical model**

This research method is Ex post facto based on observed information in terms of research method of financial science and benefits event study methodology.





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When investors update reference point in their event day, tendency towards sale winners leads to increased trading volume in terms of increased prices compared to decreased prices that is displayed in this way:

$V(U_i)$ : trading volume in terms of increased prices

$V(D_i)$ : trading volume in terms of reduced prices

We test the following volume ratio in order to analyze test statistics parametrically:

$$VR_i = \ln \left( \frac{V(U_i)}{V(D_i)} \right)$$

$VR_i$ : A parameter that considers differences between trading volume per share. In fact, this variable is a parameter that reflects the scale of trading volume ratio in terms of increased and decreased price per share and event and considers differences in trading volume of both cases.

### Variables

#### Dependent variable

A variable that is increased or decreased due to changes in independent variable is called dependent variable, response variable or outcome; (Adel Azar) The research includes:

The trading volume: the product of number of shares traded per share value on exchange time during a given fiscal year. (Omid Qaemi 2000)

Where:

V: Trading Volume

P: Share price at time of exchange

N: Number of traded shares during a given fiscal year

#### Independent variable

The potential or hypothetical reason of dependent variable is called independent variable or input variable or stimulus. (Adel Azar)

#### The research includes

Actual earnings per share: Earnings per share that is assigned at the end of each period.

Earnings Surprises: we need to compare actual and projected earnings in order to measure the earnings surprises announcement that is calculated as follows:

Earnings Surprises= actual seasonal earnings-projected seasonal earnings/ projected seasonal earnings





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**The above formula will result in the following modes**

1. The actual earnings per share greater than projected earnings per share;
2. The actual earnings per share less than projected earnings per share; and
3. The actual earnings per share equal to projected earnings per share.

**Control variable**

A variable whose effect must be neutralized or eliminated during research is called control variable. (Adel Azar)

**The research includes**

Projected earnings per share: it is earnings per share that company predicts for financial year ahead.

EPS stands for "Earning per share". Earnings per share is calculated in this way: earnings minus company's tax divided by total number of shares which represents earnings that company earns within a specified period per common stock. Concepts derived from this term are the most basic principles of decision-making in stock market.

We can use the below formula in order to calculate earnings per share (EPS): (Vakili Fard)

**Its variables include**

EBIT: Earnings before interest and tax deduction

I: interest expense

t: tax rate

E: preferred stock earnings

N: number of Common stock

**METHODOLOGY**

The study method is descriptive and correlation. It is in the range of applied research due to aim. The aim of applied research is development of applied knowledge in a particular field, in other words, applied research is performed in order to use knowledge practically. The study reasoning method is deductive - inductive. It is deductive because library, articles and Internet are used for theoretical framework and literature and it is inductive because primary data path is used for gathering information in order to accept or reject the hypotheses and the results are generalized to entire statistical population of companies listed on Tehran Stock Exchange.

**Data collection method**

The library method is used in this research in order to collect information. In this method, articles of prestigious journals that are taken from academic sites, scientific journals, indexes, PhD and Master Thesis as well as books related to topic will be used. In this study, Securities and Exchange Organization site, Rah Avard Novin and Tadbir Prdaz software are used for data collection.





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**The statistical population and samples**

According to time and spatial domain of research, the statistical population of study includes shares of all companies listed on Tehran Stock Exchange. The study sample consists of companies listed on Tehran Stock Exchange from 2008 to 2012. Adjustments related to sample members are done according to objectives and data needed for research and based on logical order that is required for sample stock tradings during data collection; companies are selected as statistical sample which are eligible as below:

1. Companies that are not among investment funds and banks
2. Companies that are not among Exchange brokerage firms
3. Companies that are not among companies with 3 months or more trading halt
4. Companies with financial years ending in /12/29

After necessary adjustments, the number of sample companies achieved 206; given that 3 month earnings are studied in this research, three-month periods in which actual and projected earnings per share were equal are removed and periods formed the sample that actual and projected earnings per share are not equal and as a result, the events are 1030.

**Data analysis**

Data needed for this study are collected mainly from following sources and methods:

A) Stock Exchange Trading System: Stock Exchange Trading System is used in order to access the primary and research raw data and access to information valid criterion and to compare it with data collected from database and other software.

B) Using software: data are collected from Tehran Stock Exchange reliable software as well as official website of organization. Obtained figures are compared with data extracted from Exchange Trading System in order to confirm the data validity. Then, data are prepared and variables are explored using computational and statistical spreadsheet software that is used in financial field (Excel). Then, hypotheses are tested using SPSS statistical analysis software in order to analyze data statistically and achieve reliable results.

**Data collection tools**

"Rah Avard Nowin" and "Tadbir Pardaz" databases will be used in order to collect needed data and calculate the variables. In cases where data of databases is incomplete, we will refer to manual archives of Securities and Exchange library and management, research, development and Islamic studies of Stock Exchange website ([www.rdis.ir](http://www.rdis.ir)). Information on theoretical foundations of research library has been collected using Farsi and English books and articles. EXCEL, SPSS and EVIEW S7 software are used in order to test the hypotheses and analyze data.

**Data analysis method**

Descriptive and inferential statistics are used in this study in order to analyze data. We describe discussed tables using descriptive statistics. We use inferential statistics in order to test the hypotheses. Firstly, we examine independency of errors hypothesis in order to test the hypotheses using Durbin-Watson test, then we examine the relationship between independent variables and dependent variable using simple linear regression. Then we will use Mann-Whitney non-parametric test in order to examine third hypothesis.





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**Linear regressions**

One of the aims of most statistical surveys is to find relationship by which we can predict effects of changes in one or more variables on other variables. Regression terms means to return and represents that value of a variable depends to another variable. In other words, regression provides a method of extracting the relationships between variables using collected mass data. "Francis Galton" used this term for the first time in 1877 in order to explain the relationships between variables.

Regression analysis is a simple way of determining the relationships between variables. In other words, regression analysis is a tool that uses correlation between variables in order to predict a variable value from other variables value that are associated with it. We estimate and analyze the mathematical relationship in regression so that we can determine unknown variable quantity using known or independent variables.

Regression is a statistical method that deals with the relationship between two or more variables and using it we can predict a variable on the basis of one or more other variables. We will encounter simple linear regression model if there is one independent variable and we will face multiple regression model if we have more independent variables.

**Simple regression**

Suppose that X is an independent variable, Y is a dependent variable and e is error variable. The regression line equation is as follows:

$$Y_i = \beta_0 + \beta_1 X_i + e_i, \quad i = 1, 2, \dots, n$$

where

$\beta_0$  Parameter represents intercept of regression line and  $\beta_1$  parameter represents the line slope. In simple linear regression model, independent variable is under control and is not random while dependent variable is random. We can test the hypothesis of relationship between dependent and independent variables using regression analysis. We use variance analysis table in order to test the hypothesis

"H0: fitted linear regression model is not significant."

alternative hypothesis

"H1: fitted linear regression model is significant."

as follows:

Where

$$SSR = \frac{\left( \sum_{i=1}^n X_i Y_i - \frac{\sum_{i=1}^n X_i \sum_{i=1}^n Y_i}{n} \right)^2}{\sum_{i=1}^n X_i^2 - \frac{\left( \sum_{i=1}^n X_i \right)^2}{n}} \quad , \quad SST = \sum_{i=1}^n Y_i^2 - \frac{\left( \sum_{i=1}^n Y_i \right)^2}{n}$$

$$SSE = SST - SSR$$





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#### Decision making

If  $P-Value < 0.05$ , we accept H1 at error level of 0.05, otherwise we accept H0.

#### Multiple regressions

Regression models that include two or more independent variables are called multiple regression models. Suppose  $X_1, \dots, X_k$  are k independent random variables and Y is a random dependent variable. Multiple linear regressions are defined between these variables as follows:

$$Y_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \dots + \beta_k X_{ik}, \quad i = 1, 2, \dots, n$$

Where  $\beta_0$  is intercept and  $\beta_1, \dots, \beta_k$  are regression coefficients  
 Now, we use variance analysis table in order to test the hypothesis  
 "H0: fitted linear regression model is not significant."  
 alternative hypothesis  
 "H1: fitted linear regression model is significant."

#### As follows

#### Decision making

If  $P-Value < 0.05$ , we accept H0 at error level of 0.05, otherwise we accept H0.

#### Durbin-Watson test

One of the assumptions that are considered in regression is independence of errors from each other (the difference between actual and projected values by regression equation). The independence concept means that result of an observation does not effect outcomes of other observations. In regression, when dependent variable behavior is studied at a time period we may don't deal with problem of errors independency, this type of data relationship is called autocorrelation. If there is autocorrelation in errors we cannot use linear regression. We use the Durbin-Watson test in order to evaluate the errors independency. If the errors independency hypothesis is rejected and errors are correlated with each other, there will be no possibility of regression. Durbin-Watson statistic is between 0 and 4. If there is no serial correlation between residuals, statistic value will be close to 2. If statistic value is close to zero it indicates a positive correlation and if statistic value is close to 4 it indicates a negative correlation. In general, if statistic is between 1.5 to 2.5, we must not be worry.

#### Mann-Whitney test

Mann-Whitney test is a nonparametric test and using this test we review whether or not there is difference as  $\delta$  between two joined and same communities median. For this purpose, we extract independent random samples of  $n_1$  volume from X community and  $n_2$  volume from Y community. We show first sample median with  $\eta_1$ , second sample median with  $\eta_2$  and  $\eta_2 - \eta_1 = \delta$ . we try to test below hypothesis:





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$$\begin{cases} H_0 : \delta = 0 \\ H_1 : \delta > 0 \end{cases}$$

We integrate all  $n_2$  observations of community X and  $n_2$  observations of community Y and arrange in ascending order, then we rank observations (rank 1 to the smallest observation). Finally we sum  $n_2$  observations of community Y and show with  $S_2$ . Mann-Whitney test statistic is defined as follows:

$$z^* = \frac{S_2 - \frac{n_2(n_1 + n_2 + 1)}{2}}{\sqrt{\frac{n_1 n_2 (n_1 + n_2 + 1)}{12}}}$$

Critical value: we extract  $Z\alpha$  value from standard normal table.

Decision making: At this stage, the test statistic is calculated  $z^*$  and is compared with critical value. If  $z^*$  value is less than  $Z\alpha$ ,  $H_0$  hypothesis will be accepted at confidence level of  $100(1-\alpha)\%$ , otherwise  $H_0$  hypothesis will be rejected. (Applied Statistics John Netter et al., Translated by Ali Amidi).

#### Central limit theorem

Central limit theorem of probability theory states that mean number of independent random variables, each with specified mean value and variance will have approximately normal distribution under certain conditions.

In central limit theorem, if  $n$  random sample of  $X_n, \dots, X_1$  from abnormal community with  $\mu$  mean and  $\sigma$  standard deviation is selected and when  $n$  is large, mean distribution of sample will tend normally and mean variables will be distributed normally as follows:

$$\frac{\sum_{i=1}^n X_i}{n} = \bar{X} \sim N\left(\mu, \frac{\sigma^2}{n}\right)$$

So, when  $n$  is large, abnormal distribution becomes normal.

Table 6 illustrates the number and type of studied industry in research. In this study, 206 companies including 28 industries are studied.

Pie Chart of examined industries is as below:

Table 4 shows variables of study along with their descriptive properties (minimum, maximum, mean and variance). As can be seen in this table mean values of actual and projected earnings per share are very close to each other (65.1733); the minimum projected earnings per share is -243 and maximum is 247.75. As can be seen in this table, mean trading volume is 1214700 and maximum traded stock price is 47274 rial and minimum traded stock price is zero.





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#### Hypotheses test

In this section, we test all hypotheses of study for all industries and specifically for two industries that have the most frequency.

#### All industries

First hypothesis: There is a significant relationship between deviations of actual and projected earnings per share and trading volume. We test this hypothesis using simple linear regression in order to examine whether or not regression coefficient is positive between independent variable of deviations related to actual and projected earnings per share and dependent variable of trading volume.

#### Durbin-Watson test for all industries

In this test, the following hypotheses will be used:

Hypothesis H0: errors are not independent.

Hypothesis H1: errors are independent.

If Durbin-Watson statistic is between 1.5 to 2.5, H1 will be accepted and we conclude that errors are independent.

In general model, Durbin-Watson statistic is 1.993 because statistic is between 1.5 to 2.5, then we conclude that errors are independent and we can use regression.

#### Structural equation of first hypothesis

#### Regression model is as follows

If we show independent variable of share deviations between actual and projected earnings per share with  $X_1$  and dependent variable of trading volume with  $Y_1$ , we will have the following regression model:

$$Y_1 = \alpha + \beta X_1$$

So that  $\alpha$  represents the intercept and  $\beta$  represents regression coefficient between independent variable of deviations between actual and expected earnings per share and dependent variable of trading volume. We can claim that there will be relationship between difference variable of actual and projected earnings per share and trading volume when regression coefficient is positive. So, we must test following hypothesis and define null and alternative hypothesis as follows:

Hypothesis H0: there is no significant relationship between deviations of actual and expected earnings per share and trading volume. ( $\beta = 0$ )

Hypothesis H1: there is significant relationship between deviations of actual and expected earnings per share and trading volume. ( $\beta \neq 0$ )

If the significance level is less than 0.01, hypothesis H0 will be rejected and H1 will be accepted.





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Table 5 shows that median regression coefficient of difference variables related to actual and projected earnings per share and trading volume is 31508.898 and significance level is 0.000 that is less than 0.01. Therefore, according to significance level and positive regression coefficient we can conclude that H1 hypothesis is statistically verified and first hypothesis is accepted and there is a significant relationship with 99% confidence between deviations of actual and projected earnings per share and trading volume.

Using above coefficients table, simple linear regression between independent variable of deviations between actual and projected earnings per share and dependent variable of trading volume is as below:

$$Y_1 = 395405.197 + 31508.898X_1$$

Any amount of trading volume can be predicted using deviations variable of actual and projected earnings per share and using regression model. The determination coefficient of model is 0.528 and 52.8% of changes can be justified using the above regression equation.

Then we check whether or not the presented regression model is appropriate, for this purpose we use variation analysis table that is obtained by SPSS software.

**Table 6 tests the following hypotheses**

"Hypothesis H0: fitted linear regression model is not significant."

"Hypothesis H1: fitted linear regression model is significant."

If significance level is less than 0.01 we conclude that alternative hypothesis is confirmed and fitted linear regression model is significant.

As we can see in Table 9, the significance level is 0.000 and is less than 0.01. So, presented regression model is significant in above equation.

Second hypothesis: There is significant difference between deviations of actual and projected earnings per share and trading volume when company's share price is increased and decreased.

As we observed in first hypothesis, there is a significant and positive relationship between deviations of actual and forecast earnings per share and trading volume. Firstly, we divide companies into both increased and decreased price in order to test this hypothesis. Then we do the following steps:

A) If any three month price is higher than the highest price of 52 weeks before stock, the stock price is increased.

B) If any three month price is less than the lowest price of 52 weeks before stock, the stock price is decreased.

C) If any three month price is between the highest and lowest price of 52 weeks before stock, the stock is neutral and normal and will be removed.

Then we examine deviations between actual and projected earnings per share of companies with increased prices and trading volume and deviations between actual and projected earnings per share of companies with reduced prices and trading volume using simple linear regression methods. If the determination coefficient of different regression models is different, we conclude that there is significant difference between "deviations of actual and projected





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earnings per share of companies with increased prices and trading volume" and "deviations of actual and projected earnings per share of companies with decreased prices and trading volume" and the hypothesis is confirmed. Therefore, two modes are discussed below.

**First mode:** there is a significant relationship between the deviation of actual and forecast earnings per share and trading volume when company's stock price is increased.

We test this hypothesis using simple linear regression in order to examine whether regression coefficient is positive or not between independent variable of deviations related to actual and projected earnings per share and the dependent variable of trading volume in companies with increased stock price.

#### Structural equation of second hypothesis first mode

##### Regression model is as follows

If we show independent variable of deviations related to actual and projected earnings per share by  $Z_1$  and the dependent variable of trading volume by  $T_1$  in companies with increased stock price, we will have the following regression model:

$$T_1 = \alpha + \beta Z_1$$

So that  $\alpha$  represents the intercept and  $\beta$  represents regression coefficient between independent variable of deviations related to actual and expected earnings per share and dependent variable of trading volume. We can claim that there will be relationship between deviation variable of actual and expected earnings per share and trading volume in companies with increased stock price when regression coefficient is positive. So, we must test following hypothesis and define the null and alternative hypothesis as follows:

Hypothesis H0: there is no significant relationship between deviations of actual and expected earnings per share and trading volume in companies with increased stock price. ( $\beta = 0$ )

Hypothesis H1: there is significant relationship between deviations of actual and expected earnings per share and trading volume in companies with increased stock price. ( $\beta \neq 0$ )

If significance level is less than 0.01, hypothesis H0 will be rejected and H1 will be accepted.

Table 7 shows that regression coefficient of deviation variable related to actual and projected earnings per share and trading volume in companies with increased stock price is 33552.551 and significance level is 0.000 that is less than 0.01. Therefore, according to significance level and positive regression coefficient we can conclude that H1 hypothesis is statistically verified and there is a significant relationship with 99% confidence between deviation of actual and projected earnings per share and trading volume in companies with increased stock price.

Using above coefficients table, simple linear regression between independent variable of deviations related to actual and projected earnings per share and dependent variable in companies with increased stock price of trading is as below:

$$T_1 = 522034.589 + 33552.551Z_1$$





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Any amount of trading volume can be predicted using deviation variable of actual and projected earnings per share and using regression model. The determination coefficient of model is 0.563 and 56.3% of changes can be justified using the above regression equation.

**Second mode:** there is a significant relationship between deviation of actual and forecast earnings per share and trading volume when company's stock price is decreased.

We test this hypothesis using simple linear regression in order to examine whether regression coefficient is positive or not between independent variable of deviations related to actual and projected earnings per share and the dependent variable of trading volume in companies with decreased stock price.

#### Structural equation of second hypothesis second mode

#### Regression model is as follows

If we show independent variable of deviations related to actual and projected earnings per share by  $Z_2$  and the dependent variable of trading volume by  $T_2$  in companies with decreased stock price, we will have the following regression model:

$$T_2 = \alpha + \beta Z_2$$

So that  $\alpha$  represents the intercept and  $\beta$  represents regression coefficient between independent variable of deviations related to actual and expected earnings per share and dependent variable of trading volume. We can claim that there will be relationship between deviation variable of actual and expected earnings per share and trading volume in companies with decreased stock price when regression coefficient is positive. So, we must test following hypothesis and define the null and alternative hypothesis as follows:

Hypothesis H0: there is no significant relationship between deviations of actual and expected earnings per share and trading volume in companies with decreased stock price. ( $\beta = 0$ )

Hypothesis H1: there is significant relationship between deviations of actual and expected earnings per share and trading volume in companies with decreased stock price. ( $\beta \neq 0$ )

If significance level is less than 0.01, hypothesis H0 will be rejected and H1 will be accepted.

Table 8 shows that regression coefficient of deviation variable related to actual and projected earnings per share and trading volume in companies with decreased stock price is 29630.207 and significance level is 0.000 that is less than 0.01. Therefore, according to significance level and positive regression coefficient we can conclude that H1 hypothesis is statistically verified and there is a significant relationship with 99% confidence between deviation of actual and projected earnings per share and trading volume in companies with decreased stock price.

As can be seen in table below, significance level of intercept is 0.107 that is more than 0.01. Thus, intercept of this hypothesis is statistically zero with 99% confidence and is not considered in writing regression equation.

Using above coefficients table, simple linear regression between independent variable of deviations related to actual and projected earnings per share and dependent variable in companies with decreased stock price of trading is as below:





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$$T_2 = 29630.207Z_2$$

Any amount of trading volume can be predicted using deviation variable of actual and projected earnings per share and using regression model. The determination coefficient of model is 0.494 and 49.4% of changes can be justified using the above regression equation.

As we see in first and second models the determination coefficient of first mode is more than second mode. So, there is a stronger relationship between deviations of actual earning and projected E and trading volume when stock prices is increased compared to when prices is decreased.

**Third hypothesis:** there is a significant relationship between changes of actual and projected earnings per share and changes of reference point from investors' prospect.

In this hypothesis, we examine whether or not difference between actual and projected earnings per share is as a reference point for investors in order to buy and sale shares? The differences can be considered as a reference point if there is no statistically significant difference between these values. So, we test this hypothesis using Mann Whitney nonparametric test and define null and alternative hypothesis as follows:

Hypothesis H0: actual earnings per share = projected earnings per share from a statistical prospect

Hypothesis H1: actual earnings per share  $\neq$  projected earnings per share from a statistical prospect

If significance level of tests is more than 0.01, H0 will be accepted.

As we can see in table below, significance level is 0.013 which is more than 0.01. So, there is no statistically significant difference between actual and projected earnings per share of companies, therefore, this difference can be considered as a reference point and the third hypothesis is accepted with 99% of confidence.

## CONCLUSION

The research results on prospect theory and reference point indicate that difference between actual and projected earnings per share is effective on trading volume and can be considered as a change in behavior. The findings of this study challenges the expected utility theory which states all people are risk averse and their utility function is decreasing. It can be said that findings of this study support the prospect theory claim. From behavioral finance prospect, a phenomenon that leads to investors behavior change from risk aversion to risk seeking mode is called loss aversion bias. Early sale of profitable assets and preserving impaired assets lies in explaining the Disposing Effect. So it can be expected that increasing market value of Company leads to decreased intensity of updating reference points that actually resulted from Disposing Effect and loss aversion.

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**Table1: The systematic removal of sample companies**

Row	Description	Number	Percent
1	The total number of companies listed on stock	485	100
2	Removal of investment funds and banks	347	71
3	Removal of Exchange brokerage firms	318	65
4	Companies with financial years ending in /12/29	262	54
5	Removal of companies with 3 months or more trading halt	206	42
Total		206	42

**Table2: Analysis of simple regression variance**

Source of changes	Sum of squares	Degrees of freedom	Mean squares	F statistics	Significance level
Regression	SSR	k	MSR=SSR/k	MSR/MSE	P-Value
Error	SSE	n-k-1	MSE=SSE/n-k-1		
Total	SST	n-1			





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**Table 3: Analysis of multiple regression variances**

Source of changes	Sum of squares	Degrees of freedom	Mean squares	F statistics	Significance level
Regression	SSR	k	MSR=SSR/k	MSR/MS E	P-Value
Error	SSE	n-k-1	MSE=SSE/n-k-1		
Total	SST	n-1			

**Table 4- Descriptive statistics of research variables**

Variable	Minimum	Maximum	Mean	Variance
Actual earnings per share	-249.25	249.25	65.1733	7805
Projected earnings per share	-243	247.75	72.3156	5883
Trading volume	1	66300000	1214700	2959000000000
Mean price	0	47274	4328.9	29190000

**Table5 - Regression coefficients of first hypothesis**

Description	Coefficients	T test statistics	Significance level	Hypothesis	Hypothesis test results
Intercept ( $\alpha$ )	395405.197	3.326	0.001	$\begin{cases} H_0 : \alpha = 0 \\ H_1 : \alpha \neq 0 \end{cases}$	H1 hypothesis acceptance
Deviation of actual and projected earnings per share ( $\alpha$ )	31508.898	33.930	0.000	$\begin{cases} H_0 : \beta_1 = 0 \\ H_1 : \beta_1 \neq 0 \end{cases}$	H1 hypothesis acceptance

**Table 6: Variance analysis of first model**

Source of changes	Sum of squares	Degrees of freedom	Mean squares	F statistics	Significance level
Regression	$1611 \times 10^{13}$	1	$1611 \times 10^{13}$	1151	0.000
Error	$1443 \times 10^{13}$	1028	$1399 \times 10^{10}$		
Total	$3054 \times 10^{13}$	1029			





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**Table7 - Regression coefficients of second hypothesis (first mode)**

Description	Coefficients	T test statistics	Significance level	Hypothesis	Hypothesis test results
Intercept ( $\beta$ )	522034.589	3.231	0.001	$\begin{cases} H_0 : \alpha = 0 \\ H_1 : \alpha \neq 0 \end{cases}$	H1 hypothesis acceptance
Deviation of actual and projected earnings per share ( $\beta$ )	33552.551	25.991	0.000	$\begin{cases} H_0 : \beta_1 = 0 \\ H_1 : \beta_1 \neq 0 \end{cases}$	H1 hypothesis acceptance

**Table 8 - Regression coefficients of second hypothesis (second mode)**

Description	Coefficients	T test statistics	Significance level	Hypothesis	Hypothesis test results
Intercept ( $\beta$ )	281964.997	1.616	0.107	$\begin{cases} H_0 : \alpha = 0 \\ H_1 : \alpha \neq 0 \end{cases}$	H1 hypothesis acceptance
Deviation of actual and projected earnings per share ( $\beta$ )	29630.207	22.226	0.000	$\begin{cases} H_0 : \beta_1 = 0 \\ H_1 : \beta_1 \neq 0 \end{cases}$	H1 hypothesis acceptance

**Table 9 - Mann-Whitney Test results for third hypothesis**

Variable	Number	Mean rank	Mann-Whitney statistics	Significance level
Actual earnings per share	1030	1066.14	499800	0.013
Projected earnings per share	1030	1000.86		





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**Table 10 - The results of hypotheses test**

Other researches	Result	Hypothesis	Row	Industry
Compliance with Daniel Hershfield, S. Ober Amanyam (1998) and Hejazi (1996)	Acceptance	There is a significant relationship between deviations of actual and projected earnings per share and trading volume	1	Total industry
Compliance with Lakronishand Smith (1986); Shefrin (1988); Ohler et al (2002)	Acceptance	There is significant difference between deviations of actual and projected earnings per share and trading volume when company's share price is increased and decreased.	2	
Compliance with Kahneman and Toersky (1979), Hodart, Lang and Yetman (2003), Juan Ming (2010) and Shavakhi (2011)	Acceptance	There is significant relationship between differences of actual and projected earnings per share and changes in reference point from investors' prospect.	3	





## RESEARCH ARTICLE

## Investigating the Antioxidant Properties and Radical Scavenging Power of Dandelion Leaf Extract (*Taraxacum officinale*)

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### ABSTRACT

Nowadays, researchers are very interested in studying medicinal plants and extracting natural antioxidants from them, in order to be used instead of synthetic antioxidants. Natural antioxidants are healthier and more beneficial and also have fewer harmful side effects. In this study, firstly, Dandelion leaf extract was extracted by using maceration method with methanol. The Phenolic compounds and the rate of free radical scavenging activity of the extract were investigated in different concentrations (200, 400, 600, 800 and 1000ppm), respectively by Folin–Ciocalteu method and DPPH test and were compared with synthetic antioxidant activity (BHT) at the concentration of 200ppm. The results showed a significant difference between different concentrations of Dandelion leaf extract, in terms of the rate of Phenolic compounds and free radical scavenging activity of the extract ( $p < 0.05$ ) and the highest antioxidant properties was related to the concentration of 1000ppm. Also, the results showed that 800ppm concentration of Dandelion leaf extract, in terms of radical scavenging power is equivalent to the 200ppm concentration of synthetic antioxidant (BHT).

**Key words:** Dandelion plant, Free radical scavenging activity, Natural Antioxidants, Phenolic compounds.





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## INTRODUCTION

The harmful effect of free radicals can be reduced by antioxidants, because these materials are able to trap and control the free radicals and through this, will prevent probable diseases caused by their existence and activity. Although nowadays, various types of synthetic antioxidants such as Butylated Hydroxyl Toluene (BHT), Butyl Hydroxyl Anisole (BHA) and some other synthetic materials are used in industry, but undesirable effects of nutrition, mutagenic and carcinogenic compounds and also the willingness of consumers to use natural compounds are all the reasons of why the use of natural antioxidants must be taken into consideration by researchers. Therefore, investigating the natural antioxidants sources seems to be necessary in order to replace it with synthetic compounds. Furthermore, investigating conducted studies on the effect of natural antioxidants in edible oils indicate that, besides the stability of edible oils, natural antioxidants can also lead to an increase in the nutritional value of them (1). Traditional medicine is an important part of Iran's treatment system and Dandelion plant is one of the famous herbs in traditional medicine and up to now, no research has been done about the antioxidant effects of the leaves of this plant. The plant of *CirsiumVulgare*, which is known as Dandelion in Persian language and Spear Thistle in English, can be found in some regions of Europe, West Asia and North-West Africa. All parts of this plant, especially its root and leaf are used as medicine. This plant is used as an anti-nausea, anti-rheumatic, analgesic and anti-inflammatory. Studies conducted on this plant indicate the existence of anti-cancer and anti-diabetic activities in this plant (2). Several studies have been done in the field of natural antioxidants extraction from medicinal plants that some of them are referred to in the following. Shamsavari et al. (2008), have investigated the antioxidant effect of *ZatariaMulifloraboiss* essence in soybean oil. In this study, the plant essence was analyzed by (GC/MS) instrument and its main chemical components were identified. The results showed that Carvacrol (26.08%) and thymol (17.23%) are considered as the major phenolic compounds. By measuring the values of peroxide and thiobarbituric acid in soybean oil (oven test), they have measured the antioxidant activity of desired essence and concluded that in oven test, the plant essence of *ZatariaMulifloraboiss*, in concentration of 1.0%, has an equivalent antioxidant effect with BHA and at the concentration of 0.02% is in the soybean oil. Thus, the desired essence oil showed a good antioxidant property and after performing other supplementary experiments, it can be used as a natural antioxidant in some foods (3). Mirzaei et al. 2011, have evaluated the antioxidant properties and the total phenol hydro-alcoholic extract of *Sisymbriumirio*, Plantain, *CarumCopticum*, coriander and fenugreek by using Maceration method. The Hydro-alcoholic extract of five mentioned herbs were examined in all models and the most antioxidant activity was related to the Plantain plant (4).

