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RESEARCH ARTICLE

The Shear Failure Mechanism of Curved Girder

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ABSTRACT

Parametric studies have been carried out to investigate the shear failure mechanism of curved I-shape steel plate girders. The finite element software ABAQUS is used for modeling; its accuracy was controlled through comparison with experimental and numerical results of other researchers. According to the results, presence of the residual stress will not be effective on load-displacement behavior in the elastic range. Yet, the effect of residual stress is visible with nonlinearizing the behavior of structures. The results show that by considering the reduction in shear strength due to residual stresses, one can determine the shear strength of curved plate girders with a reasonable accuracy. The regulations of AASHTO predict reasonably the shear strength of curved plate girders with regard to tension field action.

Keywords: Curved Plate Girders, Failure Mechanisms, Shear Failure, Finite Element Model, Residual Stress;

INTRODUCTION

Need for move smoothly, traffic and limitations of the direct route, economic and environmental considerations, and the emphasis on beauty have increased the use of curved bridges (Davidson, 2010). As curved bridge is the only choice designed to keep the speed of vehicles in the limited space of urban traffic, it has a large share of America's bridges. In this way, it includes about 25 percent of steel bridges in early 1990 (Linzell et al., 2004) and about 30 percent of bridge under construction in 2004 and 2005 (Linzell et al., 2004; Hartmann, 2005).Within the span of the conventional plate girders, the main task is to keep the wing of plate girders at a proper distance. In order to enhance the bending strength of plate girders, designers prefer to use high altitude plate girders. In spite of high shear force, curved beams usually bear the force near the base of support. For this purpose, curved beam design is generally carried out by buckling constraints (Davidson, 2006). The buckling of curved beams in straight girders, which has bifurcation buckling behavior, is is under investigation by taking into account the appropriate boundary conditions. In curve plate girder, buckling behavior of beam is more complex. First, beam is distorted due to the curvature of the torsion girder. Second, the curvature causes transverse nonuniform deformation of beam. Lateral distortion causes nonlinear distribution of longitudinal stress resulted from bending around strong axis in the height of beam plate. Simpson notes that with nonlinearization of distributing stress in beam, the tolerated anchor is reduced by beam plate; therefore, longitudinal stress in the wings of curved plate girder increases (Simpson, 2000).

Review of Literature

A beam plate panel surrounded by wings and hardening would have significant post-buckling strength because of tension field action. Bearing of curved beam does not end with its shear buckling, but bearing mechanism changes and diameter tension is created in the beam of plate and tensile field forces are absorbed by the wings and hardening. The process is called tensile field action. A sample of tensile field action is shown in Figure (1). Although post-buckling behavior of plates was identified in 1886, using strength after buckling in the design of beam of straight girders have proposed in 1960. The first study on the stability of cylindrical shells with hardening and under pure shear was conducted by Batdorf in 1947 (Batdorf, 1947). Then, Stein and Fralich (Stein and Fralich, 1949) and Stein and Yeager (Stein andYeager, 1949) conducted other researches in 1949. Generating Stein and Yeager' studies, Mariani et al (1973) investigated buckling of curved plate with some hardening under pure shear; they presented new relationships for determination of hardening distances. These examinations provide a ground for adjusting hardenings of curved plate girders beams. Mentioned investigations indicate that curved panel-buckling load is more than its equivalent flat panel-buckling load (Davidson, 2006).

Mozer et al conducted experiments on post-buckling strength of curved plate beams as a part of CURT project. The results of this experiment indicate that post-buckling strength reduces by increasing beam curvature. However, this decrease is reported about 10%, which according to Davidson (Shanmugam, 2003), it can be considered as the test and measurement error. Similar experiments were conducted in Japan in terms of shear behavior of curved panels. In this regard, one can note the studies of Nakai et al in 1984. In these experiments, the researchers concluded that curvature has little effect in shear-buckling load. However, it was mentioned that the curvature girder causes the reduction of ultimate shear strength. In 1999, Lee and Yoo show that curved panel of beam, the same as flat panel, has significant post-buckling strength. Davidson [15] conducted a study similar to Lee and Yoo's study and reported the same results.

Davidson showed out-screen displacement from the beginning of loading in curved panels under shear; thus, buckling behavior would not be bifurcation. In 2002, Zureick et al have reported the results of studies on four curved girders in actual dimensions. The experiments were carried out to test the shear behavior and ultimate strength of curved girders. The results of these experiments were used by other researches. Shanmugam et al presented an

experimental study with numerical modeling of the ultimate strength of curved girders. According to this study, increasing curvature causes generally the reduction of ultimate shear strength of girders. However, they state about conventional curvatures used in curve bridges that the curvature is as long as it does not have tangible effect on shear strength. This study shows clearly the tensile field action in curved girders, especially in curved girders with thin beam. In addition, according to this investigation, beam failure is transformed to a situation between shear and deflection in large bends.

In 2006, Jung and White (Jung and White, 2006) selected finite element model of Zureick et al and conducted their parametric studies after testing this model. Two important results were reported from these experiments. First, the available standards in the regulations of bridge design with load and AASHTO (American Association of State Highway and Transportation Officials) strength coefficients method predict properly the ultimate shear strength of curved girders by considering the buckling behavior. It is noteworthy that one should observe regulations $d_0 / D \le 3$ ، $D / t_w \le 160$ ، $d_0 / R \le 0.10$ to meet the objective. In these regulations, d_0 is arc length between stiffeners, D is the height, t_w is beam thickness, and R is the radius of the curved girders. Most real projects comply with the requirements. The second result of this study is related to the interaction of bending moment and shear force. It is noted in this regard that straight and curved girders designed by AASHTO regulations [18] do not need considering the interaction of bending moment and shear force. In 2007 and 2014, Jung, Duke, and others (Duk Kim et al., 2007; Kim and White, 2014) proposed terms and details of the new design for designing transverse stiffeners of tensile field action with reference to the final approval of the buckling behavior of curved girders.

Research Objectives

Due to the necessity to control the strength of the bridge at all stages of construction (AASHTO LRFD Bridge Design Specifications, 2010), parametric studies of this research have been carried out evaluate the strength of horizontally curved steel girders in non-composite status. For this purpose, in addition to evaluation of the effect of residual stress on the shear strength, shear strength obtained from the numerical simulation are compared with results of regulation AASHTO (AASHTO LRFD Bridge Design Specifications, 2010) to get familiar with the shear design of curved girders. Simulation and analysis are performed using software ABAQUS V.6.10 (2010) and their accuracy is controlled through comparison with experimental and numerical results of other researchers. It is noteworthy that both geometric and material nonlinear behaviors are considered in all analyzes.

Finite Element Method Modeling and Verification

For verification of modeling process, sample S2 from Jung and White's numerical and experimental study is selected. In the referred study, Jung and White simulated experimental model of four curved girders in ABAQUS software; then, they studied parametric study on shear strength of curved girders after verification. According to evidence presented in the paper, element S4R was used for modeling of girder components and element T3D2 was used for cross frames. Experimental model and general features of S2 curved girder are shown in Figure 2. According to Figure (2-B), points below compressive hardener at 1L section in the wing are fixed against displacement to implement supporting situation. At 2R section, after fixing radial deformation spring element with infinite compressive stiffness was used for vertical restraints and zero tensile stiffness was used for investigating ascendance of curved girder. Nonlinear spring element is used for modeling the mentioned spring. The end of cross frame is fixed in all three tangential, radial and vertical directions. Transverse frames are cylindrical sections with a nominal radius of 101.6 mm and 1802 mm square cross-section. As seen in Figure (2-D), the effect of residual stresses in the model has been applied to construct the actual situation. Other details of the modeling including material properties, amount of initial geometric imperfection, and stiffener dimensions are presented in the reference.

After simulation of the experiment, the geometric and material nonlinear analysis using the Riks [22] method was performed. Figure (3) shows variations diagram of shear force of middle panel versus displacement in the plate of curved girder under 3P load. It is observed that the results of finite element analysis have a very good agreement with experimental results of finite element analysis having been carried out by Jung and White (Jung and White, 2006). In addition, analysis of results shows that maximum load difference of this article is limited with numerical and experimental results in about 2% and 4% respectively. These prove the acceptable performance of finite element analysis software in modeling of numerical and experimental behaviors. Due to verification of process of shear failure mechanism of curved plate girder, experimental model of Jung and White (Jung and White, 2006) was selected as the base of studies; then, parametric studies have been conducted with changing the thickness of the section. It should be noted that analysis of the constructions have been carried out under the influence of construction weight and concentrated loads.

MATERIALS AND METHODS

Geometric Features and Details of the Models

In parametric studies, some models of curved girders were created according to Jung and White experimental model (Jung and White, 2006) to meet the objectives of the research. In all models, curved girders have curvature radius of 36.58 meters and an arc length of 11.58 meters. Geometric dimensions of the components of the model are shown in Table 1. Note that the Model A is Model S2 in white and Jung studies. In order to investigate the effect of residual stresses on the shear strength and the accuracy of regulation AASHTO, this research examines each of the four models (Models A to D) with and without considering analyzed residual stresses; the results were compared to relations of regulation AASHTO. For all models, the first buckling mode is regarded as primary geometric failure with the maximum size of 5 mm. other details of modeling including material properties, hardening measures, the residual stress distribution, and supporting and loading conditions are selected according to reference (Jung and White, 2006).

Material Properties

Materials used in the manufacture of girder components are regarded the same as experimental results of reference (Jung and White, 2006). True stress-strain curve of steel is required for evaluation of calculations and proper modeling of materials behavior by ABAQUS software. According to Figure 4, engineering stress-strain curve of girder wing is presented as a sample based on data obtained from tensile sample tests in laboratory. Finally, it is introduced to the software by changing it to multiline and true stress-strain curve. Table 2 shows a summary of the parameters necessary to define the stress-strain curve of materials wing and girder beam. It is noteworthy that the method determining true stress-strain curve are stated based on data obtained from tensile tests in references (Jung and White, 2006; Hartmann, 2005).

DISCUSSION AND CONCLUSION

After building and analysis of models according to the process described in section 2 and 3, cutting changes are depicted in the vertical deflection for models A to D in Figures 5 to 8. Reviewing process of modeled shear failure shows that in the elastic range, the behavior of the models with and without the effect of residual stress is the same. With increase in load and nonlinearity of construction behavior, the effect of residual stress will be visible. In its following and with fulfillment of ultimate load and formation of yield sectional band in beam, as shown in Figure 9, their bearing ends. Review of Table 3 shows that considering the effect of residual stress causes 2 percent reduction of shear strength in comparison with residual non-stress. In this regard, one can determine shear strength of curved girders in research activities without taking into account the restrictive reduction of strength. Moreover, relations of regulation AASHTO (parts 6.10.9 of regulation) predict shear strength of curved girder with reasonable accuracy.

However, increasing beam thickness, or reducing beam thinness (D/t_w) changes the shear failure of soft section to shear brittle fracture; thus the provisions are regulated more carefully.

The most important results of this study can be summarized as follows:

1. According to the results, the behaviors of load-displacement in elastic range for models of with and without the effect of residual stress are the same with great care. With non-linearization of construction behavior, the effect of residual stress is observable.
2. The results show that one can determine shear strength of curved girders in research activities without taking into account the restrictive reduction of strength.
3. Relations of regulation AASHTO predict shear strength of curved girder with reasonable accuracy. However, increasing beam thickness (D/t_w) changes the shear failure of soft section to shear brittle fracture.

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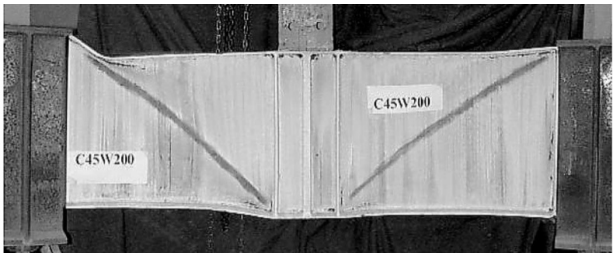
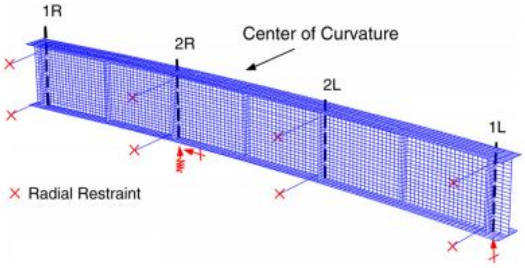
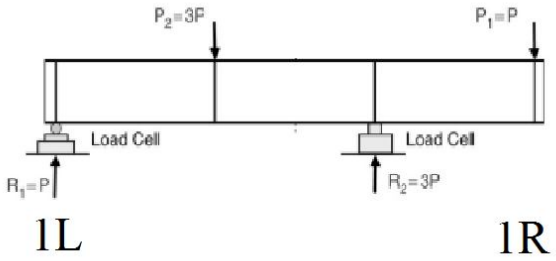


Figure 1: Tensile field in curved plate girder (Shanmugam, 2003)

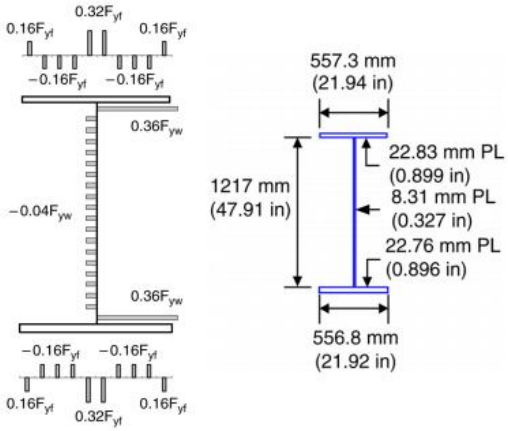
2-A) Experimental model of curved girder



2-B) Supporting situation



2-C) Loading way



2-D) The size of the girder section and the way of residual stress implementation

Figure 2: Characteristics of curved girder in the numerical and experimental studies of Jung and White (Jung and White, 2006).

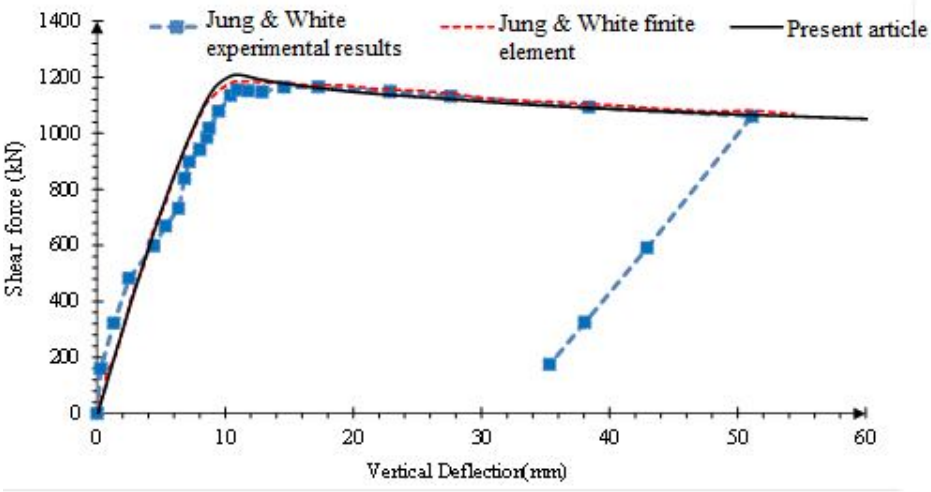


Figure 3: Comparison between results of finite element in present study and experimental and numerical results of Jung and White

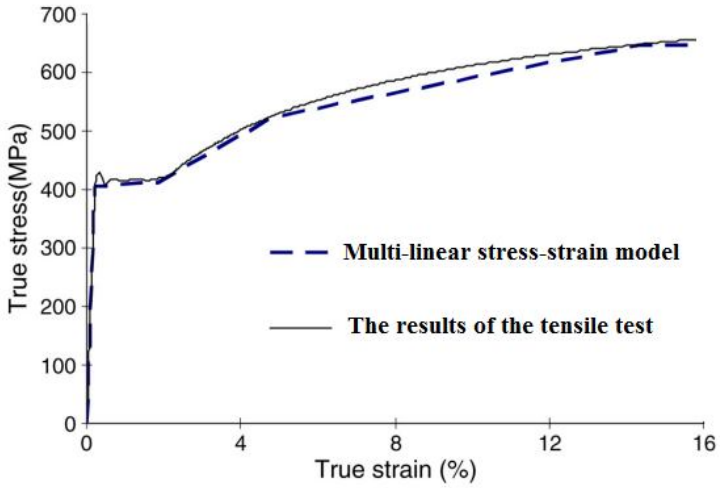


Figure 4: Stress – strain diagram of steel used in parametric studies

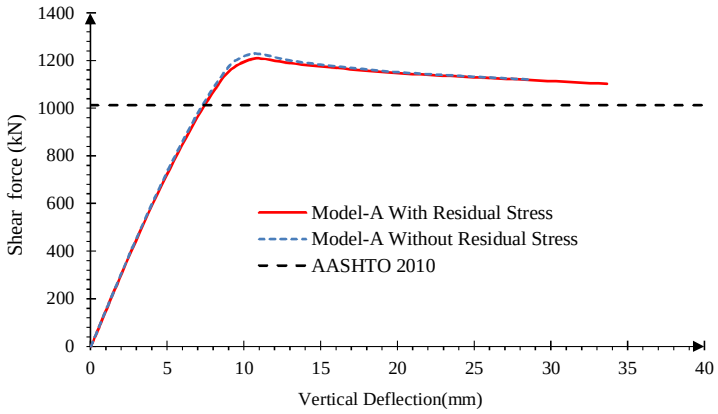


Figure 5: Variations of midspan shear versus deflection under load 3P for Model A

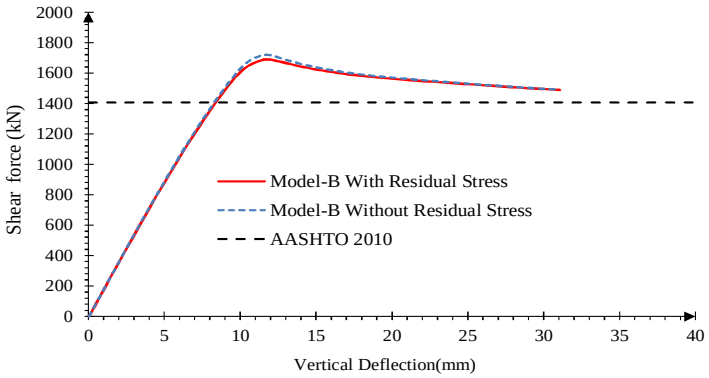


Figure 6: Variations of midspan shear versus deflection under load 3P for Model B

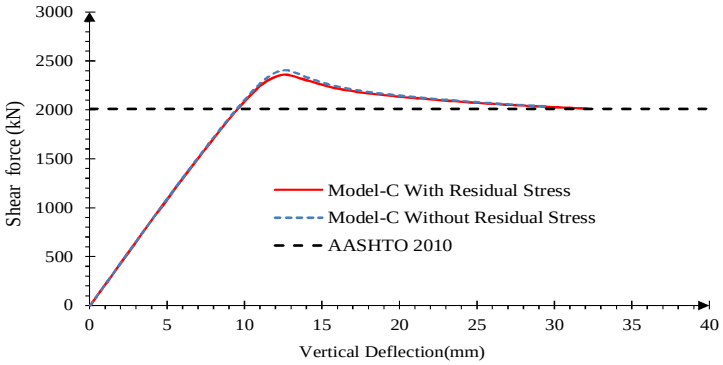


Figure 7: Variations of midspan shear versus deflection under load 3P for Model C

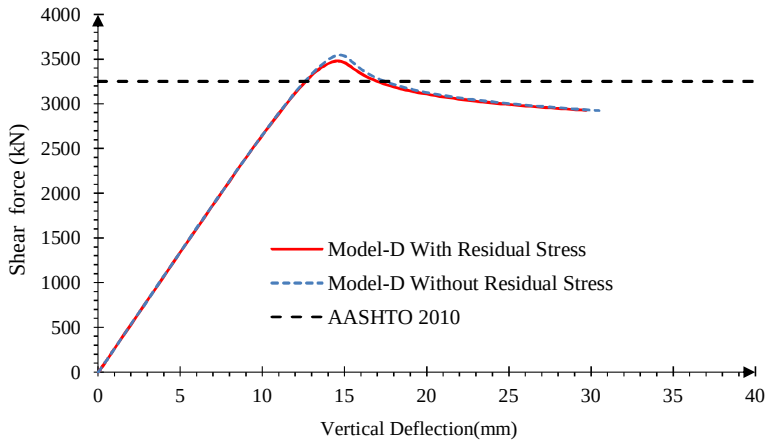


Figure 8: Variations of midspan shear versus deflection under load 3P for Model A

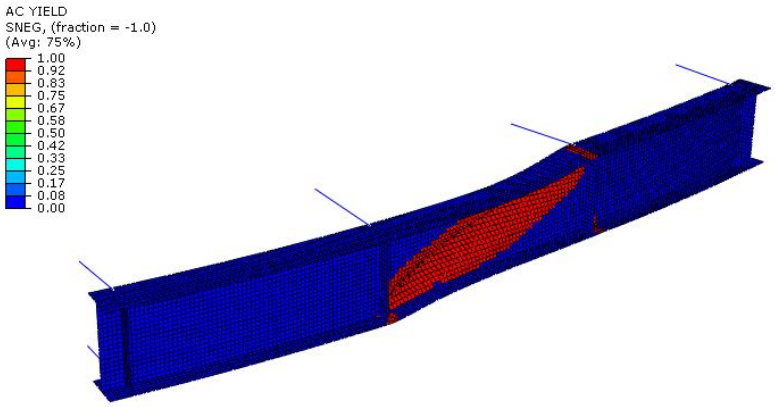


Figure 9: Shear failure mechanism of curved girder model (A) and formation of yield sectional band in beam

Table 1: Geometric measuring of components of parametric studies model

Row	Observed model	Compressive wing of girder		Tensile wing of girder		Beam of girder		
		bft (mm)	tft (mm)	bfc (mm)	tfc (mm)	D (mm)	tw (mm)	$\frac{D}{t_w}$
1	A	557.30	22.83	556.8	22.76	1217	8.31	146.45
2	B	557.30	25	556.8	25	1217	10	121.70
3	C	557.30	30	556.8	30	1217	12	101.41
4	D	557.30	35	556.8	35	1217	15	81.13

Table 2: material properties of curved girder components, resulted from experimental results of reference (Jung and White, 2006)

Target item	E (GPa)	Static Fy (MPa)	Est (GPa)	ε_{st} (%)	Fu (MPa)	ε_{u} (%)
Beam of girder	202	411	3.36	1.87	564	15.6
Wing of girder	205	397	3.61	1.90	562	15.4

Table 3: Comparison of shear strength of curved girder, resulted from analysis of finite element and the regulation AASHTO 2010

The model	Shear strength of curved girder (kN)		
	AASHTO Regulation	Finite Element(The effect of residual stress)	Finite Element(Without the effect of residual stress)
A	1012.54	1209.13	1228.48
B	1406.81	1690.08	1719.66
C	2009.55	2359.96	2406.37
D	3251.47	3478.77	3546.64

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RESEARCH ARTICLE

Designing a Knowledge-Based After-Sales Service Organization Model(Case Study: GoldiranCompany)

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ABSTRACT

A knowledge-based after-sales service organization model is designed in this work for GoldiranAfter-sales Company. To this end, McKinsey 7S modelwas used to examine the organizational structure, systems, strategies, skills and competencies, strategic style, staff and shared values in knowledge-based after sales service companies in the view of staff of Goldiran. Also, regarding statistical samples and sampling methods in this research, the number of collected questionnaires from first statistical population using purposive sampling was 70 and the number of questionnaires collected from second statistical population was 41, which in this section, samples are described separately and then results of structural equation modeling are given for first statistical sample and research model and effective variables are provided. Finally,Kolmogorov-Smirnov test, t- student test, and Friedman test is performed for 41 questionnaires collected from first statistical population, and the results are described and analyzed for Goldiran after-sales Service Company.

Keywords: Knowledge management, McKinsey 7S model, Goldiran Company.

INTRODUCTION

Since beginning of 21th century, the world witnessed knowledge-based economy. In agricultural era, use of land and labor force and wealth making through the land was axis for economic activity and gaining power. In industrial era, land resources were combined to human resource and capital and now it is found it is the knowledgeand wisdom which makes difference and it is regarded as great and endless wealth and power of the states and nations.After

passing various revolutions, the world has witnessed information and information technology revolution in which the knowledge is the valuable source of wealth, income and power creation, and its increasing significance in wisdom era has led to formation of knowledge-based economy. Knowledge-based economies have created considerable changes in economic, social, and technology conditions of the communities. In knowledge-based economy, the knowledgeis the main driving force of growth, wealth creation, and employment in all fields of activity. Based on this definition, knowledge-based economy is not only dependent on limited numbers of industries based on advanced technology, rather all economic activities in this type of economy are somehow dependent on the knowledge. Even such activities as mining and agriculture are regarded as old economy. Theoretical situation of knowledge, the way of interaction and events in outside world such as speedy trend of convergence to markets, globalization, higher competition and considerable growth in information and communication technology provide ground for formulating a model of this development paradigm. knowledge-based economy has changed all areas of commerce and globalization, information and communication technology, knowledgemanagement, structural change in economy, changes in work place and force, increased selection right for consumers, making small size of government and e-business (e-commerce) and knowledge-based organizations.

Significance of Study

Today customers demand something more than their respective values, although they value cheapness, if they put value on convenience and speed in purchase; they expect more convenience and speed. If they pay attention to the artistic aspect of the products, they want to see manifestation of art in the products. If they want expert guides, they tend they are treated intimately, accurately, and patiently so that they feel they are the sole customer of the institution. Today any limit is imagined for the customer demands; it would be even more surpassed. Essentially service was developed when satisfaction was increased in manufacturing and distributinginstitutions. In 1969, manufacturing and distributing institutions thought to provide some services along with the products (after-sales service, service during sales) so that they both make satisfy their customers and increase their sales, leading to higher profit. Since then the manufacturing and distributing companies attempted to provide more and better services, and gradually services formed so that today it is appears in various forms. Today, services are especially developed in developed countries. There are many service institutes in these countries which provide service measures in the best way.