Kamkar (2009), has determined the antioxidant activity of Ethanolic essence and extract of dill by using two methods of 2, 2-diphenyl-1-picrylhydrazyl, based on the percentage of free-radical scavenging and scavenging the oxidation of linoleic acid in the system of beta-carotene-Linoleic acid. Obtained results showed that the antioxidant power of ethanolic extract is significantly ( $P < 0.05$ ) more powerful than the antioxidant power of essence that this could be due to the difference in the rate of phenolic compounds. There is a strong correlation between the antioxidant power and rates of phenolic compounds. The antioxidant power of Butyl Hydroxy Toluene was higher than the Ethanolic essence and extract of dill (5). Eyouqi et al (2009), have investigated the antioxidant activity of dill essence by measuring the values of Peroxide and thiobarbituric acid in soybean oil. They concluded that dill essence has the ability to prevent the production of primary and secondary oxidation products in the raw soybean oil at the concentration of 6.0 mg per ml which is approximately equivalent to BHA chemical anti-oxidation at concentration level of 1.0 mg per ml. Based on the report of researchers, dill essence can act as a natural antioxidant and can be added to foodstuffs after supplementary experiments (6).

The aim of this research is to evaluate the antioxidant properties of Dandelion plant leaf through measuring the phenolic compounds and the rate of free radical scavenging activity of the extract in different concentrations and comparing it with the synthetic antioxidant power (BHT) at 200ppm, in order to replace synthetic preservatives with natural antioxidants.





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## MATERIALS AND METHODS

### The preparation of Dandelion leaf extract

Dandelion plant leaves were prepared from the local market of Sabzevar city and from one variety. For this purpose, at first, petioles, stem of the leaves and plant waste materials were separated and after washing, were dried in the shade and at a temperature of 25°C, and then, with the mill (Kenwood, model 100 CG) were completely powdered and the obtained powder, after sifting was mixed with methanol solvent to prepare the extract based on maceration method with the ratio of 1:10 (weight-volume) and located on the magnetic stirrer at a speed of 250 revolutions per minute for 24 hours at ambient temperature and then was smoothed by No.1 Whatman filter and under vacuum conditions. The resulting solution was concentrated by a rotary evaporator (model LABRATA4000) at 35°C and finally the extract was dried by drying chamber under vacuum at 40°C and until the time of use, was placed in an enclosed container and impervious to air at 4°C (7).

### Measuring the total amount of phenolic compounds of the Dandelion leaf extract

For measuring the total amount of phenolic compounds of the Dandelion leaf extract, firstly the standard solution of the Dandelion leaf extract will be prepared with a solvent which the extraction is done by it and (methanol) with different concentrations in the range of 200, 400, 600, 800 and 1000ppm and the control sample. Then, 0.5ml of each of the dilutions was transferred into a test tube wrapped with foil. Then, 2.5 ml of Folin-Ciocalteu reagent 0.2 normality (In proportion of 1 to 10 diluted with distilled water) was added to each tube and was intensely stirred for 30 seconds by the tube stirrer. Then, 2 ml of sodium carbonate solution (7.5%) was added to the tubes and after stirring for 30 seconds, it was kept in the dark for an hour at room temperature. The absorption of each of the samples in the wavelength of 765 nm was read out by the spectrophotometer device. The amount of phenolic compounds was determined by the linear regression equation which is obtained from the calibration curve of Gallic acid as a standard  $A_{765} = 0.0121C(\text{mg/ml}) - 0.0309$ ,  $R^2 = 0.9679$  based on the Gallic acid percentage. In the regression equation of the calibration curve of Gallic acid, A is the absorption rate that was read at a wavelength of 765 nm and C is the concentration of phenolic compounds based on mg/ml (8).

### Measuring the free radical scavenging activity (DPPH) of Dandelion leaves

Antioxidant activity evaluation was measured by investigating the 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radical-scavenging power. For this purpose, at first, different dilutions of the dried extract of Dandelion leaves including 200, 400, 600, 800 and 1000 ppm and also, the control sample with methanol solvent were prepared. The stages briefly are as follows. 2 ml of each of the dilutions was transferred into the test tube and then 2ml of reagent 2,2-diphenyl-1-picrylhydrazyl (0.004%) was added to each tube and was completely stirred and was kept in the dark for 90 minutes at room temperature and then the absorption of the samples was read out in the wavelength of 765 nm by the spectrophotometer device.

The free radical scavenging power was calculated by using Equation 1 (9).

$$I\% = \left( \frac{A_{\text{Blank}} - A_{\text{Sample}}}{A_{\text{Blank}}} \right) \times 100 \quad (1)$$

In this equation,  $A_{\text{Blank}}$  is the optical density of the control sample (without extract) and  $A_{\text{Sample}}$  is the optical density of different concentrations of the extract. It should be mentioned that in this experiment, 200ppm of synthetic antioxidant (BHT) was used for comparison.





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### The statistical analysis

In this study, the completely randomized design was used. Data was analyzed by using SAS software. Comparison of the mean of the data was performed by using the least significant difference test at the statistical level of 95%. Microsoft Excel 2003 was used for drawing diagrams.

## RESULTS AND DISCUSSION

### The amount of phenolic compounds of the Dandelion leaf extract

With the consideration of the phenols and phenolic compounds and their wide presence in foods and herbal products and their considerable antioxidant properties, their measurement and evaluation were investigated in this study. The analysis of variance of the impact of antioxidant compounds concentration on the rate of phenolic compounds has been reported in table 1. The results showed that the impact of antioxidant compounds concentration on the rate of phenolic compounds at the statistical level of 5% was significant ( $P < 0.05$ ).

Due to the meaningful impact ( $p < 0.05$ ) of antioxidant compounds concentration on the amount of phenolic compounds (Table 1), the majority of phenolic compounds was observed with a meaningful difference at 1000ppm concentration of Dandelion leaf extract (Figure 2). Also, the results showed that the lowest amount of phenolic compounds was observed in the control sample. About the Dandelion leaf extract, as can be seen, by increasing the extract concentration from 200 to 1000ppm, the rate of phenolic compounds contained in the extract is increased that this matter leads to an increase in the antioxidant properties. Similar results were presented by some researchers. Ahmadvand et.al (2012), have investigated the antioxidant properties of hydro-alcoholic extract and the essence of Vitex Pseudo-negundo. They reported the total antioxidant capacity of hydroalcoholic extract and the essence of Vitex Pseudo-negundo, respectively  $1.76 \pm 0.25$  and  $2.12 \pm 0.6$  and the amount of phenol in hydroalcoholic extract and the essence of Vitex Pseudo-negundo are respectively  $22 \pm 2$  and  $133.11 \pm 3$  (10).

### Radical scavenging activity of the Dandelion leaf extract

Results of the analysis of variance of the impact of type and antioxidant compounds concentration (Natural antioxidants of the dandelion leaf and synthetic antioxidants BHT) on the free radical scavenging power has been reported in table 2. The results showed the significant impact of type and antioxidant compounds concentration, at the statistical level of 5% on the free radical scavenging activity ( $p < 0.05$ ).

According to the meaningful impact of ( $p < 0.05$ ) antioxidant compounds concentration on the free radical scavenging activity (Table 2), the maximum activity of free radical scavenging was observed with a significant difference in the 1000ppm concentration of Dandelion leaf extract (Figure 3). Also, the results indicated that no significant statistical difference ( $p < 0.05$ ) was observed between the concentration of 800ppm of the Dandelion leaf extract and 200ppm of the synthetic antioxidant (BHT). The results indicated that using the 800ppm concentration of Dandelion leaves extract has an antioxidant effect equivalent to BHT at a concentration of 200ppm. In a similar study, Unver et.al (2009) investigated the antioxidant activity and the total phenol content of methanolic extract of a number of plants and concluded that there is a direct relationship between the amount of total phenols and the antioxidant activity of the extract of these plants, so that in this regard, the plant of MenthaPiperita showed the top rate of total phenols (493 mg equivalent to Gallic acid per gram) and the high antioxidant activity ( $IC_{50}$  equal to 0.23 mg/ml) and the plant of Capparis Ovate showed the low rate of total phenols (185 mg equivalent to Gallic acid per gram) and low antioxidant activity ( $IC_{50}$  equal to 4.08 mg/ml) (11).





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## CONCLUSION

According to the undesirable effects of many chemical preservatives in food products such as oilseed extraction industry, the possibility of substituting these materials with effective compounds of herbal plants have been considered by the researchers. In this regard, the antioxidant properties of methanolic extract of Dandelion leaves were investigated in this present study. Therefore, in this study, in order to introduce the use of natural antioxidants, the antioxidant power of the extracted sap from Dandelion leaves was examined in different concentrations by the Folin-Ciocalteu method and DPPH test and ultimately it was compared with the synthetic antioxidant activity (BHT) at 200ppm concentration. In general, the results obtained from investigating the antioxidant power of different concentrations of Dandelion leaf extract showed that 1000ppm concentration of this extract has the highest antioxidant properties and consequently the highest radical scavenging activity than other concentrations of the extract. Also, the results showed that the 800ppm concentration of Dandelion leaf extract, in terms of free radical scavenging power, is equivalent to 200ppm concentration of synthetic antioxidant (BHT).

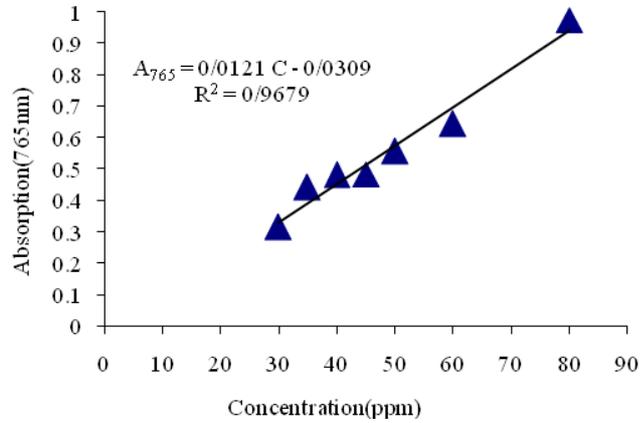
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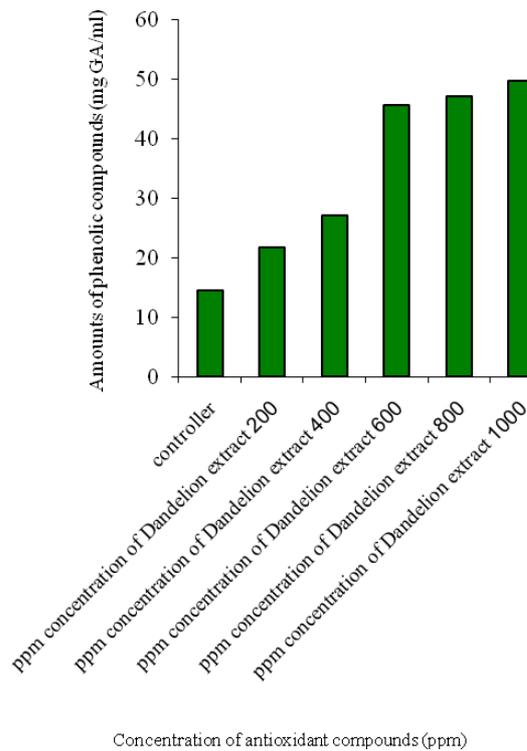




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**Figure1. Standard curve of Gallic acid for determining the total amount of phenolic compounds of the Dandelion leaf extract**

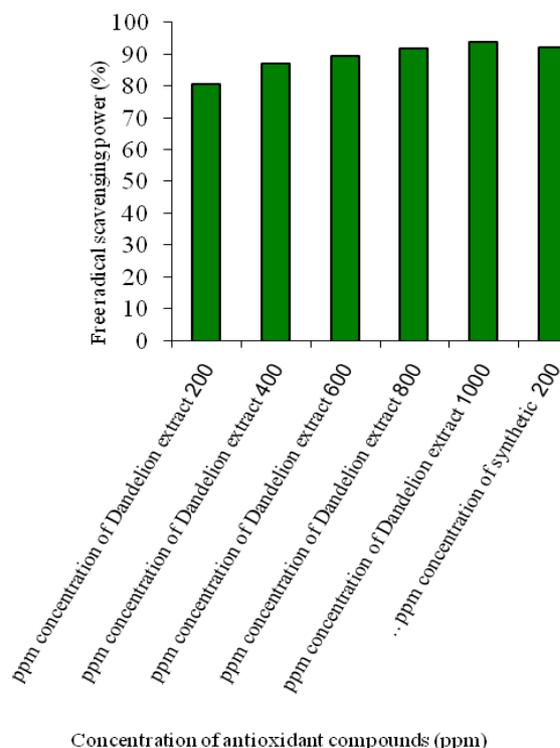


**Figure2. Changes in the amount of phenolic compounds in different concentrations of Dandelion leaf extract and comparing it with synthetic antioxidant (BHT)**





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**Figure3. Changes of the free radical scavenging activity in different concentrations of Dandelion leaves extract and comparing it with the synthetic antioxidants (BHT)**

**Table1. Analysis of variance of the impact of antioxidant compounds concentration on the amount of phenolic compounds**

Sources of change	Degree of freedom	Average of squares	Amount of F	P
antioxidant compounds concentration	5	453.052	44220.9	0.0000
Error	6	0.01	-	-
Total	11	-	-	-
C.V	0.3	-	-	-





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**Table2. The analysis of variance of the impact of type and antioxidant compounds concentration on the free radical scavenging power**

Sources of change	Degree of freedom	Average of squares	Amount of F	P
Antioxidant compounds concentration	5	47.5276	512.77	0.0000
Error	6	0.0927	-	-
Total	11	-	-	-
C.V	0.34	-	-	-





## Attitude to Economic- Financial Corruption and its Consequences

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### ABSTRACT

Financial corruption is a complex and multifaceted phenomenon, and has multiple causes and effects that arises in the different cultural, political and economic aspects and needs own specific ways to combat. Given the psycho- social effects and consequences of financial corruption on society individuals, in this research we attempted to study attitude to economic corruption consequences in social trust, apathy and relative deprivation sense. The statistical population of the study is residents of Yazd city that 384 of them were selected by cluster sampling method. Research method is survey techniques and Data were collected by questionnaire. The results confirm that there is significant relationship among attitude to financial corruption and social mistrust, apathy, and relative deprivation sense that affirm all research hypotheses. Results of bivariate regression analysis shows that attitude to financial corruption determines 23/9% of variation of the social distrust, 21/5% of variation of the social apathy and 30/5% of variation of the relative deprivation sense.

**Key words:** attitude to economic corruption, social distrust, social apathy and relative deprivation sense

### INTRODUCTION

Economic and administrative corruption is a global phenomenon and problem that has significantly found new and more complex dimensions in the light of political-economic and social developments. Corruption, in particular economic and administrative corruption is an improved socio-economic disease that permeates from an entity to another one leading to the collapse of political system.



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In Webster dictionary, corruption means illegal rewards to force someone to defy a task. According to the World Bank definition of corruption, it's the abuse of state power and authority in order to secure personal benefits. Thus, corruption is to make efforts gaining power and wealth illegally, personal profit at the expense of the public interest or the abuse of state power for personal benefits that is considered as an anti-social behavior is (Moshfegh, 2010: 150). Financial and administrative corruption is one of the forms of social deviance, and in the division of deviations it is classified under organizational deviations of white collars (Sutherland, 1949).

Corruption in developing countries is more expanded than developed countries which is not due to the different citizens of these countries, but it is because in these societies there are better conditions for the emergence of corruption, moral and human obligations are weak and the motivation of building wealth is strong motivation that is strengthened by low income (Mohseni, 2006). Durkheim believes that in the movement of societies toward modern society, thoughts and moral norms are weakened and individualism process occurs, individual interests prevail over collective interests and cause social conflict, anomie and personal confusion and conflict for more power and wealth. This is especially intensified in times of crises and economic fluctuations and with the emergence of selfish behaviors. In this situation, norms and rules regulating behavior lose their efficiency in the face of social change rapidly and the society suffers from social disorganization, such that the boundaries of legitimate and illegitimate behavior disappear in a deliberate and inappropriate manner, and people use both legitimate and illegitimate tools more to satisfy their needs and desires (Bashiriyeh, 2011).

Research shows that financial and administrative corruption prevalence in a society causes distrust in the political system, violating the rights of population, increasing poverty, inequality of opportunities, undermining the work culture and innovation, creating and increasing the injustice. In the shadow of economic corruption, the process of development damages and many economic variables such as inflation, unemployment and etc. are influenced by the phenomenon. One of the major costs of economic corruption at the macro level is the increase of a gap between rich and poor whose result is the feeling of oppression and inequality in the attitudes and minds of people. Accordingly, the belief in social system is reduced. In other words, mental control of individuals over their behavior is reduced which plays an important role for employees to be infected by economic corruption (Rafipour, 2009). In such circumstances, according to Durkheim, a sense of anomie grows in person where personal feelings are measure towards his own, which has been associated with disturbances in the person and he experiences a feeling of anomie, apathy, frustration, emptiness, loneliness, confusion and lack of effectiveness (Bashiriyeh, 2011).

According to Rosenfeld and Messner theory deviant behaviors occur in societies where their balance is disturbed and economic values have entered into other non-financial institutions and they suggest that anomie and economic corruption have been expanded because the institutions that must control the excessive emphasis on financial success (family and education) have been weakened and they have carried economic values themselves. In such societies that the economy is the dominant institution, cultural values encourage succeeding by any means possible (Heydari, 2013).

The annual report of Transparency International on financial and administrative corruption economy in different countries in 2013 show that among the 177 countries surveyed, Denmark, New Zealand, Finland, Sweden, Norway, Singapore, Switzerland, the Netherlands, Australia and Canada have taken one to ten ranking of safest countries in the world. In the case of the worst countries in the world, according to the report, Somalia is the world's most corrupt country with a score of 8 and then North Korea, Afghanistan, Sudan, South Sudan, Libya, Uzbekistan, Turkmenistan and Syria are scored. According to IRNA, the Islamic Republic of Iran with 25 points is introduced as one hundred and forty fourth countries in terms of financial and administrative corruption, a ranking that was introduced as 133 last year and this year our country has been reduced in this category. The findings of the institute research show that more than two thirds of 177 countries surveyed in terms of financial and administrative corruption, with a total score below 50 are not in a good condition, among which Iran is a country with a score of 25. In the regional ranking of the organization to determine the extent of corruption, Eastern Europe and Central Asia have gained the worst rating



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with 95% of corruption and Western Europe and Europe with more than 23% of corruption have the best rating. The level of corruption in the Middle East and North Africa is declared as 84 percent (Iran newspaper, 28 April 2015).

Today, financial and administrative corruption has become a global problem and governments are aware that corruption causes many injuries and it knows no bounds, as its consequences is different according to the type of political and economic organization and level of development. In any case, corruption causes the decline, makes the government policies in conflict with the interests of the majority, leads to the waste of national resources and reduces the effectiveness of governments to lead and direct the affairs through which people's confidence in governmental and non-governmental agencies is reduced and it increases apathy, laziness and incompetence (Rafi pour, 2009).

Mac Lagan and Nell (1998) have pointed out the issue of people's willingness not to interfere in the affairs and accept responsibilities with the title of "indifference is a kind of threat". Eberl argues that in every society there are some basic conditions that in the absence of them ,the society will be severely impaired, one of the most important factors is that the population of a society become indifferent, which is considered as a serious threat to the community as far as it would affect all the structures (Ritzer, 1995). It's in line with Habibzadeh research that shows, political indifference has influenced the reduction of people's political participation, so a negative attitude to corruption can also cause social apathy, especially in its official dimension (Habibzadeh, 2005).

An increase in these behaviors in active organizations in the community would lead to increasing expansion of social distrust, indifference, extortion and deprivation. People every day trust in social institutions less than before and their irresponsibility and apathy is reinforced. This will reduce individuals' dependence and connection to each other as well as to institutions in the community, it is clear that a society with loose connections will be more vulnerable against economic and social shocks. Fukuyama believes that social distrust has been arisen from other factors which have caused it. In other words, in his opinion social trust is a dependent variable that is affected by factors such as: industrial revolution and modernity that has led to fundamental changes in the structures of society, followed by which drastic changes in values and social norms emerges, and it in turn causes significant changes in the political system, family structure and individuals' socialization in such a family. According to Fukuyama, at this stage that family has suffered from a major collapse, it is unable to properly educate children and their appropriate socialization. Therefore, social trust as a result of proper education of people, especially through the family, will not take place (Tavasoli, Sadeghi, 2010). This is in line with research by Khalafkhani that in addition to defining the phenomenon of corruption and expressing the difference from one society to another, believes that corruption while is rooted in institutions, is affected by social factors and social environment (Khalafkhani, 2010). Also research conducted by Share'pour et al. suggests that low level of social trust is largely related to the role of institutional trust, indicating that more distrust among the people in the organization will affect their social distrust as well (Share'pour et al., 2010).

In a society social trust is like a headband that links its members together and avoids their dispersion. In the study of deviations and social problems many damages roots can be searched in the distrust of people to each other. When in a society resources are distributed unfairly among groups of people, and this inequality is perpetuated over time, the gap between rich and poor classes will be more every day that in such situation the laws and political structure of society is questioned and it strengthens a sort of social distrust in people (Abhari, 2015).

According to Rafipour, financial and administrative corruption undermines faith and moral values, increases the cost of doing things leads to decriminalization in the community, in such a way that the community in dealing with the crime will undergo severe social and economic damage and it makes the development of competitiveness and human economic development difficult. Corruption also causes the failure of poverty eradication efforts, the loss of social capital, and the creation of reluctance and skepticism in the community, leading toweaken honest people morale. What causes concern is that when corruption is converted into a culture, anybody will no longer think of his bad and



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wrong behavior, because on the one hand, he sees that everyone behave like that and on the other hand, he is also expected to behave in the same way (Rafipour, 2009).

Although the Iranian society is a society with religious and national trends where all members know corruption as an ugly phenomenon and they have always insisted on fighting it. However, we see that the spread of corruption in the society has blocked many social and national progresses and imposed enormous costs on the country and the people as well. All over the world financial fraud may occur at the level of officials and nowhere is like the paradise, but if the violation is announced and no normative action takes place to deal with it and to issue fines on violators, the individuals will suffer from a deep conflict in mental that causes obsessive-compulsive disorder (OCD). The OCD does not allocate to one person only but it involves have the collective spirit of the whole community. In other words, perceiving financial corruption in officials does not only affect the population individually but it has a collective impact that leads to the formation of collective and anti-social behaviors (Mahmoudi, 2005).

A feeling of frustration is established as a result of awareness of that these events have occurred and no one confronts with that which lays the ground to accumulate negative emotions and leads to the formation of individuals' hostile thoughts and against the law that the thoughts will even affect the family and people's relationships together. When collective morality is decline in a society everything will be destroyed. On the other hand, the economic crisis and the sanctions have imposed high economic pressure on the poor and middle classes of the community and it should be said that tolerating this situation and making a living has become a large effort for many people in the current condition (Ashayeri, 2014).

Iranian researchers in the last recent decade have argued that Iran and many Third World societies are generally living in acute or chronic anomic conditions, that is a kind of anomic situation which often rises in the process of rapid transition from pre-modern to modern society as a result of the renewal processes that is a complex condition associated with anomie or normative weakness and conflict. While moral obligations forms the foundation and base of any order social cohesion and discipline that is rooted in interdependence, trust and emotional connection to the community (Chalbi, 1996).

So according to what was said, the importance of the problem of economic corruption and the damages arising from that in the community and consequences it may have for people become clear and given the fact that various classes in the community are suffering from the phenomenon of financial corruption, this research seeks to answer this question that what is people's attitude towards economic and financial corruption and how it influences the social - mental state of the population and social apathy, social distrust, and to what extent the extortion and deprivation tarnish people.

According to theoretical and empirical literature in this study, these hypotheses have been derived:

- There is a relationship between the attitude toward economic corruption and social distrust.
- There is a relationship between the attitude toward economic corruption and social apathy.
- There is a relationship between the attitude toward economic corruption and a sense of deprivation and extortion.

## MATERIALS AND METHODS

Research method is survey and cross sectional. Data collection tool in this study has been questionnaire. The unit of analysis in this study is individual (citizen) and the analysis is in a micro level. The statistical population consists of all citizens in the city of Yazd. A sample size of 384 people was considered for this study according to Cochran formula and with considering the error rate of 0.05 percent. Sampling method of this study is a multi-stage cluster sampling that has taken place in three low, medium and high areas of Yazd. To measure the variables, a researcher



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made questionnaire was used for the attitude to economic corruption; totally the questionnaire includes 82 questions. Items related to social distrust have been 12 cases from which 4 cases are related to interpersonal trust, 4 cases related to social trust and finally 4 other cases belong to institutional trust. Items related to non-official indifference have been 16 cases. To measure official indifference or apathy dimension 11 items were used. The objective deprivation has also 8 items; the subjective deprivation has been measured with 10 items as well and ultimately, the independent variable of attitude to economic corruption has been measured with 17 items whose objective and subjective dimensions were measured with 7 items with 10 items, respectively. Here a 4-point Likert scale is used. In this research to ensure the validity of tools used, content validity and construct validity have been used.

**Conceptual definitions of independent and dependent variables****Social distrust variable**

Social trust arises from the detection ability to rely on or ensure the honesty or accuracy of others' statements or actions (Giddens, 1997). Social trust has been measured in three dimensions of Interpersonal, generalized and institutional and Rahimi questionnaire (Rahimi, 2013: 9) has been used. Interpersonal trust is a form of trust that is displayed face-to-face relations; in order to operationalize, some questions based on interpersonal relationships as trust in family members, relatives, friends and colleagues and other similar cases have been used (Rahimi, 2013: 9). Generalized trust: this type of trust can be defined as having a sense of suspicion towards individuals in the community apart from their belonging to ethnic and tribal groups. In order to operationalize this dimension of trust the questions that include respondents' trust to foreigners or people who are less familiar have been used. Institutional trust: this type of trust refers to non-personal structures. In order to operationalize it the questions have been used that reflect people's confidence in the performance of social institutions and groups, and administrative authorities of the country. Totally, its reliability was estimated as 0.74 using Cronbach's alpha.

**Social apathy**

Social apathy in a conceptual definition is introduced as a situation during which people due to the lack of subjective connection (cognitive) and objective (active) with the community (peers, institutions and social structures), with apathy and indifference to the realities around avoid the socio-political participation, social responsibilities, altruistic activities and active and civic involvement in social issues (Mohseni Tabrizi and Sedaghatifard, 2011). In evaluation of the variable of civic indifference Mohseni Tabrizi questionnaire (2011) with changes in some aspects and items has been used. Social apathy in the operating definition was taken into account on two aspects. First, apathy or indifference in the field of official social activities, such as voluntary participation in organizations, political parties and associations, participation in elections, interaction with institutions such as politics and the like. And then indifference in the field of non-official social activities such as participatory altruistic action and altruistic acts such as helping the poor, supporting others, considering to family problems and so on. In the present study to measure civic apathy and its components a 27-item scale has been, in which the questions have been measured with the options of strongly agree, somewhat agree, neutral, somewhat disagree or strongly disagree whose reliability was obtained as 0.90 using Cronbach's alpha.

**Deprivation and extortion**

Relative deprivation means understanding the difference between the value expectations and value abilities of individuals that may be formed based on comparing the individual's current situation with the past, abstract ideals or standards that are designed by a leader or a reference group (ideology) and referrals to other groups (Ger, 1998: 55). This variable is measured both subjectively and objectively. To operationalize the concept, 18 five-point items were measured in terms of cultural, economic, social and political with accessing indicators to educational services,



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political situation, social opportunities, jobs, health facilities, distribution of wealth, distribution of oil revenues, economic activities equality with the alpha as 0.90.

**The attitude to economic – financial corruption**

Attitude in social psychology includes three indicators of cognitive, emotional and willingness to act. Affective component refers to a person's emotional and affection towards objective and subjective issues particularly his positive and negative assessments of it. Cognitive component includes person's knowledge and information about that subject. And the component of willingness to act includes how a person tends to act in accordance with objective and subjective issues (Taylor, 2003). In the present study, the assessment of attitude variable was carried out in both subjective and objective dimensions that the subjective dimension was measured with 7 items with the indicators of feeling annoyed, oppression, despair, people's rights violation and the feeling of weak beliefs and disbelief and in the objective dimension 12 items were assessed with the indicators of ambiguity in the laws, inefficient administrative structure, low supervision and control, weak dealing with offenders, factionalism, meritocracy nonconformity.

**RESULTS**

The findings of the individual characteristics of the respondents indicate that from the total number of 384 respondents, 57% of them are male and 43% are female. 52.6% of respondents are single and 46.4% of them are married. In the field of employment 73.2% of respondents are employed and 26.8% of them are unemployed. 10.4% of respondents have a degree below diploma, 43.2% have an associate's degree and diploma, 36.5% of them have a bachelor's degree and 26.8% have a master's degree and above. The income of 48.7% of respondents are less than ten million RLS, 31.8% is between ten million up to fifteen million RLS, 9.6% is between fifteen to twenty million RLS and 9.9% earn more than twenty million RLS. And finally 29.7% of respondents live in uptown areas, 52.9% in middle-class areas and 17.4% of them are living in downtown areas.

The largest distribution of attitudes to respondents' economic corruption is related to the middle-class (57.6), and the lowest is related to the low-class (3.4). The objective dimension is the same, but there the highest frequency of distribution is related to the high-class (55.5) and the lowest frequency is at the low-class (7.8).

The largest distribution of respondents' interpersonal distrust is related to the middle-class (60.2), and the lowest is related to the high-class (7.6). Also in the dimension of respondents' social distrust the highest frequency of distribution belongs to the middle-class (62.5) and the lowest frequency is at the low-class (18.2). In the institutional dimension of distrust the highest frequency is related to the high-class (56.5) and the lowest frequency is at the low-class (9.4). Finally, the highest distrust of respondents belongs to the high-class (50.3) and the lowest frequency belongs to the low-class (1.8) indicating the high distrust among respondents.

The largest of frequency in the non-official dimension of respondents' social apathy is related to the middle-class (55.7), and the lowest frequency is related to the high-class (8.9). In the official dimension the highest frequency of respondents' also belongs to the middle-class (53.6) and the lowest frequency belongs to the low-class (9.4). At the end, respondents' apathy has the highest frequency in the middle-class (68.8) and the lowest at the high-class (10.8) indicating middle social apathy among respondents.

The largest of frequency in the objective dimension of respondents' feeling of extortion and deprivation is related to the high-class (60), and the lowest frequency is related to the low-class (5.5). In the subjective dimension the highest frequency of respondents' also belongs to the middle-class (59.6) and the lowest frequency belongs to the low-class (19). At the end, respondents' feeling of extortion and deprivation has the highest frequency in the middle-class (79.2) and the lowest at the low-class (12.5) indicating middle feeling of extortion and deprivation among respondents.



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To test the hypotheses that were included in this study, Pearson correlation test has been used between the dependent variables (social distrust, social apathy, extortion and deprivation) with the independent variable (attitude to economic corruption). The bivariate regression test was used to assess the explanation of dependent variables (social distrust, social apathy, extortion and deprivation) by the independent variable (attitude to economic corruption). The results of the study analysis are as follows:

Table 5 shows the correlation between the components of attitude towards economic corruption and social distrust. Among the various components of the attitude towards economic corruption, social distrust has the most relationship with the objective dimension of attitude towards economic corruption ( $r: 0.239$ ), which indicates a significant and positive correlation, that is more negative attitude to economic corruption in the objective dimension more distrust will be. Among the dimensions of distrust the most relationship is between institutional trust with attitude to economic corruption ( $r: 0.295$ ), which represents a significant and positive relationship, more negative attitude to economic corruption, more distrust in the institution level will be but there is no correlation between the subjective dimension of attitude to economic corruption with distrust, while it has a positive correlation with the institutional dimension of distrust ( $r: 0.178$ ). In general, there is a significant and positive relationship between attitude towards the economic corruption and social dimensions and institutional of distrust and distrust in general, indicating that more negative attitude of citizens to economic corruption more distrust of them will be at the institutional and social level which in turn increases their distrust.

Table 6 indicates the correlation between the attitude towards economic corruption with apathy by its dimensions that the relationship between the official dimension of social apathy with the objective dimension of the attitude towards economic corruption represent the direct and average relationship between the two mentioned variables ( $r: 0.410$ ) but the correlation between the non-official dimension of social apathy with the objective dimension of attitude towards economic corruption suggests that there is no significant relationship ( $\text{sig}: 0.809$ ) between the two raised dimensions, so there is no correlation between the two dimensions. This means according to the results obtained, the respondents' attitude to economic corruption in the objective dimension has no impact on their non-official apathy. Also the relationship between the official social apathy with subjective economic corruption is direct and weak. The correlation coefficient between the non-official and subjective attitude to economic corruption is reverse and weak as well ( $r: 0.136$ ). Finally, the table above shows that there is a direct and significant relationship between the variable of social apathy with attitudes to economic corruption ( $\text{sig}: 0.000$ ) that according to the correlation coefficient ( $r: 0.215$ ) obtained this relationship is weak and direct.

The (7) table shows the correlation coefficient between the dimensions of attitude towards economic corruption with a sense of extortion and deprivation and its dimensions (objective and subjective). The results obtained from the correlation between extortion and deprivation (subjective) with the attitude economic (objective) indicates that there is a significant relationship ( $\text{sig}: 0.034$ ) between the two dimensions introduced so the correlation between the two dimensions is direct. There is no significant relationship between the subjective dimension of extortion and deprivation and the objective dimension of attitude to economic corruption; therefore there is no correlation between the two variables. Also there is a significant relationship between deprivation and extortion in its objective dimension with the attitude to economic corruption in both objective and subjective dimensions ( $\text{sig}: 0.000$ ) suggesting a direct and average correlation between these variables. The correlation with the objective attitude is ( $r: 0.415$ ) and with the subjective attitude is ( $r: 0.335$ ). Finally, a significant relationship ( $\text{sig}: 0.000$ ) can be seen between independent variable of attitude towards economic corruption and the dependent variable of a sense of extortion and deprivation. The correlation coefficient ( $r: 0.305$ ) obtained also shows an average and direct relationship between these two variables.

In continue, the bivariate regression (that sometimes is also called as univariate) has been used to investigate the effect of an independent variable on the dependent variable. Results of the regression table (8) shows that the effect of the independent variable (attitude to economic corruption) on social distrust of citizens of the city of Yazd with



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adjusted coefficient of determination (0.055) has been significant; this means that the variable of attitude to economic corruption explains 5.5% of the variance (changes) in the dependent variable of social distrust. It also shows that the effect of the independent variable (attitude towards economic corruption) has been significant on the extortion and deprivation of citizens of Yazd. The independent variable (attitude towards economic corruption) with the adjusted coefficient of determination is (0.091), which means that the variable of attitude to economic corruption explains 9.1% of the variance (changes) in the dependent variable of deprivation and extortion. Ultimately, results of the regression table above shows that the effect of the independent variable (attitude towards economic corruption) has been significant on social apathy of citizens of Yazd that the independent variable (attitude towards economic corruption) with the adjusted coefficient of determination is (0.044) that means the variable of attitude to economic corruption explains 4.4% of the variance (changes) in the dependent variable of social apathy. In total, based on the above table data and according to standardized beta, the effect of attitude to economic corruption on social distrust, social apathy and the feeling of exclusion is 23.9, 21.5 and 30.5 percent, respectively.

**DISCUSSION AND CONCLUSION**

Financial corruption with its various dimensions could be found more or less in all countries. Our country is somewhat grappling with this problem, and the need to coping with that has been raised recently. According to psycho - social consequences of economic corruption on society that cannot be ignored, in this study we tried to examine people's attitudes to economic corruption, its impact on social distrust, social apathy and the feeling of relative deprivation. In this regard, we used the theoretical dimensions of Durkheim's and Messner's anomie theory used to explain the issue. This research has been conducted with 384 samples among citizens of the city of Yazd.

The results suggest that attitude to economic corruption has been observed in both objective and subjective dimensions at high levels among citizens of Yazd. This means that as increasing financial corruption in the community, in the subjective dimension, feeling annoyed, oppression, despair, people's rights violation, and the sense of weak belief and disbelief will increase and in the objective dimension people know the causes of corruption in cases of ambiguity in the laws, inefficient administrative structure, low supervision and control, weak dealing with offenders, factionalism and so on.

The distrust of citizens of Yazd has been also reported high that the most distrust has been in the institutional dimension that is distrust in organizations, institutions and governmental performance. Apathy has been also reported at above average level among citizens of Yazd which is estimated above average in both official and non-official dimensions. Lerner knows civic apathy the opposite of social partnership and believes that social variables have importance and centrality. The sense of deprivation and extortion has been also evaluated at the average level among the respondents which has been reported at a high level in the objective dimension of deprivation. According to Davis, income inequality and social benefit that increases its financial abuse, reinforces the feeling of deprivation and extortion and thereby leading to passivity, withdrawal, apathy and despair (Bashiriye, 2011).

The results of hypotheses testing in this study showed that there is a significant and positive correlation between the attitude towards economic corruption and social distrust ( $r: 0.239$ ), indicating with an increase in negative attitude to economic corruption, the feeling of social distrust will also increase which is more obvious in the institutional distrust. According to Fukuyama, social distrust is the dependent variable affected by factors such as modernity that leads to fundamental changes in the structures of society, followed by which drastic changes will emerge in values and social norms. As the research by Share'pour et al. (2011) also shows that low level of social trust is more likely to be related to the role of institutional trust that represents the fact that more institutional distrust among individuals will also affect their social distrust at other levels. This output of the study is consistent with Durkheim's anomie theory that considers anomic conditions for the community as a critical situation, accordingly the population in conditions of economic crisis loses the sense of effectiveness and are marginalized so they refuse to participate in the



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society, it's also in line with theoretical dimensions of Rafipour, Rahimian, Sheikhavandi, and Rahnamoud, in their view promoting administrative and economic corruption in a society leads to distrust in the political system and community members in all aspects.

The data also confirms that there is a direct and significant relationship between the attitude towards economic corruption and social apathy ( $r = 0.215$ ). In other words, more negative attitude towards economic corruption, more social apathy among people will be. In particular, in official apathy with a correlation coefficient of (0.410), this relationship can be seen dramatically. It's a situation where, according to Durkheim, social norms and ethical guidelines do not have the necessary performance in conducting social behavior, and they have not been replaced by new efficient norms yet. It is natural that in such circumstances the social behaviors are damaged and social apathy appears as one of the examples of it. According to Rosenfeld and Messner theory that knows self-oriented community as one of the consequences of anomic conditions somehow confirms the results of present study. They argue that when people are self-centered and only think about their personal interests and avoid social activities, they gradually lose their social links and are not responsible and commitment towards the community, consequently they feel social apathy. The results are in line with the research conducted by Habibzadeh (2005), which shows political indifference has reduced the individuals' political participation, so negative attitude towards economic corruption can also result in social apathy, particularly in its official dimension.

The findings also showed that there is a significant and positive correlation between the attitude to economic corruption and a sense of deprivation and extortion ( $r = 0.305$ ) which is also significant in the objective deprivation and extortion ( $r = 0.415$ ), indicating that the attitude towards economic corruption increases the sense of deprivation and extortion, the feeling can be felt more in the objective dimension. According to Merton and Ohlin, this result suggests that in conditions where there is a gap between the objectives and goals and the means to achieve them and where people see inequality, dissatisfaction is formed and leads to a sense of extortion, and people in the society are not involved and they desire to avoid being with others and discussing on things. According to Giddens, the sense of deprivation emerges when the members of society suffer from feeling deprivation and extortion in the assessment of their condition and more benefits of others, the deprivation and suffering they neglected.

The bivariate regression in this study shows that the effect of the independent variable (attitude towards economic corruption) has been significant on social distrust of citizens of the city of Yazd and it's as (0.055) with the adjusted coefficient of determination which means the attitude towards economic corruption explains 5.5% of the variance (changes) in the dependent variable of social distrust. It also shows that the effect of the independent variable (attitude towards economic corruption) on deprivation and extortion of citizens of Yazd has been significant and the independent variable (attitude towards economic corruption) is as (0.091) with the adjusted coefficient of determination that means the attitude towards economic corruption explains 9.1% of the variance (changes) in the dependent variable of deprivation and extortion.

The results finally showed that the effect of the independent variable (attitude towards economic corruption) has been significant on social apathy of citizens of Yazd that the independent variable (attitude towards economic corruption) is as (0.044) with the adjusted coefficient of determination, this means the variable of attitude towards economic corruption explains 4.4% of the variance (changes) in the dependent variable of social apathy.

In total, based on the research regression analysis results and with regard to the standardized beta, the effect of attitude towards economic corruption is 23.9 percent on social distrust, 21.5 percent on social apathy and 30.5 percent on the feeling of deprivation, respectively.





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**Table (1): Respondents' attitudes to economic corruption**

Variable	Low		Middle		Up	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
attitudes to economic corruption (objective)	13	3.4	221	57.6	150	39.1
attitudes to economic corruption (subjective)	30	7.8	141	36.7	213	55.5
attitudes to economic corruption	13	3.4	221	57.6	150	39.1

**Table (2): Respondents' distrust status**

Variable	Low		Middle		Up	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Interpersonal distrust	124	32.2	231	60.2	29	7.6
social distrust	70	18.2	240	62.5	74	19.3
institutional distrust	36	9.4	131	34.1	217	56.5
Distrust	7	1.8	184	47.9	193	50.3

**Table (3): Respondents' social apathy status**

Variable	Low		Middle		Up	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Social apathy (non-official)	36	35.4	214	55.7	34	8.9
Social apathy (official)	36	9.4	206	53.6	142	36
Social apathy	60	20.9	264	68.8	40	10.8





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**Table (4): Respondents'feeling of extortion and deprivation**

Variable	Low		Middle		Up	
	Frequenc y	Percentag e	Frequenc y	Percentag e	Frequenc y	Percentag e
deprivation (objective)	21	5.5	125	32.6	238	62
deprivation (subjective)	73	19	229	59.6	82	6.21
The feeling of extortion and deprivation	48	12.5	304	79.2	32	8.3

**Table (5): Pearson correlation test between the attitude towards economic corruption with distrust and its dimensions**

Variable	Interpersonal distrust	Generalized distrust	Institutional distrust	Distrust
Attitude to economic corruption (objective)	-0.095	0.160**	0.295**	0.239**
Attitude to economic corruption (subjective)	-0.124*	0.029	0.178**	0.092
Attitude to economic corruption	-0.095	160.0**	0.295**	0.239**

\*\*Sig ≤ 0/001 \*sig ≤ 0/005

**Table (6): Pearson correlation test between the attitudes towards economic corruption withsocial apathy byits dimensions**

Variable	Social apathy (non-official)	Social apathy (official)	Social apathy
attitudes towards economic corruption (objective)	0.012	0.410**	0.215**
attitudes towards economic corruption (subjective)	-0.136**	0.196**	0.002
attitudes towards economic corruption	0.012	0.410**	0.215**

\*\*\*Sig ≤ 0/001 \*sig ≤ 0/005





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**Table (7): Pearson correlation test between the attitudes towards economic corruption with the feeling of extortion and deprivation by its dimensions**

Variable	deprivation (objective)	deprivation (subjective)	deprivation
attitudes towards economic corruption (objective)	0.415**	0.108*	0.305**
attitudes towards economic corruption (subjective)	0.335**	0.024	0.198**
attitudes towards economic corruption	0.415**	0.108*	0.305))

\*\*\*\*\*Sig ≤ 0/001    \*sig ≤ 0/005

**Table (8): Bivariate regression test between the independent variable (attitude towards economic corruption) and dependent variables**

Variable	Raw coefficients		Standards coefficients	Adjusted coefficient of determination	t	Sig
	B	Std.error	Beta			
Distrust	0.272	0.057	0.239	0.055	4.818	0.000
A sense of deprivation	0.680	0.108	0.305	0.091	6.266	0.000
Social apathy	0/691.	0.161	0.315	0.044	4.301	0.000





## An Analysis of the Factors Affecting the Increase in Deposit Market Share of Melli Bank of Iran

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### ABSTRACT

Banks can keep up their activities when their shares of currency basket are kept and increased. For this reason, it is very important to distinguish the factors affecting the increase in banks' deposits. The main purpose of this study is to determine the factors affecting the increase in deposit market share for Melli Bank of Iran. The Econometric model has been evaluated according to Milton Friedman's the demand for money theory and the literatures for the people's savings account. This model has been estimated as a balanced panel model for the years 2009-2014 by using the annual data for the bank branch affairs departments in five provinces of Iran (Guilan, Mazandaran, Qazvin, Alborz and Ardebil). The results indicated that the real interest rate, the amount of granted facilities, the number of branches and advertisements have a positive and significant impact on the increase in banks deposits or their market share. While there is a negative and significant relationship between the real state/property price index (PPI) of urban areas and the deposit market share for Melli Bank of Iran.

**Key words:** Deposit Market Share, Interest Rate, Deposit Rate, Melli Bank of Iran

### INTRODUCTION

Market share is considered as a structural variable of market. A high average of market share for the firms can usually be observed in monopolistic industries. Conversely, we can see a lower average of market share in competitive markets. Obviously, every factor that makes some changes in the firm size and market share can change the market



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structure too (Molaei&Dehghani, 2011). With respect to the different kinds of banks in Iran, if banks can't formulate proper strategies for competing with each other, they will lose their shares of sources, expenditures, and hence their cost and benefits over time. Thus, at a time when the state economy has allowed foreign banks accesses to domestic banks, it is important to consider the banking structural reforms and conduct a study on the market share of banks. Market share is a part of whole market that has been allocated to a bank which its demands can be met by it.

The state economic situation implies the bank-oriented financial and real markets, and generally the state economy. In fact, banks are the most essential financial intermediaries to provide a society with financial services (Ahmadian, 2013). On the other hand, with respect to the formation of private banks, if the state-owned banks can't formulate proper strategies to compete against the private sector-despite a high number of state bank branches and domestic facilities provided to them- they will lose their share of resources overtime. In other words, the state-owned banks can't absolutely and permanently take advantages resulted from the number and distribution of state bank branches and after a short time, the private banking administrators can minimize the available opportunities for the state banks by increasing the capital, purchasing the bank branch buildings, using the modern and advanced equipment, mechanizing branches and connecting them to Internet, providing electronic services and employing highly qualified and motivated experts and personnel (Karimi, 2006). The factors affecting the deposit market share can be divided into the qualitative and quantitative elements. The qualitative factors are depended on the customers' perspective and comments (Yonggui&Hing, 2003). But the qualitative factors are related to the banking system's financial performance that has been recorded in the financial statements and is not depended on the staffs or customers' perspectives. These factors are the key banking system functional ratios (Bahia &Jaques, 2006). Every bank management that neglect to these ratios can endanger the bank's activities continuous and under these circumstances, even an increase in the market share can't also raise shareholders' wealth and some negative economic, social and political consequences will be achieved (Faryabi&Mahmoudi, 2013).

Indeed, this study aims to investigate the issue that since the early eighties that different private banks, financial institutions and credit cooperatives were formed, the absorption of resources by state-owned banks was decreased. As according to the banking groups share statistics of private sectors deposits in Iranian Banking System published by the Central Bank of Iran, the share of state-owned banks was decreased from 99.3% in 2001 to 32.7% in 2013. In contrast, the share of private banks was increased from 0.7% in 2001 to 67.3% in 2013. Meanwhile, despite a wide range of highly qualified personnel and experts and the high number of domestic and foreign branches of Melli Bank of Iran, its market share has been decreased from 19.80% to 12.95% during the years 2006-2013. Therefore, the current study aims to explain the factors affecting the increase in the market share of Melli Bank of Iran. According to Milton Friedman's the demand for money theory and savings literature, the environmental factors including macroeconomic variables (such as real states prices, interest rate and inflation rate) and Bank-specific factors including bank-specific variables (i.e. variables that explains a bank features such as facilities, the number of branch, the number of personnel) affect the bank deposits. In fact, this study's main question is "which factors can increase the Melli Bank of Iran deposits and hence the market share?"

**Theoretical principles**

The results of bank deposit interest rates as a property price indicate that an increase in the price of investment deposits motivates the suppliers to raise funds (more savings as an investment deposits), meaning that this results in correspond with the supply function's microeconomic principles. In a study, Amini et al. concluded that inflation rate as a component of real interest rate has a significant relationship with the amount of bank deposits. However, it has a little effect on the level of Saderat Bank's deposits. In their study, Nazarian and Mohammad Ismaeil (2009) investigated the factors affecting the private sector's deposit sources absorption in commercial and state-run specialized banks. According to Milton Friedman's the demand for money theory and the literatures for the people's savings accounts, the estimation model has been developed based on two groups of variables. The first group of macroeconomics variables include national income, interest rate and real estate price index, and the second group or



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banking industry-specific variables include the number of branches, the level of facilities and the number of personnel. The estimation results show that the real interest rate has a positive impact on the private sector's deposits sources absorption in commercial and state-run specialized banks. In a paper titled "Factors Affecting the Bank Deposits Absorption in order to Increase the Relative Share of Isfahan's Sepah Bank", Ostadi&Sarлак investigated this issue. The results show that the impact of inflation is significant. Accordingly, the first hypothesis of the current study is as follows:

**H1: There is a significant relationship between the real interest rates on time deposits and increasing their deposit market shares.**

An increase in the real estate price index and non-official exchange rate can decrease people's savings accounts as deposit resources, meaning that when the national currency is devaluated, people expect the more devaluation. So, the demand for foreign currencies will be increased and the demand for the deposit resources as a component of wealth preservation will be decreased. According to the current literature, under inflationary circumstances, the increase in the real estate price index acts as a strong alternative asset and can lead to the deposit resources absorption in the economic systems like Iran. Nazarian and Mohammad Ismaeil (2009) stated that the real estate price index has a negative impact on the private sector's deposit sources absorption in commercial and state-run specialized banks. Also, in a study conducted by Qolamipour et al. (2015), they concluded that the housing price index's growth rate couldn't have a significant impact on the resources absorption of private banks during the years 2009-2013. Accordingly, the second hypothesis of the current study is as follows:

**H2: There is a significant relationship between the state real estate price index and the increase in its deposit market share.**

With respect to the formation of private banks, if the state-owned banks can't formulate proper strategies to compete against the private sector- despite a high number of state bank branches and domestic facilities provided to them- they will lose their share of resources overtime. In other words, the state-owned banks can't absolutely and permanently take advantages resulted from the number and distribution of the state bank branches and after a short time, the private banking administrators can minimize the available opportunities for the state banks by increasing the capital, purchasing the bank branch buildings, using the modern and advanced equipment, mechanizing branches and connecting them to Internet, providing electronic services and employing highly qualified and motivated experts and personnel (Karimi, 2006). It is expected that a physical development in financial system (for the bank deposits, the branches development and increasing the number of personnel) has a significant role in the level of deposit resources absorption, but for the selected banks, the physical development in Iranian banking financial system has been saturated and if the bankers want to develop their activity, they should enter into the new fields of financial services (Nazarian& Mohammad Ismaeil, 2009). In the study of Amini et al. (2009), the number of branches had the most positive impact on the level of Saderat Bank's time deposits. While Nazarian and Mohammad Ismaeil (2009) stated that the number of branches and personnel don't have a significant impact on the level of private sector's savings resources. Accordingly, the third hypothesis of the current study is as follows:

**H3: There is a significant relationship between the number of bank branches and the increase in its deposit market share.**

Due to the importance of mobilization of resources and the central role of savings in the state economic development and with respect to the limitations of foreign deposits absorption, people's reluctance for saving money, underdeveloped capital market and unorganized money markets, the countries such as Iran compete over deposits mobilization. While if the marginal propensity to savings, the increase in bank deposits and market development is high, these countries can compete for granting facilities (Karimi, 2006). In a study conducted by Aboonouri and





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Sepanloo (2005), the effects of intra organizational factors such as bank facilities on the deposits absorbed by Mellat Bank of Iran have been investigated. Finally, it was found that granting facilities level has a positive impact on the deposits absorption. Also, Alipour et al. (2013) approved the positive impact of facilities on the increase in Eghtesad-e-Novin deposits in their study. Accordingly, the fourth hypothesis of the current study is as follows:

**H4: There is a significant relationship between the bank facilities level and the increase in its deposit market share.**

One of the factors affecting the amount of bank deposits is advertisement. It is expected that there is a direct relationship between the advertisement and the bank market share theoretically. In fact, advertisement is one of the most important elements of the new marketing for creating consumers' needs and then it is applied as a tool for using goods and services in order to meet demands, which it is used for directing customers' beliefs and attitudes. Accordingly, the fifth hypothesis of the current study is as follows:

**H5: There is a significant relationship between the banking advertising costs and its deposit market share.**

## METHODOLOGY

This is an applied and descriptive (survey) research in terms of purpose and nature, respectively. The research methodology is Ex-Post Facto and the previous data has been used in this study. In some cases which the relationship between a dependent variable and several independent variables is investigated, researcher aims to predict factors by providing models and using the historical data and parameters for independent estimation variables. In other words, this is a descriptive research where the author aims to describe the relationship between variables (dependent and independent) by using statistical tests.

### Explanation of Model

In the current study, we are going to explain the factors affecting the increase in the Melli Bank of Iran's deposit market share. Therefore, we explain how Melli Bank of Iran's deposit market share is increased by using the model suggested by Nazarian and Mohammad Ismaeil study (2009).

The econometric model estimated by Milton Friedman's the demand for money theory and the literature for people's savings is as follows:

$$DEP_{it} = \alpha_0 + \alpha_1 NET_{it} + \alpha_2 HUS_{it} + \alpha_3 FCL_{it} + \alpha_4 BRN_{it} + u_t$$

where

DEP = the amount of investment deposit as the market share index.

NET= the real interest rate of bank that is computed by subtracting the nominal interest rate from the inflation rate.

HUS = the state real estate price index in the urban areas.

FCL = the amount of facilities granted by Melli Bank of Iran.

BRN = the number of Melli Bank of Iran branches.

Two groups of variables have been used in this model. The first group or macroeconomics variables include the real estate price index and interest rate that are fixed values for all banks, and the second group or banking industry-





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specific variables include the number of branches and the amount of facilities granted by the banks that are varied from a bank to another.

For more corresponding the above model to the evaluation of the state banking industries' optimal quantitative factors, the electronic banking advertising cost has been added to the four dimensions mentioned above as a quantitative index. Consequently, the econometric model is expressed as follows:

$$DEP_{it} = \alpha_0 + \alpha_1 NET_{it} + \alpha_2 HUS_{it} + \alpha_3 FCL_{it} + \alpha_4 BRN_{it} + \alpha_5 ADV_{it} + u_t$$

where ADV is advertising costs.

This model has been estimated as a balanced panel model for the years 2009-2014 by using the annual data for the bank branch affairs departments in five provinces of Iran (Guilan, Mazandaran, Qazvin, Alborz and Ardebil). Since the measurement scales for the deposits, the facilities and advertising cost variables are significantly different from the real interest rate, the housing price index and the number of branches, the logarithms of the above variables have been computed in order to determine the real parameters. Therefore, the final model of this study is as follows:

$$LOG(DEP_{it}) = \alpha_0 + \alpha_1 NET_{it} + \alpha_2 HUS_{it} + \alpha_3 LOG(FCL_{it}) + \alpha_4 BRN_{it} + \alpha_5 LOG(ADV_{it}) + u_t$$

**Model Estimation**

One of the ways to avoid a spurious regression is ensuring that the data are static. Therefore, before estimating the model, the statistical properties of Panel data were investigated in terms of stability or the existence of unit root. The results show that all of the variables are static. Then, as mentioned in Chapter 3, in order to determine the presence or the absence of intercepts for each province separately, we should first examine the Limer test and select among the accumulated and non-accumulated data (fixed or random effects). Where, H0 is the same intercepts hypothesis (combined method) against H1 that is the different intercepts hypothesis (Panel method).

$$\begin{cases} H_0: \alpha_0 = \alpha_1 = \dots = \alpha_n = \alpha \\ H_1: \alpha_i \neq \alpha_j \end{cases}$$

$$F_{(n-1, n-k)} = \frac{(RSS_R - RSS_{UR}) / (n - 1)}{RSS_{UR} / (nt - n - k)}$$

If the known F is greater than the F in the Table (with the (n-1) and (nt-n-k) degree of freedom), the null hypothesis is rejected and so the restricted regression is not valid and more intercepts should be estimated. The likelihood-ratio test was used for conducting the test in this study. In the Eviews software, after conducting the Effects-Likelihood Ratio Redundant Fixed, if the software output probe is less than 0.05, the Panel method is valid in the level more than 95%, but if it is greater than 0.05, the combined method will be accepted.

As you can see, the Panel data will be accepted. Now there is the question "Is the difference between cross-sectional intercepts as random effects?"





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In order to select the fixed-effects model, we use  $E\left(\frac{U_{it}}{X_{it}}\right) = 0$  and  $E\left(\frac{U_{it}}{X_{it}}\right) \neq 0$  from Hausman test for the random effects model. The Chi-squared test statistics with two degree of freedom is equal to the number of independent variables:

$$\begin{cases} H_0: \text{Random Effect} \\ H_1: \text{Fixed Effect} \end{cases}$$

If the software Eviews 6 is used for Hausman test and the Prob is less than 0.05, the fixed effects model at the 95% level will be accepted. But if Prob is greater than 0.05, the random effects model will be accepted.

Thus, the regression was estimated by using the fixed effects model and the results for the first model estimations are as follows:

As you can see from the estimation output, all independent variables have a significant relationship with the dependent variable. As there is a positive relationship among the real interest rate, the level of facilities, the number of branches and the advertising costs, and the housing price index has a negative relationship with the bank's market share.

$R^2 = 0.99, R^2 = 0.99$  represents the high explanatory power of independent variables, meaning that more than 99% of changes in the dependent variable can be justified by the independent variables. The value of F is greater than its value in the table. Despite Prob=0.00, the whole regression is statistically significant. With respect to the value of Durbin-Watson statistic that is not significantly different from the value of 2 as well as the nature of Panel data method and the duration of study, the non-autocorrelation of error terms can be claimed.