Since after-sales service has turned to as one of the main axes of competitive advantage for manufacturing companies, such competition leads to increased expectations so that after-sales service companies always should think of innovation and using novel management and design frameworks in the organization. Thus, this research work is significant in terms of modeling a new concept known as knowledge-based organization in after-sales service companies and organizations.

Research Objectives

The main objective of the research is identifying aspects and structural, process, content and form components of a knowledge-based organization and its compatibility to an after-sales service organization active in Iran. Minor objectives of the research include:

- Identification of the best structure fitted to after-sales Service Company to achieve knowledge-orientation
- Identification of the most suitable working system and business processes in this company to making it knowledge-based
- Introduction and investigation of the most suitable strategy in a knowledge-based organization and shared values in it
- Identification of skills necessary for turning into a knowledge-based service organization in Iran
- Understandingsuitable and qualified staff for working in a knowledge-based organization
- Investigation of information and communication technology quality in knowledge-based organization

Research Questions

1. What are suitable goals and strategies in knowledge-based after-sales service organization?
2. What changes should be made in operational processes to achieve knowledge-based after-sales service organization?
3. Is change in organizational culture needed to turn into a knowledge-based after-sales service organization?
4. What is suitable infrastructure in a knowledge-based after-sales service organization?
5. What changes should be made in human resources achieve a knowledge-based after-sales service organization?

DEFINITION OF TERMS

After-Sales Service

After-sales service includes service which is provided by the producer after selling the product for gaining confidence and satisfaction of the customer. This service includes transport and installation, repair and maintenance, supply and distribution of spare parts, documentation of training, how to use and guarantees, etc. (Koffin, 1998). In the other definition, it is all affairs which are performed by the company after selling the products in order to attract satisfaction of customers and help them to receive highest value from the products or purchased services (Rousta, 2001). In this research, after-sales service of audio-visual and air conditioning appliances is considered as the operational definition.

Knowledge Management

Knowledge is the real asset of organizations which attempt to have successful presence in competitive global arena and systems integration and their organizational values and resources. Knowledge management deals with technical tools and multiple human values. Thus, it can represent how intelligent and learning organizations can redesign their processes using a knowledge-based approach. Academic and commercial communities both believe that knowledge-based organizations can preserve their long-term superiorities in competitive areas. Competitive outlooks of the organizations indicate influence of this view in strategic areas of the commercial organizations (Nelson and Winter, 1992). It is evident that basic knowledgeis often the distinguishing factor between data, information and knowledge. It is one of the reasons that some institutes or companies can preserve their economic and competitive superiorities in the knowledge-based space and environment. Thus, knowledge-based organizations have positive approach in knowledgecreation, increasing added value, and disseminating information. Cohen and Levinthal described that developing knowledge isdependent on motivation for learning previous knowledge (Lao and Wang, 2003).

Aspects of 7S Framework

Aspects of structure, strategy, and systems are called hard aspects and aspects of style, staff, skills, and shared values are known as soft aspects. Hard term is used in the sense that its concepts are objective, tangible, practically and easily defined. The soft term is used in the sense that its concepts are intangible, impractical, and hardly defined and described. Hardware can be defined more easily and management can directly influence them which include documentations of strategy, organizational chart, reporting structure and reporting. On the other hand, software can be defined hardly and they are less tangible and influenced by the culture, and role of management is less in them. It should be noted these factors are important and effective to achieve success.

Data Collection Method

One of the main steps in research is data collection. Needed data can be collected in different ways. There are various tools such as observation, interview, questionnaire, documents, etc. for data collection. Each of tools has some

advantages and disadvantages which should be taken into account so that reliability of research is not disturbed and strength of the tool is promoted.

Statistical Population and Sample
Statistical Population

Two research populations were used in this work. First statistical population includes all staff in companies active in home appliances which the questionnaire was distributed in the selected sample for determining model using structural equations. Total number of the population is not clear due to unavailability of information for all active companies. in the second statistical population, the focus is on the staff in Goldiran after-sales service company. Considering research statistical population should have suitable education or working experience, total number of qualified staff is estimated as 49.

Sampling Method

Sampling means selection of a number of people, events, and objects from a defined population as representative of the population. In fact, sampling includes selection of percentage of the population as its representative (Delavar, 2007). In this research, purposive sampling is used for selecting sample from first statistical population. Simple random sampling is used for sampling from second statistical population.

Sample Size

Considering the number of population was not clear in first statistical population and sampling method was purposive, and given data taken from this population would be used for determining research model using structural equations, the sample size was specified fitted to structural equation method. In structural equations, in order to obtain appropriate model fit, at least 3 samples should be selected per questionnaire items. Considering research questionnaire includes 21 items, the first sample size should be at least 63. Sample size for the second statistical population was estimated as 41 using Morgan Table with error percent 0.05.

Validity of Questionnaire

Content validity approach was used to determine questionnaire validity. In order to ensure validity of the questionnaire, content validity was used. To ensure content validity, the tool should be constructed i
n such a way that constituent items represent content of selected parts. Thus, content validity is characteristic of tool structure which is included with test formulation. In this research, the questionnaire was designed based on theoretical principles and review of literature, and it was modified according to expert ideas. Considering t-student statistics shown in Fig 3-2, it is larger than 1.96 for all indexes, thus null hypothesis is rejected. That is, above relationships are significant.

In order to investigate significance of the whole mode, investigation of model fit criteria indicates that model has good fit. Thus, indexes could describe research variables appropriately.

Reliability of Questionnaire

In this research, Cronbach alpha coefficient was used to estimate reliability of questionnaires. Authors often useCronbach alpha coefficient for measuring reliability of questionnaires with multiple choices.Cronbach alpha coefficient is calculated using following formula:

$$\alpha = \frac{k}{k-1}\left(1 - \frac{\sum s_i^2}{s_{sum}^2}\right) \quad (1)$$

Where, k is the number of questionnaire items, s_i^2 is variance of i^{th} item, and s_{sum}^2 is variance of total items.
Reliability test was performed for 20 samples from first statistical population. As observed, Cronbach alpha for all variables is larger than accepted level (0.7), thus it can be stated the questionnaire has acceptable reliability.

Inferential Statistics
Investigation of Relationship between Variables Using Structural Equation Model

Considering tests of structural equations it is observed there are significant relationshipsbetween research variables as following table. Structural equation model indicates impact of variables of strategy, structure, system, shared values, style, and staff on skills variable. As observed, t-student diagram indicates variables of strategy, system, shared values and staff have significant impact on skills variables. However, variables of structure and style have no significant impact. Of effective variables, impact of shared values variable is stronger than other variables.

Following diagram indicates significant mutual relationships between variables using bold lines. One-way relationships are specified using dotted lines. Also, it can be observed there is no relationship between style and skills variables.

Investigation of Strategy Variable

Normality tests were run for strategy variable and its related indexes. Results of the test indicate strategy variable has normal distribution, but none of its indexes has normal distribution and in order to examine significance of this variable, t-student test is used, since significance level for this variable is smaller than error value 0.05, null hypothesis is rejected. It can be concluded variable of strategy is significant. In other words, variable of strategy is important.

Ratio Test for Indexes of Strategy Variable

In this section it is examined if indexes of strategy variable are important or not. Since significance level for indexes of strategy variable is smaller than error value 0.05, null hypothesis is rejected. It can be concluded indexes off strategy variable are significant. In other words, they are important. Thus, firstly, environmental investigation is in agenda of knowledge-based after-sales service organization, and secondly, coherence and coordination between organization units and organizational goals are highly emphasized in the knowledge-based after-sales service organization.

Investigation of Structure Variable

Normality tests were run for structure variable and its related indexes. Results of the test indicate structure variable has normal distribution, but none of its indexes has normal distribution and in order to examine significance of this variable, t-student test is used, since significance level for this variable is smaller than error value 0.05, null hypothesis is rejected. It can be concluded variable of structure is significant. In other words, variable of strategy is important.

Ratio Test for Indexes of Structure Variable

In this section it is examined if indexes of structure variable are important or not. Since significance level for index of “structural renewability is common in knowledge-based after-sales service organization” is smaller than error value 0.05, thus null hypothesis is rejected. It can be concluded this index is significant. But, indexes of “organization structure of a knowledge-based after-sales service organization promotes informal relationships” and “diminishing inter-organizational boundaries is emphasized in knowledge-based after-sales service organization” are not significant.

Investigation of System Variable

Normality tests were run for system variable and its related indexes. Results of the test indicate system variable has normal distribution, but none of its indexes has normal distribution and in order to examine significance of this variable, t-student test is used, since significance level for this variable is smaller than error value 0.05, null hypothesis is rejected. It can be concluded variable of system is significant. In other words, variable of strategy is important.

Ratio Test for Indexes of System Variable

In this section, it is examined if indexes of system variable are important or not. Significance level for indexes of "defining and implementing inter-sectorial projects is emphasized in knowledge-based after-sales service organization" and "information and communication technology is used in knowledge-based after-sales service organization" is smaller than error level 0.05, null hypothesis is rejected and it can be concluded both indexes are significant. But index of "knowledge-based after-sales service organization attempts to deregulate and update existing regulations" is not significant.

Investigation of Shared Values Variable

Normality tests were run for shared values variable and its related indexes. Results of the test indicate shared values variable has normal distribution, but none of its indexes has normal distribution and in order to examine significance of this variable, t-student test is used, since significance level for this variable is smaller than error value 0.05, null hypothesis is rejected. It can be concluded variable of strategy is significant. In other words, variable of shared values is important.

Ratio Test for Indexes of Shared Values Variable

Significance level for indexes of indexes of "continuous learning culture and learning from each other is common in knowledge-based after-sales service organization" and "importance of knowledge staff role is stressed in knowledge-based after-sales service organization" is smaller than error value 0.05, thus null hypothesis is rejected. It can be concluded these indexes are significant. But, index of "necessity for trust making among coworkers is emphasized in knowledge-based after-sales service organization" is notsignificant.

Investigation of Style Variable

Normality tests were run for style variable and its related indexes. Results of the test indicate style variable has normal distribution, but none of its indexes has normal distribution and in order to examine significance of this variable, t-student test is used, since significance level for this variable is smaller than error value 0.05, null hypothesis is rejected. It can be concluded variable of structure is significant. In other words, variable of style is important**.**

Ratio Test for Indexes of Style Variable

Significance level for indexes of index of "customer needs are taken into account in knowledge-based after-sales service organization" is smaller than error value 0.05, thus null hypothesis is rejected. It can be concluded this index is significant. But, indexes of "trust-orientation is emphasized instead of control-orientation in knowledge-based after-sales service organization" and "transparency and openness is common in knowledge-based after-sales service organization" are not significant.

Investigation of Staff Variable

Normality tests were run for staff variable and its related indexes. Results of the test indicate staff variable has normal distribution, but none of its indexes has normal distribution and in order to examine significance of this variable, t-student test is used, since significance level for this variable is smaller than error value 0.05, null hypothesis is rejected. It can be concluded variable of structure is significant. In other words, variable of staff is important.

Ratio Test for Indexes of Staff Variable

Since significance level for indexes of staff variable is smaller than 0.05, null hypothesis is rejected and it can be concluded indexes of staff variable are significant. In other words, they are important.

Investigation of Skill Variable

Normality tests were run for skill variable and its related indexes. Results of the test indicate skill variable has normal distribution, but none of its indexes has normal distribution and in order to examine significance of this variable, t-student test is used, since significance level for this variable is smaller than error value 0.05, null hypothesis is rejected. It can be concluded variable of structure is significant. In other words, variable of skill is important.

Ratio Test for Indexes of Skill Variable

Significance level for indexes of indexes of "team-orientation and shift toward team making is common in knowledge-based after-sales service organization" and "horizontal participation instead of vertical decision making is common in knowledge-based after-sales service organization" is smaller than error value 0.05, thus null hypothesis is rejected. It can be concluded these indexes are significant. But, index of "freedom of action of staff is stressed in knowledge-based after-sales service organization" is not significant.

Prioritization of Research Variables Using Friedman Test

Results of Friedman test are given in Tables 3 and 4 for ranking research variables.

Chi square statistics and calculated sig level indicate H0 is rejected at sig level 0.05, and it can be stated there is significant difference between research variables.

Table 4 indicates staff variable has highest importance and structure variable has lowest importance.

Diagram 3 indicate relative situation of each index versus other indexes.

DISCUSSION AND CONCLUSION

As explained, McKinsey *7S model was used in this research for* knowledge-based after-sales service companies. Model variables include organizational structure, systems, strategies, skills competencies, strategic style, staff, and shared values. Research findings indicate:

1. Organizational strategies should be knowledge-based in knowledge-based after-sales service company, thus:

- Environmental examination is on agenda of knowledge-based after-sales service organization.
- Organizational goals are emphasized in knowledge-based after-sales service organization

2. Organizational structure should be made knowledge-based in knowledge-based after-sales service company, thus:

Organizational structure of a knowledge-based after-sales service organization does not promote informal relationships.

- Structural renewability is common in knowledge-based after-sales service organization.

3. Organizational systems should be made knowledge-based in knowledge-based after-sales service company, thus:
- Knowledge-based after-sales service organization does not act for deregulating and updating existing regulations.
- Information and communication technology is used in knowledge-based after-sales service organization.
4. Shared values should be taken into account in knowledge-based after-sales service company, thus:
- Necessity of trust making among coworkers is stressed in knowledge-based after-sales service organization.
- Importance of knowledgestaff role is emphasized in knowledge-based after-sales service organization.
5. Organizational styles should be taken into account in knowledge-based after-sales service company, thus:
   Trust-orientation is not emphasized instead of control-orientation in knowledge-based after-sales service organization.
- customer needs are taken into account in knowledge-based after-sales service organization
6. staff of the organization should be considered in knowledge-based after-sales service company, thus:
- Staff innovation and creativity is taken into account in knowledge-based after-sales service organization.
- Staff empowerment is taken into account in knowledge-based after-sales service organization.
7. Organization's skills should be considered in knowledge-based after-sales service company, thus:
- Staff freedom of action is not considered in knowledge-based after-sales service organization.
- Team orientation and shift to team making is common in knowledge-based after-sales service organization.

Recommendations

Those who are familiar to business space in the organizations in today highly competitive world are well aware of the fact that organizations are considerablychanging. Two major pressures on the organizations include speed of product entry to the market and competitors' imitation for the same product. The organizations who hesitate in such competition would be eliminated from the arena. Lack of long term commitments among organization and staff is the other factor which causes constant challenge and concern for the staff regarding their job status. Relegation of authority has gained a different form today and the era of commanding and sever controls has been ended in most organizations. All of these challenges have caused that the organizations are placed in a space totally different from the past ad even different from 10 years ago. Organizational learning can be used as a strategic source in emerging knowledge-based companies to gain and preserve competitive advantage. Paying attention to organizational learning denotes individual synergy which is known as group learning, and at the same time, special attention is paid to different levels of organizational learning (individual and group level) and the whole organizational level.One of the main points in front of today organizations is absorption and retention of intelligent people in the organization. It is a simple fact that success of business is dependent on intellectual power of a relatively limited number of highly knowledge staff. This group is individuals who can perform planning, organization, leadership, analysis management, conceptualization, strategy making, decision making, innovation, training, advising and describing ideas.To survival in competition, small knowledge-based companies require endless creation and recreation of knowledge and knowledge has become a source of value making and sustainable competitive advantage. Knowledge creation and its management are regarded as abilities of knowledge-based companies to success and survival.

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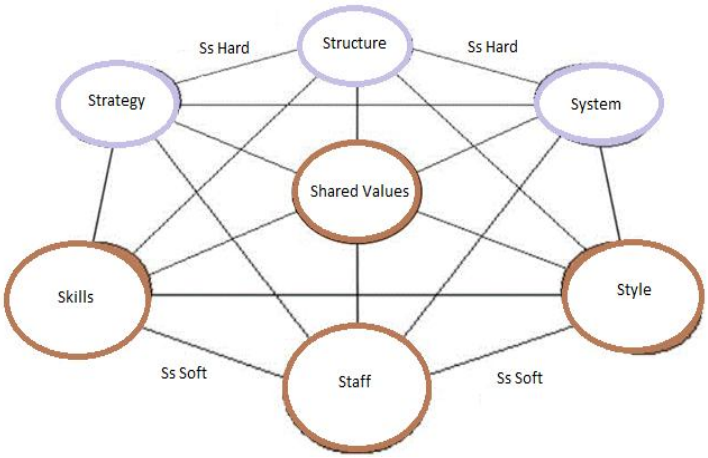

Diagram 1: McKinsey *7S model*

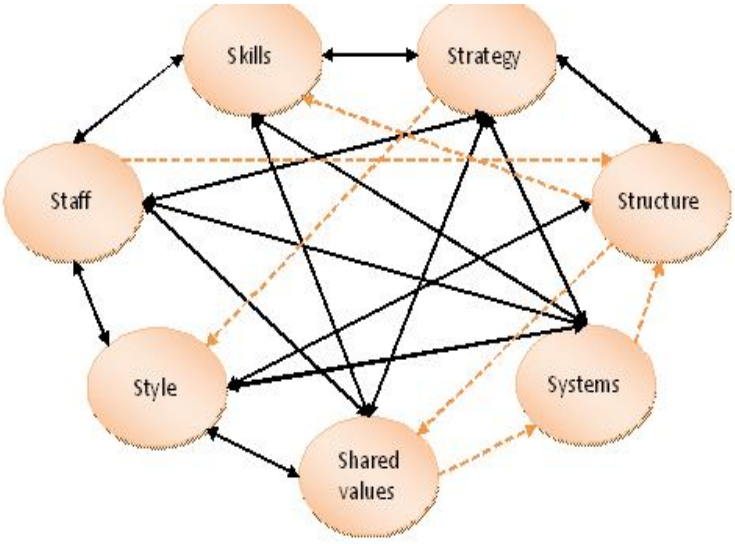

Diagram 2: Results for structural equations test

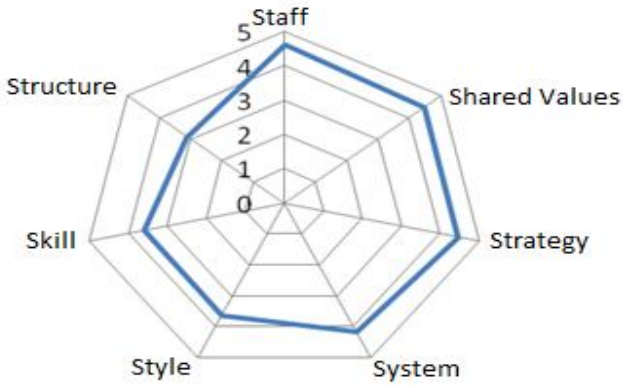

Diagram 3: Diagram of mean rank for research variable

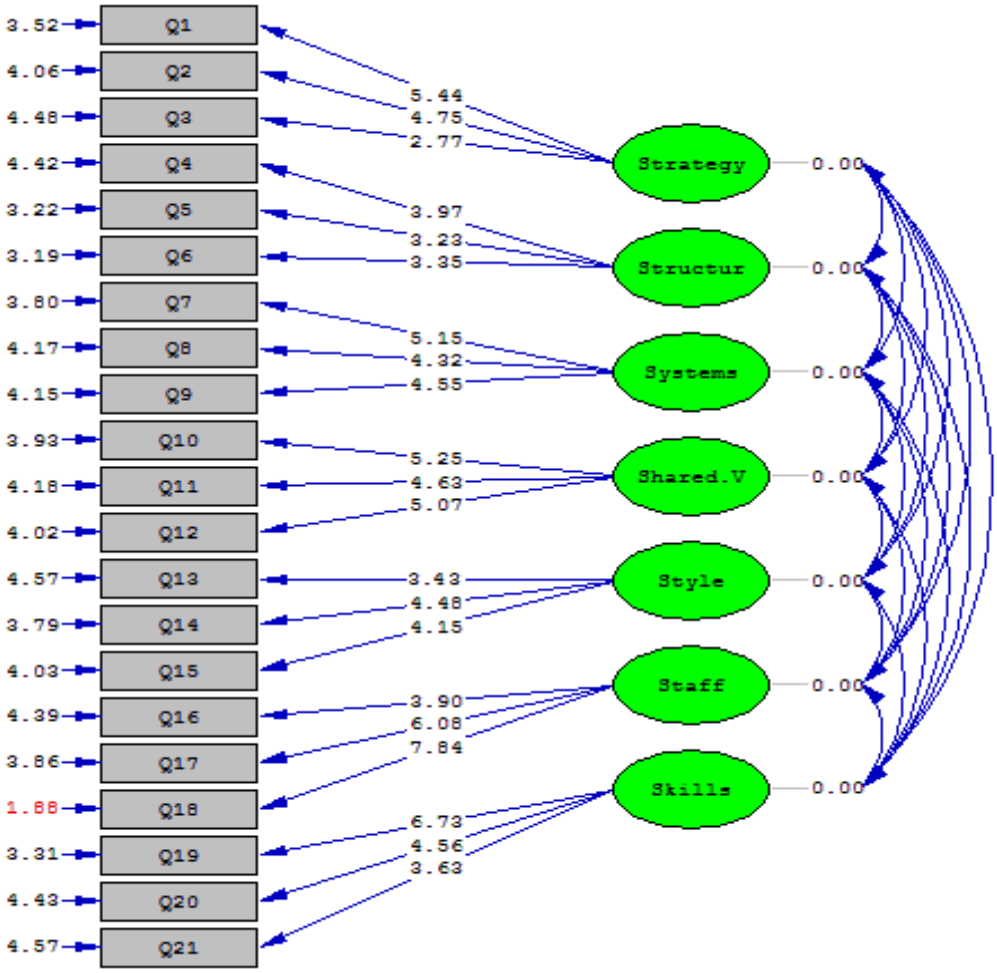

Fig 1. T-student statistics

Table 1: Indexes of goodness of fit in structural equation model (McKinsey *7S*)

Investigating variables relationship using structural equation model	Indexes of goodness of fit	Index value	Criterion	Result
Strategy variable over other model variables	-	415.99	χ^2	Good fit
	Larger than 0.05	0.116	p.value	
	Smaller than 0.05	0.000	RMSEA	Good fit
Structure variable over other model variables	-	325.62	χ^2	Good fit
	Larger than 0.05	0.094	p.value	
	Smaller than 0.05	0.000	RMSEA	Good fit
Systems variable over other model variables	-	641.13	χ^2	Good fit
	Larger than 0.05	0.121	p.value	
	Smaller than 0.05	0.000	RMSEA	Good fit
Shared values variable over other model variables	-	511.03	χ^2	Good fit
	Larger than 0.05	0.113	p.value	
	Smaller than 0.05	0.000	RMSEA	Good fit
Style variable over other model variables	-	735.21	χ^2	Good fit
	Larger than 0.05	0.159	p.value	
	Smaller than 0.05	0.000	RMSEA	Good fit
Staff variable over other model variables	-	419.23	χ^2	Good fit
	Larger than 0.05	0.059	p.value	
	Smaller than 0.05	0.000	RMSEA	Good fit
Skills variable over other model variables	-	353.99	χ^2	Good fit
	Larger than 0.05	0.102	p.value	
	Smaller than 0.05	0.000	RMSEA	Good fit

Table 2: Results for structural equations test

Variable 1 Variable 2	Strategy	Structure	Systems	Shared Values	Style	Staff	Skills
Strategy	-	✓	✓	✓	O	✓	✓
Structure	✓	-	✓	O	✓	✓	O
Systems	✓	O	-	✓	✓	✓	✓
Shared values	✓	✓	O	-	✓	✓	✓
Style	✓	✓	✓	✓	-	✓	O
Staff	✓	O	✓	✓	✓	-	✓
Skills	✓	✓	✓	✓	O	✓	-

Table 3: Results of Friedman test for ranking research variables

Chi Square Statistics	Degree of Freedom	Sig. Level	No.	Test Result
20.065	6	0.003	41	Null hypothesis rejection

Table 4: Ranking variables using Friedman test

Variable	Mean Rank	Rank
Staff	4.62	1
Shared values	4.46	2
Strategy	4.45	3
System	4.16	4
Style	3.62	5
Skill	3.59	6
Structure	3.10	7

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RESEARCH ARTICLE

Response of Soybean Growth to Drought Conditions and Micronutrient Treatments

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ABSTRACT

Dry matter accumulation in different parts of soybean plant under drought stress and micronutrient foliar treatments was studied in Kermanshah, Iran in 2010 growing season. The experiment was conducted as a split plot based on Randomized Complete Block with three replications. In this research, treatments included four irrigation regimes and eight micronutrient foliar applications. At the V4 growth stage, the plats were sprayed twice (with one week interval) with 0.5% (*w/v*) or distilled water until the leaves were wet. At the end of growing season, plants were cut from soil surface, leaves area was calculated and different parts of plant were separated, dried and weighed. Based on results obtained, except for total dry weight, other evaluated traits affected by irrigation treatments at 1% level. I3 treatment reduced LAI, LDW, SDW and PDW by -42.99%, -25.54%, -25.56%, and -48.09% compared control treatment, respectively. In addition, micronutrients foliar applications had significantly effects on leaf area index and pod dry weight (*P<0.01*) and had no effect on leaf, stem, grain, and total dry weight. In this experiment, the highest value of leaf area index was achieved when that the combination of manganese and iron as foliar were applied. Also, the most leaf dry weight was observed in simultaneous application of zinc and manganese. GDW significantly affected by cutting irrigation at pod set stage (P<0.*01*), and unaffected by micronutrient foliar application treatments.

KEYWORDS: leaf area index, micronutrient, irrigation.