## CONCLUSION

The first step for interpreting the estimated model is the model coefficients signs corresponding to the theoretical expectations. One of the most important macro factors affecting the banks' deposits is inflation and bank interest rate, because the bank interest rate leads to non-labour incomes with a very low risk. Therefore, it is theoretically expected that the variable mentioned above has a positive impact. On the other hand, a high inflation in Iran can lead to a decrease in people's real income. This can decrease the national savings, and thus physical and non-physical assets such as bank deposits will be declined. Therefore, in order to explain the real impact of the interest rate in the current study, the inflation rate was firstly subtracted from the nominal interest rate and then the real interest rate was determined. According to the results of the model estimation, the real interest rate has a positive and significant impact on the increase in bank deposits or its market share.

Another variable examined in the current study is the housing price index in urban areas. Given that the real estate and property market was always safe and profitable in Iran, hence the researcher has used the housing price as a substitution variable in this model. The results of estimation show a negative and significant relationship with the amount of deposits. In fact, when the housing price is increased, in order to obtain more interest, people prefer to invest housing market instead of depositing.

Also, it was found that the level of granted facilities has a positive impact on the increase in deposits. Accordingly, we can say that one of the motivations of people for a high turnover and depositing is getting a loan. With respect to the high inflation in Iran, it is expected that the people have a high motivation for getting loans with proper interests.





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Finally, the study results indicate a positive and significant relationship with the amount of deposits and granted facilities.

In the current study, the advertisement has a positive impact on the amount of depositing. Naturally, the notifications about different kinds of bank services can increase people motivations to select Melli Bank of Iran. Finally, it became clear that the number of branches has a positive and significant impact on the dependent variable. In fact, customers' easy access to the bank services can increase the amount of depositing.

In the estimated model, the intercepts of the five provinces of Iran are statistically different. This difference can be resulted from the state's provinces-specific social, cultural and economic properties, which should be focused for developing the bank market share.

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**Table (1): LM Test Output**

Effects Test	Statistic	d.f	Prob.
Period F	35.08	5.19	0.00
Period Chi-square	69.76	5	0.00

**Table (2): Hausman Test Output**

Test Summary	Chi-Sq. Statistic	d.f	Prob
Period random	175.42	5	0.00





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**Table (3): The Model Estimation Output**

Variable	FIXED		
	Coefficient	Statistics t	Prob
C	45.07	17.28	0.00
NET	0.005	3.23	0.00
HUS	-0.02	-4.03	0.00
LOG(FCL)	2.34	12.99	0.00
BRN	0.05	17.28	0.00
LOG(ADV)	0.67	17.77	0.00
<b><math>\bar{R}^2 = 0.99</math></b>	<b><math>R^2 = 0.99</math></b>		
F=554.11Prob=0.00			
<b>D.W = 1.69</b>			





## The Role of Nutrition in Women's Fertility

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### ABSTRACT

Lack of vitamins and minerals during pregnancy is a very common problem. This problem could cause significant effects on pregnancy, ovum and baby outcomes. Some of these effects include low birth weight and preterm delivery. As a result, we need more research to be done in order to obtain the best possible health supplement diets for women of childbearing age. In the present study author's searcher for Magiran, SID, Iranmedex, Irandoc, Scopus and Web of Sciences databases. We used keywords of nutrition, fertility and women. Lack of nutrients during pregnancy, either in form of a deficiency or multiple deficiencies, could cause considerable effects on pregnancy outcomes. Women need to take adequate levels of micro nutrients to avoid nutritional deficiencies at the beginning of pregnancy. In developed countries, practitioners frequently recommend taking iron and folic acid supplements to all women of childbearing age. In fact, iron and folic acid supplement have to be considered as a strategy preventing from iron deficiency. However, apart from supplements, the supplement nutritional approach like fortification of foods must also be taking into account. The fortification process can effectively compensate for foliate deficiency in periods prior to pregnancy.

**Keywords:** nutrition, fertility, women, diet.

### INTRODUCTION

Infertility describes as at least 12 and 6 months of unsuccessful attempts to pregnancy among women under 35 and over 35 years of old, respectively (1). Generally, approximately 15 per cent of couples have experienced this condition during their reproductive age (2). As a result, assisted reproductive techniques have been taken into consideration in

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preliminary treatment of infertility (3). However, the huge costs of these treatments besides obtained negative results have made these techniques less achievable for couples. Despite the fact that the relationship between diet and infertility has remained unexamined, some scholars have reported certain improvements among women who have taken particular nutrients. Also, other investigators have indicated that women who have taken nutrient supplements have shown higher rate of fertility even with fertility disorders (4). Additionally, about 10 to 15 per cent of infertility cases have been considered unknown, which could be due to oxidative stress (5).

moreover, scholars recommend that oxidative stress plays a role in unknown pathophysiology infertility, endometriosis, polycystic ovarian syndrome (PCOS) and tubal and peritoneal factor infertility (5). Therefore, several different studies have examined micronutrients supplement intervention strategy in antioxidants status of infertile women. On the other hand, there exist some evidence on the role of micronutrients in structure of uterus and ovarian hormones secretion(6). Accordingly, the present study attempts to review evidences of taking micronutrients role like vitamins B, D, E, and C, selenium, iron, and magnesium in women's infertility.

To this end, we extracted research papers using case-control, descriptive and intervention group (clinical trial) design which were published from 1984 to November 2014. The articles were driven from different databases of PubMed, and Embase using keywords like oxidative stress, antioxidants, vitamins, minerals, and women's infertility. Table 1 shows studies on the relationship between micronutrients and women's infertility. But, the confirmatory studies are removed from Table 1.

**MICRONUTRIENT****Iron**

Iron deficiency and iron deficiency anemia are the major nutrition problems which have affected 30 per cent of women population at childbearing age. The main clinical manifestation of iron deficiency is anemia or reduced hemoglobin. Anemia affects 41.8 per cent of women of childbearing age and also is a mortality risk factor of women's fertility (19). Iron deficiency leading to anemia is remarkably common among women. Several different studies have revealed that iron deficiency increases the rate of preterm delivery and perinatal mortality (21). In developing countries, bleeding is the main cause of death of women fertility including 25 per cent of all women fertility death (20). Also, iron deficiency increases mortality risk of bleeding and infection among anemic women. Therefore, practitioners have recommended that iron and folic acid supplements must be distributed among all women living in the developing countries. There exist several evidences about the considerable impact of iron supplements on fertility (22). Moreover, researchers have achieved some results on taking iron and folic acid supplements comparing with placebo or no intervention. Iron and folic acid supplements have reduced up to 31 per cent of risk of ovum death compared with control group, whom had taken vitamin A only. This finding was statistically meaningful (23).

**Zinc**

Although examining the prevalence of zinc deficiency is intricate, a few studies have discussed about the probability of mild to moderate zinc deficiency among women extensively (24). The prevalence of zinc deficiency in the developing countries is likely similar to iron deficiency (25). Caulfield and colleagues have reported that there is a probability that 82 per cent of women of childbearing age are taking insufficient amount of zinc through diet all around the world (26). Zinc has a considerable role in numerous synthetic metabolic reactions. A Chocran review study on the impact of zinc supplement on fertility was performed by Mahomed et al covered 9000 women and their ovum (27). The study showed that although severe zinc deficiency may be less common, it ends to death of ovum. While, milder forms of zinc deficiency associates to low birth weight, intrauterine growth restriction and preterm delivery (28).



**Bahareh Kamranpour****Vitamin A**

Vitamin A plays a considerable role in ovum and women's health of childbearing age. Several studies have indicated that vitamin A deficiency has been extensively identified in the developing countries. The clinical manifestation of vitamin A deficiency is Xerophthalmia and night blindness is seen in the second half of pregnancy (29-31). Vitamin A deficiency during pregnancy can lead to fetal wastage, although higher doses of vitamin A can be teratogenic in early pregnancy (32). Vitamin A and Beta-carotene supplements reduce all mortality causes of women's fertility up to week 12 of postpartum compared with the control group (29). In this study the rate of ovum and infant survival using supplement revealed no significant difference (29).

**Folic Acid**

Women are at increased risk of folic acid deficiency. Because the amount of folic acid intake through the diet is not sufficient enough to compensate for physiological needs of mother and metabolic needs of the developing ovum. Deficiency of folic acid of mothers associates to Megaloblastic anemia, which is due to the role of folic acid in synthesizing DNA. Lower levels of folic acid by the time of fertilization can result in neural tube defects in ovum. also, women taking folic acid supplement by the time of fertilization decreases neural tube defects like Anencephaly and Spina bifida (33). This problem has no association to neural tube defects of previous pregnancies (34).

**Vitamin D**

Maternal vitamin D deficiency is a prevalent health problem in the developing countries. Deficiency in vitamin D during pregnancy causes short-time and long-time problems in ovum. These problems include growth retardation, skeletal problems, type 1 diabetes, asthma and schizophrenia (35). The main source of vitamin D is skin production. Given the high prevalence of vitamin D deficiency and poor calcium diet, it most probably worsens fertility as a result of active transfer of calcium to developing ovum through the placenta. Deficiency in vitamin D in the early pregnancy associates to a 5-fold increased risk of pre-eclampsia presentation (35). In addition, vitamin D deficiency during pregnancy results in hypervitaminosis D of ovum, neonatal rickets, infant rickets and tetany (36-38). Vitamin D status at birth is strongly associated with female fertility vitamin D status. Umbilical cord blood at birth contains approximately 60-50% of concentration in blood circulating of fertility (OH) D<sub>25</sub> (39). Taking vitamin D supplementation in pregnancy helps to improve vitamin D status of ovum. so, it reduces the risk of vitamin D deficiency in the first months of life. In a study conducted in the United Kingdom mother treated with vitamin D supplement showed higher daily weight gain and reduced number of babies with low birth weight (40).

**Iodine**

Iodine is required for thyroid hormone release. These hormones regulate the metabolism of cells. Deficiency in iodine during pregnancy has a negative impact on the evolution of ovum. Severe iodine deficiency can lead to death of the ovum (miscarriage or stillbirth) or severe retardation of mental and physical development is also known as cretinism (41). Loss of ovum, stillbirth, goiter, congenital anomalies, hearing loss, mental retardation caused by iodine deficiency during pregnancy all are irreversible damages (42). The studies have revealed a statistically significant 29 per cent decrease in ovum fertility and during early pregnancy in case of maternal iodine supplement intake (25).

**Calcium**

Calcium is needed for skeletal development of ovum (43). Calcium also plays a role in blood clotting and neuromuscular function. In addition to the effects of calcium on bone growth of the ovum, calcium deficiency affects membrane permeability and smooth muscle contraction power. This problem also affects blood pressure and can lead to preterm uterine contractions and subsequent delivery (43). Using calcium supplement during pregnancy





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decreases the risk of high blood pressure (with or without proteinuria) up to 30 per cent (44). presently, there exist no strong evidence indicating that improved calcium status during pregnancy causes a positive and long-time effect on ovum and mother bone mass (45).

#### Magnesium

Several studies on diet during pregnancy have shown that magnesium intake is often less than the recommended amount. In these studies, magnesium supplement does not affect preeclampsia. Several studies in developed countries have reported reduced rate of preterm delivery and intrauterine growth restriction among peoples given supplements of magnesium (46-47). Unfortunately, these data will not be available for the developing countries. A recent study suggests that only magnesium and calcium affect the birth weight. Magnesium reduces SGA up to 30% (48).

#### DIETS

##### Fatty Acid

A prospective cohort study showed that eating TFA instead of mono-unsaturated fatty acid (MUFAs) has a relatively high association with the risk of infertility in ovum (49). A significant negative relationship was found in women who had high iron intake.  $\omega$ -6 desaturase is an enzyme that converts linoleic acid to arachidonic acid and also converts  $\alpha$ -linoleic acid to eicosapentaenoic acid (EPA) and catalyzes docosahexaenoic acid (DHA). The function of this enzyme considerably reduced among women with low serum concentration (50). In addition, iron is an important component of  $\omega$ -6 desaturase (50). because eicosapentaenoic acid and arachidonic acid connects receptors with peroxisome proliferators-activated (PPAR- $\gamma$ ) with greater affinity compared with PUFA with shorter chain length (51), pharmaceutical activation of PPAR- $\gamma$  promotes active ovulation in women with polycystic ovary syndrome (PCOS). it can affect PPAR- $\gamma$  function (52). Iron is a known oxidant. Oxidized metabolites PUFA are ligands of PPAR- $\gamma$  with much more power and influence than the PUFA (53). This is worthy to mention that above mechanisms account for changed effect particularly after adjusting for the expansion of iron reserves are depleted among young women in the study of observed countries (Iron deficiency-United States, 1999-2000). Iron absorption (heme) associates with consequences higher risk of insulin resistance. Therefore, the interaction should be interpreted with care (54). In addition, the replacement of trans fat with non-hydrogenated vegetable oils can reduce the risk of diabetes type 2 and cardiovascular disease (55).

##### Carbohydrates

High glycemic index foods such as cold cereals, white rice and potatoes associate with a higher risk of ovulation-related infertility. low Glycemic-index foods such as brown rice, pasta and dark bread associates with higher rate of fertility (3). Insulin sensitizers can improve metabolic parameters of fertility and ovulation function in women with PCOS (56). Since less refined starch intake associates with a reduced risk of chronic diseases (57), reduced absorption of carbohydrates from these sources are recommended to women who want contraception because it can cause an increase in fertility (55). the body mass index (BMI) and the body fat was higher in PCOS. (Group than HA group). evaluation of the absorption of nutrients in food habits showed distribution of similar micronutrient between the two groups (about 16 percent protein, 33 percent fat and 52 percent carbohydrates) (55).

##### Protein

In a very interesting study, participants were classified on the basis of average daily protein intake (3). For women of the highest intake group 41 percent there was more likely to report ovulatory infertility problems, compared with women in the lowest intake of protein. A randomized test compared the effects of low protein fertility performance (15% of energy) with a high protein diet (30% energy) for weight loss among women with PCOS who have overweight problem (58). here the improvement in the menstrual cycle and reduced androgens circulation as a



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result of a relative improvement in insulin sensitivity was observed for weight loss. But, the protein content of the diet had nothing to do with fertility performance (59). The findings from previous studies to measure the effect of diet on fertility performance in animals matched together. Increased consumption of vegetable protein (soy) was associated with an increase in fertility rates in pigs (60). Insulin response to vegetable protein was lower than response to animal protein in healthy subjects (61). In addition, it was reported that soy protein and fish oil improve insulin sensitivity compared to milk protein in mouse models (62). Another possible mechanism underlying the observed relationships can be differential effect of vegetable and animal protein on circulating levels of IGF-I. Increased levels of free IGF-I may also cause development of PCOS. The most famous reason is anovulation. Holmes et al (2002) reported that animal protein absorption among women showed a positive association with IGF-I levels. However, vegetable protein had no association with this hormone (63). But, in a similar study among men, both absorption of vegetable protein and animal protein showed a positive association with IGF-I levels of blood compared to IGF-I and its binding protein (64).

**Dairy foods**

Chavarro reported that women who used four or more daily servings of milk and other dairy foods indicated equal rate of infertility compared with those women who used one or fewer weekly servings of dairy foods. Important components of milk including calcium, vitamin D, and phosphorus had no effect on fertility (3). One serving of whole milk (milk its fat has been removed) on a daily basis associates with 50% reduction in the risk of ovulatory infertility after potentially intervening factors (65). Cramer and colleagues showed that according to age, fertility in countries where women were taking dairies more than five times a week reduced faster than countries that women were taking dairies less than three times a week (66). Subsequently, Greenlee et al realized that the risk of ovulatory infertility among women who used three glasses milk daily was 70 per cent less than women who rarely consumed milk (67).

**Antioxidants**

The recent data suggest that oxidative stress and low antioxidant status may lead to infertility with known or unknown causes (68). Characteristics associated with reduced fertility such as obesity and increasing age of mothers are associated with increased oxidative stress (69-70). A controlled clinical study showed that women with PCOS, which is a risk factor for infertility in women, had higher CRP serum and lower overall antioxidant status compared with their counterparts healthy women (71). Polak et al reported that women with unexplained infertility indicated lower overall antioxidant status in peritoneal fluid compared to fertile group (8). For women with older age (35 years and older) increased absorption of vitamin E supplement and overall vitamin E resulted in shorter times to successful pregnancy (68).

**ALTERNATIVES****Other vitamins and minerals**

The existing studies have observed no association between vitamin deficiency like vitamin B6, B12 and ovum development. In a study by Fawzi et al on HIV+ women, they found a significant decrease in intrauterine growth restriction, preterm delivery and perinatal mortality receiving high doses of vitamins C, B and E (72-73). In a review study, Rumbold and colleagues compared the effect of vitamin C supplement alone or in combination with other supplements with placebo in fertility. The results showed that the vitamin C supplement group was at risk of increased preterm delivery compared with the control group. But, the effect of vitamin C supplement and vitamin E on the risk of pre-eclampsia has been remained controversial in different studies.



**Bahareh Kamranpour****Several supplements**

Although micronutrient deficiency in women has been identified, usually one or two supplements are given which protect ovum development, sources, development of the nervous system and pregnancy outcomes. The recent studies on the effect of these supplements on fertility is a series of three articles in Food and nutrition journal (74-75). These studies show that low birth weight (SGA) significantly decreased among women intake these supplements (Bulletin) compared with control group who received iron-folate. In another study, Unimmap supplements indicated a comparable effect with iron-folate supplement in respect for maternal anemia (75). A randomized study on multivitamin supplements (vitamin B complex, C and E) showed that a single dose recommended dietary allowance (RDA) has the similar function of multiple RDA doses for reducing the risk of unwanted pregnancy outcomes among HIV infected women (76).

**Supplementation**

The usual approach to improve micronutrient status during pregnancy is used for iron and folic acid supplementation (84). We need more research on the routine use of MMS during pregnancy in developing countries. Precisely, before these supplements can replace iron-folic acid supplements which have been used for decades.

**Fortification**

This can be an alternative strategy to provide essential micronutrient through fortification of staple foods or other products. Fortification with iron increases hemoglobin levels in women of childbearing age and during their pregnancy (77). Until March 2009, approximately 30% of wheat flour had been fortified all around the world and 57 countries set in force the instruction for fortification of one or more types of flour with iron or folic acid (UNICEF). Although, many foods such as fats, oils and margarine have been fortified for several years in some countries, this approach has not been implemented in many low-income countries. It's not clear whether food fortification program must be voluntary or mandatory, and that who should determine the costs, the government or the private sector or both. Technologically, it matters that the quality of products are maintained and the fortifier factor should have good bioavailability (78).

**Dosage**

The current recommendation for women of childbearing age is daily intake of 60 mg iron, 400 µg folic acid for six months with standard doses. In case the treatment period fails to be completed during pregnancy, the use of supplements should continue until the postpartum period. Or the iron dose should increase up to 120 mg daily during pregnancy (79).

**Reactions**

Constipation is one of the known side effects of high-dose iron supplements. Other side effects of iron include digestive problems like nausea, vomiting and diarrhea. There exist evidences of metabolic reactions between micronutrients such as copper, zinc and iron. Additional iron can reduce the amount of zinc in the body (80-81). Similarly, copper and zinc have such an effect on each other (82-83). Vitamin A deficiency interferes in the body's use of iron and consequently leads to anemia (25).

**CONCLUSION**

Lack of nutrition during pregnancy, either as one deficiency or multiple deficiencies can have important effects on fertility outcomes. Women must consume adequate levels of micronutrients not to be faced with nutritional





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deficiencies at the beginning of pregnancy. Using iron and folic acid supplement are currently recommended for all women of childbearing age in the developing countries. Weekly intake of iron and folic acid supplement should be considered as a strategy to prevent iron deficiency. The weekly supplement should contain 60mg iron in form of ferrous sulfate ( $\text{FeSO}_4 \cdot \text{H}_2\text{O}$ ) and 2800 $\mu\text{g}$  folic acid. Women of childbearing age in developed countries, and wealthy class of the developing countries, are routinely using multiple micronutrient supplements. But use of these supplements (except for iron - folate supplements) is not common in low-income countries. Apart from supplements, nutritional supplement approach, such as the fortification of foods should also be considered. Fortification process can effectively resolve folate deficiency during pregnancy and improve iron status of women of childbearing age. Moreover, with better absorption of micronutrients, it ultimately leads to improved pregnancy outcomes. In each case, fortification cannot deny significance of iron and folate supplement during pregnancy.

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**Table 1. Characteristics and results of studies on the relationship between micronutrients ad infertility among women**

Reference	Procedure	Results
(7)	112 womenwithunknowninfertility, tubalinfertility,versushealthy women	Lower levelsof seleniumandglutathione peroxidasein patientswithunexplainedinfertility
(8)	53 women withfertilitydisordersversus13healthy women	Total AntioxidantStatusinPatientswithunexplainedinfertility
(9)	50 women withinfertilityof unknownagainst50 healthy women	Higher levels ofserumMDA andHcysininfertile patients
(10)	Supplementwithmagnesiumand seleniumin infertile women	100%of infertilepatientsbecame pregnant over 8 months
(11)	NACsupplementsin combination withclomiphene citratein infertile women	No significant differencewas seenwithNACsupplements
(12)	Supplementationwithvitamin cand Ein infertile women	There wasnosignificant difference inthe pregnancy rate
(6)	Supplementsof vitamin Ein combination withclomiphene citratein infertile women	Increase inendometrialthicknessinvitamins





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(13-14)	metabolism genes changes with folate in unexplained infertility	significant difference in Heterozygous genotype frequency between infertile and control patients
(15)	Of 677 C>T mutation in the MTHFR gene in ovarian responder-FSH	lower r-FSH in patients with homozygote C 677 was needed
(16)	Folic acid supplementation in IVF	The higher the degree of oocyte maturation in vitamins
(3)	Supplement with multivitamins and the risk of ovulatory infertility	RR = 0.59 for women who used the pills weekly for six months or more
(17)	Iron absorption associated with ovulatory infertility	RR = 0.53 for women with the highest quintile of total absorption of iron
(17)	prevalence of vitamin D deficiency in 1192 infertile patients	68.6% and 22.2% of patients, respectively, were inadequate and deficient
(18)	relationship between serum vitamin D levels and IVF outcomes	Each ng / ml increase in 25 (OH) -D levels in follicular fluid was associated with a 6 percent increase in clinical pregnancy

(Abbreviations: NAC= N-acetylcysteine ,IVF= In vitro fertilization, MDA=malondialdehyde, Hcys) (homocysteine)





## RESEARCH ARTICLE

## Effect of Nitrogen Rates on Agronomical Traits of Rapeseed under Different Irrigation Regimes

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### ABSTRACT

This research was conducted in order to investigate the effect of nitrogen rates on agronomical characteristics under different irrigation regimes at two agronomical years (2013-2014 and 2014-2015) in Qazvin, Iran. A factorial experiment was combined analyzed as base of RCBD in 3 replications. Results showed that irrigation, nitrogen and their interaction had significant effect on grain yield. The mean comparison of irrigation and nitrogen interaction demonstrated that the most grain yield was observed in normal irrigation and the least value related to cut off irrigation at flowering stage. Results showed that with elevate the nitrogen level until 160 kg/ha under normal irrigation regime, grain yield was significantly increased. However, in this situation there was no significant difference between 120 and 160 kg/ha nitrogen treatments. Results also revealed that increasing nitrogen rates until 120 kg/ha under cut off irrigation at both flowering and stemming stages resulted to increase grain yield and then it slightly decreased.

**Keywords:** Irrigation regime, Nitrogen rate, Rapeseed, Grain yield

### INTRODUCTION

Brassica is a remunerative genus within the family *Brassicaceae/Cruciferae* (Savicet *al.*, 2009). Rapeseed (*Brassica napus* L.) is considered as one of the most important oil seeds in the world such that after soybean and oily palm, it is the third source of the vegetable oil (FAO, 2007). Limited irrigation controls soil water deficit at certain stages of crop growth and is a very important practice in recent years in place where water resources are limited (Fabeiro et al.,



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2002). Richter et al., (2010) reported that rapeseed (*Brassica napus*) oils differing in cultivars and sites of growth. Naeemi et al. (2007) concluded that withholding irrigation treatment decreased secondary branches number (8%), silique number per plant (31%), grain yield (29%) and oil yield (28%), whereas had not significant effect on plant height, silique height and 1000 seed weight.

Canola is nitrogen demanding crop plant. Nitrogen plays vital role in its healthy growth and is one of the main precursors of protein which absorbs in the form of mineral, ammonium or nitrate by canola plant like the other crops (Hopkins and Hunter, 2004). Hocking and Strapper (2001) reported a linear correlation in increasing seed and oil yield with an increased level of nutrient availability. Ali et al. (1990) observed that the number of pods in sub-branch and total number of pods in plant showed an increasing trend with increased in levels of nitrogen. Therefore, the aim of this study was evaluate the effect of nitrogen amounts on agronomical attributes under different irrigation regimes in Qazvin area.

**MATERIALS AND METHODS**

This study was done within two agronomical years(2013-2014 and 2014-2015) in Ismael Abad Research Station, Agricultural and Natural Resources Researches Center, Qazvin, Iran. The site of conducted experiment was latitude 36N and longitude 16E with an elevation of 1285 m above the sea level. Mean precipitation per year was 320-310mm and Mean temperature per year was 9.13°C. The experimental soil was silt-loam textually with pH of 7.9-8 which was slightly alkaline and EC of  $1-1.39^3 \times 10 \text{ ds m}^{-1}$ .

Two factorial experiments separately during two years as based on randomized complete block design with three replications and it was analyzed conducted based on combined analysis. Experimental treatments included: irrigation regimes in 3 levels (I<sub>1</sub>: normal irrigation, I<sub>2</sub>: cut off irrigation at flowering stage and I<sub>3</sub>: cut off irrigation at stemming stage) and nitrogen rates in 5 levels (N<sub>1</sub>: 0, N<sub>2</sub>: 40, N<sub>3</sub>: 80, N<sub>4</sub>: 120, and N<sub>5</sub>: 160 kg/ha from urea source) were considered.

The seeds used in this study were cv. Okapi. Before implementing the map of soil was sampled soil test results (Table 1). The sowing dates were 9 and 11 October for first and second years, respectively.

Pods were harvested at 15-16 June (first year) and 18-19 June (second year), When downside of the Pods turned to brownish yellow. In this stage seeds had 14 percent of moisture. In this result measuring, the characteristics included of: biological yield, grain yield, oil percent, grain oil yield, and harvest index. Data were subjected to analysis of variance (ANOVA) using the Statistical Analysis System SAS computer software at  $P < 0.01$  (SAS, 2001) and significant treatment means were separated by DMRT.

**RESULTS AND DISCUSSION**

Result of ANOVA showed that the effect of irrigation, nitrogen and their interaction were significant effect on biological yield of rapeseed (Table 2). The mean comparison of irrigation and nitrogen interaction revealed that consumption of 160 kg/ha nitrogen under normal irrigation with mean of 12740 kg/ha had the most biological yield. In terms of cut off irrigation at flowering and stemming stages, the increasing nitrogen application until 120 kg/ha caused to increment of biological yield and then it decreased with elevating consumption of nitrogen rate. These results also indicated that there was more difference among nitrogen levels under normal irrigation than cut off irrigation at both flowering and stemming stages (Table 3).

There was found the significant difference among irrigation, nitrogen and their interaction on grain yield (Table 2). The mean comparison of irrigation and nitrogen interaction demonstrated that the most grain yield was observed in





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normal irrigation and the least value related to cut off irrigation at flowering stage. Results showed that with elevate the nitrogen level until 160 kg/ha under normal irrigation regime, grain yield was significantly increased. However, in this situation there was no significant difference between 120 and 160 kg/ha nitrogen treatments. Results also revealed that increasing nitrogen rates until 120 kg/ha under cut off irrigation at both flowering and stemming stages resulted to increase grain yield and then it slightly decreased (Table 3).

Result of variance analysis showed that effect of irrigation, nitrogen and their interaction were significant on oil percent of rapeseed (Table 2). The mean comparison of irrigation and nitrogen interaction showed that normal irrigation had the highest oil percent and cut off irrigation at stemming stage had the lowest oil percent. The difference in oil percent is due to reduce the duration of growing period under cut off irrigation at stemming stage. The results also revealed that oil percent was increased until 40 kg/ha nitrogen rate under normal irrigation and then the oil percent was decreased with consumption of nitrogen until 160 kg/ha. In situation of cut off irrigation at flowering the oil percent was almost constant and oil percent was decreased only in 160 kg/ha nitrogen rate. In cut off irrigation at stemming stage, oil percent declined with application of 40 kg/ha nitrogen rate and then it had decreasing trend with increase nitrogen rate until 160 kg/ha, so that 160 kg/ha nitrogen rate had the least oil percent into grain (Table 3).

The result of ANOVA revealed that irrigation, nitrogen and their interaction had the significant effect on grain oil yield (Table 2). The mean comparison of irrigation and nitrogen interaction demonstrated that normal irrigation regime had the highest grain oil yield and the least value belonged to cut off irrigation at flowering stage. The oil yield was increased by elevated nitrogen amounts under normal irrigation. However, there was not found significant difference between 120 and 160 kg/ha nitrogen rates under normal irrigation regime regarding to oil yield of grain. In terms of cut off irrigation at flowering and stemming stages, the increase oil yield up to 120 kg/ha nitrogen rate occurred and then increasing nitrogen rate reduced oil yield of grain (Table 3).

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**Table 1. Physical and chemical properties of experimental soil before planting**

Depth (cm)	O.C. (%)	N (%)	P (ppm)	K (ppm)	Texture	pH	EC (ds/m)
0-30	0.80	0.1	11.2	308.5	loam	8.00	1.00

**Table 2. Analysis of variation for the studied traits**

S.O.V	D.f	Biological yield	Grain yield	Oil percent	Grain oil yield
year	1	41338.181 ns	66.260	1.406	628.093
Replication (year)	4	1262886.119	1057109.590	1.089	146746.084
irrigation	2	64147477.381 **	12984591.942 **	40.081 **	2110472.107 **
Irrigation × year	2	70747.668 ns	19454.740 ns	0.291 ns	1764.709 ns
Nitrogen	4	35593826.439 **	743660.740 **	0.052 **	945194.523 **
Year × nitrogen	4	74489.095 ns	723.710 ns	0.111 ns	161.724 ns
Irrigation × nitrogen	8	3873102.603 **	564831.140	0.963 **	75806.440 **
Year × irrigation × nitrogen	8	76328.103 ns	41740.064 ns	0.169 ns	558.020 ns
Error	56	332900.570	63102.920	0.330	8430.527
CV	-	6.85	10.76	1.56	10.68

\*\*Significant at 0.01 level, \*Significant at 0.05 level and ns: Non-significant

**Table 3. The mean comparison of irrigation and nitrogen interaction on studied traits**

Irrigation regime	Nitrogen rates	Biological yield		Grain yield		Oil percent		Grain oil yield	
<b>Normal</b>	0	7232	Ghi	1795	Hi	37.85	B	675	Ef
	40	85011	De	2258	Def	39.15	A	880.4	Cd
	80	9797	C	3409	B	38.7	A	1310	B
	120	11790	B	3780	A	37.71	B	1424	Ab
	160	12740	A	4054	A	36.53	Cde	1479	A
<b>Cut off at flowering stage</b>	0	6553	I	1114	K	36.78	C	402.7	G
	40	7434	Fgh	1499	Ij	36.74	Cd	556.9	Fg
	80	8497	De	1962	Fgh	36.64	Cd	734.1	De
	120	9146	Cd	2211	Efg	36.76	C	835.1	Cde
	160	9061	D	2086	Efgh	36	Def	769.2	Cde
<b>Cut off at stemming stage</b>	0	5784	J	1431	JK	35.83	Ef	524.6	Fg
	40	6715	Hi	1904	Gh	36.22	Cdef	691.8	Ef
	80	7409	Egh	2323	Cde	36.1	Cdef	831.3	Cde
	120	8066	Ef	2623	C	35.64	F	930.6	C
	160	7678	Fg	2567	Cd	34.69	G	891.7	Cd

Means within the same column and rows and factors, followed by the same letter are not significantly difference (P <0.05).





## RESEARCH ARTICLE

## Effect of Organic Fertilizers, Biological and Chemical Corn and Grass Peainter cropping on yield of Forage

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### ABSTRACT

In order to evaluate the effect of organic fertilizers, biological and chemical corn and Grass pea intercropping on yield of forage Factorial experiment in a randomized complete block design with three replications in a farm at 2012-2013 and 2013-2014 years in both Qazvin, Iran was conducted. Treatments consisted of four cultivation levels: corn, grass pea intercropping of maize increased by 25 % (Density of pure grass pea) , intercropping corn and Grass pea increase of 50% (density of pure grass pea) and grass pea net, four levels of fertilizer: Chemicals (basic and top dress in two stages according to soil test), Cow manure (base) and kitchen manure of top dressing two times with corn and grass pea seed and inoculation with Azotobacter and use mycorrhizae in the cultivation location, Cow manure (base) and chemical top dress in two stages, Along with corn and grass pea seed inoculation with Azotobacter and culture in the context mycorrhiza, and cow manure (base) and chemical (top dress first stage one month after planting and the second stage two months after planting to spraying) Along with corn and grass pea seed inoculation with Azotobacter and mycorrhizae were location of cultivation. Combined analysis of the interaction of fertilizer and cultivation levels was significant on seed yield characteristics and silage corn, grain, forage and grass pea harvest index. The comparison showed the results of the interaction of fertilizer and cultivation levels. The highest average yield of 979.27 grams per square meter of treated 25% grass pea corn, of chemical spraying chemical manure, The highest forage yield an average of 8423.16 grams per square meter of treated 25% grass pea Corn chemical manure, The average yield of 140.05 grams per square meter of treated grass pea, pure grass pea chemical manure and The highest forage yield an average of 4602.16 grams per square meter treatment pure grass pea chemical manure. The





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results of this study generally to reduce the use of chemical fertilizers in terms of environmental and increase the level of health, fertilizers of natural origin and intercropping is recommended

**Keywords:** intercropping, fertilizer, chemicals, corn, Grass pea, forage production

## INTRODUCTION

Forage plants important in the production of the human protein needs and providing raw materials to clothing. Given the number of livestock in the country, the need to produce forage for their food supply is essential. According to production and the need for forage, fodder shortage in the country there. This increases the intensity of grazing pressure on pastures and therefore excessive degradation, soil erosion and eventually desertification (Chaichi and Jahanian, 2005). One of the solutions proposed to solve this problem, Development of forage crops And the identification, cultivation and use of forage plants is new. For years, forage plants have been operated as a single cropping. The use of mixed cropping pattern and determine the most suitable for the cultivation of forage plants Effective step for the preservation and sustainable development of natural ecosystems. Culture and water resources better mix of uses, higher performance intercropping system of more complete use of natural resources is to monoculture (Agindo, 2003). In recent decades, the use of chemical inputs in agriculture has caused numerous environmental problems such as water pollution, quality of agricultural products and reducing soil fertility is (Sharma 2002). In fact, fertilizer biological material includes free-living micro- organisms that can convert the nutrients in the form of inaccessible biological process and lead to the development of the root system and seed germination are better (Vessey, 2003). In intercropping of maize and beans under water stress was observed that the inoculation with Rhizobium and mycorrhiza fungi, the highest yield is obtained, and the plants can better withstand drought conditions (Sharma 2002). Solomon et al. (2002) in sandy soils and poor Egyptian bean and wheat seeds to inoculation with Azotobacter and were mycorrhiza and relatively good performance for both plants found And concluded that poor soil fertility, bio fertilizer addition , yield also improve plants that have been inoculated with them. Maize (*Zea mays*) plant corn one year, single- family base and cross pollination of grasses, one of the world's most important crops. The highest crop after wheat and rice cultivation area of grain and its economic importance is obvious to everyone (Anonymous, 2002) Because all its parts, including seeds , shoots and leaves, and even the cob and equitably used - be and in human nutrition (25-20%), feeding livestock and poultry (75-70%), pharmaceutical industry (5%) has many uses . The old power plant due to high adaptation to different climate is spread all over the world And the efforts and the efforts of plant breeders, resistant varieties adapted to different climatic conditions is possible that the extent of cultivation has increased, So that the producing countries of corn in six countries (US, China, Brazil, Mexico, France, Argentina) 75 percent of the world have (Anonymous, 2002). Maize is not native to Iran due to ecological and climatic conditions required for the plant to comply with the climate of great potential for the development of its culture (Nurmohammady et al., 2001). Grass pea plant with the scientific name *Lathyrus sativus* the annual belong to the legume family (*Fabaceae*) is Grasspea with annual and perennial species that often grows sleeping and sometimes elevated. Some *L. palustris* and *L. hirsutus* grass pea such as crop beans for animal feed and human food, such as *L. sativus* and having a large and beautiful flowers used for decoration. (example. *odoratus*) and the rest used as green manure (Muehlbauer and Tullu, 1997). Economically important species, including *Lathyrus cuera* and *L. tingitanus* and *L. ochrus*, *L. sylevstris*, *L. latifolius* are forage species. Grass pea can be used as human food is the very delicious. The seeds are a good source of protein (30-26%) and iron and vitamin B is richer than other legumes (Spencer et al., 1986; Cocks et al., 2000) it is also low in fat and high in lysine and cystine and methionine containing adequate amounts of amino acids than is. But as a source of protein in feed for ruminants full Grass pea and poultry and can be used for hay, green fodder and hay to feed his cattle and sheep. Also is the nutritional value of the hay 0.75.

Grasspea fed lambs weighing about 100 to 130 grams per day had increased. The Cerci & ozer (1993) stated that the replacement of Grass pea seeds instead of soya in the diet of lambs increased food intake and nutrient digestibility



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coefficients (Hojabri et al. 1999). *Lathyrussativus* as a forage crop grown cold climates, and if mixed with grains of family plants to be cultivated, the quality will be better (Hojabri et al., 1999).

**MATERIALS AND METHODS**

The experiment in the edge city Alborz province at 5.5 km East Qazvin (geographic coordinates 36 degrees 13.8 minutes north and 50 degrees 4 minutes east with an altitude of 1268 meters above sea level ) in a factorial design randomized complete block on 3 replications at 2012-2013 was conducted in the summer of arable crop year 2013-2014. Treatments consisted of four cultivation level: corn, grass pea intercropping of maize increased by 25 % ( Density of pure grass pea), intercropping corn and Grass pea increase of 50 % ( density of pure grass pea) and grass pea net, four levels of fertilizer :Chemicals ( basic and top dress in two stages according to soil test), Cow manure (base) and kitchen manure of top dressing two time With corn and grass pea seed and inoculation with Azotobacter And use mycorrhizain the cultivation location ,Cow manure (base) and chemical top dress in two stages , Along with corn and grass pea seed inoculation with Azotobacter and culture in the context mycorrhiza, And cow manure (base) and chemical ( top dress first stage one month after planting And the second stage two months after planting to spraying) along with corn and grass pea seed inoculation with Azotobacter and mycorrhizawere location of cultivation. The approximate dimensions of 60 × 60 m on a land area of approximately 3,600 m<sup>2</sup> was carried out. In the treatment of pure Grass pea, *Lathyrussativus* two rows of corn growing on the stack, a row of corn grown on the stack. A row of corn and Grass pea intercropping treatments a row on the stack is grown as forage Ns640 hybrid.the growing period of 90 days and 90-75 days during the growing season was the Grass pea . The culture of the plant (the plant spacing and constant distance between the rows of crops to 75 cm was carried out.Corn density of 8.5 plants per square meter, depending on the mix net grass pea 100 per square meter and an increase of 25 and 50 plants per square meter, respectively. The basic fertilizer and top dress test the soil, the amount of fertilizers and plant food and was estimated According to the map, plot plan is in the middle of the stack after the appropriate slots on the base of livestock manure (One third of the base) or chemical (one third of the base) and use the band was on its soil. The grooves on both sides of the border stack , corn on the sidelines of the right treatment , the treatment of mixed cultures ( corn - *Lathyrussativus* ), corn and Grass pea left right stack (net *Lathyrussativus* ) seeds according to density requirements set out in both sides of the stack with a depth of about 3 cm was killed . In all treatments (except for treatment of chemical fertilization and road base , corn and Grass pea seeds were inoculated with bacteria and fertilizer azotobactermycorrhiza) one hundred kilograms per hectare ) After calculating the necessary amount of tracks, the location and distance of the seeds after a little Placement of the soil and then drilling was carried out , including fertilization road . The data were entered into an Excel file and documented statistical calculations based and analyzed factorial experiment comparing the average variance with Duncan's multiple range test at 5% using SPSS, MSTAT-C and SAS.

**RESULTS AND DISCUSSION****Corn grain yield**

Analysis of combined grain yield showed that the effect of these traits was not significant, but fertilizer, crop patterns and interaction in this trait were significant at 1% (Table 1). The results showed that the highest yield fertilizer compared with the average 934.08 grams per square meter of treated livestock and poultry lowest average yield of 779.60 grams per square meter of chemical spray were treated animals (Table 3). Comparison of the results showed that the highest levels of culture, with an average yield of 934.62 grams per square meter of treated corn, Grass pea (50%) and the lowest yield of 797.60 grams per square meter of treated corn, Grass pea , with an average 25 %, respectively (Table 4).

The results mean the interaction of fertilizer and planting patterns showed that the highest yield with an average of 979.27 grams per square meter of treated corn, Grass pea chemical spraying and the lowest 25% of livestock with an average yield of 660.67 grams per square meter of corn animal treatment chemical spraying respectively (table 2).



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Research has shown that in most cases intercropping of forage plants produce more performance than a single crop its application potential damage caused by pests and diseases reduced and makes maximum use of water resources, soil conservation and soil and also because of the coverage, it provides (Dileep et al 2001). Intercropping yield of compatible plants together that deals more, always more than monoculture of the plants. This is a further reduction of competition and compatibility between them by Tremblay (Kochaki et al., 2001).

**Corn forage yield**

Analysis of combined yield showed that the effects of these traits was not significant, but fertilizer, crop patterns and interaction in this trait were significant at 1% (Table 1). Comparison of the results showed that the highest forage yield an average of 8016.9 grams of fertilizer per square meter of chemicals and chemical treatment lowest forage yield an average of 7254.4 grams per square meter of chemical spray were treated animals (Table 3). The results indicated that the cultivation of forage yield compared with an average of 7813.7 grams per square meter of treated corn forage yield and the lowest with an average of 7260.2 grams per square meter of treated corn, Grass pea 25 %, respectively (Table 4). The results mean the interaction of fertilizer and planting patterns showed the highest forage yield an average of 8423.16 grams per square meter of treated corn, Grass pea livestock 25 % Chemical And the minimum weight of 6716 g of corn silage with an average 25 % of animal Grasspea chemical spraying were obtained (Table 2). Unlike monoculture intercropping systems that increase only by high energy costs and the resulting tremblay, an appropriate tool for crop production (Mondal et al, 1996). Although the components of the mixed culture is controversial among researchers, but they believe that the quantity of production to net culture is increased (Hayder, et al, 2003; Jurik and Van, 2004; Mandal, et al, 1996; Nsernice, 1997)

**Corn harvest index**

HI indicates the distribution of assimilates between economic performance and yield is similar to the distribution index. Assimilate to destinations metabolic drug users (for example, roots, stem new, developing fruit) is extremely complex. The results showed that the effects of years of combined harvest index, and the interaction was not significant as fertilizer and planting pattern on fertilizer levels, cultivation patterns in this trait were significant at 1% (Table 1). Compare the results of combined analysis showed that the main effects of fertilizer levels on average 12.59 % of the treated animal avian highest harvest index (HI) and the least with an average 10.99 % of chemical treatment chemicals were obtained (Table 3). Comparison of the results showed that the highest levels of planting an average of 12.13 % of the treated corn, Grass pea harvest index 50% and the lowest harvest index of corn treated with an average of 11.07 Grasspea 25%, respectively (Table 4). Mana and Singh (2001) the pilot announced that due to the optimum use of available resources is an advantage of mixed cultures, different components of the mixture in the use of resources, increasing the efficiency of their use of resources. In many experiments, intercropping, components of a mixture of legumes and grasses comprise the majority of the performance is superior to monoculture.

**Grasspea grain Yield**

Analysis of combined grain yield showed that the effects of these traits were not significant. Fertilizer, cropping patterns and interaction in this trait were significant at 1% (Table 1). Results showed that mean levels of fertilizer the highest average yield of 90.33 grams per square meter animal treatment chemicals and the lowest average yield was 52.01 grams per square meter of treated chicken manure (Table 3).

Comparison of the results showed that the highest levels of culture, with an average yield of 87.06 grams per square meter of net Grasspea treatment and the lowest average yield of 34.86 grams per square meter of treated corn, Grass pea 25%, respectively (Table 4). The results mean the interaction of fertilizer and planting patterns showed that the highest yield with an average of 140.05 and the lowest chemical treatment of animal Grasspea 90.88 average yield of Grass peatreatment chemical manure was applied (Table 2)



**Mohammad Shahbaghi et al.****Grass pea forage yield**

Analysis of combined yield showed that the effects of these traits was not significant Fertilizer, cropping patterns and interaction in this trait were significant at 1% (table 1) The results showed that mean levels of fertilizer The highest performance with an average of 1886.61 grams per square meter of treated animal feed, chemical and lowest forage yield an average of 1387.96 grams per square meter of chemical spray were treated animals (Table 3). The results indicated that the cultivation of forage yield compared with an average of 3672.1 grams per square meter of treated net and little Grass pea forage yield an average of 378.186 g square meters of Grass pea corn 25 %, respectively (Table 4).The results mean the interaction of fertilizer and planting patterns showed that the highest yield of forage with an average of 4602.16 and the lowest chemical treatment of animal Grasspea corn forage yield an average of 90.88 Grasspea treatment was 25 % pure chemical trap (Table 3).

**HI Grasspea**

HI to biomass production than before pollination and remobilization of assimilates produced before pollination depends on the relationship between economic performances. In other words, the performance showed biological HI. The results of combined analysis showed that effects of the seed weight was not significant as fertilizer levels, cropping patterns and interaction in this trait were significant at 1% (Table 1). Comparison of the results showed that the highest levels of fertilizer and harvest index average 13.48 % of the treated animals and the lowest harvest index, with an average 5.27 percent foliar application of chemical treatment chicken manure, respectively (Table 3). Comparison of the results showed that the highest levels of culture, with an average of 13.51 % of the treated corn, Grass pea harvest index 25 % and the lowest harvest index by an average 22.2 percent of group net *Lathyrussativus*, respectively (Table 4). The results mean the interaction of fertilizer and planting patterns showed that the highest harvest index of corn treated with an average of 25.40 with 25% of livestock Grasspea chemical spraying And the lowest harvest index with an average of 1.42 out of pure animal bird Grass pea treatment were obtained (Table 2) the performance of a plant can be increased by increasing the share of total dry matter production on the farm or economic performance, or both increase (Table 2) The evaluation of intercropping of maize Grasspea.

**Land equivalent ratio (LER)**

In order to determine intercropping systems while having high biological efficiency, is also relevant to the performance requirements of the standard land equivalent ratio was used. In determining the standard land equivalent ratio for different treatments, pure and it is used for maximum performance.

The results showed that the highest land equivalent ratio in terms of grain yield (in intercropping corn and Grass pea) with mean of 1.48 from treatment of corn, Grass pea, 50% livestock chemical spraying and the lowest with an average of 0.79 from corn Grasspea 25 % chemical chemicals were obtained (Table 5).

The results showed that the highest proportion of land equivalent in terms of biological function Maize (corn and Grass pea intercropping on) with mean of corn, Grass pea from treatment of 1.15 50% minimum average 0.81 livestock and poultry manure from treated corn, Grass pea chemical spraying 25 % , respectively (Table 5).

The results showed that the highest land equivalent ratio in terms of yield *Lathyrussativus* (in intercropping corn and Grass pea) with mean of 1.45 from treatment of corn, Grass pea 50 %, chemicals and chemical lowest with an average of 0.23 from treated corn, Grass pea , 25 % livestock chemical spraying were obtained (Table 5).





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The results showed that the highest land equivalent ratio in the forage *Lathyrussativus* (in intercropping corn and Grass pea) with mean of 0.78 from treatment of corn, Grass pea 25% of chemicals and chemical lowest with an average of 0.02 from treated corn, Grass pea 25 % livestock chemical spraying were obtained (Table 5).

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**Table 1. The mean comparison of maize – Grass pea characteristics**

S.O.V	D.f	Grass pea HI	Grass pea forage yield	Grass pea grain yield	Maize HI	Maize forage yield	Maize grain yield
Year	1	0.0393ns	162.9ns	26.402ns	0.00067ns	2126.61ns	11.24ns
Replication × Year	4	0.9213	7542.6	67.963	6.2940	10313743.57	29315.71
Fertilizer	3	218.246**	81759.9**	5712.13**	9.9207ns	2274199.59**	74544.82**
Fertilizer × Year	3	0.0297ns	0.4ns	0.424ns	0.0026ns	6485.09ns	30.98ns
Culture combination	2	829.006**	81867252**	17148.65**	7.5868**	2661535.69**	112747.99**
Culture combination × Year	2	0.8123ns	7.2ns	0.364ns	0.0022ns	5919.22ns	31.152ns
Fertilizer × Culture combination	6	196.52**	1559065.1**	43338.27**	23.4079ns	1699950.71**	55311.63**
Fertilizer × Culture combination × Year	6	0.0085ns	1.5ns	0.495ns	0.00128ns	5115.36ns	31.876ns
Error	44	3.632	6432.1	211.560	1.0712	231291.34	520.58
C.V (%)	-	21.61	4.88	22.62	0.078	6.29	2.63

\*\*and \* significant at 1 and 5 %, respectively; ns non-significant

**Table 2. The mean comparison of maize – grass pea**

Grass pea HI (%)	Grass pea forage yield (g/m <sup>2</sup> )	Grass pea grain yield (g/m <sup>2</sup> )	Maize forage yield (g/m <sup>2</sup> )	Maize grain yield (g/m <sup>2</sup> )	Treatments
1.42e	3002.83c	42.88d	7071.50cd	925.625bc	Maize – net grass pea – chicken - animal manure
7.65d	619.16e	39.7d	7178.33cd	935.79bc	Maize – grass pea 25% - chicken – animal manure
6.73d	1091.16d	73.41bc	8077.03ab	940.83ab	Maize – grass pea 50% - chicken – animal manure
1.81e	369.66b	66.88c	8190.26ab	958.66ab	Maize – net grass pea - chemical -chemical fertilizer
14.22bc	301.00f	42.61d	7787.50abc	764.36d	Maize –grass pea 25% - chemical -chemical fertilizer
6.26d	1181.83d	74.03bc	8073.00ab	894.75c	Maize –grass pea 50% - chemical -chemical fertilizer





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3.05e	4602.16a	140.50a	7804.16abc	933.7bc	Maize – net grass pea – animal manure - chemical fertilizer
6.80d	501.66e	34.00d	7358.50bcd	791.40d	Maize –grass pea 25% - animal manure - chemical fertilizer
17.35b	556.00e	96.50b	8423.16a	923.65bc	Maize –grass pea 50% - animal manure - chemical fertilizer
2.61e	3751.83b	98.00b	8188.75ab	660.67f	Maize –net grass pea - spraying animal manure -chemical fertilizer
25.40a	90.88g	23.08d	6716.50d	698.87e	Maize –grass pea 25% - spraying animal manure -chemical fertilizer
12.45c	321.16f	39.83d	6858.00d	979.27a	Maize –grass pea 50% - spraying animal manure -chemical fertilizer

Means within the same column and rows and factors, followed by the same letter are not significantly difference (P <0.05).

**Table 3. The mean comparison of maize – grass pea traits**

Grass pea grain yield (g/m <sup>2</sup> )	Grass pea forage yield (g/m <sup>2</sup> )	Grass pea HI (%)	Maize grain yield (g/m <sup>2</sup> )	Maize forage yield (g/m <sup>2</sup> )	Maize HI (%)	Treatments
52.01b	1571.06c	5.27d	934.08a	7442.3b	12.59a	Chicken– animal manure
61.17b	1724.83b	7.43c	872.52b	8016.9a	10.93b	chemical– chemical manure
90.33a	1886.61a	9.07b	882.97b	7861.9a	11.32b	Animal manure – chemical fertilizer
53.63b	1387.96d	13.48a	779.60c	7254.4b	11.07b	Spraying Animal manure – chemical fertilizer

Means within the same column and rows and factors, followed by the same letter are not significantly difference (P <0.05).





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**Table 4. The mean comparison of maize – grass pea traits**

Grass pea grain yield (g/m <sup>2</sup> )	Grass pea forage yield (g/m <sup>2</sup> )	Grass pea HI (%)	Maize grain yield (g/m <sup>2</sup> )	Maize forage yield (g/m <sup>2</sup> )	Maize HI (%)	Treatments
87.06a	3672.1a	2.22c	869.70b	7813.7a	11.27b	Maize – net grass pea
34.86c	378.18c	13.51a	797.60c	7260.2b	11.07b	Maize – grass pea 25%
70.94b	787.54b	10.70b	934.62a	7857.8a	12.13a	Maize – grass pea 50%

Means within the same column and rows and factors, followed by the same letter are not significantly difference (P <0.05).

**Table 5. The mean comparison of maize – grass pea intercropping**

Treatments	LER (maize biological yield)	LER (maize grain yield)	LER (grass pea biological yield)	LER (grass pea grain yield)
Maize – grass pea 25% - chicken – animal manure	1.01	1.008	0.21	0.91
Maize – grass pea 50% - chicken – animal manure	1.15	1.026	0.32	1.72
Maize – grass pea 25% - chemical – chemical fertilizer	0.95	0.79	0.78	0.77
Maize – grass pea 50% - chemical – chemical fertilizer	0.98	0.92	0.31	1.45
Maize – grass pea 25% - animal manure – chemical fertilizer	0.98	0.86	0.10	0.28
Maize – grass pea 50% - animal manure – chemical fertilizer	1.07	0.98	0.11	0.68
Maize – grass pea 25% - animal manure – chemical fertilizer spraying	0.81	1.04	0.02	0.23
Maize – grass pea 50% - animal manure – chemical fertilizer spraying	0.83	1.48	0.08	0.41





## The Evaluation of Drillability and Support System Type in Western to Southern Part of Mashhad Rock Mass Based on Rmi Classification

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### ABSTRACT

Binaloud mountain range is located in western to southern parts of Mashhad city. This mountain range is mainly composed of metamorphic rocks, ophiolitic complexes and acidic igneous rocks. This paper investigates 3 areas in west to southwest parts of Mashhad city with different rock types. Area number 1 in the west of the city with acidic igneous rocks, area number 2 in southwest of the city with ultrabasic rocks and area number 3 in the west to southwest parts of the city with metamorphic rocks. After rocks study and quality assessment, drillability of the study area was investigated and then rock support system for all three areas was recommended based on RMI classification system. The results show that areas with acidic igneous rocks such as area 1, due to the presence of minerals resistant to weathering, rocks show high quality (RQD) and the drilling type and support system have no significant difference. In contrast, in areas with ultrabasic rocks which have minerals with low weathering resistance such as area 2, rock quality decreases and drilling type as well as support system might be highly variable even in a small area. In rocks with high degrees of weathering such as those found in area 3, due to clay and iron oxide formation, rocks have lost their structure, rock quality is very poor and rock support systems are not usable.

**Keywords:** Rocks of southern Mashhad; Rock quality designation (RQD), Drillability, Rock Mass index (RMI), Support system





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## INTRODUCTION

Rock strength is the most important parameter in any civil engineering project and drilling type, rock support system and many other factors depend on it (Noorbakhshrazmi, 2013). As the results of this paper show, mineral resistance to weathering is one of the main factors which control the drilling method and rock support systems and may highly influence civil engineering activities in an area. In ultrabasic rocks which have minerals prone to weathering, the importance of weathering on rock resistance is much more than of acid igneous rock. Besides from being highly influential on rock strength, drilling methods and support systems, minerals resistance to weathering also affect rock quality designation (RQD) as well.

Southern Mashhad heights have become municipal areas in the recent years and several landslides have occurred due to excavations there. Figure (1) shows an example of excavation failures in Hashemieh neighborhood. Due to the trending high-rise constructions and increase of excavations in this region, there is a high probability of these incidents in the future. Therefore, this paper investigates rock outcrops properties influencing drillability and trench stability in the area.

The study area includes the western and southwestern heights of Mashhad. This area is geologically comprised of acid igneous rocks (in the west), ultrabasic rocks (in southwest) and metamorphic rocks (in southwest to south ), (Alavi, 1991).

## MATERIALS AND METHODS

Three areas with different geology were selected to investigate the engineering properties and drillability of rock outcrops, the location of each area is shown in figure (2). In area 1 in western Mashhad (Vakilabad), rocks are granodioritic, in area 2 in southwestern parts (end of Hashemieh), they are mostly ultrabasic and in area 3 towards south of the city (Rezashahr), rocks are metamorphic. Due to the importance of lithology in rocks drillability, we first assessed the rock type and quality in each area. Then, drillability of the rocks in each area was analyzed and based on RMI classification, appropriate support system was recommended.

### Area (1), western Mashhad (Vakilabad)

This area is located in western Mashhad at the end of Vakilabad Boulevard. Its rocks are mostly granodiorite with abundant plagioclase and quartz content (figure 3). Thin section microscopy of the rock forming minerals almost show no sign of weathering (figure 3,C).

To understand the rock mass quality based on RQD, field joint measurements and prospecting borehole logs of the area (Jahdazmay Consulting Engineers 2012 - 2013) were used to draw RQD variation profile in Rockwork software. Figure (4) shows RQD variation profile for area (1). To compare the profiles equally, first 12-meters of the borehole depth was used for all of the 3 areas.

As shown in figure (4), rock quality in this area is mostly in the medium range and from depth of 10 meters onwards, good to great rock quality is observed.

### Area (2), southwestern Mashhad (end of Hashemieh Blvd.)

Rocks in this area are mostly ultrabasic. Based on thin section microscopy, the main rock forming minerals in this area are serpentine, biotite and sulfur minerals such as pyrite and chalcopyrite (figure 5). Sulfur minerals are oxidized as soon as they encounter open air or when reduction condition changes to oxidation (Babae, 2010). Since





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the area has arid to semi-arid climate, temperature variations can help in the oxidation of sulfur minerals. This oxidation converts one mole of pyrite to two moles of sulfuric acid and two moles of gypsum (Babae, 2010).

Figure (6) depicts the RQD variation profile of this area. It is observed that the superficial parts of the rock outcrops in this area have low RQD and with increasing depth, the rock quality increases. Rocks in this area are generally categorized as poor quality with very few instances of good rock quality.