INTRODUCTION

Soybean yield and quality can be improved through adequate water and nutrient supplies. However, soil application is more common method to supply macronutrients to plants, but this way will create problems for micronutrients. Therefore, under certain conditions, foliar fertilization is more economic and effective (Fageria *et al*., 2009). In calcareous soils, iron, zinc, and manganese deficiency are common (Vasconcelos *et al*., 2004; Ducic and Polle, 2005; Rosas *et al*, 2007), and root availability to these elements is reduced (Barrow, 1986; Nikolic and Romheld, 2003; Murillo-Amador *et al*., 2006). Additionally, Micronutrient uptake decreased with increasing of drought stress level (Rosolem *et al*., 2005; Khudsar *et al*., 2008). Also, drought stress and antagonistic effects between these elements in soils and/or fertilizers can reduce uptake by roots plant (Deckers and Steinnes, 2004; Wang and Jin, 2007; Malakouti, 2008). Indeed, soybean production in arid and semi-arid regions is restricted by soil deficiencies in moisture and plant nutrients (El-Fouly *et al*., 2011). Zhang *et al*., (2007) emphasized that soil fertility is reflected by the status of soil nutrients and water, and are the two key factors limiting agricultural productivity in the arid to semiarid areas. Despite these drawbacks, and in order to avoid these interaction effects, foliar application of micronutrients (repeated) is preferred. Foliar fertilization requires higher leaf area index for absorbing applied nutrient solution (Fageria *et al*., 2009), and for achieve maximum yield of soybean, LAI values 3.5 to 4 is required at early to mid-reproductive development stages (Malone, 2001). When root activity is reduced due to drought, foliar fertilization is more advantageous in absorption compared to soil application.

The main aim of this study is evaluation impact of micronutrients foliar application on LAI and dry matter accumulation in different parts of soybean plant under drought stress in Kermanshah climatic conditions. Therefore, in this research, the role of micronutrients foliar application in improving the drought tolerance potential and productivity of soybean is reviewed. In the other words, effects of drought stress and nutritional factors on dry matter production of soybean (*Glycine max* L.) plant were assessed simultaneously.

MATERIALS AND METHODS

The experiment in the field conditions was conducted at $34^0 23'$ N, $47^0 8'$ E; 1351 m elevation, Kermanshah, Iran at 2010. Williams (Glycine max, supplied by the oilseed company of the Kermanshah agricultural administration, Iran) was selected as the experimental material. Soil samples were collected from experimental area at 0-30 cm depth. The soil texture was silty clay with pH 7.3, electrical conductivity 0.96dSm^{-1}, total organic matter 2.6%, total nitrogen 0.11%, available phosphorus 8.2ppm, available potassium 531ppm, and zinc, iron and manganese 0.81, 2.76, 4.49 mg.kg^{-1}, respectively. The experimental design was a split plot based on Randomized Complete Block with three replicates in 32 plots. The main plot includes: four irrigation regimes: (I1) Irrigation at all of growth stages, (I2) Irrigation Withholding at flowering stage, (I3) Irrigation Withholding at pod set stage and (I4) Irrigation Withholding at seed filling period. There were eight foliar treatments which consisted: (1) spray with distilled water, (2) zinc spray, (3) manganese spray, (4) iron spray, (5) zinc and manganese spray, (6) zinc and iron spray, (7) manganese and iron spray, and (8) zinc, manganese and iron spray, are replaced in sub plot. Soybean seeds (cv. Williams) were inoculated with BradyRhizobium japonicum and sown at a high-planting rate the field. When the unifoliate leaves were expanded, the plots were hand-thinned to obtain a uniform plant population of 33 plants per m^2. The quantity of irrigation water in each plot was calculated according to Karam *et al*., (2005), controlled by counter and exercise irrigation treatments at different growth stages according to Fehr and Caviness, (1977). At the V4 growth stage, the plats were sprayed twice (with one week interval) with 0.5% (w/v) or distilled water until the leaves were wet. In order to study dry matter accumulation in different parts of soybean plant, at the end of growing season, plants were cut from soil surface with shears, and then, leaves area was measured and different parts were separated, put in paper bags, and placed in oven at $70^{\circ c}$ for 48 hr. For determination of dry weight, different parts of plant (leaf, stem, pod, and grain) were separately weighed. Leaf Area Index (LAI) was calculated was using the formula: LAI=Surface area of sampled leaf / Ground area occupied by the sampled plants (Khan *et al*., 2008). Data for evaluated traits were

statistically analyzed using a standard analysis of Variance technique for the factorial experiment in randomized complete block design using the statistical software MSTATC. Means were separated by the LSD (Least Significant Difference Test) at 5 percent probability level.

Experimental plan

-four irrigation treatments: (I1) Irrigation at all of growth stages, (I2) Irrigation Withholding at flowering stage, (I3) Irrigation Withholding at pod set stage and (I4) Irrigation Withholding at seed filling period arraigned in main plot and eight foliar treatments: (1) spray with distilled water, (2) zinc spray, (3) manganese spray, (4) iron spray, (5) zinc and manganese spray, (6) zinc and iron spray, (7) manganese and iron spray, and (8) zinc, manganese and iron spray, are replaced in sub plot.

RESULTS AND DISCUSSION

Micronutrient fertilization increased the dry matter production through increase in nutrient uptake and thereby vegetative growth. Soybean growth is determined by the amount of total dry matter accumulating in the plant and measured in units of g/m^2. Results of variance analysis were shown that except for TDW, other evaluated traits affected by irrigation treatments (IR) at 1% level. Also, micronutrients foliar applications (MFA) had significantly effects on LAI and PDW (*P<0.01*) and had no effect on LDW, SDW, GDW, and TDW. Moreover, the effects of IR × MFA interaction had significantly effects on PDW (*P<0.01*), whereas had no significant effect on the other traits (Table 1). Zayed *et al*., (2011) stated that micronutrients application enhances leaf area index, dry matter accumulation and grain yield as result of enhancing the enzymatic system of plants. Also, foliar micronutrients use has the highest effect on dry matter accumulation and plant growth rate (Safyan *et al*., 2012). The means comparison of soybean traits under IR and MFA are shown in Table (2). Withholding irrigation at pod set stage had the greatest impact on the LAI, LDW, and SDW. I3 treatment reduced LAI, LDW, SDW and PDW by -42.99%, -25.54%, -25.56%, and -48.09% compared control treatment (I1: irrigation at all of growth stages), respectively. In the other side, GDW and TDW significantly reduced (-29.89% and -9.27% compared control treatment, respectively) when withholding irrigation at seed filling period was occurred (Table 2). Nobuyasu *et al*., (2003) reported that in legumes at the during pod set, seeds are the important sink for assimilates and remobilization. The research shown that translocation of assimilates from the source to sink (Ohashi *et al*., 2000) and partitioning Mohapatra *et al*., (2003) affected by water availability. These results obtained emphasized that the highest values of evaluated traits were obtained from regular irrigation. Meenakshi *et al*., (2008) reported that nutrients absorption by plant roots depends on many environmental factors such as physico-chemical characteristics of soil (organic matter, soil pH, lime content, soil salinity), variety and agro climatic condition prevailing in a place. In this experiment the highest value of LAI was achieved when that the combination of manganese and iron as foliar were applied. This treatment increased LAI by +19.61% compared M0 (distilled water spray) (Table 2). Dry matter accumulation in different parts of plant is influenced by micronutrients through various modes of action. Marschner, (1995) in a study showed that iron and manganese are involved in the fixation of carbon by activation and constitution of enzymes. MFA treatments had no significantly impact on LDW, SDW, GDW, and TDW, but Fe application was more effective. Indeed, these traits with Fe foliar application increased, slightly. Foliar application of zinc and manganese combination increased Pod dry weight by +65.01% compared M0 (distilled water spray). Additionally, manganese foliar application separately, and /or combined with iron or zinc had greater effects on LAI and PDW compared other MFA treatments. Sultana *et al*. (2001) emphasized that foliar application of MnSO4 increased photosynthesis, dry matter accumulation and yield of rice under sea-water stress. In previous study, micronutrient use efficiency is higher when sufficient water is available, and under drought stress conditions manganese foliar application has the highest effect on soybean yield (Kobraee *et al*., 2013). Interaction effects of IR × MFA indicated that under regular irrigation, MnFe treatment had significantly effect on LAI and increased it up to 2.35. The lowest leaf area index belonged to M0I3 treatment (distilled water spray and withholding irrigation at pod set stage) (1.12). In term of withholding irrigation at flowering stage has occurred, there

is no difference between M0, ZnFe and ZnFeMn foliar application concerning LAI (Table 3). The most LDW was observed in ZnMn foliar application under regular irrigation (3.37 g/plant). Whereas, the highest and lowest SDW were obtained with FeI1 and MnI3 treatments with 4.52 and 3.00 g/plant, respectively. When drought stress occurred at seed filling period stage, ZnMnI4 treatment led to increased pod dry weight up to 4.46 g/plant. Also, ZnMn foliar application in well watered plant increased grain dry weight up to 4.19 g/plant. Thalooth *et al*. (1988) stated that dry matter, flowering and fruiting of bean increased with foliar application of zinc particularly under conditions of severe Zinc deficiency. While, water deficit at seed filling period stage without fertilizer applications was reduced GDW to 2.62 g/plant. In addition, in irrigation complete condition, Fe foliar application separately, and/or combined with zinc, had greater effects on total dry weight and led to increased in TDW up to 12.89 g/plant. In contrast, at experimental conditions, the lowest TDW was observed in ZnMnI4 treatment.

CONCLUSION

Micronutrient fertilization increased the dry matter production through increase in nutrient uptake and thereby vegetative growth. In this experiment, evaluated traits were responding to micronutrient treatments. Moreover, withholding irrigation at pod set stage had the greatest impact on the LAI, LDW, and SDW, while, GDW and TDW reduced when withholding irrigation at seed filling period was occurred. Also, some Antagonistic effects between zinc, iron and manganese were observed, that Requires more study.

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I3	Zn
	ZnMn
	Fe
	M0
	ZnFe
	MnFe
	ZnMnFe
	Mn
I1	M0
	ZnFe
	Mn
	Zn
	ZnMnFe
	Fe
	MnFe
	ZnMn
I2	Fe
	Zn
	Mn
	M0
	ZnMn
	ZnMnFe
	MnFe
	ZnFe
I4	ZnMn
	MnFe
	M0
	ZnFe
	Mn
	Zn
	ZnMnFe
	Fe

I1	ZnFe
	M0
	ZnMn
	ZnMnFe
	Zn
	Mn
	Fe
	MnFe
I4	Mn
	Zn
	ZnFe
	ZnMn
	Fe
	ZnMnFe
	MnFe
	M0
I3	MnFe
	ZnFe
	Fe
	ZnMn
	Mn
	M0
	ZnMnFe
	Zn
I2	ZnMnFe
	MnFe
	M0
	Fe
	ZnFe
	Zn
	ZnMn
	Mn

I2	Fe
	ZnFe
	ZnMnFe
	MnFe
	Zn
	Mn
	ZnMn
	M0
I3	ZnMnFe
	ZnFe
	ZnMn
	Mn
	M0
	Zn
	MnFe
	Fe
I4	ZnMn
	MnFe
	Fe
	Mn
	M0
	ZnMnFe
	ZnFe
	Zn
I1	MnFe
	Mn
	Zn
	M0
	Fe
	ZnMnFe
	ZnMn
	ZnFe

Table 1-Analysis of variance of soybean traits (leaf area index, dry matter accumulation in leaf, stem, pod, grain and total plant) at different irrigation regimes (IR) and micronutrient applications (MFA)

				Ms			
Source of variation	**df**	**LAI**	**LDW**	**SDW**	**PDW**	**GDW**	**TDW**
Block	2	0.001	0.179	0.088	0.140	0.040	0.025
Irrigation regimes (IR)	3	4.646**	3.263**	5.881**	17.861**	6.243**	6.757ns
Error a	6	0.040	0.113	0.072	0.039	0.058	0.866
Micronutrient foliar application (MFA)	7	0.112**	0.085ns	0.111ns	1.726**	0.194ns	0.710ns
(IR) × (MFA)	21	0.011ns	0.044ns	0.093ns	0.261**	0.022ns	0.167ns
Error b	56	0.019	0.054	0.102	0.063	0.101	0.668
Coefficient of variation (%)	-	9.07	8.69	8.94	9.27	10.13	7.04

-ns, * and **: non-significant, significant at 5% and 1% levels of probability, respectively
-LAI: leaf area index, LDW: leaf dry weight, SDW: stem dry weight, PDW: pod dry weight, GDW: grain dry weight, and TDW: total dry weight.

Table2- Means comparison of soybean traits at different irrigation regimes (IR) and micronutrients foliar application (MFA)

						Means (g/plant)						
Treatments		**LAI**		**LDW**		**SDW**		**PDW**		**GDW**		**TDW**
Irrigation regimes (IR)												
I1		2.176a		3.216a		4.295a		3.254a		3.880a		12.40a
I2		1.419b		2.601b		3.466b		1.985b		2.938b		11.38ab
I3		1.237b		2.395b		3.197b		1.689c		2.997b		11.40ab
I4		1.274b		2.499b		3.325b		3.374a		2.726b		11.25b
LSD value (0.05%)		0.2447		0.4113		0.3283		0.2416		0.2946		1.139
Micronutrient foliar application (MFA)												
M0		1.418b		2.537a		3.440a		1.866c		2.914a		11.74a
Zn		1.482b		2.754a		3.672a		2.207c		3.017a		11.60a
Mn		1.610ab		2.625a		3.461a		2.783ab		3.217a		11.83a
Fe		1.580ab		2.778a		3.700a		2.695b		3.308a		11.93a
ZnMn		1.533ab		2.700a		3.590a		3.079a		3.253a		11.26a
ZnFe		1.440b		2.705a		3.572a		2.572b		3.128a		11.74a
MnFe		1.696a		2.592a		3.503a		2.813ab		3.118a		11.38a
ZnMnFe		1.454b		2.730a		3.630a		2.588b		3.128a		11.38a
LSD value (0.05%)		0.1953		0.3292		0.4524		0.3555		0.3172		1.158

-I1: Irrigation at all of growth stages, I2: Irrigation Withholding at flowering stage, I3: Irrigation Withholding at pod set stage, I4: Irrigation Withholding at seed filling period, and M0: distilled water spray.-LAI: leaf area index, LDW: leaf dry weight, SDW: stem dry weight, PDW: pod dry weight, GDW: grain dry weight, and TDW: total dry weight.

Table 3-Means comparison of soybean traits (leaf area index, dry matter accumulation in leaf, stem, pod, grain and total plant) under interaction effect irrigation and micronutrient treatments (IR × MFA)

Treatments		Means (g/plant)					
	LAI	LDW	SDW	PDW	GDW	TDW
M0I1	2.12b	2.86bc	3.82bcd	2.51hi	3.55cde	12.31abcd
ZnI1	2.13ab	3.15ab	4.21abc	3.17f	3.65bcd	12.52ab
MnI1	2.25ab	3.31a	4.41a	3.35def	3.88abc	12.38abc
FeI1	2.17ab	3.35a	4.52a	3.30def	4.11ab	12.89a
ZnMnI1	2.15ab	3.37a	4.42a	3.68bcd	4.19a	12.00abcde
ZnFeI1	2.08b	3.21ab	4.39a	3.14fg	3.93abc	12.89a
MnFeI1	2.35a	3.21ab	4.28ab	3.61cde	3.88abc	12.27abcd
ZnMnFeI1	2.15ab	3.27a	4.31ab	3.27def	3.85abc	11.91abcde
M0I2	1.28efgh	2.55cdefg	3.41defgh	1.37no	2.72fg	11.35bcde
ZnI2	1.38def	2.71cde	3.71cde	1.76lmn	2.87fg	11.31bcde
MnI2	1.61c	2.47defg	3.25efgh	1.88klm	3.11efg	11.89abcde
FeI2	1.52cd	2.76cd	3.65def	2.35hij	3.15def	11.50bcde
ZnMnI2	1.35defg	2.67cdef	3.56defg	2.17ijk	2.95fg	11.02de
ZnFeI2	1.28efgh	2.67cdef	3.52defgh	1.99jkl	2.88fg	11.82abcde
MnFeI2	1.65c	2.52cdefg	3.35defgh	2.34hij	2.91fg	11.00de
ZnMnFeI2	1.28efgh	2.46defg	3.28efgh	2.01jkl	2.91fg	11.11cde
M0I3	1.12h	2.31fg	3.19efgh	1.31o	2.77fg	11.76abcde
ZnI3	1.18fgh	2.45defg	3.17fgh	1.17o	2.88fg	11.35bcde
MnI3	1.27efgh	2.27g	3.00h	1.87klm	3.15def	11.85abcde
FeI3	1.35defg	2.41defg	3.21efgh	1.88klm	3.09efg	11.31bcde
ZnMnI3	1.38def	2.27g	3.07gh	2.00jkl	3.02fg	11.31bcde
ZnFeI3	1.21fgh	2.46defg	3.11gh	1.89klm	2.99fg	11.31bcde
MnFeI3	1.47cde	2.29fg	3.17fgh	1.48mno	3.01fg	11.05cde
ZnMnFeI3	1.21fgh	2.70cde	3.65def	1.91kl	3.07efg	11.27bcde
M0I4	1.15gh	2.43defg	3.34defgh	2.27ijk	2.62g	11.55bcde
ZnI4	1.23fgh	2.71cde	3.59defg	2.73gh	2.67fg	11.21bcde
MnI4	1.31defgh	2.45defg	3.18fgh	4.03b	2.73fg	11.21bcde
FeI4	1.28efgh	2.59cdefg	3.42defgh	3.25ef	2.88fg	11.27bcde
ZnMnI4	1.25efgh	2.49cdefg	3.31defgh	4.46a	2.85fg	10.71e
ZnFeI4	1.19fgh	2.48cdefg	3.27efgh	3.27def	2.71fg	11.61abcde
MnFeI4	1.31defgh	2.35efg	3.21efgh	3.82bc	2.67fg	11.21bcde
ZnMnFeI4	1.17fgh	2.49cdefg	3.28efgh	3.16f	2.68fg	11.21bcde
LSD value (0.05%)	0.2255	0.3801	0.5224	0.4105	0.5198	1.337

Similar letters in each column shows non-significant difference according to LSD test in %5 level

-I1: Irrigation at all of growth stages, I2: Irrigation Withholding at flowering stage, I3: Irrigation Withholding at pod set stage, I4: Irrigation Withholding at seed filling period, and M0: distilled water spray.

-LAI: leaf area index, LDW: leaf dry weight, SDW: stem dry weight, PDW: pod dry weight, GDW: grain dry

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RESEARCH ARTICLE

Factors Affecting Intention to Use Mobile Banking by Customers of Tejarat Bank

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ABSTRACT

Considering ongoing progress in novel technologies in different industries, most banks attempt to adopt with novel ways of communication with their customers. Mobile banking service is one of the new ways of delivering services to the customers. Current work aims at investigating impact of different factors including perceived usefulness of mobile banking and perceived ease of use of mobile banking on intention to use mobile banking. Also, impact of perceived ease of use of mobile banking on perceived usefulness of mobile banking is explored. Statistical population includes customers of Tejarat Bank branches which either uses only internet banking or both channels of internet banking and mobile banking. Almost 300 customers were selected using multi-step cluster sampling. Research findings indicate perceived usefulness of mobile banking and perceived ease of use of mobile banking has positive significant impact on perceived usefulness of mobile banking.

Keywords: Technology Acceptance Model, Mobile Banking, Intention to Use Technology

INTRODUCTION

Ongoing progress in technologies encourages most banks to adopt with novel ways of communication with their customers so that they can create better status in the minds of customers compared to competitors using various and better channels, reduce costs and preserve competitive advantage, and provide easier ways to the customers (Peevers et al., 2011). With emergence of new technical innovations, the problem which occurs is acceptance of technical innovations which always includes essential attempts for training users and requires information and guidance from provides of these innovations. In Iran, although some banks have utilized such channels as mobile banking for

delivering their banking services to the customers, there are some obstacle for acceptance of this channel by the customers which leads they do not use mobile banking for performing their banking affairs extensively. Since many banks in Iran extended service devilry channels, paving the path to use these new channels and identifying factors which may influence better use of customers from these channels seem necessary. Because every organization, which invests and sends costs, expects profit return and utilization of the investments. Current research seeks for exploring factors affecting mobile banking acceptance by the customers in Iranian banks. Also, it attempts to identify factors which finally lead to increased intention to use mobile banking by the bank customers. Thus, the main research question is: What are the factors which influence mobile banking acceptance by the customers?

Theoretical Foundations

Marketing includes the process of development, distribution, promotion, and pricing goods, services and ideas in order to facilitate transactional relationship with customers and develop sustainable relationship with stakeholders in dynamic environment (Pride and Ferrell, 2010).Electronic business was introduced originally in 1997 by IBM Co. electronic business covers a more general concept than electronic commerce. Electric commerce mostly relies on external relationship of institution or individual, while electronic business refers to both external relationships and internal strategy of the organization includes electronic commerce (EC), business intelligence (BI), customer relationship management (CRM), supply chain management (SCM) and enterprise resource planning (ERP). Overall, electronic business is integration of systems, processes, and supply chains and the whole market using principles and technologies related to internet use.

Electronic commerce includes directing working communications and transactions on the networks through computer (Seyedjavadin and Saghatchi, 2006). E-commerce and e-commerce odes were originally proposed early in 70s. In this era, use of e-commerce models was highly costly and its main users were great financial companies and banks and sometimes great industrial companies.

Information technology progress in banking industry recently has changed the way of performing banking operation fundamentally and customers are able to perform banking activities in 24-h (Eriksson et al., 2008). Internet banking provides electronic banking services via internet by personal computer or other equipment with accessibility to internet (Gkoutzinis, 2008). Internet banking allows customers to have extensive electronic banking interactions through bank's website in a quicker way with lower costs compared to traditional branches without any local and temporal limitations (Krauter and Faullant, 2008). One of the advantages of online banking is saving traditional branches' maintenance cost (Mahmoudi Meymand et al., 2009).

Advantages of electronic banking can be considered in two views: customers and financial institutions. In customer's view, saving cost, saving time, and access to multiple channels for performing banking operations are the advantages. In financial institution's view, creating and increasing fame of the banks in innovation, retaining customers despite of local changes in banks, creating opportunities to seek for new customers in target markets, extending geographical range of action and establishing perfect competition conditions are the major advantages.
Cellphone Banking: Rapid IT growth has globally influenced banking industry, so that mobile banking emergence is considered as one of the main outcomes (Amin et al., 2007). Such innovations allow formation of novel ways for providing banking services, one of which is mobile banking (Laukkanen and Pasanen, 2005). Mobile banking is a form of banking transactions which is done through cellphone. This form of banking enables customers to control their accounts, perform banking operations via the credit cards, and be informed of latest transactions in their accounts (Amin et al., 2007). Eliminating local and temporal limitations in performing banking affairs is the other advantage of cellphone banking. That is, the customer with access to cellphone everywhere and every time can perform all banking affairs easily with lower cost. Thus, it can be argued that if internet banking services brings about economic benefits for the banks, mobile banking services not only are profitable for the banks, but also it can be consisted as a way which provides added value for the customers (Laukkanen, 2007).

Since the number of users of cellphone banking services is limited, content of the services should be valuable for the customers so that they have willingness to pay for them, and use them for a long time following trying the services. Lack of awareness about needs and demands of the final audiences and failure to retain tentative users of new technology leads to failure in the market. In such case, perception of the value may be useful, since these perceptions are associated with purchase behavior. Thus, the companies should attempt to absorb customers which are loyal to the service provider and prefer to access the services via mobile banking channel. In addition, the companies should attempt to provide services which are perceived as valuable for the users.

Considering widely development of mobile commerce as well as rapid growth in mobile payment, it is necessary to examine relationship between system characteristics and personal differences and perceived usefulness and perceived ease of use in mobile payment area.Technology Acceptance Model (TAM) was proposed by Davis (1989). As observed in Fig 1, perceived ease of use and perceived usefulness are the main elements of TAM.

Venkatesh and Davis (2000) extended original TAM and new theoretical constructs including social impacts and methodological processes were added, which is known as TAM2. Fig 2 indicates TAM2.TAM2 explores voluntary and forcibly use of technology and indicates people obtain more experiences of the system over the time, and judge usefulness of a system based on potential situational benefits resulting from higher use of social information in formation of perceived usefulness.

Review of Literature

Various research works on technology acceptance model are summarized in Table 1.

METHODOLOGY

It is a research of development – applied type, because methods discovered in previous literature in applied ways are utilized and it seeks for acquiring additional knowledge for utilizing this method in a applied special purpose, which is studying domestic Iranian banks and specifically branches of Tejarat Bank. This research study is descriptive type in terms of data collection and path analysis and correlation is used as research design.
Data collection methods are library studies and field study through questionnaire.

Research Model

Fig 3 indicates research conceptual model.

According to the model proposed in Fig 3, research hypotheses include as follows:
H1. Perceived ease of use of mobile banking influences perceived usefulness of mobile banking positively.
H2. Perceived usefulness of mobile banking influences intention to use mobile banking positively.
H3. Perceived ease of use of mobile banking influences intention to use mobile banking positively.

Statistical Population and Sample

Statistical population includes customers of Tejarat Bank branches which either uses only internet banking or both channels of internet banking and mobile banking. Multi-step cluster sampling method was used. Firstly, Tehran City was divided into five districts including north, south, east, west and center. Then, four branches of Tejarat Bank were randomly selected from each district. In the next step, questionnaires were distributed among customers of selected branches who had used internet banking services or had used internet banking and mobile banking simultaneously in Tejarat Bank in Tehran province. Sample size selection is a function if population size, cost, time and facilities of the authors. In addition, experts of path analysis model propose sample sizes as 100 to 200 for this type of research

works. In order to ensure adequacy of the sample size in this work, 300 questionnaires were distributed among customers. Data analysis procedure in this work includes two steps including structural equation model and factor analysis using LISREL software. Relaiblity and validity of the questionaire items are fristly measured so that it is ensured that items reflect related concepts well. In the next step, research's structural model is tested through investigation of level and direction of relatinoship between concepts in the model.

Content validty method was used to test questionaire valdity, because cotent validty of the questionaire should be confirmed by the experts for initial imlmentation of the questionaire. The questionaires were give to the experts and their ideas were taken to promote validty of the questionaires. Following content validty approval for the research tool, the questionaire was implmented among 35 from the sapmle in order to ensure relbiality of the questionaire.

In order to determine reliability, Cronbach's alpha was used.

Questionnaires were extracted using questionnaires proposed by Nel (2013).

Demographic characteristics of respondents are as follows: 2% were below 20, 41% were 20 – 29, 36% were 30 – 39, 14% were 40 – 49, and 7% were above 50. In terms of gender, 55% were male and 45% were female. In terms of educational level, 3% had high school degree, 20% had high school diploma, 14% had associate degree, 50% had BA degree, 10% had MA degree and 3% had PhD degree. In terms of background of using mobile banking services, 83% used also mobile banking and 17% did not use mobile banking.

Confirmatory factor analysis was used in order to determine validity of research constructs.

Following determining validity of the measurement tools, identification of relationship between variables using Pearson correlation coefficient is the next step to enter path analysis. Findings obtained from correlation coefficient between research variables are given in Table 2.

Testing Research Hypotheses Based on Path Analysis Model

Results of variables' direct, indirect, and overall effects coefficients are given in Table 3.

Testing Research Hypotheses

H1 states perceived ease of use of mobile banking influences perceived usefulness of mobile banking positively. Findings indicate impact factor of perceived ease of use of mobile banking on perceived usefulness of mobile banking is $\beta = 0.54$ which is positive and significant at $p < 0.01$. Thus, H1 is supported and perceived ease of use of mobile banking has positive impact on perceived usefulness of mobile banking.

If the user feels his work is done easily via using a specific channel, it will be considered as a benefit and advantage for that channel. Hence, it can be said the more ease of use a channel provides for the customer, he would have more perceived usefulness toward the channel.

H1 states perceived usefulness of mobile banking influences intention to use mobile banking positively. Findings indicate impact factor of perceived usefulness of mobile banking on intention to use mobile banking is $\beta = 0.08$ which is not significant at alpha level 0.01. Thus, H2 is rejected. This finding is not consistent with findings by Nel (2013), since findings of this work suggest positive impact between two variables.

H3 states perceived ease of use of mobile banking influences intention to use mobile banking positively. Findings indicate impact factor of perceived ease of use of mobile banking on intention to use mobile banking is $\beta = 0.78$ which is significant at level 0.01. Thus, this hypothesis is supported.

It is evident that if the user feels more ease in use of a channel, the probability to use that channel is increased, because perceived ease is in fact a value which is provided for the customer.

Fig 4 indicates tested model with standardized values on the paths.

Fit indexes obtained for the tested model in Table 4 suggest that index RMSEA in the estimated model is in acceptable level (0.075), and other fit indexes such as CFI, GFI, NFI, NNFI, and AGFI as 0.91, 0.93, 0.90, 0.90, and 0.90, respectively, are in suitable level and these goodness of fit characteristics indicate that research data have good fit with factor structure of the model.

Practical Recommendations

1. Role of various variables which directly or indirectly influence intention to use mobile banking was investigated in this work. Thus, bank managers and authorities are recommended to consider characteristics of their complex considering these variables and act for their improvement, and hence improve service delivery and increase customer satisfaction. Because more attention to service distribution channels leads to improvement in other service distribution channels, which influence each other according to research findings.
2. The bank managers and authorities are suggested to provide facilities for improvement of service delivery through internet banking channel and utilize benefits which are created due to customer satisfaction via this channel for the bank. It is because of positive impact on the perception of customers about other banking channels including mobile banking.
3. Actions should be taken for reduction of perceived risk and increasing customer trust in channels which are less common including mobile banking. For example, it is suggested that banking system is carefully maintained and system inactive times are minimized, and it acts as expected in periods of the months which high numbers of users use the system. Also, in order to reduce internet banking risk some actions should be taken including improvement of security features, training users on protecting the password and informing them on security threats.

Recommendations for Future Works

1. It is recommended comparative evaluation model of multiple channels is implemented also in industries other than banking, which was explored in this work, and obtained results are compared with the findings in the current research work.
2. Future authors can extend this model and include many other variables such as perceived time saving in internet banking, factors facilitating internet banking, etc., which may have direct or indirect impact on intention to use mobile banking, and retest the model.
3. Considering other service delivery channels in the banks such as physical presence, telephone banking, etc. and exploring influence of these channels on each other is also suggested for future research studies.

Research Limitations

1. One of the limitations in this work was problems in implementing the questionnaires including: reluctance to answer by some sample members, lack of due accuracy in answering items, and biases which some respondents may have in some items.
2. Research data were collected through self-reporting tools. Mixing these ideas and perceptions with biases, thoughts, and judgments may influence accuracy of the research findings.

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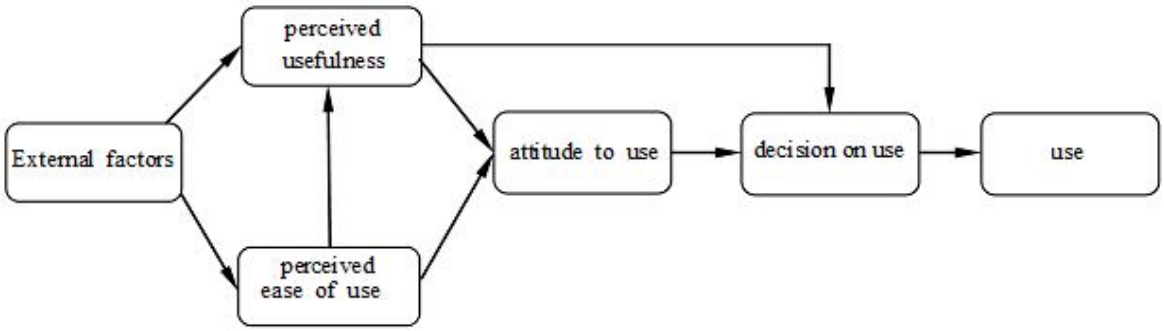

Fig 1.Original Technology Acceptance Model (Davis, 1989)

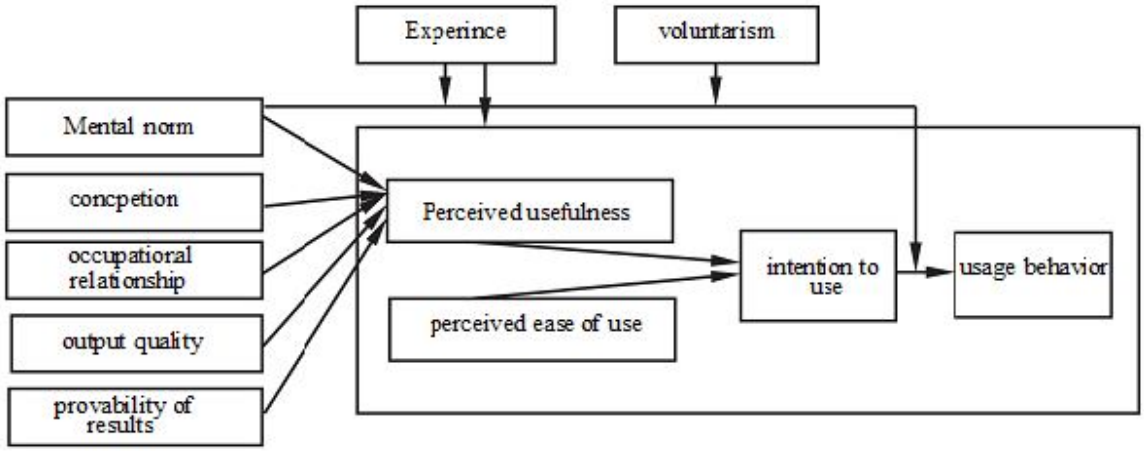

Fig 2. TAM2 (Venkatesh and Davis, 2000)

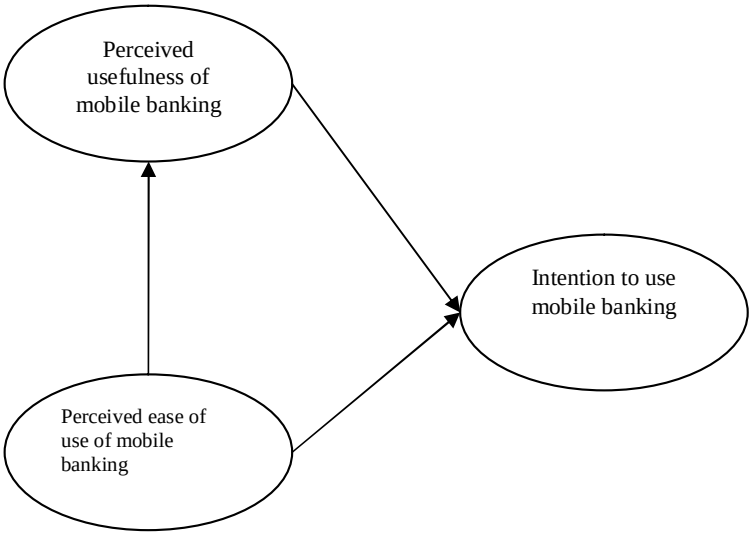

Fig 3. Research conceptual model

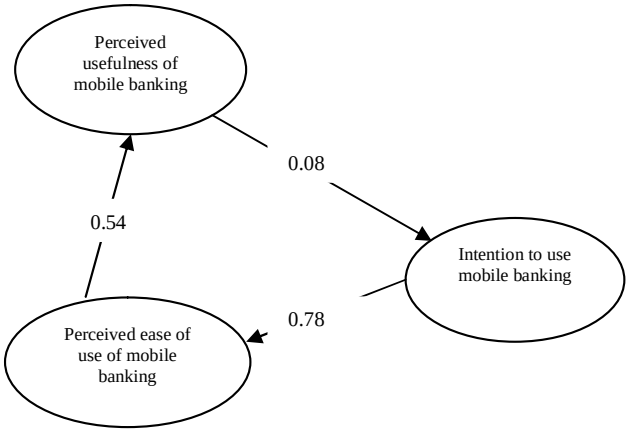

Fig 4. Research's tested model (* p < 0.05 ** p < 0.01)

Table 1: Review of Literature

Authors	Subject	Research Methodology	Variables / Main Findings
S. Yaghma (2009)	Impact of factors affecting e-banking acceptance	Extended TAM	Independent variables: expected performance, expected effort, social impacts Dependent variable: customer acceptance Conclusion: These three factors influence intention to use the service, and two factors of intention to use and facilitating conditions influence use of e-banking services.
S. Yazdani fard (2005)	Factors affecting intention to use e-banking services in Iran	Extended TAM	Independent variables: self-efficacy, ease of use, usefulness Dependent variable: technology adoption Conclusion: Self-efficacy influences intention to use internet banking services through influencing perceived ease of use and perceptions on usefulness of these services.
F. Kalanta ri (2008)	Acceptance of e-banking services in the view of customers based on decomposed theory of planned behavior in public and private Banks in Tehran	decomposed theory of planned behavior	Independent variables: related benefits, compatibility, complexity, the effect of the norm, usefulness, facilitating conditions Dependent variable: customer acceptance Conclusion: banks should pay attention to customer needs, ideas and complaints in relation with banking services in order to retain them.
A. Beiginia , A. Soleima ni, & M. Esfandi ari (2011)	Assessing the mobile banking adoption based on the decomposed theory of planned behavior	Comparison of three models: Rational function model, Planned behavior model and decomposed theory of planned behavior	independent variables: adjustment, behavioral intention, attitude, subjective norm, perceived behavioral control, relative advantage, complexity, faith, effects, and facilitated conditions Dependent variable: customer acceptance Conclusion: Investigation and comparison of three models helped bank managers to identify factors affecting customer behavior so that they can achive more competitive advantage compared to the competitors.
M.	Identification	Investigation of	Independent variables: strategic factors, technical

Authors	Subject	Research Methodology	Variables / Main Findings
Marsa (2010)	of critical factors in e-banking development success in Iran (case study: Iran's Saderat Bank)	critical success factor for e-banking development	factors, operational factors. Dependent variable: e-banking development Conclusion: identification of critical factors for success of e-banking development is an important step for determining factors affecting in this regards.
M.R. Davari & F. Akbari (2007)	Mobile banking in Iran, challenges and barriers, and providing strategies based on TAM	TAM	Independent variables: perceived usefulness, perceived ease of use dependent variables: customer acceptance Results: According to the survey, the main reason for the adoption of mobile phone technology in the companies is optimal service to customer in TAM model.
B. Pani (2008)	Identification of factors affecting internet banking services by customers (Case study: Saman Bank in Tehran)	Diffusion of innovations theory	Independent variables: relative advantage, perceived enjoyment, perceived ease, visibility, testing capabilities, human interaction, security and privacy, cost and availability Dependent variable: customer acceptance Conclusion: self-perception of one's ability and self-believing are important in Internet banking acceptance.
M. Mohamedpour (2010)	Factors influencing mobile service acceptance using path analysis method	Investigation of TAM related models	independent variables: perceived usefulness, perceived ease, mental norms, feelings of pleasure, perceived behavioral control, compatibility, cost and reliability Dependent Variable: Acceptance of Mobile Services
Dehdashti & M.M. Kovaruee (2008)	Factors affecting e-banking in customers of Parsian Bank	Pikkarainen model	Independent variables: perceived usefulness, ease of use, perceived enjoyment, information about e-banking, security and privacy, quality internet connection Dependent variable: adoption of electronic banking Conclusion: It was concluded that the most important factors in adoption of e-banking in the view of Parsian Bank's customer are security and confidentiality.
H. Fatemi Shariatp	Providing a model of influence of	Extended TAM	Independent variables: perceived usefulness, ease of use Dependent variable: Technology acceptance

Authors	Subject	Research Methodology	Variables / Main Findings
anahi (2008)	factors responding to technology acceptance change		Conclusion: Integrating Technology Acceptance Model with issues related to change management allows close examination of adoption of Information Systems.
M. Kazemi (2010)	Investigation and determination of barriers to use mobile banking (Case study: Melli Bank in Shiraz)	TAM	independent variables: barriers to use, value barriers, obstacles, hazards, functional barriers, customs barriers, mental image barriers, mental barriers and resistance Dependent variable: TAM Conclusion: Studies on innovation selection introduce relative advantage as the main motive of consumers' selection. While most innovations have this feature compared to their alternative products, they face resistance by the consumers. It explains that why customers resist against innovation selection and it is as important as understanding the reason for selection of innovation.

Table 2: Coefficient of correlation between research variables

No.	Variables	1	2	3
1	Perceived usefulness of Mobile Banking	1		
2	Perceived ease of use of mobile banking	56** 0.0	1	
3	Intention to use Mobile Banking	51** 0.0	83** 0.0	1

Table 3: Results of direct, indirect and overall effects coefficients

Paths	Direct effect	Indirect effect	Overall effect
To perceived usefulness of mobile banking from:			
Perceived ease of use of mobile banking	0.54**	-	0.54**
To intention to use mobile banking from:			
Perceived ease of use of mobile banking	0.78**	0.04**	0.82**
Perceived usefulness of mobile banking	0.08	0	0.08**

Table 4: Fit characteristics of the fitted model

x/df	RMSEA	CFI	GFI	NNFI	NFI	AGFI
5.59	0.075	0.91	0.93	0.90	0.90	0.90

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RESEARCH ARTICLE

The Study of Effective Factors on the Vitality of Urban Public Areas with Identification Approach to New City (A Case Study of the New City-Golbahar)

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ABSTRACT

The present paper was derived from a research conducted in Golbahar downtown to identify factors affecting the vitality of urban public spaces and creation of a lively urban space to achieve an identity for new towns where urban public spaces continue to be existed without any cultural and social identities leading to intensified identity crisis and lack of vitality. The research investigated factors affecting vitality of urban public spaces with an approach to identity of new towns by proposing two hypotheses: 1. it seems that vitality of urban public spaces leads to prosperity of their nature. 2. It seems that security in Golbahar is in good conditions. Research method is descriptive-application. Data was analyzed by calculating Cochran sample size and distributing questionnaires using SPSS software. To investigate relationships and test hypotheses, one-sample t-test and Kolmogorov-Smirnov test were used. The results obtained from questionnaire and SWOT tables, strategies and policies were suggested to promote quality and vitality of urban public spaces in Golbahar which can be used as a basis for prioritization and promotion of indices to achieve sustainable vitality and identity in the studied area.

Keywords: vitality, space, identity, new town.

INTRODUCTION

The variety of activities performed in one place per day per week is a sign of vitality in the place. In a society where most of the daily life is performed in private spaces (in private homes, personal computers, personal cars, and controlled shopping centers), the need for public life in public spaces is growing, thus reduced quality of urban

public space is one of the problems that cities and especially new towns encounter with; on the other hand, overlooking the dimensions and factors of identity in new towns have made them to be artificial environments devoid of human identity. The consequence is low sense of belonging to the place, solidarity and social participation, reduced incentives for residents to continue residence and impact on people's lack of reaching goals. Since urban public spaces reflect the peak spatial manifestation of urban life and the citizens, the interaction of reduced quality of urban spaces and degraded quality of urban life make the depth and scale of the problem clearer. On the other hand, as one of the problems of new towns is urban identity and they continue to exist without any cultural and social burden leading to intensifies identity crisis and lack of vitality, so it is necessary to identify factors affecting improvement of overall quality of a space including cleanliness, accessibility, attractiveness, safety and security, comfort and dynamism and vitality in order to analyze status quo, make future decisions to enhance quality of public spaces of new towns and consequently to prevent frequent defects in construction of urban places and spaces. Therefore, understanding the strengths and weaknesses of vitality in such cities can solve many problems resulted from lack of identity.

The necessity and purposes of the research

Human society in all periods has intertwined with its own past and cities are among the most enduring elements that preserve the link in terms of visual, semantic and identity. Therefore, understanding the factors of vitality is essential to preserve the identity of new towns. Some requirements of the research are: 1. Making the area studied as lively and dynamic at all hours of the day and night, (2)promoting the identity by creating or strengthening elements, signs and indicators that will increase citizen participation. The purpose of this study is investigating the vitality of downtown of Golbahar new town and defining public space and urban identity.

Research hypothesis

Considering the purpose and necessity of the research, two hypotheses are suggested: 1. it seems that vitality of downtown of Golbahar new town leads to prosperity of its nature. 2. It seems that security in Golbahar new town is in good conditions.

METHODOLOGY

The research is descriptive-application. In this research with the approach to strategic planning, first vitality indicators of public spaces were designated based on theoretical studies and previous research in the field of public spaces; then table of strengths and weaknesses and opportunities and threats was formulated and different conditions were evaluated. Statistical population studied for this research was Golbahar citizens with a population of 11,701. Sample size was obtained based on Cochran method and finally 193 questionnaires were randomly assigned and evaluated in Golbahar at different hours of day. In this research, Cronbach alpha was used to determine reliability of the test. This method is used for calculating internal consistency of the measurement tool measuring different properties. If alpha value is greater than 0.7, it indicates good reliability but values less than 6.0 indicate are unfavorable (Cronbach, 1951). Using SPSS software, confidence coefficient was obtained 791.0, which represents that the reliability of the questionnaire is good.

In the present study Kolmogorov-Smirnov test was used to examine the assumption of normality of variables. Kolmogorov-Smirnov test is a simple non-parametric method for determining consistency of experimental data with selected statistical distributions. Thenceforward, Kolmogorov-Smirnov test is represented by K-S which is a method for detecting normal distribution of data collected. In this case, according to the hypotheses, normality of data was examined.

Review of Literature

Here, a number of theories of some intellectuals emphasizing the vitality of public spaces are discussed.

Jane Jacobs: she considers downtown as a dynamic and lively environment and points to economic, social and psycho-emotional positive effects of such centers; so physical comfort, transparency, diversity, accessibility, attractiveness and security plus busy and lively people portrait an ideal downtown for Jacobs (Habibi and Salimi, 1997:35). She claimed healthy and lively cities are organic, spontaneous and lucky ones (Jacobs, 2009:17).

Chapman: he considers five basic qualities as prerequisites for vitality in public urban spaces: attraction, accessibility, comfort, security and identity. Vitality of an urban space is enabled when the area is far away of social insecurities and environmental threats. For example, cars moving during the day in the context can be annoying or dangerous; however, at nights providing quiet traffic in the neighborhood could help to provide security and call for people to public spaces and community centers and enable them to recognize such centers and choose the needed space where they feel comfort (Chapman, 2007:155).

Rob Krier: he emphasizes on walking pedestrians throughout the city and considers organization of the modern cities as responsible for creation of spatial compositions consisting of fragmented and inconsistent components which are unable to meet human needs due to lack of attention to creating urban space especially for pedestrians (Habib and Salimi, 1997:35). In contrast, he seeks good order in past organizing pattern and recommends imitation of medieval squares due to public popularity. He also suggests that uses around the square and urban spaces that have circadian function should be created (Carrier, 1996:19).

Kevin Lynch: Lynch spreads city image and mentions five elements of path, node, edge, landmark and district as the main elements of city face (Lynch, 2002:231). He considers environmental health as the basis of vitality and a well-defined settlement where health and well being and survival of living organisms are provided. As regard to urban identity especially in new towns, numerous studies have conducted; most research consider the major factor of identity in new towns as natural identity. In a paper about urban identity components and its relationship with belonging sense to a place in residents of new towns, Hamid Varesi, associate professor of geography and urban planning in Isfahan University, studied the effects of economic factors and cultural symbols on urban identity and how to achieve identity in new towns.

Introducing Golbahar New Town and the study area

Golbahar New Town with latitude of3036N and longitude of 252E is located in western north of Khorasan-e-Razavi province 35kmaway of Mashhad (New Towns Development Corporation, 52:2006). Golbahar New Town in Mashhad metropolitan was the first new town approved in 1988athe goal of creating the city was to reduce demographic, economic, social and physical problems of the metropolitan of Mashhad (www.golbahar.org). However, the city was notable to meet its goals of formation in practice. The reasons for choosing the study area were its importance and role as the city center, its position at intermediate areas adjacent to office and commercial buildings and tourist and recreational complex.

The image of passages walls and urban spaces plays a significant role in identification of urban areas. In this regard, the area studied is in unclear and ambiguous situation due to the formation process of Mehr Housing project and private constructions. Architectural integrity is too uncertain and confused. Factors such as lack of adequate supervision on the part of responsible institutions, relatively poor economic conditions of the residents for construction and lack of criteria for designing urban bodies and building facades have caused confusion and lack of identity in visual image of the area leading to a space without physical identity.
Figure 2: downtown and districts

Definitions of urban vitality and urban identity

A. Urban vitality

That is how much the shape of the city supports vital function, biological needs and human capabilities and most importantly how it makes the survival of all organisms possible. Vitality is a raw energy and power in the city that should be concentrated on reaching to a purpose. To achieve a vital city or vitality in urban environment, places and situations should be provided to create lovely experiences (Lennard, 82: 1998). Our main objective for defining vitality in this study is to define the elements that are involved in the creation of urban identity and make the city more vital. Therefore in table 1, vitality is defined by four aspects of economic, environmental, social and cultural in Landry's point of view.

B. urban identity

Moeen Encyclopedia defines identity as what causes a person to be recognized and what differentiates one from the other (Moeen, 2005, 1014). Since "identity" is a set of qualities and characteristics that make an individual or a community distinct from other individuals and societies, so a city is personalized and independent too. Due to creating "public memory" in citizens, identity provides them with devotion and attachment and drives residents to be "citizens" which has more active range of being mere residents. To define identity in cities and buildings, Kristopher Alexander said that identity of any space is formed by constant repetition of a certain pattern of events occurred at that location. The identity of a city or building is most affected by the events occurred (Alexander, 52: 2002). Marco Lalli defines a more specific aspect of local identity and calls it urban identity for humans lived in urban areas. According to him, urban identity is the result of a profound link between the individual and urban environment (Lalli, 1988:303-311). Some theorists, such as Rolf employs the concept of placeleness. Ralph believes that placeleness refers to the equal quality of places; he considers new towns as an example of placeness (Reza Zadeh, 238: 2006). He believes that identity in an environment is the result of interactions of three components; first physical and virtual combination of symbols in the environment, second visible activities and performances in the environment and third, concepts of symbols in the environment (Torabi, 426: 1994). Here, if urban identity is considered as a more specific aspect of local identity, it can be said that according to views expressed, the elements and factors affecting the creation of an identity for a place can be the underlying cause of its vitality. There is a wide range of these factors from urban morphology to social and cultural aspects.

Social life and identity in New Towns

A. social life in New Towns

In international experiences, social approaches to New Towns from ideal to today's cities, all have emphasized on improving living conditions and social life of New Towns' residents. In other words, social factors have been considered as important elements influencing the development of the new towns. Such attitudes have existed since the beginning of the movement to create new towns and social reformists including the pioneers of ideal city to Garden City designers, from new thinkers of modern urbanism to today urban designers have always looking for employing effective factors in urban society and improving urban environment and strengthening social life (Arjmand Nya 42: 1999). Creating a new urban space depends on providing all urban living aspects and making them lively. A vibrant urban life requires it to have humanistic features. In a new urban space, appropriate opportunities for enjoying urban life should be offered to resident and settlement volunteers in order to their different social and cultural values be developed. One of the current problems of new towns is uniformity of building blocks without social and service spaces, enigmatic silence of accumulated massive amounts of building materials in which many social and physical shortcomings can be seen. A good solution is that the progress of construction is coincided with absorbing population by social, cultural and economic institutions. By creating social centers and areas, appropriate fields for absorbing people and guiding them for the establishment and development of urban environment is provided.