#### Area (3) southwestern Mashhad towards south (Rezashahrneighborhood)

Rocks in this area are mainly metamorphic (phylite and schist). Based on thin section microscopy, the main rock forming minerals are biotite and chlorite with abundant iron oxides (figure 7). These rocks are highly folded and tectonized and the moisture in the area has caused high erosion which is evident by rock debris in most of the hillsides.

RQD variation profile of this area is shown in figure (8). As depicted in the figure, rocks in this area are in the “very poor” quality range and no high quality rock is observed before the depth of 12 meters.

## RESULTS

### Rock Drillability Assessment in the Area

One of the important issues in civil engineering projects is the prediction of drilling easiness in rocks and rock masses (Noorbakhshrazmi, 2013). There are several methods to determine rock drillability based on geological and geotechnical engineering properties (Noorbakhshrazmi et al., 2014). Siambaus and Sauglou (2010), assessed rock mass drillability using point load index, weathering degree, joint spacing, continuity and openness and GSI classification system. Khamechian et al. (2014) have used RMI system developed by Palmstrom (2000) to assess rock mass drillability in open space and consequently presented a graphical chart for drillability assessment (figure 9). RMI is a volumetric parameter that shows rock mass uniaxial compressional strength. Input parameters of this system include: block size, joint properties and intact rock strength (to indicate uniaxial compressional strength) and is defined as the following equation:

$$RMI = \sigma_{ci} \times J_p = \sigma_{ci} \times 0.2 \sqrt{j_c} \times V_b D$$

For jointed rocks:

$$(D = 0.37 j_c - 0.2)$$

$\sigma_{ci}$ ) Intact rock uniaxial compressional strength,

( $V_b$ ) Block size,

( $j_c$ ) Joint condition factor which is derived from joint length ( $j_L$ ), joint roughness ( $j_R$ ) and joint alteration ( $j_A$ ).

$$j_c = j_L \times j_R / j_A$$

$j_L$ ,  $j_R$  and  $j_A$  are standard parameters that determined by Palmstrom (2000).

( $J_p$ ) is the jointing parameter ( $0.2 \sqrt{j_c} \times V_b D$ ) which is variable from 0 (for crushed rock masses) to 1 (for intact rocks).

To predict drillability in this study, Khamechian et al (2014) method was used. First RMI required parameters were measured for the three areas (table 1) using RMI input parameters chart (Palmstrom, 2000). Then the values were plotted in the graphical chart presented by Khamechian et al (2014), (figure 9).

In the mentioned chart, based on drillability, the rock mass was classified into 5 areas as follows:

- Digging
- Ripper (D7)
- Ripper (D8, D9)





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- Hammer

- Blasting

In area (1) where rock are less weathered and the mother rock is granodiorite, more difficult drilling methods are required compared to the other two areas. The recommended drilling methods are blasting in more resistant rocks (1A) and hammer in less resistant ones (1B).

In area (2), ultrabasic rocks have undergone weathering and serpentinization which reduced the intact rock strength and disintegrated the rock mass structure. Serpentinization have made the measurement of intact rock difficult. Several research have been done on this issue such as Cortolus et al. (2012) and Rigopolus et al. (2012). Serpentinization has generally made drilling easier in this area. Therefore, blasting is recommended for the stronger rocks (2A) and ripper for weaker ones (2B).

In area (3), weathering processes have progressed so much that iron oxides have formed red clay soil. Weathering have altered lithological, textural and mineralogical properties and consequently engineering properties of the rocks. As depicted in figure (9), points (3A) and (3B) are plotted outside the drilling zone which indicates that the intense weathering have converted the rocks in this area to soil. Weathering in some boreholes is sometimes as deep as 15 meters.

#### Recommendations on Rock Support Systems in the Region Based On Rmi Classification

In his research, Palmstrom (2000) have presented a method to determine suitable rock support systems. He introduced 2 parameters; ground condition factor (GC) and size ratio (Sr), upon which he presented a chart to determine the suitable rock support system. Using 3D block volume in designing rock support systems has led to more accurate calculations. The above-mentioned parameters are calculated by the following equations:

$$GC = \frac{RM_i \times (SL \times C)}{J_p \times (SL \times C)}$$

$$Sr = CF \times \left( \frac{Co}{Nj} \right) = \left( \frac{Dt}{Db} \right) \times \left( \frac{Co}{Nj} \right)$$

SL: Stress optimization factor (Palmstrom, 2000)

C: Gravity optimization factor (Palmstrom, 2000)

$RM_i$ : Uniaxial compressional strength of the intact rock

$J_p$ : Jointing factor (Palmstrom, 2000)

CF: Wall height to the equivalent block diameter ratio

Dt: Wall height

Db: Equivalent block diameter ( $Db = 3\sqrt{Vb}$ )

Co: Principal joint sets optimization factor (Palmstrom, 2000)

Nj: Joint set number optimization factor (Palmstrom, 2000)

GC: Ground condition factor

Sr: Size ratio.

The calculation results based on the mentioned equations was shown in Table (2).

Figure 10 shows the diagram introduced by Palmstrom (2000) to determine rock support system. The plotted points indicate GC and Sr parameters calculated for the rocks in the region. Based on the chart, suitable support system can be determined for weak and strong rocks in all of the three areas.

Results indicate that in area (1) (Vakilabad) and in stronger rocks, rockbolts with more than 3 meters spacing and in less strong rocks, rockbolts with 2 meters spacing together with 50 millimeters of shotcrete should be used. In area (2) (Hashemieh), rockbolts with 1.5 to 2 meters spacing and 40 to 50 millimeters of shotcrete is recommended for stronger rocks and rockbolts with 1 to 1.25 meters spacing and 100 to 150 millimeters of shotcrete for softer rocks. In area (3) as mentioned before, intense weathering of rocks has disintegrated them to soil which was also confirmed by the fact that the points for this area were plotted outside the chart.





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Comparison among support systems in the three areas also indicates that in acid igneous rocks with resistant minerals such as quartz, rockbolts with large spacing may be used and if necessary, a small amount of shotcrete is sufficient. However, in ultrabasic igneous rocks that have minerals with low resistance to weathering, even in small areas such as area (2), there is a need for rockbolts with 1 to 2 meters spacing in combination with shotcrete variable from low (40mm) to high (150mm) thickness. In metamorphic rocks that iron oxides were abundantly formed due to weathering (such as area (3)), rocks have lost their integrity and rock support systems are not useful anymore.

## CONCLUSION

Rocks studied in this research include acid and ultrabasic igneous rocks and metamorphic rocks of Binaloud heights in western to southwestern Mashhad. In the area with acid igneous rocks (area (1), Vakilabad), due to the presence of weathering resistant minerals such as quartz and feldspars, drilling method and support system type is not much different between rocks with the highest RMI and those with the lowest. Furthermore, RQD in these rocks are considered medium to good to the depth of 12 meters. In contrast, in the area with ultrabasic igneous rocks (area (2), Hashemieh), due to the low resistance of minerals such as serpentine, biotite and sulfur minerals, rocks with high and low RMI are significantly different in terms of drilling method and support systems. The RQD of the rock mass are mainly poor to the depth of 12 meters. In southwest of the city towards south (area (3), Rezashahr), intense weathering of metamorphic rocks (phyllite and schist) has produced large amount of iron oxides in these rocks, disintegrated their structure and converted them to clay soils such that rock drilling and supporting methods are not usable in this area. The RQD of the rock mass in this area shows very poor quality to the depth of 12 meters which indicates the intense crushing of the rocks. The comparison between drillability in these 3 areas shows that besides from the rock type, weathering degree is of utmost importance in civil engineering activities.

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**Table 1.RMi classification system parameters values and their maximum and minimum in each area**

RMi	$\sigma_c$	Jp	Vb (cm <sup>3</sup> )	jc	jA	jR	jL	Condition of Rock	Area	
84	200	0.42	180000	12	1	6	2	strong (RMi <sub>max</sub> )	(1A)	Area (1): (Vakilabad)
8.96	112	0.08	24000	2	2	4	1	Weak (RMi <sub>min</sub> )	(1B)	
16.52	118	0.14	200000	1.5	2	1.5	2	strong (RMi <sub>max</sub> )	(2A)	Area (2): (Hashemieh)
1.56	78	0.02	6000	0.5	2	1	1	Weak (RMi <sub>min</sub> )	(2B)	
0.15	5	0.03	20000	0.5	4	1	2	strong (RMi <sub>max</sub> )	(3A)	Area (3): (Rezashahr)
0.003	1	0.003	4000	0.125	4	0.5	1	Weak (RMi <sub>min</sub> )	(3B)	

**Table 2.Values used for Sr calculations and its maximum and minimum values in each area**

Sr	GC	Nj	Co	Db(cm)	Dt (cm)	RMi	C	SL	Condition of Rock	Area	
10.91	210	0.85	1.5	56.46	350	84	5	0.5	strong (RMi <sub>max</sub> )	(1A)	Area (1): (Vakilabad)
21.37	22.4	0.85	1.5	28.84	350	8.96	5	0.5	Weak (RMi <sub>min</sub> )	(1B)	
13.54	8.26	0.85	1.5	58.48	450	16.52	5	0.1	strong (RMi <sub>max</sub> )	(2A)	Area (2): (Hashemieh)
43.59	0.78	0.85	1.5	18.17	450	1.56	5	0.1	Weak (RMi <sub>min</sub> )	(2B)	
22.7	0.075	0.85	1.5	27.14	350	0.15	5	0.1	strong (RMi <sub>max</sub> )	(3A)	Area (3): (Rezashahr)
38.81	0.002	0.85	1.5	15.87	350	0.003	5	0.1	Weak (RMi <sub>min</sub> )	(3B)	





Figure 1. Excavation failure in metamorphic rocks of Hashemieh neighborhood in Mashhad (24/10/2013)

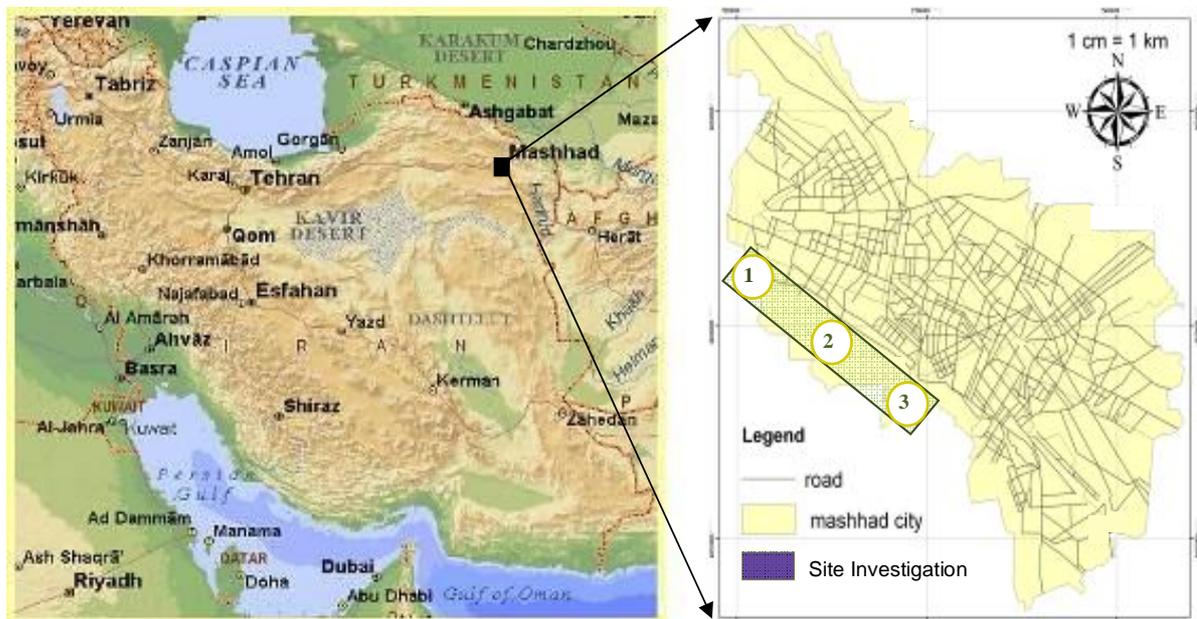


Figure 2. Mashhad map and the three selected areas from west to southwest of Mashhad





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Figure 3. Area (1) rocks: (a) in the area (b) in the hand specimen (c) in microscope section

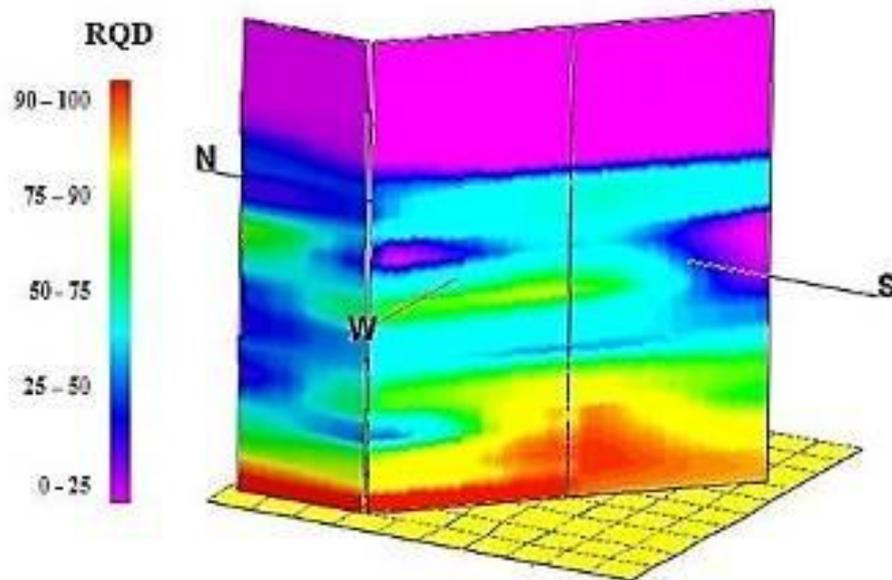


Figure 4. RQD variation profile in area (1)





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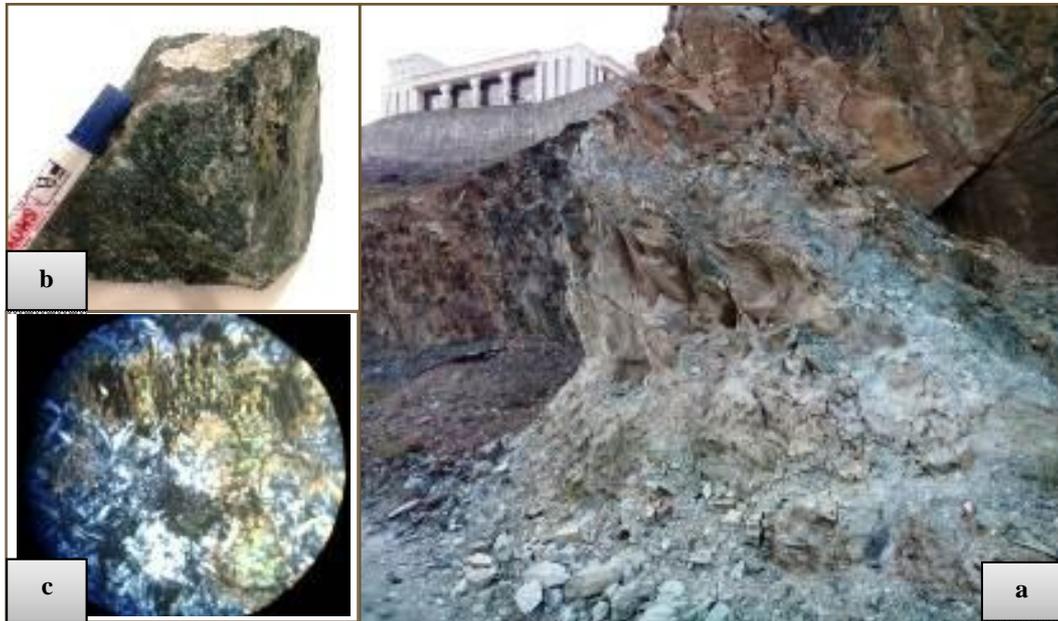


Figure 5. Area (2) rocks: (a) in the area (b) in the hand specimen (c) in microscope section

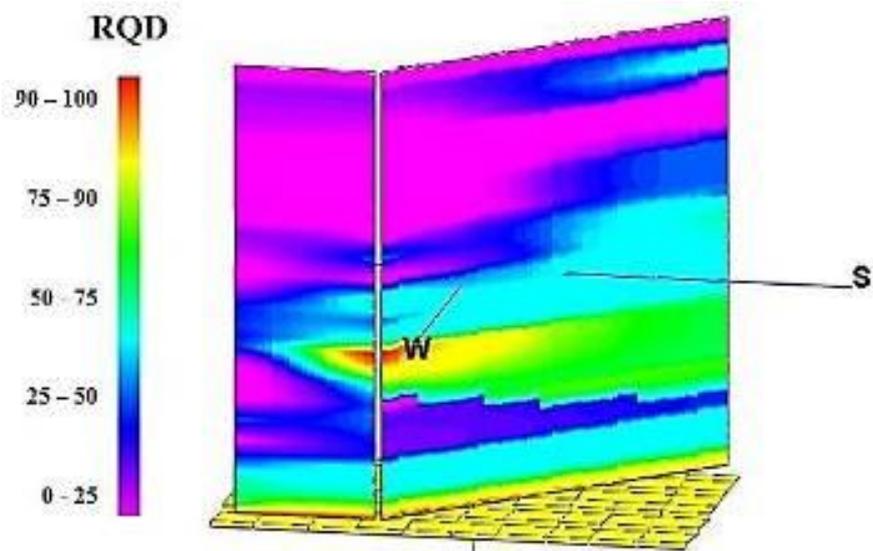


Figure 6. RQD variation profile in area (2)



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Figure 7. Area (3) rocks: (a) in the area (b) in the hand specimen (c) in microscope section

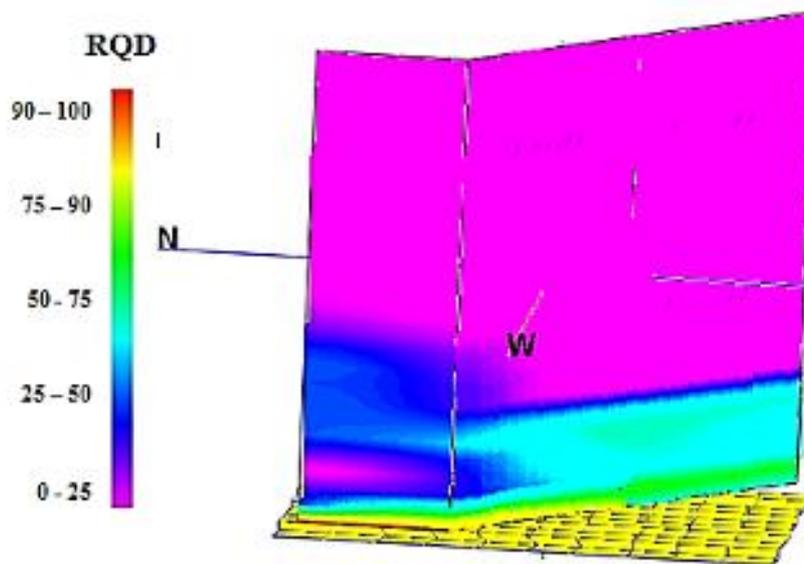


Figure 8. RQD variation profile in area (3)





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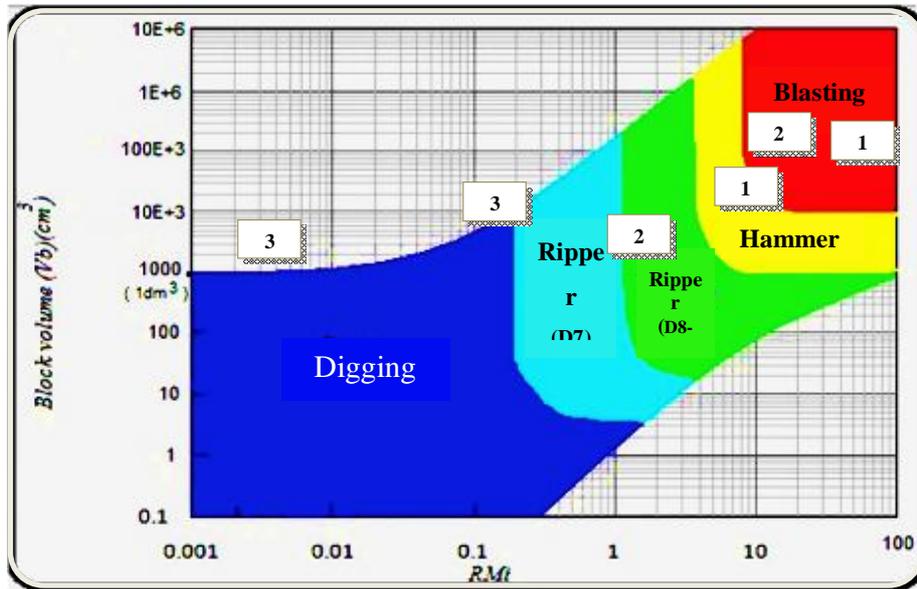


Figure 9. Position of the three study areas in the graphical charts developed by Khamechian et al. (2014)

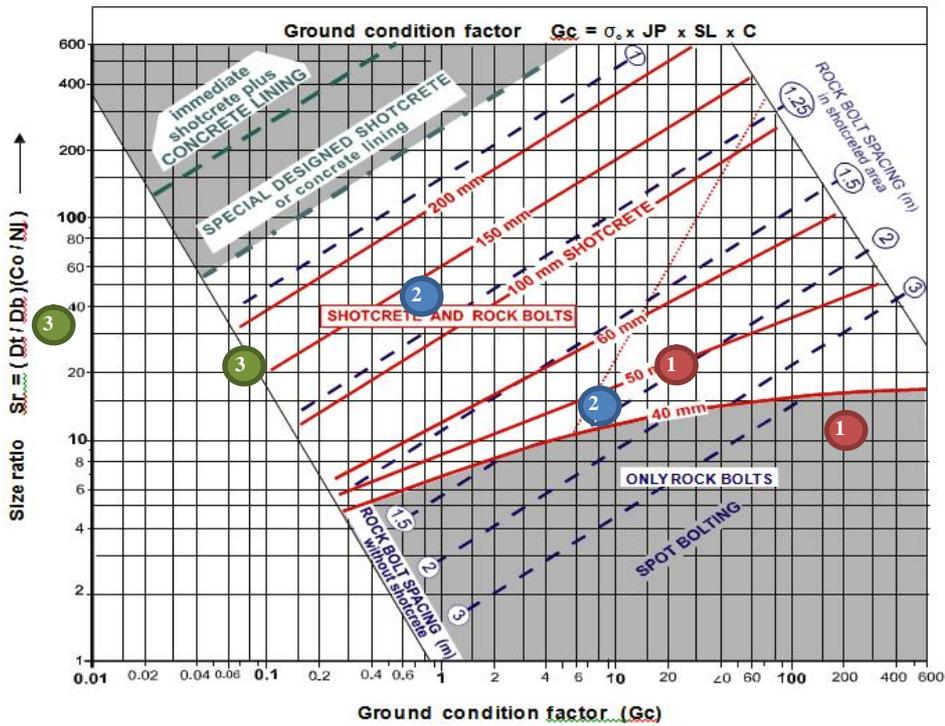


figure10. The chart introduced by Palmstrom (2000) for determination of rock support system





## Investigating the Effect of Quality of Performance Management on the Quality of Accrual and its Components among the Companies which Admitted in Tehran Stock Exchange

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### ABSTRACT

The aim of this study was to investigate the effect of managerial ability on the quality of accrual and its related components. Therefore, financial statements of 100 companies have been analyzed in stock exchange for managerial ability of the present study has been measured the model of data envelopment analysis. The result of the hypotheses have denoted from the negative and meaningful effects between managerial ability and the quality of accrual and it has a positive and meaningful effects on evaluation of accrual and also it has a negative and meaningful effect on the financial activities and the remaining components of accrual the result of the present study showed that management performance quality was effected on the quality of profit of the companies which were governed by management

**Key words:** managerial ability, data envelopment analysis (DEA), accrual quality (AQ), components of quality of accrual.

### INTRODUCTION

Managerial occupations were typically complicated and the way they carry out successfully and effectively was needed to a number of merits, skills, abilities and specific features. Therefore, organizations were tried to keep the most qualified managers as a competitive advantage in order to access to higher profit quality which was the same as company's accrual quality (Moosazadeh&Adli, 2009).

There was one criterion for management performance quality which was company's profit quality. But a type of profit has a high quality which was close to actual economical profit. While the reported profits were not the same as





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economical profits in financial statements and it was due to the use of accounting accepted principles and also implementing the decision which made by assessments and judges of managements (FrancisWhisper 2003, Damerjian and et al, 2012). Recently, accrual was considered as one of the most important symbols for profit quality. Consequently, quality of accrual was an important index for recognition of profit quality. In order to investigate the relationship between managerial ability and quality of accrual (Damerjian& et al, 2012) believed that the senior directors were fully aware of their scope of activity and it caused that they could have had a better judge and evaluation and consequently, it caused to the products to have a better accrual quality. Capable directors were able to evaluate the accrual better and it caused to profit's exact evaluation. In other words, it was expected that a capable management team have had a high ability for the evaluation of accrual. For example, it was expected that capable managers have had a better understanding from their customers and macroeconomics while they evaluated the cost of paid debts or evaluation of inventory value (resulted from correct identification of false inventory) based on their recognition and knowledge from industry process. This recognition may cause to effect on the company.

Therefore, the main aim of this research was to examine the effect of managerial ability on the quality of accrual and its related components. Accrual Quality(AQ) and its components have been considered in this research referring the carried out (research by Damerjian& et al,2012), (Francis & et al 2008, LA fond 2008, Deco&dicot 2002).

Therefore, in order to satisfy the purpose of the present research, the below questions were set forwards:

1. Does managerial ability have an effect on annual accrual quality?
2. Does managerial ability have an effect on evaluation AQ components?
3. Does managerial ability have an effect on AQ components financial activities?
4. Does managerial ability have an effect on remained component of AQ?

In order to examine the above hypotheses which were related to research question of the present study, it was used from compound regression analysis method and also data envelopment analysis (DEA) method was used for calculation of efficiency of a commercial unit. Based on the method and by using games software, efficiency of productive companies calculated and the score of managerial ability was gained. (It was used from Evieuesandspss) to investigate the effect of managerial ability on AQ and its component through regression statistical methods.

#### Research hypotheses

The main aim of the present research was to investigate the effect of managerial ability on AQ and its components which were in accordance with its related research. Therefore, the below hypotheses were compiled as follows:

1. Managerial ability has a negative meaningful effect on AQ quality.
2. Managerial ability has a negative meaningful effect on AQ component.
3. Managerial ability has a meaningful effect on economic activities of AQ.
4. Managerial ability has a meaningful effect on remaining component of AQ.

#### Definition of variables and applied model of the present research

##### Independent variable

Independent variable of the present research was managerial ability score. There was limited number of research which carried out in this area. Because it was difficult to evaluate the degree of managerial ability it has been used from criterion such as share historical yield (Francis& hadlock,2003) and media evaluation (Francis and et al 2008, Raj Gopal et al,2006)(melborn,2003). (By media evaluation it was meant that viewpoint of financial press about manager's ability). It has also been used from company size (Rozer 1982) and fixed and dominant effects of manager on company's decisions (Bertrand & Schurz 2003). These criterion were encompassed both manager's ability and feature of company. Therefore, it was hard to evaluate the effect of managerial features (separated from company's features) on profit quality and specifically AQ. In line with the research carried out by Damerjian and et al, effectiveness of company which include tangible & intangible asset of company, innovation capital (R&D) and other resources that were not reported in financial statements (including manpower, consulting services), but their cost were reflected in





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total cost of sold products and administrative and selling costs (Damerjian& et al), where shown. Therefore, the research was used from DEA mathematical method. In order to implement this method; we needed to seriesof input and output information. A list of input and output variable for managerial ability score and the way they calculate were considered as follows:

**Asset, machinery and net equipment:** Total of purchased tangible fixed assets after decreasing its accumulated depreciation.

**Operative rental value:** structure of operative rental value authorized the companies to not submit it in the balance sheet of company. But, this resource was actually constructs as one of input of company due to its capital value (the current value of payments of operative rental value at minimum cost for next 5 years)(Damerjian& et al 2012). The value of (i) research was considered as the rate of partnership papers during last three years in the present, whichwas meant to 15%.

**Research &Development Cost**

It was expected that most of the managers have followed the R&D projects. Therefore, the net cost of R&D cost was calculated referring to one five years capital period as follows:

$$RD_{net} = \sum_{t=0}^4 (1 + 0.3t)^{-1} RD_{R\&D} \quad (1)$$

In this model,  $RD_{R\&D}$  was cost of R&D and  $RD_{net}$  was capital R&D which was calculated with refers to equation (1).

**Purchased goodwill:** good will was reflected a part of intangible assets value.

**Other intangible assets:** For this variable, purchased goodwill was decreased from the total sum of intangible assets. Total cost of purchased product and administrative, general and selling cost: both costs of inventories and advertisement caused to earn money. Therefore, the total sum of sold inventory added to total price of sold product and it construed as an appropriate input where was most of the cost which paid if advertisementwas not specified, but costs of selling administrative and general were considered here. These variables were an image of other assets which were not recognized frankly as accounting assets. (Damerjian& et al, 2011, 2012)

Output variable of the present research was DEA which was used for calculating the managerial ability. It has been used from seven input variables and one output variable to calculate the score of managerial ability.