Urban life is able to meet the needs of society and its citizens when all urban spaces and institutions are created have integrated function and represent required dynamism in all aspects (Arjmandnya, 1999: 78).

b. Key ways to achieve identity in New towns (identification components)

Identity donates a city a characteristic making it to be distinguished from other cities. Each city affects on how well its citizens and each urban environment creates a special spirit for its citizens and communities. Urban identity is inseparable from citizens' identity. People psychologically need to be loyal to a special place and respect for their own place where they feel credit (Safayi, 283: 2006). Identification of a new city can be started out from the geographical position in which the city is constructed and resided by human due to its topography (Farid, 1992:51). The location of a city is of certain natural characteristics that depict some of the city's identity which is able to be described as natural identity of the city (Yazdani and Yari, 2007:220). Climate, mountains, rivers, lakes, vegetation and animal species unique to particular regions and other natural factors identified as the main symbol of the city and introduced as key elements of identification, play an important role in recognition of the city and its inhabitants.

In addition to natural elements that show the appearance of a city; buildings, roads, public spaces, space complements such as urban furniture and in general the built environment, if having identity, are able to display different view and image of the city structure. Based on their functional and physical characteristics, urban buildings and spaces are considered as the first identification element. Identification should be aligned and matched with the culture and beliefs of the town inhabitants (these indicators can determine the type of architecture, land use and urban bodies) (Hashemi Zadeh, 227: 1994).

Symbols and signs originated from the citizens' culture influence the city's identity; perhaps holding sporting events, regional competitions, local meetings, street theatres and mourning are events that make the city memorable.

Economic activities can also be considered as an indicator of urban identity. There are so many activities that are specific to a particular place or city and are manifested as one of the pillars of the city identity; and there are so many characteristics and economic activities that affect on urban morphology (Yazdani and Yari, 223: 2007). Since new towns are designed and located to accommodate a specific range of employees so manifestation of economic activity in morphology, urban face and other urban elements can contribute to the formation of a sense of place. For example, strengthening local and regional activities, handicrafts and tourism are objective examples of this part of urban identity. Identity in new towns can be referred by other names including visual identity, physical identity, cultural social identity, economic and historical identity, and so forth.

Descriptive statistics

In the present paper, the sample was consisted of 193 people; most of them, 79.3%, were male. The birthplace of most respondents, 54.4%, were the city of Mashhad and 17.6% were Golbahar and most of respondents, 63.2%, were in the age of 18 and 34 years old. Most of the respondents' family, 74.7%, consisted of 3 to 4 family members. In terms of length of residence, most of respondents, 48.2%, have lived less than 5 years in Golbahar. Also 3.1% of respondents had a high school certificate or below, 27.5% Diploma degree, 38.9% Bachelor's degree and 10.4% Master's degree. 45.6% of respondents were employees of the public sector and 58.5% of respondents had monthly income of 4000-8000 Rial. As regard to satisfaction with residence, 90.2% were satisfied average to high (table 3).

Theoretical framework

Vitality and urban identity in urban public space will link the two together. The most important factor in shaping and formation of a city as a context for collective life is urban space which plays a main role in achieving social goal of urban landscape. A basic condition for creating a lively atmosphere is passionate and joyful presence and active

participation of people in the space for which the criteria of safety, health, good access to services, leisure and social activities, culture, quality of equipment and services should be met. Urban identity and vitality as two important factor in the survival of a city especially new towns formed unpland, find meaning in urban areas and in accordance with the hypothesis it can be turned to overlapping of these two factors. Finally, the criteria necessary for a vibrant environment and overlapping criteria between urban vitality and identity can be summarized as:

Data analysis

By assessing 9 vitality criteria in Table 5, safety, health and access to services are measured as the main indicators of vitality in the downtown of Golbahar by K-S test.

According to table 6 and KS test, it is concluded that since the value of significance level for variables is bigger than α=0.05, so the variables have a normal distribution and the percentage of vitality in the New Town of Golbahar is medium. Considering normality of variables, parametric one-sample t-test was used to test hypotheses. In testing hypotheses, average variable was compared to 3.

Testing hypotheses

Hypothesis 1: It seems that security in Golbahar new town is in good conditions.

According to the majority of residents, women and children don't have enough security at the evening and there are many places that will cause insecurity and increase crime (uncrowned parks, poor lighting at entrances and exits, walking paths, inappropriate distribution of active and bright points in the streets), car accident occurs with a high percentage in the downtown and there is weak oversight of law enforcement agencies; all of them indicate lack of enough security in the downtown of Golbahar. According to t-test and the results presented in the table, although significance level of the variable is less than 0.05, average of this index is less than 3. So it can be said that the index which is one of key factors of vitality in Golbahar is not in acceptable level and the hypothesis is rejected. Hypothesis 2: It seems that vitality in urban spaces of Golbahar new town leads to prosperity of its nature.

According to the t-test and the results presented in Table 8, significance level is less than 0.05, and the mean of index is bigger than 3, thus according to Table 9 indicating 51.8% of respondents chose very high option that vitality in public spaces causes prosperity of its nature and 1.45% of respondents emphasized that vitality in downtown of Golbahar improves the quality of life; so with 95% confidence it can be said that this hypothesis is supported.

CONCLUSION AND SUGGESTIONS BASED ON SWOT TABLE

The analysis of vitality measures in the downtown of Golbahar shows that vitality in the study area is in average level and since many new towns can achieve a particular identity based on some economic potentials (such as mining, agricultural land, tourism, etc.) and Golbahar New Town has specific and unique features where economic identification dimension isn't salient, one of ways of strengthening the identity of the city is reinforcing vitality factors such as security in order to gain peace of citizens, circadian activities, vitality and attractiveness, environmental health, readability and variety of land use to attract special agencies and departments and economic institutions and visitors to this city. Socio-cultural identity in Golbahar New Town can be promoted by taking advantage of culture and social customs and beliefs of residents and conversion them to urban culture on one hand and on the other by creating symbols, rituals, celebrating special occasions , exhibitions, competitions and scientific meetings and creating social spaces and pleasant places. Seeking citizens' participation in different aspects of urban activities is one of effective means of identifying the city. Golbahar new town enjoying the pleasant climate is able to have a natural identity and uses it to for introducing. To strengthen the physical identity of Golbahar New Town, the most important and effective measure is creating physical differences in typology of the city such as forms of

buildings, streets, urban furniture, business, recreational and cultural places increasing vitality in addition to natural identity. In hypothesis 1 in which security was tested as one of the main factors of vitality in the downtown of Golbahar and the results show insecurity with mean of 2.85% in respondents' point of view, so considering potential and active qualities the following table reinforces the indicators in the downtown of Golbahar. In the second hypothesis, correlation between two variables of vitality and urban identity was confirmed and based on the results obtained there is a direct and medium relationship between urban identification components and vitality.

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Table 1. Types of vitality

Types of vitality: vitality is related to resilience	Economic vitality: The truth about cities is that a wide range of sectors that are made up by the city and its wide range of variation are inherent to the cities. Economic vitality is evaluated by employment, incomes and living standards; the number of tourists per year, the efficiency of retailers, value of lands and buildings.
	Environmental vitality: environmental vitality considers two distinct perspectives. Ecological sustainability in relation to variability and diversity, such as noise pollution and air pollution, energy over consumption, traffic mix and green spaces. The second is design perspectives including changes and insecurities such as readability, sense of place, architectural differences, terms and conditions in different parts of the city, quality of street lighting, security, friendly and psychological closeness to the urban environment.
	Social vitality: Social vitality is evaluated by activity levels, social reactions, type and nature of social relationships and social life. Vitality should be determined as the level of deprivation rule, social cohesion, good communication and dynamism between social classes, civic pride and urban spirit, different life styles, harmonious race relations and an agile and vibrant civil society.
	Cultural vitality: considers preservation and conservation and respect for the city and its people. This includes identity, memory and heritage, tradition, respect for the community, distribution and consumption of products and signs and symbols that express distinct essence of the city.

Table 2: Frequency and percentage of respondents by satisfaction with residence

Frequency percent	Frequency	Satisfaction
3/1	6	Very low
6/7	13	Low
52/3	101	Average
27/5	53	High
10/4	20	Very high
100	193	Total

Table 3: dispersion indicators of the components studied

Indexes	Average	Standard division
0/64	2/85	Security
0/71	3/22	Hygiene
0/58	2/12	Appropriate access to services
0/77	2/49	Recreational activities existence
0/48	2/78	Equipment and services quality
0/59	3/10	Environment tissue and image of Quarter

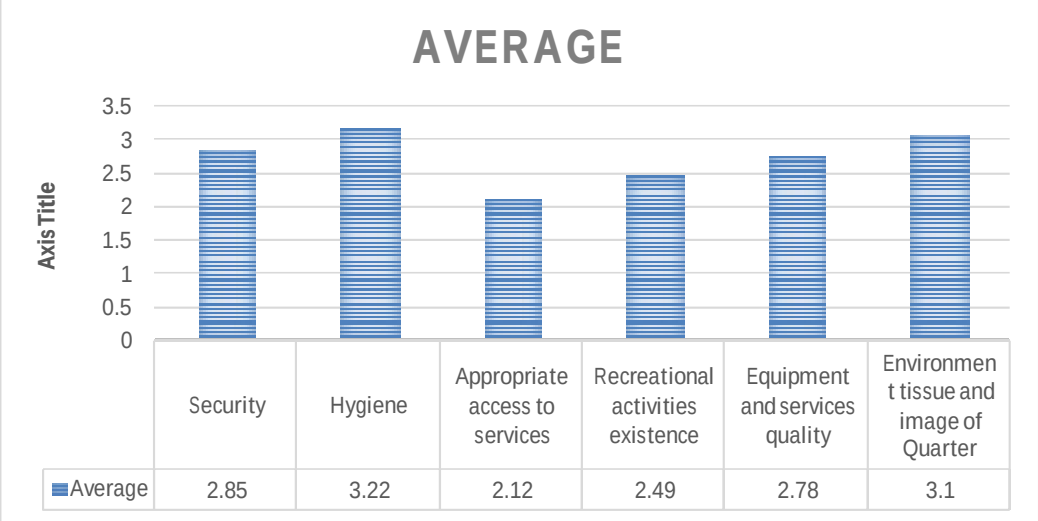

Diagram 1: comparison of average criteria obtained from respondents

Table 4:overlapping criteria of a lively environment with urban identity in the downtown of Golbahar

Urban identification criteria	Vitality criteria in urban environment	Number
Physical (objective) factors consists of economic activities and cultural activities such as holding regional competitions, local and national meetings, street theatres and mourning that make a city memorable. Perceptual factors (mental) are originated from natural identity of the city.	Security: Security people feel is the most important factor in their willingness to participate in a place or space	1
	Mix land uses: urban areas which are the origins of everyday life have never been special-purpose spaces. These are general-purpose spaces and provide many activities and are used by citizens.	2
	Circadian activities: use of a space for 24 hours a day does not amortized it but it becomes important due to citizens' continuous participation.	3
	Health	4

	Appropriate access to services: movement system and appropriate access	5
	Recreational activities: optimum use of time and place to meet more needs more efficient use of time	7
	Increasing social relations of citizens in the neighborhood and the center of neighborhood	8
	Spatial diversity (environment and landscape): People want to understand their environment and enjoy the excitement of learning. If the environment does not have a new thing, it can be tedious and boring for them.	9

Table 5: K-S test for indicators affecting the vitality of the neighborhood

Significance level	Statistics of K-S test	Number	Variables
0/113	1/609	193	Security
0/849	2/407	193	Health
0/881	2/780	193	Appropriate access to services

Table 6: T-Test results for Security Index

Confidence interval 95% Difference percentage		Mean difference	Significance level	Degree of freedom	t statistic	Mean	Indicators
Upper bound	Lower bound						
-0/0546	-0/2356	-0/14508	0/002	192	-3/162	2/85	Security

Table 7: the results of t-test

Confidence interval 95% Difference percentage		Mean difference	Significance level	Degree of freedom	t statistic	Mean
Upper bound	Lower bound					
1/4390	1/2035	1/32124	0/000	192	22/130	4/32

Table 8: frequency percentage of questionnaire

Standard deviation	Mean	Percentage of selected options					Questions
		Very high (much better)	High(better)	Medium (indifferent)	Low (worse)	Very low (much worse)	
0/829	4/32	51/8	32/1	12/4	3/6	٠	It seems that vitality of urban spaces leads to prosperity of its nature
0/736	4/32	45/1	45/1	6/7	3/1	٠	How much vitality of neighborhood can improve your quality of life

Table 9: SWOT analysis of security measures in the study area

Negative Quality		Positive qualities		Nature of Activities	standard	
❖ Unaffordable lighting at entrances & exits of walk ways ❖ Imp roper distribution active & bright sport in the street ❖ Poor supervision of the military institutions ❖ Lack of barriers for reducing the speed of cars	Weakness	Opening stores in public places	Strength	Actual quality	Security	Operation

❖ Public area insecurity of sub-areas ❖ In secure environment in secondary road's & sidewalks ❖ Street walking with car as a recreation ❖ Defenseless environment existence in areas ❖ The lack of traffic signs and car speed in areas ❖ Existence vacant land within the area	Threat	❖ The existance of park's façade of current city's center ❖ Cultural art activities planning possibility in parks ❖ Locating telephone kiosk & newspaper selling in are ❖ Use vacant to create the accumulation ❖ Social & police agencies enforcement ❖ Locating the suitable day night activities along the streets	Opportunity	Potential quality		

Table 10. SWOT analysis of the correlation between urban identity and vitality

Negative Quality		**Positive qualities**		**Nature of Activities**	**standard**	
-Lack of belonging Sense towards area by the majority of residents - Confusion In the face of the earth and walls - poor, weak and identity furniture -lack of attention to present and point indexes like square,,, -lack of attention to linear indexes like street. -not considering up-to-date Active Seniors depended to different groups and people -lack of attention to Subjective symptoms.	Weakness	The exectance of park's entrance of present city's central as an architectural art - Imam Sadiq Mosqueas an indicator -the existence of district central park -Passing within range as natural component	Strength	Actual quality	Security	Operation

- Lack of belonging Sense towards area by the majority of residents. -Meher Housing construction without architecture identity. -lack of supervision on private construction. - Unsuitable quality of contraction material. -lack of Qualitative attitude in organizing to urban area by mangers. - Lackluster of urban area.	Threat	-attention to natural components in direction to Identity. - using of The urban furniture identity to environment. -using of vacant lands in order to create Pause space. -to create various spaces in two Axisas of east and west area -using of Canal route within area to create Recreational, cultural, commercial area.	Opportunity	Potential quality		

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RESEARCH ARTICLE

A Study on the Role of Urban Furniture in Citizen Satisfaction in Mashhad Municipality-11th Zone

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ABSTRACT

This article is based on a research performed to examine the role of urban furniture in citizens' satisfaction of Mashhad Municipality district eleven. The study proposed two hypotheses: (1) It seems that current design of urban furniture in Mashhad Municipality district 11 isn't satisfied by users (2) it seems that current layout of urban furniture in Mashhad Municipality district 11 isn't satisfied by users. This study examined the role of different types of urban furniture and urban spaces in citizens' satisfaction with emphasis on two streets of Imamat Boulevard and Moalem Boulevard in Mashhad Municipality district 11. The research is descriptive-application. Data was analyzed by calculating sample size and distribution of questionnaire using SPSS software. To test hypotheses, Kolmogorov-Smirnov test and one-sample t-test were used and by using the results of Morgan's table for determining sample size, strategies and policies to improve the quality of urban spaces are discussed.

Keywords: urban furniture, district 11, Mashhad Metropolitan.

INTRODUCTION

Reviewing urban spaces systematically and introducing general characteristics of urban structures and elements are of great importance. Elements and structures affect urban areas and urban spaces affect elements so they interact. In such a complex environment brought about by construction and manipulation of man, environmental-cultural factors are among the most essential factors that establish the relationship between human and natural environment. On the other hand, urban furniture is considered as one of constituents of urban spaces and its quantity and quality, style, comfort, durability and location play key role to achieve beautiful and healthy city. There are three main

purposes of planning, health, comfort and beauty and achieving all three depends on the precision and patience in designing and planning of urban furniture in addition to a pleasant urban space. Considering human proportions in construction of urban furniture and also climatic conditions and indigenous materials are among the requirements in the design of urban furniture. Locating the seating of furniture, sequence and frequency of space layout have positive effect on visual quality.

The necessity and purposes of the research

The importance of urban furniture for the face of a city and visual harmony between the elements of urban furniture and other urban elements to reinforce and complement the beauty of urban space is inevitable. Urban furniture can play an important role in increasing the attractiveness of working time and security as well as a sense of peace and comfort for residents. Therefore, consideration of the role played by urban furniture to create peace for citizens, especially in big cities such as Mashhad, is the most important issue for urban designing and planning. 1. Qualitative study of urban furniture in terms of appropriate distribution, readability and size compatible with the environment 2. Satisfaction of people and citizens with the furniture used in district eleven. The overall objective of this study was to investigate the role of urban space and urban furniture in creation of satisfaction with the emphasis on two streets of Imamat Boulevard and Moalem Boulevard for the citizens of Mashhad Municipality district eleven.

Research Hypotheses

Hypotheses in this study are (1) It seems that current design of urban furniture in Mashhad Municipality district 11 isn't satisfied by users (2) it seems that current layout of urban furniture in Mashhad Municipality district 11 isn't satisfied by users.

METHODOLOGY

Materials and methods in urban planning and urban development research means moving towards explaining the facts about the construction and development of the city (Matoof, 1988:41). This research is descriptive-analytical and application and data was collected using multiple sources such as library, field data, expert interviews, observation, maps and documents, location data in GIS and social questionnaires to measure satisfaction and comfort. Considering the size of population which is the citizens residing in district eleven, 222,000, and using Morgan's table for determining sample size, sample size in this study was determined 384. Then they were questioned as the size of sample and the results were measured by statistical analysis software SPSS.

Introducing Mashhad Municipality district eleven

Mashhad Municipality district eleven was separated from district ten in 1995 (1374) in line with faster and easier access of citizens to civil service. The region covers an area of 1,800 hectares, which is currently 6.16% of the city's area and is in seventh place among all districts. This area was divided into two districts in line with the policy of district-centered plan and citizens and clients reverence which accommodate about 222 thousand people being 7.9% of total population of the city and its population density is 123 people per hectare. The area reaches Qaem Square, Imam Ali Expressway and international exhibition in north; Qaem Square, Azadi Highway, Azadi Square in east; Azadi Square, Vakilabad Boulevard, End of Vakilabad Blvd. in south; and Vakilabad, Jahed Town Road in west. It also accommodates Zibashar, Azadshahr, Hashemi Nejad, Sayyed Razy, Farhang, Daneshjoo, Tarbiat, Sharif, Faregh-al-tahsilan neighborhoods. Major land uses in the area are residential, commercial, administrative and educational.

Total area of sidewalks is 415 hectares, which is about 23 percent of the region's area. In addition, total area of green space is 1,715,983m^2 and green space per capita is estimated about 7.73 m^2. Construction budget of the area in

2012(1391) was considered about 440 billion Rial with the per capita of about 2 million Rial (Source: Mashhad Municipality statistics, 2014 (1393))

Definitions and concepts related to urban furniture and sidewalks

Urban equipment refers to a set of mobile and immobile, decorative or applied devices accessed to inhabitants in public spaces of the city permanently or seasonally with the permission or knowledge of the government. Urban equipment is an integral part of urban environment making full understanding of identity of a city possible (Maurer et al., 1994). In England the facilities is known as street furniture and in America universal furniture or Outdoor Furniture (Mortezaee, 2002:2). Sidewalk is the most important urban access network. The network is important because it is in the scale of human movement, and should therefore be completely unblocked to facilitate movements. Ministry of Roads and Urban Development (former Ministry of Housing and Urban Development) defines sidewalk as follows: sidewalk is walkway parallel to roadway but distinct from it (Ministry of Housing and Urban Development, 1996: 1). Pedestrians are people walking, sitting and standing or using wheelchair in public spaces and can include various groups of children and teenagers to adults, the elderly, the disabled, workers, residents, shoppers and guards (Basiri, 2002: 10).

Classification of furniture

Urban furniture refers to a wide variety of devices, objects, symbols, buildings, spaces and elements installed in the city, streets and open spaces and are used publicly(Maurer et al., 1994: 207). Equipments basically consist of components that are open to the public employed in the main elements of the city (Malt, Gable, 1989: 30). Street equipments consist of lights, traffic signs, phone booths and trash cans that constitute functional equipment (Saif-al-dini, 1989: 472). Street furniture is a set of devices and elements employed in streets and other public spaces for safety, comfort, protection, beauty, guidance, cleanliness, health, etc. Street equipment can be divided into three main categories: functional equipment, safety and comfort equipment and beautify equipment (Zadboom Consulting Engineers, 1983: 36). Urban furniture includes elements that firstly are located in urban public open space and are used publicly and secondly, their presence in urban space meets some needs of citizens (Namad Resa Gostar 1989:2). Urban furniture is objects installed in urban spaces for creating comfort, presenting information, controlling movement, providing protection and using by users (Pakzad, 2000: 78). Functional equipments and decorations include elements such as lighting, trees, etc. Urban public spaces, especially Shah Square benefited from lighting to illuminate and decorate the space. According to Chardin, there were wood catapults and legs on which lights installed throughout them surrounding the buildings of the square and they were turned on in festivals and holidays, and their total number was about fifty thousand (Ahari, 2001: 294-293).

Related Review of Literature

Kevin Lynch believes that special walking paths designed based on the same recreational road motivation but for different vehicles are rarely found. Provision of appropriate furniture and lighting for these paths and motivate them make these places more humanistic, meaningful with an identity. Walking paths also protect against traffic and unite and coordinate disharmonious appearance of streets (Lynch 1997: 578- 574).

Introducing some furniture of Mashhad Municipality district eleven by pictures

Picture 1: A view from a bus station and a telephone booth in Imamat Boulevard
Picture 2: a view of benches in Moalem Blvd.
(Source: photography by author)
As clear in the pictures, improper positioning of benches next to trash cans and electric posts and in front of inappropriate spaces causes their inefficiency so citizens aren't able to use them desirably.

Analysis of findings obtained from questionnaires (descriptive findings)

In this study, the sample size was 384; 74.5% of respondents were male. Most of respondents (60.9%) were married, 39.6 percent were between 29 to 47 years age. More than half of respondents (57%) were lived in 4-member family. As regard to the level of education, most of respondents (63.5%) had bachelor's degree, 8.3% had diploma degree, 10.7% had associate degree, 10.7% had master's degree and 6.8% had doctorate degree. With regard to birthplace, most of respondents, 76%, were born in Mashhad and 24% in other cities.

Describing main variables (inferential findings)

In this section main variables are described. These variables include traffic on sidewalks, the extent of using sidewalk, how much available furniture in the area is matched with people's needs and spirits, evaluation of number of sidewalk furniture, evaluation of satisfaction with different types of furniture (Flooring, phone booths, benches and chairs, trash cans, flower vases, signs and panels, etc.), evaluation of location and layout of furniture and the most important problems of the area furniture. The variables were inquired in the form of 5-point Likert scale and descriptive report included frequency and percentage of items.

Data analysis

In this study, we examined two hypotheses:

(1) It seems that current design of urban furniture in Mashhad Municipality district 11 isn't satisfied by users
(2) It seems that current layout of urban furniture in Mashhad Municipality district 11 isn't satisfied by users.

To test the first hypothesis, first the index of satisfaction with current state of urban furniture was considered. The index consists of variables of respondents' satisfaction with flower vases, telephone booths, press kiosks, trash cans and lighting. Since this index is in five-item Likert scale, so it is in the range of 1-5.

The second hypothesis was also tested by creating an index of satisfaction with urban furniture layout and location in the study area. To construct this variable, a number of 14 variables measuring respondents' satisfaction with urban furniture location (satisfaction with flower vase location, telephone booth location, fence around trees, etc.) were combined. Since this index is in five-item Likert scale, so it is in the range of 1-5.

Before testing the hypotheses, first normality of variables was examined by Kolmogorov-Smirnov test. This test indicates whether either side of the mean in a bell-shaped distribution curve is the same or not. Findings indicate that in both variables of respondents' satisfaction with different types of furniture and respondents' satisfaction with furniture location and layout, significance level of Kolmogorov-Smirnov test was less than 0.05 (sig=0.000) so It can be said that these variables are not normally distributed and nonparametric tests should be used to test the hypotheses.

Testing 1st Hypothesis

It seems that current design of urban furniture in Mashhad Municipality district 11 isn't satisfied by users. To test the hypothesis, one-sample mean-comparison test was used to compare mean. In this case, the index mean created was compared to theoretical mean (in a 5-item range, the average is 3) and the results were interpreted given to the mean obtained from index and significance level.
So the first hypothesis is confirmed and the null hypothesis of mean-comparison test to test the hypothesis one is discussed as follows:
Null hypothesis implies that theoretical mean is equal to empirical mean; however, the hypothesis implies their inequality which was tested by one-sample mean comparison test.

The findings show that this result is generalize able to statistical population due to the fact that t-test significance level is less than 0.05 (sig = 0.000) so with confidence level of 95% and 5% error it can be said that respondents aren't satisfied with the current state of urban furniture in the study area so the hypothesis is rejected.

The results confirm that the number of respondents their satisfaction level is less than average (3) is less than those their satisfaction level is more than average (3) and significance level of Chi-square test is less than 0.005 (sig=0.000) so suing the results of chi-square test it can be said that the current state of urban furniture in the study area isn't satisfied by users.

Testing 2nd Hypothesis

It seems that current layout of urban furniture in Mashhad Municipality district 11 isn't satisfied by users. The hypothesis was also tested by one sample mean comparison test and chi-square test. The findings show that empirical mean of the index of satisfaction with the current state of urban furniture layout is equal to 2.58, which is lower than theoretical mean, 3, and given to mean difference is negative,-0.4107, so it can be said that there is low satisfaction with the current state of urban furniture layout in the study area and their satisfaction is lower than average given to the significance level of t-test is less than 0.005 (sig=0.000).

Chi-square test was used to examine H2 to confirm the results of testing hypothesis by one-sample mean-comparison test. The results obtained from the test indicate that the number of respondents their satisfaction level is less than average (3) is less than those their satisfaction level is more than average (3) and significance level of Chi-square test is less than 0.005 (sig=0.000) so with 95% confidence it can be said that urban furniture location in the study area isn't satisfied by users.

CONCLUSION

Urban life for many people flows well when movement in sidewalks and neighborhood is well-defined, urban space doesn't only serve to the passage of vehicles and influenced by mere traffic and engineering principles, and aesthetic qualities and solutions consistent with the humanitarian principles and ethics are considered in the environment organization. The key to success in planning and designing is active participation of local communities. Obstacles in access networks of urban walking, urban furniture and equipments and discontinuity of comfortable movement in walking paths provide difficulties for different people. Elderly, women carrying their babies in strollers and wheelchair bound people have trouble by discontinuities in walking paths so they have to stop moving. Sometimes a step, a narrow passage or improper installations of urban furniture are among the inhibiting factors forced the disabled no to go out and this is the major cause of isolation of the disabled people. Overcoming these obstacles, optimizing the environment from the beginning of a project, its development and using indigenous knowledge are consistent with sustainable development.

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Table 1: Basic characteristics of Mashhad Municipality district eleven

waste generated per	Green space per capita (m^2)	Sidewalk area(hectare)	Construction budget per capita (million Rial)	Percentage of the area to total area of Mashhad	Area (hectare)	Percentage of population to total population of Mashhad	Population	Number of districts	General characteristics of the region in year
532	7.73	415	2	6.16	1800	7.9	222000	2	**1391**

Source: Mashhad Municipality statistics, 2014 (1393)

Table 2: Frequency distribution of respondents' evaluation of sidewalk furniture

Percentage	Frequency	Number of furniture
85.4	328	Low
14.6	56	Medium
100.0	**384**	**Total**

Table 3: Frequency distribution of respondents' evaluation of furniture performance in providing a sense of peace

Mean	Very high	High	Average	Low	Very low	Satisfaction with different types of furniture
2	0.0	0.0	6.3	81.3	12.5	Satisfaction with shelter
3	0.0	4.2	83.3	6.3	6.3	Satisfaction with bridges
4	2.1	72.9	12.5	12.5	0.0	Satisfaction with lightning
1	0.0	0.0	6.3	12.5	81.3	Satisfaction with drinking water stations
4	2.1	70.8	14.6	6.3	6.3	Satisfaction with bus stations and their shelters
1	0.0	0.0	10.4	20.8	68.8	Satisfaction with post boxes
1	2.1	2.1	8.3	16.7	70.8	Satisfaction with press kiosks

Source: findings obtained from the research questionnaire, 2014

Table4: Frequency distribution of respondents' satisfaction with furniture location and layout

Percentage	Frequency	Satisfaction with location of different types of furniture
10.4	40	Very low
77.1	296	Low
6.3	24	High
6.3	24	Very high
100.0	**384**	**Total**

Table 5: Investigating the normality of the variables

Satisfaction with furniture layout	Satisfaction with different types of furniture	
7.519	7.224	K-S statistic value
.000	.000	Significance level

Source: findings obtained from the research questionnaire, 2014

Table 6: One-sample mean comparison test to test hypothesis one

One-sample mean comparison test(T-test) to test hypothesis one					
Standard error of the mean		**Standard deviation**	**Mean**	**Number**	
.01502		.29435	2.4301	384	Satisfaction with current design of urban furniture
The results of one-sample mean comparison test(T-test) to test hypothesis one					
Confidence interval 95% for difference from mean		Difference from mean	Significance level	Degree of freedom	t-statistic value
-.5404	-.5995	-.56994	.000	383	-37.944

Table 7: Chi-square test to assess satisfaction with the current state of urban furniture

Satisfaction with different types of furniture			
Residual	**Expected number**	**Observed number**	**Mean**
-19.4	27.4	8	1.64
-19.4	27.4	8	1.79
-19.4	27.4	8	2.00
244.6	27.4	272	2.36
-19.4	27.4	8	2.43
-11.4	27.4	16	2.50
-19.4	27.4	8	2.64
-19.4	27.4	8	2.71
-19.4	27.4	8	2.79
-19.4	27.4	8	2.86
-19.4	27.4	8	2.93
-19.4	27.4	8	3.00
-19.4	27.4	8	3.29
-19.4	27.4	8	3.43
		384	جمع
2350.667	Chi-square statistic value		
13	Degree of freedom		
0.000	Significance level		

Source: findings obtained from the research questionnaire, 2014

Table 8: one sample mean comparison test to test hypothesis two

One-sample mean comparison test(T-test) to test hypothesis two					
Standard error of the mean		Standard deviation	Mean	Number	
.01524		.29866	2.5893	384	Satisfaction with urban furniture layout
The results of one-sample mean comparison test(T-test) to test hypothesis two					
Confidence interval 95% for difference from mean		Difference from mean	Significance level	Degree of freedom	t-statistic value
-.3807	-.4407	-.41071	.000	383	-26.948

Table 9: Chi-square test to assess satisfaction with urban furniture location

Satisfaction with furniture layout			
Residual	**Expected number**	**Observed number**	**Mean**
-21.5	29.5	8	1.43
-21.5	29.5	8	1.64
-21.5	29.5	8	2.07
-21.5	29.5	8	2.14
-21.5	29.5	8	2.29
-13.5	29.5	16	2.36
-21.5	29.5	8	2.43
-21.5	29.5	8	2.57
234.5	29.5	264	2.64
-13.5	29.5	16	2.71
-21.5	29.5	8	2.79
-13.5	29.5	16	3.07
-21.5	29.5	8	3.43
		384	Total
2021.000	Chi-square statistic value		
12	Degree of freedom		
0.000	Significance level		

Source: findings obtained from the research questionnaire, 2014

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RESEARCH ARTICLE

A study on the Relationship between Job Satisfaction with Performance and Motivation of Secondary High Schools Teachers in Education& Training Organization , 1st zone, Mashhad City, Iran.

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ABSTRACT

The present paper aims at establishing a relationship between job satisfaction with motivation and performance for high school teachers. Research method was descriptive and survey and statistical population was high school teachers of Mashhad Municipality District One. The sample was selected by simple random sampling method using Krejcie & Morgan table. Data was collected using a questionnaire and SPSS software and analyzed by Pearson statistical test and independent t-test.The findings indicate that there is a relationship between teachers' job satisfaction and motivation. There is also a relationship between teachers' job satisfaction and performance.

Keywords: job satisfaction, motivation, performance, teacher.

INTRODUCTION

To continue a job, work motivation is essential. If one is not interested in the job and isn't motivated by it, employment would be tedious or even impossible to continue. Various theories have been proposed about work motivation including but not limited to stimulus response theory, rational argumentation theory and compatibility theory. On one hand, job success requires two factors of performance and efficiency. On the other hand, job motivation has a significant effect on success so it can be said that there is a reciprocal relationship between job

motivation and job success.Job satisfaction is also an important factor of job success leading to increased efficiency as well as a sense of personal satisfaction. Due to the fact that any authority attempts to increase efficiency and a sense of satisfaction in subordinates so in the present paper it was tried to determine whether there is a significant relationship between job satisfaction with job performance and motivation.

Domestic literatures

Relatively abundant research has been performed in the field of employment and job satisfaction in Iran. However, most of the researches are not general and limited to a specific job, such as teacher, nurse, etc. For example, a study performed in 1992 in Isfahan on women's employment status, income, leisure time and job satisfaction can be mentioned in which the relationship between types of job and job satisfaction was studied. The results indicated that in administrative jobs, marketing and sales job satisfaction was slightly above the average and in management and supervision, educational and cultural professions it was the highest while in scientific, expert, manufacturing and health care jobs it was below average among which healthcare workers was the least satisfied.

Abbass Keshani (1998) in his study concluded that women and men were different in terms of job satisfaction and burnout. Higher job satisfaction and lower burnout were observed among women than men. Also, singles had lower levels of job satisfaction than those who were married. In general, there was an inverse relationship between job satisfaction and burnout; so if job satisfaction was high, burnout was low and vice versa.

Hejazi (2002) believes that work motivation is one of the most studied aspects of management. A range of theories were presented to help explain what may motivate workers in their work and innovation. Unfortunately, most of these theories are often in conflict with each other and don't give complete explanation of work motives. Managers can't force their employees to be motivated at work, but they can encourage them to dominate in their work and appreciate them for meeting the desired goals in appropriate opportunities.Shojaee Abbasi (2003) conducted a study entitled "Participation in decision-making and its relationship with work motivation of employees in different departments of Shahid Beheshti University". The basic objective of this study was to determine participation rate in decision-making and its relationship with work motivation of employees in order to achieve a proper and efficient level of organizational behavior in different departments of Shahid Beheshti University. To this purpose, general questions were raised to determine employees' participation rate in decision-making and their level of job motivation based on research hypotheses. Rahimi (2003) examined motivational effects of bonuses paid to employees of Ministry of Science, Research and Technology on their performance. The study was application, descriptive and correlation, and it has been done in the field by using questionnaire. Statistical population studied in this research was 210 permanent, temporary and contract workers of Ministry of Science, Research and Technology. This number was determined based on Cochran formula and two main data collection methods of library and documentation and field were used.

Foreign literatures

Ratsvi (1954) quoted by Heavy and Miskle (1987) that he concluded after reviewing literatures that overall job satisfaction of teachers in schools where there is bureaucracy is low. Motivation is also correlated with job satisfaction. Motivational and health needs contribute to teachers' and managers' job satisfaction and expectancy motivation is correlated significantly with job satisfaction. Likewise, as school climate is more open and collaborative, teachers' job satisfaction will be higher.

In a study on 150 school principals in Malta, Mark et al. reported that they consider their job as very stressful so more stress causes lower job satisfaction. They cited stress sources as follow: 1. Lack of support 2. Engaging in problem solving 3. Inadequate resources 4.hard work 5. Inappropriate working conditions 6.too much responsibility.

By comparing job satisfaction of 48 full-time counselors who served in several schools with job satisfaction of 52 counselors who served in one school, Laden and Brown concluded that counselors who served in several schools spent more time, were more engaged and had lower job satisfaction than those who worked in one school.

Konly et al. reported that participation of teachers with an experience in job redesigning caused job satisfaction increase and this was much less effective on novice teachers. They also found that pay raise increased their job satisfaction among both groups. Imam conducted a research in 1990 on 100 teachers (50 male and 50 female) between 21-55 year and asked them to fill a questionnaire measuring job satisfaction factors. The results showed that there was a significant relationship between job satisfaction and variables of age, gender, level of education and monthly salary. In a comparison performed between Japanese and American workers and their attitude towards their work, it was concluded that if there was an interest in the principal and attitude toward work, there was also job satisfaction and there wasn't found a significant difference between Japanese and American workers by job satisfaction. For example, job satisfaction of Japanese employees was 2.12 and American employees 2.95. As seen, the difference is as low as 0.83.

Statement of the problem

Manpower or human factor is undoubtedly the most significant and the most valuable factor among various sources of production. Human factor in an organization involves all people working in the organization including managers, professionals, experts, staffs and employees in different rankings. Employees' job satisfaction is undoubtedly an important factor for enhancing productivity and personal satisfaction in an organization. Managers intend to increase job satisfaction of their employees in various ways in order to improve their job performance.Intrinsic satisfaction comes from two sources; the first is a sense of pleasure resulted from engaging in a work and activity. The other is the pleasure of observing one's own progress or doing some social responsibilities and manifestation of human abilities and personal desires.

Extrinsic satisfaction is related to working conditions and workplace and is changing and evolving.
One of the most controversial topics in the field of job satisfaction is its relationship with performance. There are three theories proposed in this regard:

1. Job Satisfaction causes job performance
2. Job Performance causes job satisfaction
3. Reward, acts as an intermediary between job performance and job satisfaction.

Therefore, this study aimed to determine the relationship between job satisfaction, motivation and performance of high school teachers in order to take effective steps and improve their motivation and performance based on documented information in planning and promotion of teachers' satisfaction.

Theoretical Definitions

Job satisfaction

Job satisfaction (in the sense spiritual joy from satisfying needs, desires and hopes) is a satisfaction attitude that people have about their work.

Motivation

Working willingly with a desire or motivation is a critical factor in making efforts and activities by people (Hosseini Nasab, 1994).

Performance

Performance is literally the quality of function.

Operational definitions

Scores obtained by tastes in satisfaction measuring test in job descriptive index (JDI).

Performance

Scores obtained by tastes according to performance indicators of Department of Education.

Motivation

It is the scores obtained by tastes in teachers' job motivation questionnaire.

Research Purposes

The main purpose of the study is to investigate the relationship between job satisfaction with motivation and performance of high school teachers.

Secondary purposes

1. Investigating the relationship between teachers' intrinsic job satisfaction and motivation.
2. Investigating the relationship between teachers' extrinsic job satisfaction and motivation.
3. Investigating the relationship between teachers' intrinsic job satisfaction and performance.
4. Investigating the relationship between teachers' extrinsic job satisfaction and performance.

Main hypotheses

1. There is a relationship between teachers' job satisfaction and motivation.
2. There is a relationship between teachers' job satisfaction and performance.

Secondary hypotheses

1. There is a relationship between teachers' intrinsic job satisfaction and motivation.
2. There is a relationship between teachers' extrinsic job satisfaction and motivation.
3. There is a relationship between teachers' intrinsic job satisfaction and performance.
4. There is a relationship between teachers' extrinsic job satisfaction and performance.

METHODOLOGY

In general, research methods in behavioral sciences can be classified by two criteria: Research purpose and Data collection method.Accordingly, the present study is application by purpose and descriptive-survey research by data collection method.

Statistical population

Population in the study is male high school teachers in Mashhad Municipality District one, the number of them were 85.

Sample size and sampling method

Simple random sampling method was used for sampling and sample size was calculated 70 using krejcie and Morgan table.

Data collection method

In this study, data on literature was collected by library method using scientific articles, library and internet and for proving hypotheses; data was collected in field by questionnaires.

Data collection tools

Questionnaires used were:

Job descriptive index (JDI)

The model has five major dimensions of job satisfaction:

1. pay: the amount received and the perceived equity of pay
2. job: the extent to which job tasks provide opportunity for accepting responsibility
3. promotion opportunities: the availability of opportunities for advancement
4. Supervisor. The supervisor's abilities to demonstrate interest in and concern about employees.
5. Coworkers: the extent to which coworkers are friendly, competent and supportive.

Teachers' work motivation questionnaire

This questionnaire is designed to measure teachers' work motivation and consists of 20 5-choice questions (Strongly Agree, Agree. No comment, Strongly Disagree, Disagree).

Teacher job performance questionnaire

It is a researcher-made questionnaire based on performance indicators of Department of Education which is composed of 20 questions.

Reliability and validity of questionnaire

Validity was approved by experts and professors and reliability was calculated 0.88 after initial implementation on a number of cases based on Cronbach alpha which was considered acceptable.

Calculating Cronbach's alpha

$$r_a = \frac{j}{j-1}\left(1-\frac{\sum S_j^2}{S^2}\right)$$

Where

j= the number of subsets of questions of the questionnaire or test

S_j^2= variance of j-th subtest

S^2= variance of the test

With regard to the questionnaire consists of two subsets of questions with the sum of 20, with variances of 4, 5, and total variance of 16, Cronbach's alpha coefficient was calculated 0.88 using the formula which is acceptable.

$$r = 2\left(1-\frac{9}{16}\right) = 0.88$$

Data analysis

The software SPSS was used to analyze data in two levels of descriptive and inferential statistics. Analysis of Covariance was used for inferential statistics.

Tastes profiles

Frequency distribution of the sample by level of education

The following table shows frequency distribution of respondents by level of education. According to information obtained the sample included 3% Associate degree, 90% Bachelor's degree and 7% Master degree. Graph 1: respondents by level of education.According to the data in above table and graph, the highest percentage of the sample is for respondents with a bachelor's degree with 90%.

Frequency distribution of the sample by years of service

Respondents were asked for the years of service, its range is specified by less than 10 to more than 20 years as interval of 5 years. The results show that 5% served between 10 and 15 years, 5% between 15 and 20 years and 90% more than 20 years.According to the data in above table and graph, the highest percentage of the sample is for respondents with more than 20 years of service.

Inferential statistics

Confidence coefficient was considered 95% in this study; in other words margin of error 5% was predicted in calculation of the results.

Linear regression

Satisfaction and motivation

To check whether job satisfaction increased motivation and consequently performance, linear regression was used. In this study satisfaction was considered independent variable and motivation dependent variable. To conclude, if standardized coefficient obtained is positive, it shows a positive relationship between two dependent and independent variables, and if it is negative, it indicates an inverse relationship between these two variables. Also, if p-value is greater than 0.05, the null hypothesis (H0) of a linear relationship between two variables will be accepted and H1 is rejected.

The results of regression analysis shown in table 3-4 suggest that coefficient of determination for these two variables are 39. This means that 39% of motivation variation can be attributed to staff satisfaction.However, as the level of significance (0.000) is less than experimental error (0.05), we can conclude that there is a linear relationship between teachers' motivation and satisfaction.

Satisfaction and performance

To check the effect of job satisfaction on performance and the relationship between two variables, satisfaction was considered independent variable and performance dependent variable. The results of regression analysis shown in table 4-4 suggest that coefficient of determination for these two variables are 38. This means that 38% of performance variation can be attributed to staff satisfaction.However, as the level of significance (0.000) is less than experimental error (0.05), we can conclude that there is a linear relationship between teachers' performance and satisfaction.

Proving hypotheses

Main hypothesis one: There is a relationship between teachers' job satisfaction and motivation**.**
Since we want to predict such variable with interval scale as motivation (because absolute zero is not significant for this variable; it means that zero score in the questionnaire doesn't imply lack of motivation) based on two variables with interval scale (satisfaction and motivation), so the best analysis method is multivariable linear regression. In the above hypothesis, satisfaction was considered as criterion (dependent) variable and motivation as predictor (independent) variable.

Table 5-4 indicates that predictor variable could explain and predict 35% variance (variation) of criterion variable (motivation). In other words, at the same time with the arrival of predictor variable in the equation, 0.35 of variance (dispersion) of motivation scores can be predicted which is relatively good.The findings shown in table 4-4 indicate that predictor variable included in the equation predicts criterion variable well because significance level is less than 0.001 and it can predict teacher motivation by 99% confidence (α=0.05). Since beta coefficient is positive so as teachers' satisfaction increases, their motivation increases too.

Secondary hypothesis one: There is a relationship between teachers' intrinsic job satisfaction and motivation.Since we want to estimate the relationship between two variables with interval scale; intrinsic satisfaction and motivation and it is assumed that fundamental distribution of two variables in the population is in normal range so the best statistical method is Pearson parametric correlation coefficient.Null hypothesis: there is no relationship between teachers' intrinsic job satisfaction and motivation: Inverse hypothesis: there is no relationship between teachers' intrinsic job satisfaction and motivation.The findings shown in table 6-4 indicate that there is a positive significant correlation between the two variables with 99% confidence; as one of them increases the other increases too. So the null hypothesis is rejected and research hypothesis is supported.

Secondary hypothesis two: There is a relationship between teachers' extrinsic job satisfaction and motivation.
Null hypothesis: There is no relationship between teachers' extrinsic job satisfaction and motivation.
Inverse hypothesis: There is a relationship between teachers' extrinsic job satisfaction and motivation.
The findings shown in table 7-4 indicate that there is a positive significant correlation between the two variables with 99% confidence; as one of them increases the other increases too. So the null hypothesis is rejected and research hypothesis is supported.

The main hypothesis two: There is a relationship between teachers' job satisfaction and performance. ince we want to predict two variables with interval scale, satisfaction and performance, so the best analysis method used is multivariable linear regression. In the above hypothesis, satisfaction was considered as criterion (dependent) variable and performance as predictor (independent) variable.Table 8-4 indicates that predictor variable could explain and predict 35% variance (variation) of criterion variable (performance). In other words, at the same time with the arrival of predictor variable in the equation, 0.35 of variance (dispersion) of performance scores can be predicted which is relatively good.The findings shown in table 9-4 indicate that predictor variable included in the equation predicts criterion variable well because significance level is less than 0.001 and it can predict teacher job performance by 99% confidence (α=0.05). Since beta coefficient is positive so as teachers' satisfaction increases, their job performance increases too.

Secondary hypothesis three: There is a relationship between teachers' intrinsic job satisfaction and performance.
Null hypothesis: There is no relationship between teachers' intrinsic job satisfaction and performance.
Inverse hypothesis: There is a relationship between teachers' intrinsic job satisfaction and performance.
The findings shown in table 10-4 indicate that there is a positive significant correlation between the two variables with 95% confidence; as one of them increases the other increases too. So the null hypothesis is rejected and research hypothesis is supported. In other words, as intrinsic satisfaction increases, teachers' performance improves too.

Secondary hypothesis four: There is a relationship between teachers' extrinsic job satisfaction and performance.
Null hypothesis: There is no relationship between teachers' extrinsic job satisfaction and performance.
Inverse hypothesis: There is a relationship between teachers' extrinsic job satisfaction and performance.
The findings shown in table 11-4 indicate that there is a positive significant correlation between the two variables with 95% confidence; as one of them increases the other increases too. So the null hypothesis is rejected and research hypothesis is supported. In other words, as extrinsic satisfaction increases, teachers' performance improves too.

RESULTS

The purpose of this study was to determine the relationship between job satisfaction with motivation and the performance of high school teachers. The findings showed that there is a relationship between job satisfaction with motivation and performance of high school teachers.The first hypothesis stated that there is a relationship between teachers' job satisfaction and motivation. According to findings of the research, the hypothesis is supported so as teachers' satisfaction increases their motivation increases too. This hypothesis was investigated in two sub-hypotheses of the relationship between intrinsic satisfaction with motivation and extrinsic satisfaction with motivation. The results showed that there is a significant positive correlation between two variables of intrinsic satisfaction and extrinsic satisfaction with 99% confidence so by increasing the amount of one of variables, the other increases too and vice versa.

The second research hypothesis suggested that there is a relationship between teachers' job satisfaction and performance. The findings indicated that at the same time with the arrival of predictor variable in the equation, 0.35 of variance (dispersion) of performance scores can be predicted which is relatively good. Since beta coefficient is positive so as teachers' satisfaction increases, their performance increases too. This hypothesis was also investigated in two sub-hypotheses of the relationship between intrinsic satisfaction with performance and extrinsic satisfaction with performance. The results showed that there is a significant positive correlation between two variables with 99% confidence so by increasing the amount of one of variables, the other increases too and vice versa. In other words, as intrinsic or extrinsic satisfaction increases, teachers' performance improves too.

Since students in Mashhad Municipality district one is different in terms of social behavior and level of knowledge so the performance of teachers in different schools can't be evaluated with the same evaluation form. The results can't be generalized to the whole community based on the reason that teacher evaluation system relies on individual performance.

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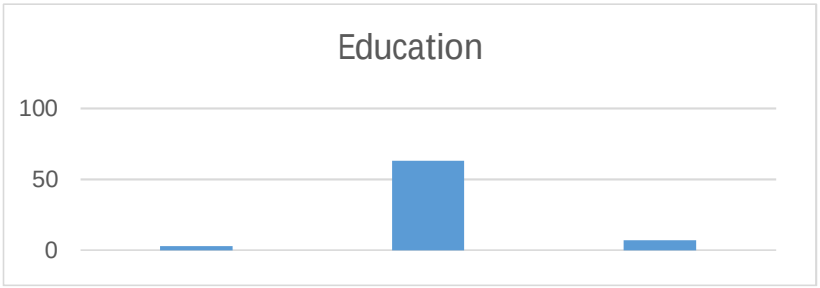
Table 1-4: Frequency distribution of respondents by level of education

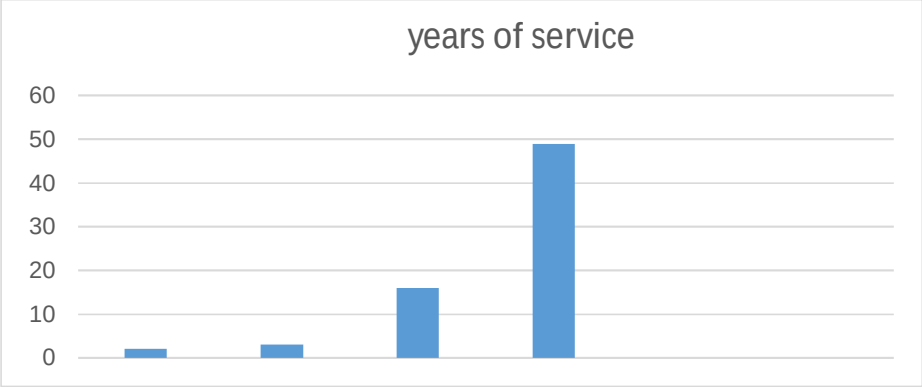
percentage	Frequency	Level of Education
3	2	Associate degree
90	63	Bachelor's degree
7	5	Master's degree
100.0	70	Total



Graph 1: respondents by level of education

Table 2-4: Frequency distribution of respondents by years of service

percentage	frequency	years of service
3	2	Less than 10 years
4	3	10-15 years
23	16	15-20 years
70	49	More than 20 years
100.0	70	Total



Graph 2-4: Respondents by years of service

Table 3-4: linear regression results

p-value	t	Standardized coefficient	Standardized coefficient		Model
		Beta	Std.Error	B	
0.001	3.470	0.469	0.471	1.663	Constant value
0.000	5.760		0.99	0.570	Staff motivation

Table 4-4: Linear regression results

p-value	t	Standardized coefficient	Standardized coefficient		Model
		Beta	Std.Error	B	
0.001	3.470	0.398	0.471	1.663	Constant value
0.000	5.313		0.98	0.497	Staff performance

Table 5-4: The variance of criterion variable by predictor variables			
Standard error of the estimate	Adjusted R-squared	R-squared	R value
15/05	0/34	0/35	0/59

Table 4-4: Standardized coefficients between variables			
Significance level	T-statistic	Standardized coefficients (β)	Model
0/000	9/07	-	Constant coefficient
0/000	10/32	0/59	Job satisfaction

Table 6-4: Pearson correlation coefficient between motivation and intrinsic satisfaction

**0/325	Pearson correlation coefficient
0/001	Significance level
70	Number of tastes
**. Correlation is significant at the 0.01 level (2-tailed).	