In the present research, the variable returns to scale (VRS) considered as hypotheses and this was an actual hypotheses. Because, commercial units were not operated in optimized scale (khajehvand et al, 2010)

By VRS, it was meant that outputs were not changed in conformity inputs. For example if the inputs were doubled, the outputs were not being doubled (Mehregan, 2004). Therefore, Banker,Charnes, Cooper (BCC model) for DEA was selected based on the hypotheses of variable to scale for calculating score of efficiency of decision making department among DEA model.The purpose of this study from implementation of this modelwas to maximize out (net scales) (Momeni2008)

In order to evaluate the efficiency of the whole company the below formula was considered by using DEA method (the proportion of output proportion of output to input)

$$\text{Efficiency evaluation} = \text{net selling} / (\text{properties , machinery and equipment} + \text{operative rental value} + \text{cost of R\&D} + \text{purchased good will} + \text{intangible properties} + \text{total cost of sold product} + \text{administrative , general and selling costs} ) \quad (2)$$

Formula (2) such as previous researched was going to consider both managerial ability and company's features. In such cases, the proportion on efficiency criteria to the whole company caused that manager's ability maximized. Therefore, in the second stage of evaluating managerial ability, we omitted the factors which were not related to managerial ability (Which may cause to company's efficiency according to Damerjian& et al (2012) viewpoint, the below factors were not managers referring equation (3) :

**Firm Efficiency<sub>i</sub>**=

$$\beta_0 + \beta_1 \ln(\text{Total Assets}_i) + \beta_2 \text{Market Share}_i + \beta_3 \text{Positive Free Cash Flow}_i + \beta_4 \text{Foreign Currency Indicator}_i + \varepsilon_i$$





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Firm efficiency: efficiency of productive companies was calculated by using BCC method with output nature. The efficiency of each unit which makes decision was calculated between 0 & 1 (Jahanshahloo & et al).  $(\ln \text{Total Assets}_t)$ , as criteria for company's size,  $(\text{Market Share}_t)$  was calculated preparation of company sales at the end of year (t) to sales of industry.

If a company has a positive free flow index  $(\text{Positive Free Cash Flow}_t)$ , it's in index was 1, otherwise it's index was 0.

Free cash flow was calculated as below (Mehrani & Bageri, 2009)

Free cash flow = paid share profit – paid fee cost – paid taxes – operative share before decreasing depreciation.

Foreign currency indicators: if a company reports an port selling, its index was 1, otherwise it's index was 0. As a result, remaining sum of above model was our main criteria for measuring the score of managerial ability.

Finally, the score of managerial ability was measured based on decile unit as per year of the industry in order to compare the gained score with regard to gear and industry. Also, in equation (3), the fixed effective of company was considered. Although this calculation decreases the possibility of companies, but it was decreased the fact that non-specified of company may effect on this equation and course the purpose of this research was not related to comparing the company's efficiency.

**Control Variables**

Criteria for profit quality were principally concentrated on company's specific feature. In the present research, it will be used from company's size, operative cycle (executive), loss share, sales volatility of cash flow inferred from operative action as control variable (Deco & dicot, 2002) (Hirbar & Nicole 2007) (Damerjian et al, 2012). Previous researches have been shown that these factors were effected profit quality. Therefore, the effect of this variable was controlled in this research. Each control variable was calculated as below:

**Firm Size<sub>t</sub>**: was equal to Ln of company at the end of year.

**Sales Volatility<sub>t</sub>**: was equal to (selling to average of company's assets).

**Operating Cycle<sub>t</sub>**: was equal to Ln average :  $(\text{inventory average}) / (360 / \text{total price of sold product}) + (\text{average of received account}) / (360 / \text{selling})$ .

**Losses<sub>t</sub>**: was equal to proportion of losses which was reported in financial years.

**Dependent Variables**

There were two dependent variables in the present research: profit quality (AQ quality and its components) which will be calculated based on the researched carried out by Damerjian & et al (2012) with below indexes.

**AQ quality**: According to (Deco & dicot, 2002) viewpoints, AQ with high quality were finally fulfilled as cash flows. The researched hypothesis was, the managers who know their business well will have fewer mistakes for evaluation of AQ. In the present research, calculating below regression, the researcher will determine that how the company designs AQ for changing to cash turn over.

$$\Delta WWC_t = \beta_0 + \beta_1 CFO_{t-1} + \beta_2 CFO_t + \beta_3 CFO_{t+1} + \beta_4 \Delta REV_t + \beta_5 CPPE_t + \epsilon_t$$

Model (5)

In this model:

$\Delta WWC_t$  = changes of received account + inventory changes – changes of paid accounts- changes of paid taxes + changes of other assets)

CFO = cash flow resulted from operative activities

$\Delta REV_t$  = changes in income resulted from company's sales in year t

PPE t = net value of properties, machinery and equipment (5) were standardized based on grand average of each company.





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We create criteria for measurement of profit quality called "Annual AQ". If the modulus of remaining sum becomes high, the quality of AQ will become low.

$$AQ_t = -1 * | \epsilon_t |$$

For testing the hypothesis, below regression was measured by using criteria for measurement of profit quality:

$$AQ_t = \beta_0 + \beta_1 \text{MgrAbility}_t + \beta_2 \text{Firm Size}_t + \beta_3 \text{Losses}_t + \beta_4 \text{Volatility}_t + \beta_5 \text{Cash Flow Volatility}_t + \beta_6 \text{Operation Cycle}_t + \epsilon_t$$

Model (7)

In this model:

$AQ_t$  = was equal to annual AQ

This variable was calculated based on decile unit for its related year of industry in order to confirm it with independent variable (managerial ability). Actually, two variables become standard by this method. Control variable equations (7) were become standard based on grand average of company's assets.

**AQ components**

AQ components were classified in three sections in this research: accrual evaluation, actual and remained activities, which were shown by EST , REAL,  $\epsilon_t$  respectively and the relationship between managerial ability and three factors (components) of accrual, was investigated accordingly.

The considering variable were formulated through regression evaluation as follows:

$$AQ_t = \beta_0 + \beta_1 \text{Firm Size}_t + \beta_2 \text{Losses}_t + \beta_3 \text{Sales Volatility}_t + \beta_4 \text{Cash Flow Volatility}_t + \beta_5 \text{Operation Cycle}_t + \beta_6 \text{R\&D Volatility}_t + \beta_7 \text{Advertising Volatility}_t + \beta_8 \text{M\&A Volatility}_t + \beta_9 \text{M\&A Activity}_t + \epsilon_t$$

Model (8)

In this model:

Beside control variable in equation (7) ,related component which may effect on evaluation of accrual were considered including (volatility of R&D , advertising cost were education and merger activities). LA fond (2008) believed that current economical of company may effect on AQ of company without any reason ( Deco&dicot , 2002) .

In this model:

R&D volatility = was equal to variance of

Cast of R & D within the last five year years, advertising volatility; was equal to variance of education & merger activities in year t. Volatility of education & merger activities:was equal to variance of education and merger activities within the last five years, if companies do not report these activities, we will consider it as 0.

Addition of related activities to actual activities to this model was due to gain the non-conforming between capital accrual which has a turn over and cash flow resulted from operative activities which actually inferred from company's actual economical activities.

Finally, in model (8) the value measured from  $\beta_0 - \beta_5$ , provide a component for EST .The value measured from  $\beta_6 - \beta_9$ , also provide a component for REAL activities and the final stage, the remaining sum of the equation was the section which was not defined in AQ.

In order to investigate the relationship between managerial ability and its components, the below regression was measured:

$$AQ \text{ component} = \beta_0 + \beta_1 \text{MgrAbility}_t + \beta_2 \text{size Decile}_{t-1} + \epsilon_t$$

model (9)

In this model:

AQ Component = total sum of each three measured components form model (8) was calculated in model (9).

size  $\text{Decile}_{t-1}$  = In order to size of a company it was measured in terms of decile unit based on Company's annual in its industry. In this model, total of control variables were omitted in annual AQ section.

**Sample and population of statistic**

All the companies that accepted in the list of Tehran stock Exchange were considered as sample population of the





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present study. It was used from systematic omission as sampling method. The companies were selected based on the below conditions:

1. In order to homogenize the statistical population of the present research, companies selected which has been accepted in stock Exchange before 2004.
2. In order to increase the Comparison capability, companies selected which their fiscal years led to March 29<sup>th</sup>.
3. They should have not changed their scope of activity.
4. They should have not changed their fiscal years.
5. During the three fiscal years, they should have not changed their managing director.

The fiscal year which was going to investigate in this study was form 2004 to 2013. Therefore, our sample population was including 100 Companies among 334 Companies which accepted in Tehran Stock Exchange.

### Research Finding

#### Descriptive statistics

In table 1, Descriptive indexes of research variable have been shown.

In table (1), skewness and kurtosis index deviations for all variables, expect managerial ability skewness index and AQ, was higher than modulus of 1.96 which showed the non-conformity of distribution and also deviation of distribution curve from its normal shape. This index was shown that observation for these variables which were far from central index in left and right domain. (By left domain, it was meant to the figure of skewness index deviation was negative and by right domain, it was meant to figure of skewness index deviation in positive) was observed but accumulation of observation were more condensed in the central index and it was stronger than normal distribution. Skewness deviation index for managerial ability and AQ was lower than modulus of 1.96 which was shown that variable distribution has no deviation from normal distribution and it was the same as normal distribution. The average of managerial ability was 5.004 which were shown that the score of managerial ability for sample population was equal to this amount and standard deviation was shown that distribution of variable for managerial ability in sample companies was 2.683.

#### Testing Research Hypothesis

**Hypothesis 1:** managerial ability has a negative effect in AQ in a year.

For investing this hypothesis, compound regression analysis was used.

In this model, referring to the fact that the meaningful relationship of Hasman statistic was higher than 0.05, this model was not rejected by accident therefore; this model has been processed by compound regression with accidental effect. The model results showed that it had correlation and Watson statistical model showed the amount of 1.878. The Fisher statistical meaningful relationship was lower than its acceptable error level which showed the existence of a linear relationship among one of independent or dependent variables. The recognition index for the present model showed the amount of 0.116 which justified the change of annual AQ by its independent variable along with five other variables about to %12.

The variable of T which was calculated for index of slope of independent variable showed the amount of -8.721 which was lower than 0.05. Therefore, proportion of fluctuating slope index for managerial ability to annual AQ was meaningful and reversed relationship. Consequently, it would be claimed that this slop had a reversed and meaningful effect. Therefore, based on data gathered from sample population, the research hypothesis was accepted. The result of index for effect of explanatory variable was shown in table 2.

**Second hypothesis:** managerial ability has a meaningful effect on one of AQ components, that was meant to evolution of accrual



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In order to investigate this hypothesis it was used from compound regression.

In this model, referring the Hasman statistical meaningful level was higher than 0.05, it was not rejected by accidental effect. The model results showed that it had no correlation and Watson statistical model showed the amount of 1.796. The Fisher statistical meaningful relationship was lower than its acceptable level which showed the existence of a linear relationship among one of independent or dependent variables. The recognition index for the present model showed the amount of 0.069 which justified the changes of annual AQ by its dependent variable along with one another variable about to %7.

The T variable which was calculated for index of slope of independent variable showed the amount of 6.872 which was lower than 0.05. Therefore, proportion of fluctuating slope index for managerial ability to annual AQ was direct and meaningful. Consequently, it would be claimed that this slope had a direct and meaningful effect on AQ evaluation. As a result, the research hypothesis was accepted the results of this index were shown in table 3.

**Third hypothesis:** managerial ability has a negative effect on the one of the AQ components; it is meant to AQ economical activities.

In order to investigate this hypothesis it was used from compound regression.

In this model, referring the Hasman statistical meaningful level was higher than 0.05, it was not rejected by accidental effect. The model results showed that it had no correlation and Watson statistical model showed the amount of 1.831. The Fisher statistical meaningful relationship was lower than its acceptable level which showed the existence of a linear relationship among one of independent or dependent variables. The recognition index for the present model showed the amount of 0.014 which justified the changes of annual AQ by its dependent variable along with one another variable about to %1.

The T variable which was calculated for index of slope of independent variable showed the amount of -2.854 which was lower than 0.05. Therefore, proportion of fluctuating slope index for managerial ability to annual AQ was reversed and meaningful. Consequently, it would be claimed that this slope had a reversed and meaningful effect on AQ evaluation. As a result, the research hypothesis was accepted the results of this index were shown in table 4.

**Fourth hypothesis:** managerial ability has a meaningful effect on AQ components; it is meant to AQ remaining components.

In order to investigate this hypothesis it was used from compound regression. In this model, referring the Hasman statistical meaningful level was higher than 0.05, it was not rejected by accidental effect. The model results showed that it had no correlation and Watson statistical model showed the amount of 1.884.

The Fisher statistical meaningful relationship was lower than its acceptable level which showed the existence of a linear relationship among one of independent or dependent variables. The recognition index for the present model showed the amount of 0.096 which justified the changes of annual AQ by its dependent variable along with one another variable about to %10.

The T variable which was calculated for index of slope of independent variable showed the amount of -7.944 which was lower than 0.05. Therefore, proportion of fluctuating slope index for managerial ability to annual AQ was reversed and meaningful. Consequently, it would be claimed that this slope had a reversed and meaningful effect on AQ evaluation.

As a result, the research hypothesis was accepted the results of this index were shown in table 5.





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## CONCLUSION

The result of first hypothesis showed that managerial ability had a negative effect on annual AQ. These results were contrary to our expectation. Otherwise, it was expected that if a company's managers have a high ability, then that company will benefit from a better AQ. While the results denote that managerial ability had a negative relationship with annual AQ. But these results were in accordance with findings of Damerjian and et al (2012) & Francis et al (2008). Francis & et al have found that managerial validity which was evaluated by using media assessment had a negative effect with the indexes for profit quality, which was gained with reference to remaining of standard deviation from Deco & Dicot model (2002) have found that managerial ability had a negative relationship with AQ.

The result of second hypothesis showed that managerial ability had a direct and meaningful effect on AQ evaluation. The most qualified managers have had a better understanding from their customers and macroeconomic status while the cost of paid debit was being assessed. Managers could influence on component of AQ valuation referring their knowledge and experience from industry process and asset their company in a better way. This finding was in accordance with findings of Damerjian & et al (2012) & Francis and et al (2005).

They have believed that managerial ability caused to evaluate the accrual in a high quality way. The result of third hypothesis showed that managerial ability have had a negative and reversed effect on component of economic activities. The finding denoted that referring to the fact the economic activities was reflected the evaluation and judge of management, managerial ability had a negative effect on the above activities. LA fond (2008) have believed that current economic activities of company may have effect on annual AQ criteria (Deco & Dicot 2002).

For example: it may be possible for companies which have had emerges and education activities or had a high R&D costs to have a poor relationship between capital AQ and operative cash flow process. Also, among these companies it was more probable that they have used from more qualified managers. Companies which have had a wide range of activities such as actual economical activities, R&D costs or emerge and education activities have had a low AQ due to above activities. This type of AQ was one of side products of accounting system and had not reflected the manager's evaluations and judges consequently; it was hard to improve this situation for manager. This finding was in accordance with Damerjian & et al (2012) and LA fond (2008) findings.

Finally the result of fourth hypothesis showed that managerial ability had a negative and reversed effect on AQ component. Therefore, this negative relationship was resulted from non-specified component of AQ. The findings denoted that it may be possible to devote more financial activities to component remained. This finding was in accordance with finding of Damerjian & et al (2012). Managers who have had an inherent ability had a better knowledge and understanding from company and industry and had a more better ability for combining information with identical evaluation from future in order to report higher quality profit in order to have a more stable company. Based on the finding of the present research, the below suggestions and implications were submitted:

Using from finding of the present research on behalf of managers of productive companies which was accepted in Tehran Stock Exchange for improving their productive efficiency, investors and finance providers could benefit from these findings for evaluating ability and quality of manager's performance.

The one who set standard for accountants could make use from this research in order to compile accounting standard and mentioned the effect of managerial ability on the AQ.

The below implications were provided for future studies:

1. Investigating the effect of managerial ability on total AQ.
2. Investigating the effect of managerial ability and historical yield of share on AQ.
3. The effect of managerial ability on company's strategies including company's investment supplying financial resources & operative strategies.





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**Table1. Research variables descriptive statistic specifications**

Research variable	Average	Standard Deviation	Variance	skewness	kurtosis	Index deviation	
						skewness	kurtosis
Companies efficiency	0.7920	0.18953	0.036	-0.493	-0.760	-5.36	-4.108
Managerial ability	5.004	2.683	7.197	0.000	-1.327	-0.001	-7.190
AQ	4.977	2.760	7.619	0.035	-1.371	0.354	-6.885
AQ Components	4.403	2.383	5.677	0.389	-0.938	3.896	-4.707
AQ components economical activities	4.078	2.409	5.805	0.567	-0.732	5.680	-3.674
AQ remained component	4.295	2.498	6.238	0.375	-1.044	3.755	-5.241

The sign \* was shown dependent variable and managerial ability was construed as independent variable.





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**Table2. Result of regression analyses for testing the effect of explanatory model (7)**

Dependent variable: Annual AQ,Period No:10,Interval:100,Observation after adjustment:900					
Variable name		Index	Error	T factor	Meaningful Relationship
$\beta_0$	C	5.691322	1.737356	3.275853	0.0011
$\beta_1$	MgrIAbility	-0.376243	0.043141	-8.721133	0.0000
$\beta_2$	FS	0.101340	0.110690	0.915525	0.3603
$\beta_3$	L	-0.436436	0.488894	-0.892701	0.3724
$\beta_4$	SV	0.253450	0.738217	0.343328	0.7315
$\beta_5$	CFV	-0.337373	1.806865	-0.186717	0.8519
$\beta_6$	OC	-0.036868	0.150964	-0.244214	0.8071
Recognition Index		0.116763	Dependent Variable Average		3.901380
Amended Recognition Index		0.107827	Dependent Variable Deviation		2.613285
Regression Standard Deviation		2.468377	Total SQ of Justification Deviation		3613.080
(F) Factor		13.06571	Watson Factor		1.878028
(F) Meaningful relationship		0.00000	Hasman Factor	$K^2$ Factor	2.465149
				Meaningful Level	0.8723

**Table3. Result of regression analysis for testing the explanatory model (9)**

Dependent variable: Annual AQ, Period No:10,Interval:100,Observation after adjustment:900					
Variable name		Index	Error	T factor	Meaningful Relationship
$\beta_0$	C	3.111972	0.350211	8.885998	0.0000
$\beta_1$	MgrIAbility	0.253753	0.038608	6.572549	0.0000
$\beta_2$	Size Decile	0.0044321	0.050362	0.085802	0.9317
Recognition Index		0.067371	Dependent Variable Average		2.697178
Amended Recognition Index		0.064246	Dependent Variable Deviation		2.117905
Regression Standard Deviation		2.048742	Total SQ of Justification Deviation		2505.814
Factor (F)		21.56287	Watson Factor		1.796076
(F) Meaningful Relationship		0.00000	Hasman Factor	$K^2$ Factor	3.093662
				Meaningful Level	0.2129





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**Table4.Results of regression analysis for testing the effect of explanatory variables of model 9**

Dependent variable: Annual AQ, Period No:10,Interval:100,Observation after adjustment:900					
Variable name		Index	Error	T factor	Meaningful Relationship
$\beta_0$	C	4.870967	0.383568	12.69911	0.0000
$\beta_1$	MgrIAbility	-0.112918	0.039559	-2.854390	0.0045
$\beta_2$	Size Decile	-0.045232	0.056086	-0.806472	0.4203
Recognition Index		0.014328	Dependent Variable Average		2.131579
Amended Recognition Index		0.011026	Dependent Variable Deviation		2.011767
Regression Standard Deviation		2.000646	Total SQ of Justification Deviation		2389.543
Factor (F)		4.339010	Watson Factor		1.831381
(F) Meaningful Relationship	0.013463	Hasman Factor	$R^2$ Factor	0.260035	
			Meaningful Level	0.8781	

**Table5.Results of regression analysis for testing the effect of explanatory variables of model 9**

Dependent variable: Annual AQ, Period No:10,Interval:100,Observation after adjustment:900					
Variable name		Index	Error	T factor	Meaningful Relationship
$\beta_0$	C	5.715618	0.393126	14.53890	0.0000
$\beta_1$	MgrIAbility	-0.301359	0.037932	-7.944604	0.0000
$\beta_2$	Size Decile	0.017320	0.058147	0.297873	0.7659
Recognition Index		0.096424	Dependent Variable Average		1.938500
Amended Recognition Index		0.093397	Dependent Variable Deviation		1.947634
Regression Standard Deviation		1.854454	Total SQ of Justification Deviation		2053.082
Factor (F)		31.85411	Watson Factor		1.884922
(F) Meaningful Relationship	0.00000	Hasman Factor	$R^2$ Factor	0.187392	
			Meaningful Level	0.9106	





## Design of Inventory Control Model in Supply Chain

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### ABSTRACT

Inventory in supply chain is kept in different forms due to several reasons. Since the inventories can be followed by the costs over 20%-40% of their value per year, their management in an academic way for keeping minimum inventory will be followed by proper economic outcomes. The present research designs inventory control model in supply chain. Mathematical modeling is the method used in this research. This model has been developed from three sections: 1-inventory analysis in retailers, 2-demand process in Central warehouse, 3-inventory analysis in Central warehouse. The main purpose of this study is to minimize the inventory costs for purchase and sale.

**Key words-** supply chain management, inventory control, reduction of costs.

## INTRODUCTION

Competition has doubled in importance in today's world that the companies must have the ability for rapid reaction to external stimulants to reach to success. Numerous instruments, techniques and processes have emerged to help for success of companies against environmental pressures. Supply chain management is one of the most important preconditions for success of companies. Supply chain management puts an emphasis on the factors such as improvement in domestic processes of production and use of engineering patterns and use of production materials with the best quality and least cost for production and relationship between distributors of products with the policies of market development. With emergence of modern technologies to the companies, most of stages of supply chain management are being fulfilled via new methods (Kasraei, Nazeri, 2011, p. 3). A supply chain encompasses a series of activities which are fulfilled for production and delivery of a good or service from the supplier to the customer, including supply and demand management and planning, providing materials, scheduling for the product or service, inventory control, delivery to customer. Supply chain management coordinates all these activities in a way that the



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customers acquire the products with maximum quality and minimum cost. The tasks inside the chain include prediction of demand for commodities and services, selection of suppliers, ordering materials, inventory control, planning for production, quality management, and information management. Supply chain management coordinates operations of a company with the operations of suppliers and customers. Any organization is a part of a supply chain and most of organizations are a part of several supply chains. Hence, in general, it can say that supply chain refers to a chain which encompasses all the activities associated to process of commodity and transformation of materials from the stage of providing early material to the stage of delivery of end-product to the consumer. Some researchers have limited supply chain in the relationship between purchaser and seller. Another group has known it included of all the supply databases including the first-order, second-order and third-order suppliers. In the third attitude, supply chain includes all the activities required for supply of a product or service to the end-consumer. In this regards, supply chain encompasses three areas of procurement, production and distribution (Najafi, Movahedi mehr, 2011, p. 4). Supply chain management has been regarded as an integrative approach for suitable management of process of materials and commodities, information and monetary process and the ability for response to environmental conditions; determining number of suppliers and finding a method to have the best relationship with suppliers have been mentioned as the most important contents proposed in supply chain in studies in recent years. Supply chain management refers to a comprehensive systematic approach to administrate thorough process of information, materials and services from the suppliers of early materials, factories and warehouses to the customers. Supply chain management is elaborated as use of a variety of approaches for effective and useful integration and cohesion in a way to produce and distribute the product in a suitable amount, place, cost, services. The key factors in supply chain management include information, communication, cooperation, reliability, demand planning, supply planning, manufacturing, warehousing, transportation and supply chain network optimization. The suppliers' abilities in point of view of manufacturers regarding their conditions can vary, yet the standards below can be used in normal conditions to select the suppliers: quality, response to special orders, response to problems, performance of transport, storage plans to respond to possible factory orders, stability of prices, closeness to factory and convenience in ordering the required items. Numerous agreements is a barrier in access to excellent supply chain management systems required in supply chain, enabling to transform the cost of changing partners to inhibitors. In this regards, supply chain emerges as a stable structure that cannot exploit from opportunities at market to a sufficient extent. Supply chain management can provide competitive advantage for the company and increase desire of company for competition and cooperation.

Mohammad Vahok has elaborated three key factors in cost of supply chain including inventory costs, booting and transport. Studying other books and articles, it can add costs of distribution, operations, retail, level of services and warehousing to above costs. Inventory in supply chain in different forms is kept due to several reasons. At any point of inventory production process, the process might undergo manufacturing. Further, inventory might be in central warehouse, retails or transfer between each of databases, under which there will be: insecure demand in combination with time of insecure transfer or production will cause maintenance of high inventory in aforementioned database. Balu estimated that the inventory maintenance cost under any status is about 20%-40% of total inventory value. Nevertheless, maintenance of inventory is required to increase level of providing services to customer and reducing production costs. Yet, inventory management in a scientific way to keep minimum inventory causes reduction of total costs. It is obvious that the lowest inventory level occurs when the entire supply chain is considered as a system. Determination of the optimal inventory policy for multistage inventory systems is a complicated task due to the interaction between different levels. The present research seeks to investigate these complexities and remove the barriers to implementation of an optimal inventory policy.

**Concept of supply chain**

At the 1980s, with increase of diversity in customers' needs, manufacturing organizations increasingly tended to increase of flexibility in production lines, modify and improve existing processes and products and develop new products to meet customers' needs. At the 1990s, managers of industries perceived that different suppliers play a potential role in increasing organization's capabilities to deal with customers' needs. This widely affected





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organizations' focus on the databases to provide sourcing strategies. Further, managers perceived that production of a qualitative product is not sufficient. Indeed, supply of products with customers' conditions raise new challenges in the organization (Amid, 2010). Under such conditions, organizations perceived that these changes in a long term are not sufficient for management of their organization. They should have cooperated in network management of all the factories which have been supplying inputs of organization as well as network of all the factories interested in delivery of after sale services to the customer. With such an attitude, supply chain was emerged (Ghazanfari & Fatholah, 2006). With regard to this attitude, a comprehensive definition for supply chain can be as follow:

Supply chain encompasses all the activities pertaining to process of transforming materials from the stage of raw material to end-consumer as well as information processes pertaining to them (Ghazanfari & Fatholah, 2006).

#### Supply chain management

Supply chain management is assumed as a series of approaches and efforts that takes side of manufacturers, suppliers and distributors and coordinates the value chain in a way to manufacture and distribute products at suitable amount, suitable time and suitable place so as to achieve customer satisfaction.

Thakkar et al.(2008) defined supply chain management as building coordination between activities that cause integration between supplier, manufacturer, distributor, customer and retailer.

Decision making steps in supply chain management

Decision making in supply chain management has three steps:

Step 1: design of supply chain strategy: decision making on how to build a cohesive structure adapted with strategies of organization and specify compositions and processes which are required at each stage

Step 2: supply chain planning: adoption of operational policies and decisions in the status of activities of organizations existing in the chain without any change in decisions for the strategy adopted in previous step

Step 3: supply chain operations: decision making and adopting the actions for a better responsiveness to customers' orders and needs which are generally examined per day or week (Chopra & Meindl, 2001).

## METHODOLOGY

An analytical-mathematical method has been used as the research method, including design of model, determination of population and sample, preparation of data collection tables, determination of data analysis methods, calculation of parameters of model, solving model, examining validity of the designed model and analysis of the obtained results. The statistical population consists of *Pegah Dairy Companies attended in the research during 2014*.

#### Research model

In the present research, an attempt is made to represent a model to determine optimal inventory policy for the two-stage production/distribution system with several suppliers through combining the existing models for the multi-stage inventory systems and separation of order between several suppliers. This model aims to determine an optimal inventory policy from type (S,Q) to determine rate of order and *reorder* point at central warehouse with the aim of minimization of total logistic costs regarding the limitations at providing services for the customer. In the model, two sub-systems must be analyzed:

- 1-Inventory analysis in retailers
- 2-Demand process in central warehouse
- 3-Inventory status in central warehouse





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This model includes N retailers, one central warehouse and M suppliers. Daily demand at retailers is in random which follows Poisson distribution with rate  $(i=1, 2, \dots, n)$ . When the inventory of retailers reduced to  $S_{ri}$ , they issue the order to the rate of  $Q_{ri}$  to the central warehouse. Delivery times at any retail include: 1-fixed time to process order at retailers, 2-waiting time at central warehouse at the occasions which face shortage, 3-the transfer time from the central warehouse to retail which is in random with certain distribution function. The waiting time for the order of retail in central warehouse is estimated via mean of N. the demand which is remained without response in central warehouse is considered as suspended demand. Further, inventory of central warehouse reduces with retailers' orders and when reaches to level of  $SW$ , central warehouse arranges an order to the rate of  $Q_{wj}$  for each supplier that might be different dependant on the delivery time and propose price of manufacturers. This order requires a fixed time for processing. The transfer time is elaborated via a random variable and certain distribution function. Central warehouse does not issue any order unless all the previous orders from the suppliers had been received. Any order at retail which remains without response is suspended. If lower than  $Q_{ri}$  inventory exists in central warehouse, total order is suspended. Further, it is assumed that the first part of orders is received by means of central warehouse which determines level of service providing. The ultimate aim is to minimize total logistic inventory cost regarding the limitation in providing services for the customer. In tables 1-4, characteristics of variables of decision, variables of decision and *proven and probable* parameters have been proposed.