Table 7-4: Pearson correlation coefficient between motivation and extrinsic satisfaction

0/608**	Pearson correlation coefficient
0/000	Significance level
70	Number of tastes
**. Correlation is significant at the 0.01 level (2-tailed).	

Table 8-4: The variance of criterion variable by predictor variables

Standard error of the estimate	Adjusted R-squared	R-squared	R value
12/58	0/31	0/32	0/63

Table 9-4: Standardized coefficients between variables

Significance level	T-statistic	Standardized coefficients (β)	Model
0/000	9/13	-	Constant coefficient
0/000	10/32	0/59	Job satisfaction

Table 10-4: Pearson correlation coefficient between performance and intrinsic satisfaction

0/218*	Pearson correlation coefficient
0/001	Significance level
70	Number of tastes
*. Correlation is significant at the 0.5 level (2-tailed).	

Table 11-4: Pearson correlation coefficient between performance and extrinsic satisfaction

0/229*	P earson correlation coefficient
0/001	Significance level
70	Number of tastes
*. Correlation is significant at the 0.5 level (2-tailed).	

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RESEARCH ARTICLE

The Study on Relationship between Job Satisfaction and Job Stress with Psychological Empowerment of Teachers in Boys Public Secondary School in Education &Training Organization

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ABSTRACT

The present paper aimed at studying the relationship between job satisfaction and occupational stress with psychological empowerment among male public secondary school teachers in Mashhad Municipality district seven. The method was descriptive-inferential with the type of co relational. Statistical population of the research was 580 teachers and sample size was calculated 231 by Cochran formula using simple random sampling. To collect data, Minnesota job satisfaction questionnaire, Kyriacou & Sutcliffe job stress questionnaire and Spreitzer & Mishra psychological empowerment questionnaire were used. To analyze data in this study, descriptive statistics and inferential statistics such as the Kolmogorov-Smirnov test, t-test, and Pearson correlation coefficient were used.The results showed that job satisfaction and job stress were both in the average level. The average of psychological empowerment was significant at the level of 0.01 and it was below average. The results also indicated that there was a positive significant relationship between teachers' job satisfaction and psychological empowerment with correlation coefficient of 0.42 at significance level of 0.01. It was also found that there was a negative significant relationship between teachers' occupational stress and psychological empowerment with correlation coefficient of 0.263 at significance level of 0.01.

Keywords: job satisfaction, job stress, psychological empowerment, school teachers.

Human resources are the most important and valuable assets that any organization posses and the most effective way to gain a competitive advantage in the current situation is to make the resources efficient. Since human resources play a critical role in the growth, dynamism, development or disruption of an organization, so it can be claimed that meeting organizational goals is impossible without efficient workers. Due to changes in the environment that constantly challenge organizations and for organizations to be able to maintain in the competition and handle changes to their benefits, they need empowered workers (Amir Kabiri and Fathi, 2007: 101).

Rapid changes, technological developments and overt and covert competitions in the world have revealed the importance and necessity of empowerment. Empowerment is an effective and leading technology both providing strategic advantage for organizations and creates opportunities for staff members as well as is a tool for participation of members in the success or failure of an organization (Tavanaee Shahroodi and Mahram, 2010: 24).Essentially the philosophy of empowerment suggests that organizations can make their workers to be satisfied and at the same time obtain what is needed (Emami and Nazari, 2003: 62).

Empowerment is the process of empowering people. In this process, we help our employees to improve their self-confidence and dominate on their sense of powerlessness and helplessness. In this sense, empowerment means mobilizing internal motivations (Ezabadi, 2009: 11).Studies performed show that empowered people are a great asset to an organization because they are self-directing and reliable. On the other hand, stress exists in the life of everyone in the community who works and brings pressure for them. Given that one spends at least a third of his lifetime at work and most of social relations are shaped during working hours, stress from work or occupational stress can play a major role in the health and happiness of people; this is particularly true for teachers as they directly related to students (Dehshiri, 2004: 54). Occupational stress is a type of stress reported in such occupations as teaching and it is considered among four most stressful jobs at national level including teaching, nursing, police force and social working (Etemadi et al. 2007 quoted by Wilkinson, 1996:14).

Occupational stress is the interaction between working conditions and worker so that they are unable to cope with the pressures associated with (keramati, 2012: 105). The other factor lack of which may create obscure conditions for empowerment is job satisfaction that causes individual productivity to be increased, workers to be more committed to the organization, individual spirit to be increased, workers to be more satisfied with life and learn more quickly new job skills, have less tendency to lodge a complaint, are more healthy physically and mentally, have more longevity, learn more quickly new duties associated with job and face with lower occupational accidents (Mohammad Zadeh and Mehrojan , 1996: 280).Based on above discussion and the impact of job satisfaction on performance which approved in abundant researches including Mirkamali et al. (2009), Yazdi and Jafari (2009) and Majidi (2001) as well as the effect of job stress on performance supported by many researchers including Mirkamali et al. (2009), Ebrahimi (2011) and Samadi et al. (2012) and also unconditional effect of psychological empowerment on performance confirmed by many researches including Gorji (2010), Samadi (2010) and Salajegheh and coworkers (2010), it can be assumed that there is probably a relationship between variables of job satisfaction and psychological empowerment.

Researches performed on the relationship between teachers' job stress and job satisfaction with psychological empowerment are very rare and most of them have considered one dimension, either the role of occupational stress or job satisfaction in productivity and performance. Given to rare researches performed in this field, it can be assumed that unfortunately there haven't been enough attention to this approach which can create a change in empowerment and performance of and consequently pupils and schools and since empowerment can support good performance and performance is a tool for judging people beyond the goals of organization (Sahami et al., 2012: 86), so it can have significant importance for both individual and organization as well as society. Therefore it is necessary to more researches be done on the lack of job satisfaction in people in the society. Having a sense of stress for many reasons including lack of job security and consequently lack of self- confidence and empowerment motivated us to conduct a research. With respect to the importance and necessity of empowerment especially in education system

due to its deep impact on the future of society, culture and economy of a country and also the teacher's role as the most influential factor in education performance, empowerment is considered vital. It seems that little attention has been given to this important and influencing factor. As regard to the importance of occupational stress and job satisfaction for empowerment and that reduced occupational stress and increased job satisfaction require change and change is also requires empowerment, and according to Torlakson, "empowerment is a change process of workers form what they are told to do to what is needed to do" (Ezabadi, 2009:12); this question arises that whether reduced occupational stress and increased job satisfaction can create useful changes contributing teachers' empowerment and thus better performance?

Review of Literature

Domestic literature

In a research "The relationship between organizational climate and teachers' job satisfaction in the city of Masal in Gilan Province", Sadeghi and Fathi concluded that first, there was a significant relationship between organizational climate of schools (open, committed, strange and closed) and teachers' job satisfaction and then there was no significant relationship between teachers' gender and job satisfaction. (Sadeghi and Fathi, 2002: 55).

Maria Aguilar concluded in a research that the most important outcomes of occupational stress for primary school teachers were lack of job satisfaction, fatigue, contempt for job and indifference towards job and for high school teachers the most important outcomes were manifested in mental health such as physical symptoms, anxiety and insomnia, and depression and inadequacy in social roles (Maria Aguilar, 2000: 63).

In a paper entitled "the relationship between employees' occupational stress and job satisfaction", Azad Marzabadi and Tarkhorani concluded that there was a significant relationship between job stress and job satisfaction, satisfaction with authorities and satisfaction with salary and benefits (Azad Marzabadi and Tarkhorani, 2007: 121).

Mirkamali and colleagues in a study entitled "The relationship between psychological empowerment and job satisfaction and organizational commitment among employees of Tehran University" concluded that there was a positive and significant relationship between psychological empowerment and its subscales, meaningfulness, self-determination, competence and impact with job satisfaction. They also concluded that there was a significant relationship between all components of psychological empowerment (except competent) and two components of organizational commitment, affective commitment and normative commitment but not continuance commitment (Mirkamali and colleagues, 2009:15).

Soleimani and colleagues in a study entitled "The relationship between work ethic and staffs' job satisfaction and job stress at technical and vocational education organization in Tehran" concluded that there was a positive significant relationship between work ethics perceived by employees and job satisfaction, but there was a significant negative correlation between work ethics perceived by employees and occupational stress (Soleimani et al, 2012: 21).

Kooshki and colleagues in a research entitled "The relationship between personality characteristics and teachers job satisfaction factors" found that there was a significant relationship between the fourth factor (attention to human desires and group interests, attachment and sense of responsibility by authorities) and the eighth factor (facilitating the client works) of job satisfaction with extraversion and responsibility. There was also a significant relationship between the fifth factor (work experience, scientific and ethical competence of seniors, and how the organization is led) and traits of extraversion, compatibility and responsibility (Kooshki et al., 2009: 8).

In a study entitled "interaction of job stress and job satisfaction", Yazdi and Jafari found that Job satisfaction interacts with occupational stress in various aspects so that job satisfaction explained 49% of the variance in job stress and job stress explained 52% of the variance in job satisfaction of managers and supervisors (Yazdi and Jafari, 2009: 25).

Ansari and colleagues in a study entitled "The relationship between occupational stress, job satisfaction, organizational commitment and organizational citizenship behavior" concluded that there was a significant negative relationship between occupational stress and job satisfaction components and organizational commitment. It was also found that job satisfaction has a positive and significant effect on organizational citizenship behavior and organizational commitment (Ansari et al., 2010: 153).

Asghari et al in a study entitled "The relationship between empowerment and self-efficacy with job satisfaction" found that there is a direct relationship between empowerment and job satisfaction, and between empowerment and self-efficacy. There was not found a relationship between self-efficacy and job satisfaction while a relationship existed between empowerment and self-efficacy interacted with job satisfaction. So the research concluded that both empowerment and self-efficacy affect on job satisfaction thus by increasing empowerment and self-efficacy, teachers' job satisfaction improves (Asghari et al. 2008:228).

Majidi in an article entitled "job satisfaction and performance" examined the relationship between job satisfaction and by investigating different scenarios between job satisfaction and performance concluded that if all aspects of job satisfaction is considered and an appropriate criterion for measuring performance is defined, then we can say job satisfaction leads to better performance and conversely, if better performance is associated with fairly reward leads to increased job satisfaction (Majidi, 2001: 98).

In a research entitled "the relationship between middle school teachers' job satisfaction and performance in Torghabeh district in Mashhad", Pop and Latifian came to the conclusion that there was a positive correlation between teachers' job satisfaction and performance (Pop and Latifian, 2009: 56).

In a research entitled "evaluating the effect of empowerment on personnel performance", Gorji concluded that empowering employees in Telecommunication Company of Golestan province could affect their performance (Gorji, 2010: 38).

Salajegheh and colleagues in a paper entitled "The role of employees' empowerment in effectiveness and efficiency of an organization" concluded that employees are able to assume duties when they have a good deal of skill, knowledge and identify organizational goals. Empowerment is a tool that can help managers in this regard. Empowerment is one of the effective tools for increasing efficiency and effectiveness of staff and using individual and group capacities and capabilities optimally in line with organizational goals (Salajegheh et al. 2012:34).

Izadi, Yazdan Abadi and Noushevar in a research entitled "teacher job description and its relationship with empowerment" found that there was a significant positive relationship between teacher job description and psychological empowerment. The results also showed that the teachers studied were evaluated their psychological empowerment at a high level. They also evaluated job characteristics in the respective model for teachers at a relatively high level. The results also indicated that there is a significant difference between principals and teachers about job characteristics of teaching.

Foreign literature

In a research entitled "Analysis the influence of teacher empowerment performance within improving the quality of education in elementary schools in Surabaya city", Subroto concluded that teachers' empowerment increases performance and it affects on the quality of education by indices of knowledge, attitudes and skills (Subroto, 2012: 39).

Aksel et al. in a research conducted, "Study teachers' perceptions of organizational citizenship behaviors and psychological empowerment in Turkey", supported a positive relationship between teachers' perceptions of psychological empowerment and organizational citizenship behaviors. Statistical analysis showed that teachers' psychological empowerment enhances citizenship behavior (Aksel et al., 2013: 72). In a research project on the relationship between psychological empowerment and work motivation and intention of leaving among secondary school principals in Malaysia, Fook and colleagues concluded that all five dimensions of psychological empowerment was significantly and positively correlated with internal work motivation. The study also showed that when intention of living increases, different dimensions of psychological empowerment decrease (Fook et al., 2011: 2907).

Trivellas and colleagues conducted a research entitled "the effect of occupational stress on employees' satisfaction" and concluded that conflicts, heavy workload and lack of independence in work were correlated negatively with all aspects of job satisfaction while there was a positive correlation between compensation and job security with employees' job satisfaction (Trivellas, 2013: 718).

Yashoglu and colleagues in a study entitled "Empirical research on the relationship between job insecurity, job-related stress and job satisfaction" concluded that lack of job security was negatively correlated with job satisfaction and organizational attitudes as well as staff health (Yashoglu et al., 2013: 332).

In a study to determine the relationship between occupational stress and job satisfaction of secondary school teachers in Nepal", Kayastha & Kayastha concluded that there was a significant correlation between work stressors, occupational stress and job satisfaction (Kayastha & Kayastha, 2012: 52).

Demirtas in a research entitled "job satisfaction levels in Turkey" in which job satisfaction level of primary school teachers were measured concluded that their job satisfaction was at very high level. He found that job satisfaction of teachers between 36 to 40 years of age was well above average while job satisfaction of those over 41 years of age was slightly lower (Demirtas, 2010:1069).

In a research entitled "Sources and effects of work-related stress", Moustaka & Constantinidis concluded that some aspects of work life are associated with stress and various aspects of work can by itself be stressful. They also found that stress is associated with reduced productivity, reduced work capacity and lack of interest in the organization and colleagues (Moustaka & Constantinidis, 2010: 210).

METHODOLOGY

This is an applied study. Since it describes phenomena and conditions so in terms of data collection it is descriptive and since it studies the relationship between variables (job satisfaction, occupational stress with psychological empowerment), this is correlational research and Pearson correlation coefficient was used to determine correlation between variables.

Population, sample and sampling method

The population was all teachers in public secondary schools in Mashhad municipality district seven; in sum 580 teachers. Sample size was calculated 231 by Cochran formula.Simple random sampling method was used so that about half of the schools were selected randomly and the inventory was distributed among teachers.

Data collection method

Data collection methods in this study were library research (including library resources such as books, articles, conferences and Internet, etc.) and field research (distributing and collecting data measurement tool for analysis).

Measurement tool

Minnesota job satisfaction questionnaire

The questionnaire consists of 19 questions and aims at examining job satisfaction dimensions. In a research performed by Mohammedi, its reliability was calculated 0.86 using Cronbach's alpha coefficient (Mohammedi, 2011). The questionnaire has 6 components and 19 items and uses five-item Likert scale.

Occupational stress questionnaire

To determine the status of teachers stress, Kyriacou & Sutcliffe (1987) occupational stress questionnaire was used and its reliability was obtained 0.93 by Kiani (2009) using Cronbach's alpha coefficient. The questionnaire has seven components and 64 items and uses five-item Likert scale.

Psychological empowerment questionnaire

The questionnaire was adapted from Spreitzer & Mishra (1997) and its reliability was calculated 0.883 by Beigi Nian et al. (2010) using Cronbach's alpha coefficient. The questionnaire has five components and 15 items and uses five-item Likert scale (1 = strongly disagree, 2=disagree, 3 = no comment, 4 = agree, 5 = strongly agree).

Reliability and validity of the tool

Validity

Although the validity of Minnesota job satisfaction questionnaire was supported in many studies like Mohammadi (2011) and also the validity of occupational stress questionnaire was approved in studies such as Kiani (2009), since these questionnaires was used in a new study, its validity has been approved by the Supervisor. The validity of Spreitzer & Mishra (1997) psychological empowerment questionnaire was also approved in many researches including Beigi Nia (2010) but since it was used in a new study; its validity has been approved by the Supervisor.

Reliability

In this study, Cronbach's alpha coefficient calculated for job satisfaction questionnaire was 0.888, for occupational stress questionnaire, 0.945 and for psychological empowerment questionnaire was 0.926 indicating good reliability of these questionnaires.

Variables normality test

Kolmogorov-Smirnov test with the value of 1.027 and significance level of 0.243 Showed that the variable of job satisfaction has a normal distribution. It also indicated that the variable of occupational stress with the value of 1.083 and significance level of 0.191 and the variable of psychological empowerment with the value of 1.499 and significance level of 0.88 have a normal distribution. So due to the variables are normal and are in interval scale, parametric tests for data analysis can be used.

RESULTS

Research question 1

How is the status of teachers' job satisfaction in public secondary school of Mashhad Municipality district seven?
Job satisfaction was totally less than theoretical average and since it was not significant so it was reported at average level.

Research question 2

How is the status of teachers' occupational stress in public secondary school of Mashhad Municipality district seven?
Job stress was totally less than theoretical average and since it was not significant so it was reported at average level.

Research question 3

How is the status of teachers' psychological empowerment in public secondary school of Mashhad Municipality district seven?

Psychological empowerment average was totally less than theoretical average and was significant at the level of 0.05 so it was reported at low level.

Research question 4

Is there a relationship between job satisfaction and occupational stress with psychological empowerment of teachers in public secondary school of Mashhad Municipality district seven?

The relationship between teachers' job satisfaction and psychological empowerment

The following table shows that there is a positive significant relationship between teachers' job satisfaction and psychological empowerment in public secondary schools of Mashhad Municipality district seven with Pearson correlation coefficient of 0.420 and significance level of 0.01.The table also shows that the component "Job" with correlation coefficient of 0.522 is most and the component "payment system" with correlation coefficient of 0.149 is least related to psychological empowerment.

The relationship between teachers' job stress and psychological empowerment

The table below shows that there is a significant relationship between teachers' occupational stress and psychological empowerment in public secondary schools of Mashhad Municipality district seven with Pearson correlation coefficient of 0.291 and significance level of 0.01.

The above table shows that the component "physiological symptoms of stress" with correlation coefficient of 0.477 is most and the component "students' behavior problems" with correlation coefficient of 0.122 is least related to psychological empowerment.

DISCUSSION AND CONCLUSION

The relationship between teachers' job satisfaction and psychological empowerment

The results of correlation test between variables indicated that there was a significant positive relationship between teachers' job satisfaction and psychological empowerment in public secondary schools of Mashhad Municipality district seven. The highest correlation existed between job satisfaction components and psychological empowerment with the component "job" had the lowest and the component "payment system" had the highest correlation.

The results of the present research is consistent with similar studies including Izadi, Yazdan Abadi and Noushevar (2011), Asghari et al. (2008), Rasuli (2005), Jafari (2013), Mirkamali et al. (2009) and Mirkamali and Nasti (2010). The results are also inconsistent with similar studies such as Azad Marzabadi et al (2012).

Given the undeniable effect of job satisfaction on employee performance confirmed by many researches including Mirkamaly et al (2009), Yazdi and Jafari (2009), Majidi (2001) and Dehghan et al (2012) and the significant impact of psychological empowerment on staff performance supported by many researches including Salajegheh et al (2012), Samadi and Suri (2010), Gorji (2010) and Rezaee Nejad (2004), so it can be concluded that there is a significant relationship between two variables approved by the results obtained from field research. So, given that there is a positive significant relationship between job satisfaction and psychological empowerment, increasing each of them (which are already considered in detail) can result in enhancement of the relationship between them. Thus by proper attention to the components of above variables better individual and organizational performance will be followed.

The relationship between teachers' job stress and psychological empowerment

The results of correlation test between variables indicated that there was a significant relationship between teachers' job stress and psychological empowerment in public secondary schools of Mashhad Municipality district seven.The highest correlation existed between job stress components and psychological empowerment with the component "physiological symptoms of stress" had the lowest and the component "students' behavior problems" had the highest correlation.

The results of the present research is consistent with similar studies including Jafari(2013), Khoshooee and Bahrami (2014). The results are also inconsistent with similar studies such as Azad Marzabadi et al (2012) and Rasuli (2005). Given the probable effect of job stress on employee performance confirmed by many researches including Mirkamaly (1998), Ebrahimi and Javadi (2011), Ahmadi et al. (2011) and Samadi et al (2012) and the significant impact of psychological empowerment on staff performance supported by many researches including Salajegheh et al (2012), Samadi and Suri (2010), Gorji (2010) and Rezaee Nejad (2004), so it can be concluded that there is a significant relationship between two variables approved by the results obtained from field research. So, given that there is a significant relationship between job stress and psychological empowerment, increasing each of them (which are already considered in detail) can result in enhancement of the relationship between them. Thus by proper attention to the components of above variables better individual and organizational performance will be followed.

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Table-1.

Test value=3			Average	Frequency	Components
Significance level	**Degree of freedom**	**t**			
0.000	230	15.941	3.9841	231	Payment system
0.000	230	-9.012	2.4167	231	Job
0.000	230	5.766	3.3680	231	Job opportunities
0.000	230	-5.955	2.6212	231	Organizational climate
0.028	230	-2.216	2.8853	231	Leadership style
0.000	230	-5.416	2.6941	231	Physical conditions
0.908	230	15.941	2.9949	231	Job satisfaction

Table-2.

Test value=3			Average	Frequency	Components
Significance level	**Degree of freedom**	**t**			
0.000	230	5.999	3.2763	231	Teachers adverse economic, social and family conditions
0.218	230	1.236	3.0587	231	Problems related to school

					space and facilities
0.000	230	5.328	3.2495	231	students Behavior problems
0.204	227	1.274	3.0581	228	Professional competence of teachers
0.003	230	2.993	3.1291	231	Low educational motivation among students
0.009	227	-2.648	2.8925	228	Time pressure
0.000	230	-2.150	2.0618	231	Physiological symptoms of stress
0.302	227	-1.035	2.9616	228	Job stress

Table-3.

Test value=3			Average	Frequency	Components
Significance level	Degree of freedom	t			
0.000	230	-26.253	1.5815	231	Meaningfulness
0.000	230	-22.953	1.6652	231	Competence
0.000	230	-14.693	2.1299	231	self-determination
0.000	230	-8.495	2.5065	231	Impact
0.028	230	-11.048	2.3853	231	confidence
0.000	230	-21.176	2.0537	231	psychological empowerment

Table-4.

psychological empowerment	Job stress components	psychological empowerment		Job satisfaction components
0/165	Teachers adverse economic, social and family conditions	0/149	correlation coefficient	Payment system
0/012		0/024	significance level	
231		231	frequency	
0/230	Problems related to school space and facilities	0/522	correlation coefficient	Job
0/000		0/000	significance level	

231		231	frequency	
0/122	students Behavior problems	0/206	correlation coefficient	Job opportunities
0/065		0/002	significance level	
231		231	frequency	
0/180	Professional competence of teachers	0/296	correlation coefficient	Organizational climate
0/006		0/000	significance level	
228		231	frequency	
0/223	Low educational motivation among students	0/402	correlation coefficient	Leadership style
0/001		0/000	significance level	
231		231	frequency	
0/263	Time pressure	0/286	correlation coefficient	Physical conditions
0/000		0/000	significance level	
228		231	frequency	
0/477	Physiological symptoms of stress	0/420	correlation coefficient	Total variable
0/000		0/000	significance level	
231		231	frequency	
0/291	Total variable	--------	correlation coefficient	-------
0/000			significance level	
228			frequency	

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RESEARCH ARTICLE

The Study on the Reasons given to Employee Empowerment Issue as Modern Method in Management of Organization

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ABSTRACT

In today's competitive world, one of the most important tools to create change and the survival of the organization and achieve the goals and desired apostolate is human element. In this between what grants brio, and life the changing category and also warrants survival of the organization are the human resources.organizational success depends on effective mix of money , materials, machines and human resources for achieving the short - term and long - term goals depends and due to complexity and diversity and unity of organizations , have emerged many specialized fields to maximize the potential benefits of each of the creator components**.** The fact is that if we do not enjoy by the existence of creative, researches, analyst of the issues and opportunist people in organizations, we will lose many opportunities and situations**.**To achieve the objective of globalization or even to stay in this level the education and the replacement of the new forces in order to continue on the path of development and progress is necessary and the future of industry belongs to those who have the program and objective for it.In this way change and transformation of manpower and organizational structure is inevitable and management scientists believe that change and transformation in human resource is the root of all organizations 'successes. It is evident if a change does not be occur in human resource management , the industry is condemned to the end .Therefore planning in line with the development of human resources and design Empowerment programs of human resources is one of the basic strategies to achieve sustainable development and globalization that human resource managers will play a significant role in it. (Talbian&Vafai, 2010).

To Employees 'Empowerment must raise staff who have the ability to self – management so that both employees and managers are benefited. On the other hand, Employees 'Empowerment with motivation and capable, allows managers to show more and more rapid - reaction against the competitive environment dynamics of themselves (Jazyeni, 2007).Finally reasons for the selection of this issue on the listed above arguments can assume it's up to to date - - the tendency of organization in its proper use to honor to the human capital place and to improve the individual and organizational efficiency.

Keywords: Empowerment, Pattern of Ability, productivity, Job satisfaction, Employees, Organization.

INTRODUCTION

In explanation of a suitable pattern for employees empowerment, to recognize their factors and kind of impact is very critical and important, to choose a good model for employees 'empowerment of Islamic Azad University,Quchan Branch is of the importance i.e. this research can make clear the aim of empowerment.The objective of empowerment Overall is to provide the conditions and delegating more authority and responsibility and empowering employees with motivation creation and appropriate design, and structure, effective training with efficient management.In Islamic Azad University ,Quchan Branch also with regard to the importance of manpower and due to a shortage of appropriate human resources and shortcoming which is there regarding proper employing of employees and considering that employees are of importance for organizations in this era and with regard to the needs of the organizations to efficient and up to date human force to solve their problems , organizations are forced to empower their employees to gain competitive advantage against competitors and customers ' attraction , therefore, this study intends to design appropriate questions provide solutions and explaining adequate pattern for Training empowered human resources.