Daily demand at retailers  $n_i$  is in random which follows from Poisson distribution.

-delivery time of commodity from central warehouse for the retailers is a random variable with certain density function

-the time for transfer of commodity from suppliers to central warehouse is a random variable with certain density function

**Inventory analysis in central warehouse**

Inventory analysis in central warehouse is the same as retail analysis, yet there are two differences between them: 1-it should take into consideration this point that order should be in  $Q_{ri}$  sizes, 2-it should take into consideration this point that central warehouse uses several suppliers. The target orders which remain without response for certain coverage rate( $PW$ ) include:

$$(1) TNS = \sum_{j=1}^m Q_{w_j} (1 - pw)$$

If  $ES_w$  is considered as the number of the expected orders for not responding,  $Sw$  will be determination target for certain  $Q_w$ , so that:

$$(2) ES_w \leq Q_w (1 - pw)$$

Determination of  $Q_w$  and  $Sw$  depend on our ultimate aim in minimization of cost; period demand at central warehouse ( $DW$ ) follows Poisson distribution with rate of  $\lambda_w$ .

If  $T_{wj}$  assumes as the delivery time(j) of the suppliers, the first part of orders will take last equivalent to the least m time, as the central warehouse(m) gives the order with the time same as  $Q_{wj}$ . The delivery time at central warehouse ( $T_w$ ) can be written down as follow:

$$(3) T_w = M_{in} (T_{w_1}, \dots, T_{w_m}) + \gamma_w$$





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If  $H_j(t)$  represents cumulative distribution function for each of  $T_{w_j}$ s, then cumulative function of  $I(t, n), T_w$  can be represented as  $P(T_w \leq t)$  :

$$(4) I(t, n) = 1 - \prod_{j=1}^m [1 - H_j(t)]$$

If  $ES_{tw}$  represents number of expected orders for a certain delivery time( $tw$ ), there will be:

$$(5) (t_w = 1, 2, \dots, l) \quad ES_{tw}(s_w) = \sum_{k=s_w}^{\infty} (k - s_w) \sum_{j=1}^m e^{-\lambda_{w_j} t_w} (\lambda_{w_j} t_w)^k / k! (t_w = 1, 2, \dots, l)$$

Hence, it can calculate  $ES_w$  at random delivery time as follow:

$$(6) ES_w = \left[ \sum_{tw=1}^l ES_{tw}(s_w, Q_{r_i}) \right] P_{tw}$$

There is the probability of  $T_w = t_w$  for  $t_w = 1, 2, \dots, l$ .

**Total cost model**

Total expected annual cost for system is elaborated as follow:

$$(7) WTAC(Q_{w_j}, S_w, Q_{r_i}, S_{r_i}) = Cp + Co + Ch + Cs$$

$C_p, C_o, C_h$  and  $C_s$  represent purchase cost, order cost, maintenance cost and transport cost. In this regards, it can elaborate each of costs as follow. It should be noted that the first part associates to the costs in central warehouse and the second part associates to the costs in retailers.

Purchase cost includes:

$$(8) Cp = \sum_{j=1}^M C_{w_j} Q_{w_j}$$

$C_{w_j}$  represents the purchase cost at central warehouse from each of suppliers. Order cost includes:

$$(9) Co = \left( \frac{a + bm}{\sum_{j=1}^m Q_{w_j}} \right) R_w + \sum_{i=1}^n (R_{r_i} A_{r_i} / Q_{r_i})$$

$a$  and  $b$  represent fixed and varied costs at processing order at central warehouse and  $A_{r_i}$  represents order cost at each of retailers.





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$$(10) C_h = \left( \frac{\sum_{j=1}^m Q_{w_j}}{2} + S_w - \mu_{y_{w_j}} \right) h_w + \frac{\sum_{i=1}^n Q_{r_i} h_i}{2} + \sum_{i=1}^n \left[ (S_{r_i} - \mu_{y_{r_i}}) h_i \right]$$

$\frac{\sum_{j=1}^m Q_{w_j}}{2}$  and  $S_{r_i} - \mu_{y_{r_i}}, S_w - \mu_{y_{w_j}}, \frac{\sum_{i=1}^n Q_{r_i}}{2}$  represent the inventories at central warehouse and retail and precautionary reserves at central warehouse and retail. Further,  $h_w$  and  $h_i$  represent the maintenance cost of a commodity unit at central warehouse and retail.

Transport cost includes:

$$(11) C_s = \left( \frac{R_w}{\sum_{j=1}^m Q_{w_j}} \right) (FC_w) - \left( \sum_{j=1}^m [Q_{w_j} (d_{w_j}) (VC_{w_j})] \right) + \left( \frac{R_r}{\sum_{i=1}^n Q_{r_i}} \right) (FC_r) + (d_{r_i}) (vcr_i)$$

$\frac{R_w}{\sum_{j=1}^m Q_{w_j}}$  represents total number of orders per year at central warehouse and  $\frac{R_r}{\sum_{i=1}^n Q_{r_i}}$  represents total orders per

year at retails.  $FC_w$  and  $FC_r$  represent the fixed transport cost at central warehouse and retails.  $d_{w_j}$  and  $d_{r_i}$  represent distance between central warehouse and suppliers and distance between central warehouse and retailers.  $VC_{r_i}, VC_{w_j}$  represent varied transport cost for transfer of a commodity unit from each of suppliers to central warehouse and transfer of a commodity unit from central warehouse to each of suppliers to the central warehouse and transfer of a commodity unit from central warehouse to each of retailers. Hence, the cost for transfer of commodity will be the transport cost ( $R_w$ ) from suppliers to central warehouse and transfer of  $R_r$  from central warehouse to the retailers. Hence, the main problem is to find  $S_{r_i}, Q_{r_i}, S_w, Q_{w_j}$  so as to minimize ETAC regarding the limitations below:

$$(12) ETAC (Q_{w_j}, S_w, Q_{r_i}, S_{r_i}) = C_p + C_p + C_k + C_s$$

$$(13) ESW \leq Q_w (1 - P_w) / \sum Q_{r_i}$$

$$(14) i = 1, 2, \dots, n$$

$$ES_{r_i} \leq Q_w (1 - P_{r_i})$$

$$(15) Q_{r_i} = K_{r_i} Q$$

$$(16) Q_{w_j} \leq CAP_j$$





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$$(17) (j = 1, 2, \dots, n) \quad Qw_j \leq CAP_j$$

$$(18) \sum_{j=1}^M Q_{wj} \leq ICAP_i$$

$$(19) (i = 1, 2, \dots, n) \quad Qr_i \leq ICA Pr_i$$

$$(20) Sw, Sr \geq 1$$

$$(21) Qr_i, Qw_j, Kw_j, Kr_i \geq .$$

Equations 14 & 15 represent providing services for the customers; equations 16 & 17 represent the orders in Q classes; equation 18 represents the restriction in capacity for each of suppliers; equations 19 & 20 associate to the capacity of warehouse in central warehouse and retail.

#### Implementation of model

This model can be implemented for the systems with several suppliers and one warehouse and several retails. In following, the exact inventory management program has been obtained after solving model, including rate of order, order point for each of retailers and order rate and point for each of suppliers from central warehouse. In following, optimal result from implementation of mathematical model of inventory management was examined and compared with the real status of company. In table below, a comparison has been made between the costs for use of different approaches. It should be noted that the costs of proposed model include the costs for purchase, order, maintenance and transfer. Yet, just maintenance and order costs are considered in model EOQ. To compare costs of these two approaches, firstly the purchase costs are subtracted from the costs in proposed model and the transfer costs are considered as a parameter in calculation of amount of annual maintenance costs. With regard to the results in figure 1, the inventory status at most of retails in the proposed model is under the existing status. Further, differences between order rates and reorder point rates are witnessed.

#### CONCLUSION

In the present research, a mathematical model based on inventory policy(S,Q) has been designed for the multi-stage production/distribution networks. The ultimate aim is to minimize the costs including inventory, transport, purchase and order costs. The designed model was tested via the real data and the results from this model were compared with the existing inventory models. These comparisons indicated that the proposed model proposes better results to reduce costs.

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**Table 1. Characteristics of variables of decision**

Range	Explanation	Index
I=1.2.....n	Retail No	J
J=1.2.....m	Supplier No	J
K=1.2.....L	Demand during delivery period	K

**Table 2. Variables of decision**

variable	Explanation
Sw	Reorder point at central warehouse
Sri	Reorder point at retail
QWj	Rate of order at central warehouse from supplier j
Qri	Rate of order at each of retails from central warehouse

**Table 3. Proven parameters**

Paramet er	Explanation	Parameter	Explanation
N	Number of retailers	cw <sub>j</sub>	The purchase cost of a commodity unit from suppliers j
M	Number of suppliers	A <sub>r</sub>	The order cost at retail from central warehouse
Rw	Annual demand from central warehouse	a	The fixed order cost at central warehouse from suppliers





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R <sub>r<sub>i</sub></sub>	Annual expected demand	b	The varied order cost at central warehouse from suppliers
P <sub>r<sub>i</sub></sub>	Rate of demand coverage at retails	VC <sub>w<sub>i</sub></sub>	The varied cost for transport of a commodity unit from central warehouse
P <sub>w</sub>	Rate of demand coverage at central warehouse	VC <sub>r<sub>i</sub></sub>	The varied cost for transport of a commodity unit
dw <sub>j</sub>	Distance of each supplier from central warehouse	FC <sub>w</sub>	The fixed cost for transport of a commodity unit from central warehouse
Dr <sub>i</sub>	Distance of each retail from central warehouse	FC <sub>r</sub>	The fixed cost for transport of a commodity unit from retails
C <sub>t</sub>	Transport cost at the commodity unit from suppliers	Q	Size of orders
I	Maximum delivery time for the suppliers	CAP <sub>j</sub>	The capacity of supply by each of retailers
HW	Maintenance cost of a commodity unit	ICAP <sub>w</sub>	Inventory capacity at central warehouse
H <sub>r<sub>i</sub></sub>	Maintenance cost of a commodity unit in retails	ICAP <sub>r<sub>i</sub></sub>	Inventory capacity at retails

**Table 4. Probable parameters**

$Dr_i$	Daily demand at each of retails with mean of $\mu_{DR_i}$
$Dw$	Demand at central warehouse with mean of $\mu_{DW}$
$Tr_i$	Delivery time from central warehouse for the retailers
$Tw$	The first delivery time at central warehouse from suppliers
$Lr_i$	The time for transfer of commodity from central warehouse to each of retails with mean of $\mu_{LR_i}$
$Lw_j$	The time for transfer of commodity from each of suppliers to central warehouse with mean of $\mu_{LW_j}$
$Yr_i$	Demand during delivery at each retail with mean of $\mu_{YR_i}$
$Yw$	Demand during delivery at central warehouse with mean of $\mu_{YW}$





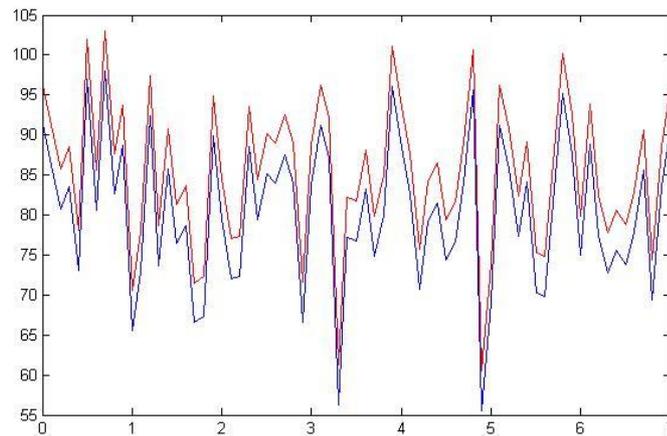
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**Table 3. Comparison of existing status with the results from proposed model at central warehouse**

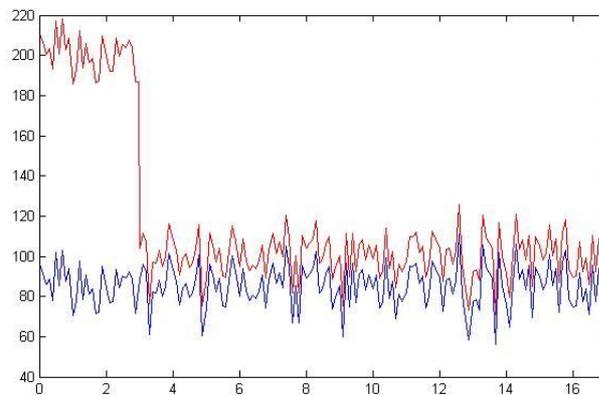
Supplier	Results from proposed model		Results from existing status	
	QWJ	SW	EOQ	ROP
1	2896	2987	2147	5214
2	2785		2254	

**Table 4. Comparison of costs at different approaches**

Inventory management approaches	Total cost	Associated costs
Existing status	4558879	4558879
Proposed model(2 suppliers)	2895488520	215489500
Proposed model(3 suppliers)	154855210	189525214



**Figure 1. Comparison of order rate in proposed model with existing status**



**Figure 2. Comparison of cost at different approaches**





## The Human being Reality and his Role in Islamic Economy and Capitalism

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### ABSTRACT

Humans are living things with beauty, perfection, and light in their souls so they like them and look for them. Human beings' effort to reach real perfection and happiness as well as to achieve sustainable enjoyment depends on recognition. Since most human beings have not realized the objective of creation, they are confused toward their own recognition and evolution; however, real perfection recognition of human being is rooted in natural instinct. God sent holy prophets and his ambassadors to wake this sleeping nature up, leading human beings by the help of wisdom and holy prophets. In this paper, we will review the real position of human beings and their roles in various economies and capitalism and in particular in Islamic system and economy. This is mainly because type of considering human beings, dimensions, requirements, and objectives in lives affect economic relationship regulation and eventually, economic system formation.

**Keywords:** human being, economy, Islam, capitalism

### INTRODUCTION

In the world where materialists consider human beings as complex machine, Darwin's followers introduce him as a superior animal, and humanists try to take human beings away from spirituality and their holy souls, Quran considers human beings different from other ones, the ones who are blown by God's soul and their eyes which are connected to soil and their souls which are linked with God. They are such a pearl in that God created other creatures for them. God created human beings in a way that they are able to use them. It is obvious that each of human beings enjoys his own certain objective. They move and try toward this goal from the first day of creation. So the final goal of human creation is natural progress, meaning that all living things were created for human beings in order to reach their holy goal which is the nearness to divine. The science of economy studies economic phenomena concerning





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production, distribution, consumption as a result of reasonable human behavior. Behaviors of human beings are formed as a result of their opinions, thus, it is necessary to know individuals' human behaviors in order to determine orders governing economic relationships and activities which are meaningful in accordance with human objectives. Different understandings were raised concerning nature and its concepts. Mentioned interpretations have led to various life methods in different economic systems. Such systems are based on worldview in clear or hidden form.

In each system, behavioral patterns, in economic fields, are taken from special economy and economic laws are taken from its economic rules and regulations. Those rules and regulations are organized according to certain views about God, universe, human, and society. In this paper, we tried to study the reality of human beings in various systems.

#### Human nature

One of important human-related issues and probably the most important of them is understanding human. Human beings need to know themselves before they start to know the world around them as well as good and bad of them. They have to try to discover their treasures of nature, make them perfect, and moderate sensual and carnal desires. In this way, they will reach the biggest felicity. If they do not pay attention, do not discover their talents, and only meet their sensual and carnal desires, they will experience loss, falling from humanity to animal nature.

Invitation to human understanding is one of holy prophets', moralists', and even philosophers' pieces of advice. Human beings have also realized the importance of such issue. Human is the center of researches in different sciences. The meaning of human understanding in this paper is that he enjoys talents and forces to know himself, the world, and human evolution. If human beings know talents and facilities for growth and evolution with contemplation, he can better perfect his own capitals because self-knowledge is the prerequisite of world-knowledge, theism, and eventually human problem trouble shooter[3].

#### Human reality

There are two opinions in terms of human reality: material and divine. Some people consider the existence equal to material. They believe in human as completely material phenomenon. They consider all human rules as material ones and they believe that human being can be known by material rules which are based on sense and experience. Basically, all their analyses are based on material concerning human.

In addition to material dimension, another group of people believes in non-material dimension. They consider a non-material dimension called soul within the body[2]. Divine religions and in particular Islam agree with the second opinion. The basis of teachings of divine religions is soul. If human pays attention to body. It is due to the effect of soul. This non-material soul cannot be studied with sensory and experimental sciences. Its understanding tool is non-sensory and non-experimental because it heads to eternal life. This is the soul of human beings which is the reality of human beings, according to Quran. Soul which is accompanied by material body leaves the body at the time of death. It remains unchanged after body decomposition. It continues to live in intermediate world. Quran states that: " Allah takes the souls at the time of their death". (Az-Zumar /42).

#### Human and faith

Faith is rooted in "security" [in Persian language]. It means belief in heart, or belief in some thing or somebody. As it is clear from the meaning, belief in some body or something is called faith. A person with faith is called faithful. Whenever the term " faith " is used, its special meaning is referred which is belief in heart to God, day of resurrection, etc[9].





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Human dream is reaching perfection. Faith is the path to reach this perfection. Faith provides joy, peace, heart belief, meaning, hope, braveness, and objective. Quran respects faith a lot and considers it as the salvation factor. It is also pointed out as the virtuous guided people. Quran states that faith can lead human from the dark to the light. Faith is a spiritual matter. The place of faith is heart. Real recognition of spiritual affairs such as sadness, happiness, and hope, is accessible through physical science. Human beings need to feel them and they cannot be known with definition[5]. They can be realized through knowing tools. Human beings will have a different overview toward life and world in comparison with somebody who does not believe in God and himself[1].

#### Human, faith, and wisdom

In Islam's point of view, religious faith is based on wisdom. In philosophy of religion, when we talk about here[12]. faith and wisdom, it means the relationship between religion and wisdom. It will briefly be discussed Islam believes that religion and faith are two gifts of God, provided by God for people. Human, with wisdom and religion, can reach eternal happiness[18]. Wisdom approves religion and religion does wisdom. As it is stated in Quran: "We sent Quran in Arabic language for contemplation." Quran in Al-Anfal states: "Surely, the worst of beasts in the sight of Allah are the deaf and the dumb, who have no sense."

These verses clearly show that human wisdom takes the center stage in Islam[13].

#### Human, faith, and action

In Islam's point of view, a close link exists between faith and action. As it is clear from Islamic narratives, action is the appearance of human faith. If no action exists, it means that faith was not able to enter the heart. That is why, faith and correct action are mentioned together in Quran.

Whoever works righteousness, whether male or female, while he (or she) is a true believer (of Islamic Monotheism) verily, to him We will give a good life (in this world with respect, contentment and lawful provision), and We shall pay them certainly a reward in proportion to the best of what they used to do (i.e. Paradise in the Hereafter).

Nevertheless, faith leads to human perfection. Faith is along with action. That is why action without faithful background is not accepted by God. God states that: "the parable of those who disbelieve in their Lord is that their works are as ashes, on which the wind blows furiously on a stormy day, they shall not be able to get aught of what they have earned[14]. That is the straying, far away (from the Right Path). "

It means that action without faith is like ash for God. Nothing remains after storm. Such actions are not valuable for God. Thus, faithful human can act based on awareness and understanding with holy background and such actions are accepted by god.

#### The objective of human creation

The objective of God is not to do meaningless actions. So the objective of human being is highly regarded. Quran states: "Did you think that we had created you in play (without any purpose), and that you would not be brought back to us?"

#### Test

"Who has created death and life, that he may test you which of you is best in deed?"

According to the verse of Quran, testing is introduced as the objective of human life and death. The objective of this test is to reach correct action, which means development of knowledge, sincerity, and any good work. Thus, human





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beings always experience different tests such as wealth, poverty, etc. in order to become patient. They will reach some stages of growth and evolution by these tests.

#### Worship

“And I (Allah) created not the jinns and humans except they should worship me (Alone).”

It is implied from this verse that, first, the objective of human being is worship. Worshiper is somebody whom his existence belongs to his owner. Therefore, his intention follows God's intention. His desire is God's desire and he does not neglect following. Second, worshiping does not only consists of praying, fasting, etc[10]. but following all God's orders. So any actions with divine intentions are considered worshiping even supporting family, etc. If worship is the objective of creation, it means all good actions done for individual and social happiness.

#### Divine Mercy

Quran: “If God wanted you, he would unify people; however, they are always in disagreement, unless those that God had a pity for them. That is why God created them and the God's promise came true.”

There are some important points in this verse: first, divine mercy was introduced as the objective of human creation. Selecting divine mercy is optional and all can take advantage of it. Second, the difference and disagreement lie in structure of soul, body, and love of people. Also, no barrier existed for freedom of human beings for God to create equal and forcefully faithful people; however, such faith was not beneficial. No reason existed for human personality as well as no contemplation and gift. Third, divine mercy is equal to divine guidance for all people through wisdom, prophets' guidance, and holy books.

#### Divine meeting

“O man! Verily, you are returning towards your Lord with your deeds and actions (good or bad), a sure returning, so you will meet (i.e. the results of your deeds which you did).”

Thus, the main and final objective of creation is to meet God. Some believe that the meaning of meeting God is participating in resurrection scene.

#### Human and resurrection

One of important and crucial issues of human is resurrection. Human is interested in resurrection because of two reasons: first, human beings are naturally science seeker and truth seeker in particular about whatever is related to their lives. Human wants to know whether or not his life ends with death and there is another future life. He wants to know how the quality of transfer is from this life to another world. Finally, he seeks if he needs to provide the future life tools here or not. Responses to such questions can satisfy him[7]. Second, knowing the objective of life is highly regarded because it plays an important role in formation of human activities and actions. This is mainly because human who considers death as end of life regulates his behaviors in order to enjoy the most here. He only supplies his material requirement and enjoyment. On the contrary, if somebody believes in eternal life, he regulates his life in a way that his life is beneficial for the next future life. Hardships, with this opinion, of current world do not discourage him and he continuously tries to reach final perfection.

Thus, according to Quran verses, a world called resurrection after this world, considering the fact that almost one fifth of verses are about resurrection day, exists. This world is explained in Quran and there is even a Surah called resurrection. Resurrection has a close link with human reality[11].





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**Human in capitalism**

Capitalism is an economy system in which goods and service production and distribution are done with free market mechanism relying on individual originality, private ownership, and approval of indefinite personal freedoms. The highlighted characteristics of this system are production and distribution for profit. In capitalism, according to Deism philosophy, God is the origin of the world. He created the world according to some rules and regulations. The world continues to live automatically with such rules and regulations. After creation, no interference is made in the world. In other words, human behaviors are partially taken into account without considering the origin and resurrection.

The relationship between God and world is similar to clock maker and the famous clock in church, Strasburg, France. Although it is a master piece of its creator, it continues to work without interference[16]. These natural rules govern all natural phenomena including social and economic ones. Economic system tries to follow natural rules and regulations.

That the main justification of deists is human interference in the world after the initial creation means failure acceptance in creation process. Also, creatures` exclusions is in natural world. Deism philosophy leaves human beings in reed-bed of Whys with wisdom sufficiency to know human perfection and adversity as well as comprehension of all governing rules on human societies.

Capitalism defines human as a creature who tries to stimulate soul to enjoy and benefit. In other words, human effort in economic field is for gratification and carnal desires. Thus, each individual selects any more beneficial method or thing. The meaning of nature in capitalism is seeking maximum desire, belief in wisdom originality, self-orientation, detail-orientation, and profit seeker. Human wisdom helps him reach carnal desires[18].

In this outlook, economic human behaves based on economic intellectual principles. In other words, consumer position is to maximize desire and the position of manufacturer is to optimize production in order to maximize profit which are the basis of human behavior. To this end, individual profits and personal profit seeking are introduced as economic activity incentives.

So all human beings follow unified criteria and logic while selecting and making decision called intellectual behavior. In this type of behavior, objective and actions which need to be done are determined according to carnal desires and the role of wisdom is to show the obtaining methods in order to maximize enjoyment and personal benefit.

Thus, moral values such as altruism, loyalty, patriotism, fame-seeking, sacrifice, and dedication are replaced with personal benefits and profit seeking.

One of consequences of maximizing personal benefits and accepting the Deism philosophy was that employers kept their workers` wages in the minimum possible level for survival. So exploitation of worker who were the dominant population was common[6].

In the second half of the 19th century, Ashly conducted some researches concerning female and children working condition in coal mines. According to this report, female and children working hours reached 12 to 16 hours in mines and wells. Children used to start working in mines since they were six years old. In France, Villerme, in 1840, studied working condition in textile industry. In this report, daily working hour used to reach 16 to 17 hours in textile industry. Children who used to start work in this industry since they were 7 years old had to stand all day. Anti-sleep drugs were used in these factories to keep them awake. Wages were only sufficient enough for the family affairs until they were able to work.





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We can see that capitalism brought only ignorance and perdition, as well as oppression and injustice for the world. Nowadays, a religious ideology is felt more ever than before, showing guidance path to the mankind[8]. Prophet Mohammad (peace be upon him) stated that:” we did not come for collecting wealth, but were created for correct distribution of wealth.”

#### Human in Islamic economic system

Since economy is one of material aspects of life, it is necessary that material issues and their relation with spirituality be studied.

If Islam point of view is clear toward material issues, then the position of economy, as the most important material dimension of human life, is determinable and it can be discussed. In Imam Khomeini’s point of view, Islam enjoys both material and spiritual aspects; however, the basis is spirituality and materials can only be used as tool and path to reach spiritual values. Material are acceptable only if they are along with spirituality and Islam rejects materials without spirituality.

Islam value system has simultaneously paid attention to both this world and future life. The world is introduced as farm of the next life. According to this, any beneficial economic behavior within allowable Islamic values is desired. Islam does not leave moral values while reaching economic objectives such as removing poverty, creating welfare, and running justice because all these values are Islam objectives along with Islamic implementation. In fact, Islamic economic system is a collection of coordinated actions in which Islam has designed according to special basis in order to reach certain objectives.

Islamic economy is based on Islamic values and these values are rooted in Islamic social culture and traditions. Value system has its own principles in Islamic economy and these principles have close link with religious beliefs, morality, and spirituality.

In Islam economy system, human is the main axis and he forms the social economic activities. Human who is selected is responsible not only toward himself, society, and received gifts but also world improvement[16].

On the other hand, all human beings are brothers not equal in Islamic economic system. Human is a selector, teachable, and authorized creature with two dimensions, soul, and body. He is not affected by economic systems or internal interests and natural rules and regulations. He has different tastes such as material, spiritual tendencies and moral values, God-seeking nature, and perfection-seeking nature. Thus, obtaining maximum profit is not only logical intention of human activities but it is the basis of behavior and human movement in economy, justice, and benevolence. Also, if motivation is not well created, no system is able to reach its goals.

Personal and public benefit is not only considered bad but also been approved. It is accepted as a holy intention in creation, a strong and effective motivation on various economic activities as well as an essential component to reach progress and efficiency in economic system.

Effort to reach personal benefit does not devastate public benefits unless it exceeds some limitations or individuals do some necessary activities for creating a society where economic brotherhood and justice are considered as main objectives. When we consider being audited in front of God who is able for everything and we take the next life into account, a more advanced intellectuality is born. These two beliefs provide stronger motivations for beneficial activities for communities because personal benefit is given a longer and more long lasting outlook.

Both mentioned dimensions point out to the fact that personal benefit does not happen through optimizing the current world conditions but through optimizing resurrection day condition, too. That is why when an individual





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tries to increase his own benefit, he never thinks about short-term welfare but tries to privilege others in order to guarantee long-term welfare.

Although community interest is before individual's interest in Islam and sacrifice is highly desired in economic behaviors and actions in Islam, personal motivations are also accepted in Islam. They are directed through moral teachings in that God's satisfaction for helping people is obtained through economic and Halal activities.

Islamic view of human communities is not overviewed like materials community culture and spirit is independent from individual's culture and spirit. It enjoys more features[17]. In economic activities, Islam pays attention to social motives and taking care of community interests is more important than individual's ones. That is why Islam directs social motivations of Muslims by considering individual interests of people. Islam also values implementing them in which it prevents people from unacceptable activities by societies and encourages them to do beneficial activities.

## CONCLUSION

In Islam, none of human requirements is undoubtedly seen as objective but they are considered as tools for completing and promoting spiritual and sensual aspects. General view of Quran toward material and spiritual needs of human being is to guide and satisfy them and meet economic needs with efforts. This is because human beings have to meet their economic and basic needs to survive. Islam, which claims to manage all affairs, is a comprehensive, complete, and desired system for economic activities of human beings to meet basic needs where the basis of such system is individual's effort. Quran states: "And that man can have nothing but what he does (good or bad)" and it asks people to go and work hard for economic activities and requests the food from God. "Seek sustenance from Allah". The same Quran considers wealth and money collection as unlawful activity even through Halal activity. It promises torment for those who collect wealth. "Those who collect gold and silver and do not donate in charity activities are promised to painful punishment." This because there are the poor who are not able to do economic activities and their economic requirements needs to be met. So, Islamic system, despite other economic systems, values both real position of human beings and healthy and beneficial economy based on Islamic principles in order to lead to perfection of world and future life.

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