Literature or Research Review

The history of using empowerment term in management refers to industrial democracy and employees' involvement of in the decisions of the organization under various titles of team making and participation and total qualitymanagement.The latest change that has been done on this subject was named employee empowerment (Hardy, 1998). The Empowerment is not a new concept. This concept has appeared in various forms in the majority of new scientific resources management literature, for example, in the years of 1950 decade , management scientific resources was full of these prescriptions that managers need to have friendly behavior towards their employees (human relations). In the 1960, managers must be sensitive to the needs and motives of their employees.The mangers should hold group in the decade of 1980. (Baihaim, 1988) Pursue these issues in the decades of 1990 and then indicates that managers must learn how to expand the empowerment. Empowerment in scientific management age was not in pundits' management's spotlight. After human relations movement, the issues such as satisfaction, job enrichment and the Democratic leadership were introduced and empowerment of the employees provided as a vital and important goal of organization.

Empowerment as an associated idea with the performance of the organization, has the most obvious its roots in explanation of McGregor theory (1960) in a book "human face of organization"This theory is based on the conditions creation for people to move towards business goals achievement instead of supervision and guidance of their efforts. McGregor theory and other views and experiences and in order to employee empowerment have shared assumptions that most obvious of them are as follows:

1.Industrial and commercial organizations using only a part of the Intellectual resources of the employees.

2 .Control, is not only or the best way to achieve organizational objectives and that is impossible method to achieve excellent organizational performance and continuous improvement. People and teams acts more effective and efficient when they be given opportunity of maximum of monitoring to them in their work.

3.Competence and merit is not particular for a number of professionals. But distributes at all levels of an organization widely.

4 .Employees have more personal ownership and responsibility feeling to affairs that that have influence on them, and have gained experience of them.

In McGregor theory took managers participate the perception of the employees at all levels of decision - making , encourage the upward communication and pay attention carefully to comments and suggestions of employees, the Indi duals are given opportunity of greater responsibility accepting , due to manager's commitment to the boom of employees , director looks for Job enrichment of staff for jobs and career development of individuals.In hierarchy of Mazlo theory' needs considers physical needs to boost and assumes that needs and motivational resources as much as is for the people over the hierarchy ,it has also evidence for low people in hierarchy system of organization. Doubtless McGregor theory is empowered philosophy in management.

Over the past 20 years, hundreds of companies have proved that employee' participation and involvement and empowerment at work is certainly not a new idea. Empowerment is more than a theoretical or experimental possibility. This phenomenon at present is guidance for development that organizations accept it to maintain their competitiveness and survival.

The term empowerment has been very common since two decades of 1980 and 1990. Being empowered in area of psychology, sociology and religion biology has the root that backs to the past decade, even the past centuries. Adler in 1997 introduced the concept of dominance incentive with emphasis on an effort that people have to gain dominance in deal with their world in psychology filed . Similar concepts were introduced several decades ago, White expressed in the year 1959 that incentive of effectiveness is of an intrinsic motivation that makes things happen. Bahrham in 1966 introduced empowerment as psychological reaction that indicates for freedom of restrictions "Conversancy motivation is effort for dealing with the challenges and overcome them. (Vaten&Cameron, 2009).

In each and every of the studies, the core concepts simulates to the concept of becoming i.e. tendency for individuals to experience for self - control and to emphasize on themselves and accepting implications for freedom . The concepts of empowerment in sociology have been fundamental about most of movements and mutations in which people struggle for freedom and control their personal circumstances. In theology, controversies about optional and mandatory, headstrong against t surrender, faith, humanism vis-a-vis of pluralism in each other's throats has been heated during centuries.

The root of all these arguments, changed forms is issue of empowerment against disability and Helplessness. In summary, history to use the term of empowerment in the management goes back to industrial democracy and involving employees in the organization's decision making under the team titles participation team making and total quality management. This term was quickly day's issue in year 1980 and was registered and developed in by theorists like kanger&kanengo(1988) , sperinizer(1995)Kenneth blanchard &John P. Carlos and Randolph(2000) .

in an empowered organizational culture consensus establishment , democratic styles , organizational open communications and less formality in organization is encouraged and enhanced and on issues like the team making and the free flow of information is emphases to the horizontal and vertical relations . (Abtahi, 1997) In spite of emphasizing on various forms in involving empowerment still the power of employees' empowerment is not popular in skills collection of most of the managers and empowerment is seen very rarely towards what is prescribed.

Words definition

Empowerment

A management practice of sharing information, rewards, and power with employees so that they can take initiative and make decisions to solve problems and improve service and performance. Empowerment as a management concept process can increase the right of decision making (to) people and all of the bailout - divide - and team activity .Empowerment is based on the idea that giving employees skills, resources, authority, opportunity, motivation, as well holding them responsible and accountable for outcomes of their actions, will contribute to their competence and satisfaction.(Kazemi,2010).

Employees' Capability

The purpose of empowering employees is to score that members of the team obtained from the empowerment questionnaire. This questionnaire includes 12 question that every question is numbered from 1-5 according to a five - point Likert scale (I fully agree , I agree , somehow, I disagree , I strongly disagree.)

Organizational Structure

An organizational structure defines how activities such as task allocation, coordination and supervision are directed towards the achievement of organizational aims.[1] It can also be considered as the viewing glass or perspective through which individuals see their organization and its environment. Organizations are a variant of clustered entities . An organization can be structured in many different ways, depending on their objectives. The structure of an organization will determine the modes in which it operates and performs.

Organizational structure allows the expressed allocation of responsibilities for different functions and processes to different entities such as the branch, department, workgroup and individual. The typically hierarchical arrangement of lines of authority, communications, rights and duties of an organization. Organizational structure determines how the roles, power and responsibilities are assigned, controlled, and coordinated, and how information flows between the different levels of management.

A structure depends on the organization's objectives and strategy. In a centralized structure, the top layer of management has most of the decision making power and has tight control over departments and divisions. In a decentralized structure, the decision making power is distributed and the departments and divisions may have different degrees of independence. A company such as Proctor & Gamble that sells multiple products may organize their structure so that groups are divided according to each product and depending on geographical area as well.(Tavasoli,1997).

Organizational structure affects organizational action in two big ways:First, it provides the foundation on which standard operating procedures and routines rest.Second, it determines which individuals get to participate in which decision-making processes, and thus to what extent their views shape the organization's actions.

Reward

The reward system is a group of neural structures that are critically involved in mediating the effects of reinforcement. A reward is an appetitive stimulus given to a human or some other animal to alter its behavior. Rewards typically serve as reinforces. A reinforce is something that, when presented after a behavior, causes the probability of that behavior's occurrence to increase. Note that, just because something is labeled as a reward, it does not necessarily imply that it is a reinforce. A reward can be defined as reinforce only if its delivery increases the probability of a behavior.

Reward or reinforcement is an objective way to describe the positive value that an individual ascribes to an object, behavioral act or an internal physical state. Primary rewards include those that are necessary for the survival of species, such as food and sexual contact.Secondary rewards derive their value from primary rewards. Money is a good example. They can be produced experimentally by pairing a neutral stimulus with a known reward. Things such as pleasurable touch and beautiful music are often said to be secondary rewards, but such claims are questionable. For example, there is a good deal of evidence that physical contact, as in cuddling and grooming, is an unlearned or primary reward Rewards are generally considered more desirable than punishment in modifying behavior. (Greefin&Morhead, 1996).

Motivation

Internal and external factors that stimulate desire and energy in people to be continually interested and committed to a job, role or subject, or to make an effort to attain a goal.Motivation results from the interaction of both conscious and unconscious factors such as the (1) intensity of desire or need, (2) incentive or reward value of the goal, and (3) expectations of the individual and of his or her peers. These factors are the reasons one has for behaving a certain way. An example is a student that spends extra time studying for a test because he or she wants a better grade in the class.

Job Satisfaction

Job satisfaction or employee satisfaction has been defined in many different ways. Some believe it is simply how content an individual is with his or her job, in other words, whether or not they like the job or individual aspects or facets of jobs, such as nature of work or supervision Others believe it is not so simplistic as this definition suggests and instead that multidimensional psychological responses to one's job are involved. Researchers have also noted that job satisfaction measures vary in the extent to which they measure feelings about the job (affective job satisfaction). Or cognitions about the job (cognitive job satisfaction).

Participation

Participation in social science refers to different mechanisms for the public to express opinions - and ideally exert influence - regarding political, economic, management or other social decisions. Participatory decision-making can take place along any realm of human social activity, including economic (i.e. participatory economics), political (i.e. participatory democracy or parpolity), management (i.e. participatory management), cultural (i.e. poly culturalism) or familial (i.e. feminism).

For well-informed participation to occur, it is argued that some version of transparency, e.g. radical transparency, is necessary but not sufficient. It has also been argued that those most affected by a decision should have the most say while those that are least affected should have the least say in a topic. Employee participation and empowerment can be achieved in a small business context. To empower employees, management must transfer some decision-making authority — this shows employees that management has faith in them. Participation may be encouraged through a variety of means; the result is greater employee involvement in certain aspects of your business and greater organizational efficiency.

The Importance and Role of Human Resource Empowerment in Today's organization

To empower people causes that to managers and organization to attain their goals quickly without a waste of resources. Empowerment, leads that employees consider the organization and belong to themselves and enjoy of working in such environment know without empowerment, neither organizations nor managers cannot be successful in the long term. (Islamia, 2010). Bowen Velaver (1992) expresses the benefits of employee empowerment in service organizations as follows:

a)Empowered Employees meet rapid response and on time to the needs of customers during providing services. b)Empowered people give rapid and timely response to unsatisfied customers during intra - relapse services. c)Empowered employees have a better sense toward their job and themselves. d)Capable personnel with customers communicate with warm welcome and open arms. e)Empowered employees could be a great source of service thoughts. (Eslami, 2009).in the business world, today any organization which could not produce faster , cheaper , with a higher quality of its global rivals will be eliminated from market arena ,in this competitive area the organizations can be successful which get fully use of their human resources capacities . (Ghanbari, 2008):Today, the management task is to make empowered group. To achieve this importance some of important elements must be developed. Managers and employees are Contribute in developing these elements, the aforesaid elements form the foundation of the decision-making process based on the empowerment (Jafari, 2002).

It can be said that the Intensity of interest to employee empowerment interest among managers of organizations and researchers is not without a reason, the Conger & Kanungofor(1988) counted the following reasons for consideration intensity to empowerment : Management skills studies show that subordinates 'empowerment is an important part of managerial and organizationaleffectiveness.The power Analysis suggests that employees engage in power and control increases organizational effectiveness.The group experiences Implicates that employee empowerment strategies plays a great role in permanence. Group creation and

Role of Cognitive Empowerment Approaches on improving productivity of Human Resources.

The complexity extent, formality and centralization of decision making process are at very high level in mechanical structure, but in the organic structure these three pillars are placed at low level. The structure public bodies necessarily don't have a union impact on the level of performance and job satisfaction of every employee or monotony of workers.

Personal taste of employees and mental interpretations that they do from Physical characteristics, caused by the effects on the structure and members of the objective be reduced. The structure in terms of complexity, formality and centralization of decision - making system is on high level, normally leads more employees' job satisfaction reduction, thereby causing decreasing productivity .Of course this is not always sincere, because we can be witness, affiant more formality in centralized structure and decentralized On the other hand, also there is an inverse

relationship between complexity and centralization. Because the increase in the number of jobs and experts and giving more technical training to more employees, who are indicators of complexity leads to tendency of most of employees to participate in decisions - making, that is of decentralization manifestations. people who appreciate the freedom of action and prosperity will not have much job satisfaction , if they be engaged in a large organization where in it the process of decision - making be very centralized . Since that as much as organization be large the problem of attributing the result will be more difficult to it.

In organic structures, solidarity among its members will be more and Individuals have more inclined to claimed responsibility for the actions which has been done in the field of their authority. In connection with some activities, there's no doubt that this type of structures are more considered and confirmed by management of the organization. To increase the performance and job satisfaction of employees, their Individual difference should be observed and their performance evaluation should be done fairly, and according to their Competence, (Daryadel, 2012).

DISCUSSION AND CONCLUSION

Organization is the social phenomenon that coordinated consciously and has relatively specified limitations and borders and for achieving the goal, or targets, acts according to a series of permanent principles. An organization is a set of people who come together to achieve goals. Empowerment is process that performance by giving more independence to employees and participate them in the information which restrains the factors which influenced job performance.Empowerment leads to be aware of the conditions that caused the weakness of the employees and organization and employees ' self-Insufficiency sense increases, innovation and creativity and determination and perseverance of employees be promoted and enhanced strengthen and conditions be provided to dominate the conditions and overcome the difficulties that may be exposed .

After (1388)in an article entitled " Acquaintance to organizational success methods acquainted of the employee empowerment –salvation of organizations" indicates at this point that the final empowerment initiative is that, to create a kind of confidence sense among the employees towards manger's competence . The confidence is most fundamental sense that anyone can feel it. Trust is considered as infrastructure of Empowerment, and leadership foundation. It is not competent abuse of confidence of people and betrays them; Shelton (2002) believes trust is a prerequisite for the empowerment of employees.Through empowerment managers shows trust to capability of employees to enable the employee to perform his duties at a higher level. Psychological Empowerment means the intrinsic motivation of employees towards perform the delegated duties.

This matter is a innate and personal affair and is rotted in motivational needs and not in people's health needs, the manages who are willing to empower employees should ignore and aside the control, restrictions and obstacles. And vies-a-vis provides motivation, guidance, and encourages their behavior. There is strong evidences that empowered employees as compare to incapable staff have higher productivity and more job satisfaction and provide more and more initiatives and finally provide more quality products and services . Unlike the image of some people productivity is not only for industries , but the efficiency has various levels and all the people have role in all levels that means people can be effective with in various level practically by their thought , innovation and creativities . Efficiency promotion improvement the requires the Planned and comprehensive attempt and effort t by the people and concerned authorities that itself needs , guidelines, regulations and procedures and systems, to be improved. In this the attempt was that by studying concepts, objectives, dimensions understand the role of empowerment approaches on human resources efficiency.

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RESEARCH ARTICLE

Designing a Linear Time Amplifier Aiming at High-Gain,High-Resolution and Wide Dynamic Band

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ABSTRACT

In this article one of the key blocks of time domain processors, e.g. time amplifiers is introduced, designed and simulated. Time domain processing is at the forefront alternatives to be replaced with amplitude voltages of nano-scale technologies. The kernel of time domain processor block is the time to digital converter. The higher time resolution, the more effective processing is achieved. One of the great challenges in this area is the processing of the signals with very short time differences (between samples). Many techniques have been proposed to cope with this issue. one of the techniques is amplifying the very time difference before the signal is introduced to time domain processor circuits. Considering such problem, this article attempts to design a high gain, high resolution performance with a wide dynamic band. The pre-detector circuit of this amplifier is a digital pulse to edge converter with the capacity of high frequency performance. The circuit is designed in 0.18 um CMOS and is simulated with ADS, Cascade software. The total power consumption of the circuit is 1.7 m watt, the surface occupied by the chip is 0.35 mm2, the time resolution is 5 Pico sec and the approximate gain is 200. Moreover, the dynamic band without nonlinear signs is 250 sec.

Key words: time amplifier, pulse to edge converter, time to digital converter

INTRODUCTION

Contrary to the analogue to digital converters which are primary blocks for the time domain signal processors, this work aims to make the phase domain ore time domain signal processing more applicable. Time to digital converters (TDC) is a system that is applied for high accurate time measuring. At the moment, these circuits are used as a accurate time measuring device in wide range of applications such as laser radars, robot sight, video signal processing, physical experiments, diffusion-based time measuring, particle identification, medical industries, positioning laser, nuclear sciences and metering industries[1]. However, some critical applications have been come up in this area: the use of TDC in ADC design, in phase detectors and in fully digital phase lock-loop synthesizers has advanced dramatically. In line with the increasing growth of the technology in this regard, the need for a more accurate converter is more tangible than before. In recent years the attentions to the design and application of complex signal circuits not only have resolved the existing problems, but also it plays a key role in radio frequency circuits [4]. The time domain processing can bring a large range of benefits: flexibility of the designed circuit, matched to the small scale semiconductor devices, robust against the variation of the process, voltage and temperature. Low power consumption and other benefits could be attributed to the time process-based circuits. In line with the semiconductor technology advance from CMOS tech. toward the nano scale technologies, the voltage source amplitude values of information-carrying signals will be dramatically confined. To cope such limitation, the use of alternative methods such as time domain process and the use of time instead of amplitude account for one of the best proposals. As usual, the increase in resolution of a time to digital converter involves more power and more cost. In most techniques which is proposed for this goal, the need for phase lock loops or delay lock loops is critical; nevertheless, the presence of such blocks yields the increase in chip area and chip power consumption. This article attends to this issue from a different prospective so that the small time difference-related problem is not merely referred to the design of TDC. But also depends on the condition of input signals. On the other hand, the question is come up that how to modulate the input signal or input time difference so that it easily becomes possible to detect or measure the modulated signal via a low resolution TDC. It first implies that similar to a voltage amplifier which amplifies the input signal, the phase difference or time difference get amplified so that the detection becomes more possible. In this paper, first the time amplification is explained then the designed circuit of time amplifier will be designed. Going forward, this article introduces the pulse to edge converter block which is placed back of the amplifier. Concluding remarks are brought at the end of the paper.

Concept of time amplifier

As fig.1 shows, in fact the purpose of time amplifier is broadening the time difference between the rising or falling edges of one input signal. GTA is the amplifier gain.

It is obvious that the longer time difference, the easier digitization is gained; therefore, thanks to this amplifier, the time intervals get broadened so that even a low resolution TDC can handle high resolution signals.

As shown, the amplifier is completely a digital structure. This digital time amplifier is formed based on a block called MUTEX. This block takes the duty to recognize which edge first attains the amplifier, the reference signal edge or the input signal edge? In order for a better performance, two MUTEX blocks MUTEX +45 psec and MUTEX -45psec are utilized; the first block for phase differences less than 45 psec and the second one for phase differences more than 45 psec. The multiplying feedback structure, which is consist of NAND gates, is a by-stable circuit and the output transistors do switch when the time difference between inputs edge be so small that make the by-stable structure unstable. Undoubtedly, if this difference be more than a certain limit, the by-stable circuit remains stable and an appropriate amplification doesn't take place. Because of completely digital structure, this time amplifier model occupies little on chip area. Nevertheless, this structure has some drawbacks; the dynamic band of this structure is very short (no more than a couple of p sec), this structure has low transform gain usually less than 10. To cope with

such issues for a relatively high gain and more dynamic band, the analogue circuit consists of two operational trans-conductance amplifier (OTA)(in orthogonal topology) whose outputs are connected to pole/phase inverse detectors (PID)(see fig. 3).

In this amplifier, the OTA takes the pivotal role of amplification. By considering the two edges as Ψ_{in1} and Ψ_{in2} it can be written

$$\Delta\phi_{in} = \phi_{in2} - \phi_{in1}$$
$$\Delta\phi_{out} = \phi_{out2} - \phi_{out1} \quad (1)$$

In fact, the response of differential couple is equivalent to the output phase reversal. Moreover, such response depends on either the natural response of the differential couple or the voltage value of negative pin (input) when the positive pin is triggered. For more perception of the performance and response of differential couple to the inputs, the two following states are considered.

Suppose the phase differential of the two input signal ($\Delta\varphi_{in}$) be large. Once the Ψ_{in1}'s edge attains the circuit, the first differential couple toggle their output voltage(V_{out1}) from low to high level. . this high level voltage enters the comparator by which the phase reversal get detected and Ψ_{out} is generate as output reference phase. Naturally, the generation of output reference phase just depends on the Ψ_{in1}'s edge and natural response of OTA1.

φ_{out2} is generated as measuring phase. Since it was assumed that the voltage V_{out1} be stable before φ_{in2} attains, it could be claimed that generation of φ_{out2} just depends on φ_{in2} and OTA_2; there is no dependency on φ_{in1} and OTA_1. Herein it is assumed that no internal (sdf) dependency exists among output signals. Each of two output phases is originated independently and without any interaction between one and another. Therefore, it could be shown that duo to the amplifier saturation, the time amplification does not occur any more. This is because the time amplification is based on the interaction between input phases and both OTAs.

In the case of short time difference between the edges, the dynamic trend of the system would be different. The state of the circuit could be interpreted as follows. In this situation, the φ_{in2}'s edge attains the circuit when OTA_1 's response to φ_{in1} is not still at stable state (steady state) so there would be a reaction chain between both output of OTA and thereby a contradiction appears in assumption of independent outputs. In this condition, φ_{out1} not only depends on φ_{in1} and OTA1 but also depends on OTA2 andφ_{in2}; the generalization of this condition for φ_{in2} is as straightforward as theΨ_{in1}'s scenario.

In such condition the dependency of output phases on each other is due to the diagonal interconnection exists between differential couples. Therefore, one can state that the output phase differential $\Delta\varphi_{out}$ is a function of both input phases. Since the response speeds of OTAs are not the same, the output phases are influenced by different delay time and eventually the output differential phase becomes longer and the time amplification occurs. This condition is presented in fig.4 in which G is gain of the time amplifier.

OTA-based time amplifier design

In order for the amplifier implementation, the odd differential circuit of fig. 5 is used

From figure 5 the circuit primarily is structured by two OTA structures with capacitive- resistive load consideration (Rd and Cv2, respectively.The structure is a symmetric topology which can decrease the devastating effects of undesired mismatches. The circuit has two operational phases (Modes).

Before inputs Ψ_{in1} and Ψ_{in2}, the transistors M1 and M2 are off because their gates are low(Vg1=Vg2=0) so the drain voltages get VDD, while current of Ibias is injected diagonal. Thereby the drain voltage drops such that it can be interpreted that the M2 and M4 fall in Treyoud zone as a result of facing high impedance loads. On this basis, before arrival of Ψ_{in1} and Ψ_{in2}, the explanatory voltages are:

$$V_{out1-} = V_{out2-} = V_{DD}$$
$$V_{out1+} = V_{out2+} = V_{DD} - R_D.I_{Bias} \quad (2)$$

Where Rd is resistance of PMOS transistor.

By what assumed before and attaining the first edge of Ψ_{in1}, the first stage of performance is on. And when Ψ_{in1}turns on the M1 and M3, a fast load distribution occurs in OTA1. When M1 becomes on, a very fast load discharge takes place through the M1-M2 path. This load flows from capacitor C1 toward empty capacitor C2.Before charge exchange ends and circuit reach the steady state, the second phase or (edge) Ψ_{in2} attains to the circuit and influences the charge exchange. On the basis of such interference, the amplification is formed. By reaching the second edge, M3 becomes turned on and provides a path to C1 to be discharged into C2; the exchanged load is generated by OTA2.

Similarly, in this stage, the gate voltage of M4 encounters a drop because of connection to M1's drain. It should be noted that M1 starts to discharge once the circuit begins to perform. As M4 was in Teryoud zone, similar to Eq. 3, we have the following equation for transistor's resistance.

$$R_{eq} \cong \frac{1}{\mu_n.C_{ox}.\frac{W}{L}(V_{GS} - V_{th})} \quad (3)$$

Where Mn is the mobility of electrons through the transistor. COX is Gate Oxide capacitor, Wl is the ratio of width to length of transistor, Vth and Vgs are threshold voltage and gate –source voltage, respectively. One can see that decline in gate voltage leads to the increase in channel's resistance. So it could be concluded that discharging current in M4 is less than the recent stage's.

Thereby, the delivered charge of OTA2 in this stage is less than the discharged load in pervious stage. When the charge of C1 in OTA2 is discharging, the resistance of channel M2 increases, thereby, it causes a positive feedback increasing the resistance of M2 and M4 channels. This feedback, e.g. the gate voltage decline of the M2 and M4 and increase in their channel resistance, continues up to both transistors turn off. After this stage in which the charge exchange between transistors takes place, the second stage begins. In second stage after leaving transient state the transistors get the steady state. In a way that the drain voltages of M1 and M3 take the zero level while the drain voltages of M2 and M4 take the source voltage. In figure 5 the current flow of one of circuit cells e.g. M1 and M2 is presented.

If the short channel model is considered, the simplified relationship of saturation current e.g. I_{DS-m1} is as follows.

$$I_{DS} = W.v_{sat}.C_{ox}(V_{GS} - V_{th}) = k(V_{DD} - V_N - V_{th}) \quad \textbf{(4)}$$

Where k is technological parameter [7].

$$I_{C2} = k(V_{DD} - V_{th}).\frac{r_{M1}}{r_{M1} + R_{DS}}.e^{-\frac{t}{C_2(r_{M1}+R_{DS})}} \quad \textbf{(5)}$$

The exchange current relationship of C2 could be written by [7]:

$$I_{C2} = k(V_{DD} - V_{th}).\frac{r_{M1}}{r_{M1} + R_{DS}}.e^{-\frac{t}{C_2(r_{M1}+R_{DS})}} \quad (6)$$

The drain – source current of M2 and the drain voltage is depicted in figure 6. In figure 7 the charge and discharge current of capacitors is presented. The presented voltages relate to the drain of transistors in which voltages, the phase difference is equal to the distance between two crossing points of charge and discharge graphs of transistors.

The gain of this amplifier is [8]:

$$G = \frac{\Delta\phi_{out}}{\Delta\phi_{in}} = k_1 \frac{\tau.g.I_{DD}}{C_1.(V_{DD} - V_{th})}$$
$$g = F(W/L, C_2) \quad (7)$$

Where I_{DD} is the saturation current when $V_{GS}=V_{DD}$ and g is a function of transistor size and the C2 charge.
In fig.8 the input- output characteristic graph of the amplifier is presented for capacitor ratio of 3 and the sweep value of R associated with the biasing source.

Pulse to edge converter design (PEC)

As structure of time amplifier indicates, inputs of the amplifier are two pulses not two periodic rectangular signals. So the first work that should be considered on the two periodic differently phased signals is to extract two edges whose phase difference is the same as phase difference between original pulses. This task is attributed to a block called pulse to edge converter which can be implemented in either in analogue or digital way. In fact this block is initial detector of the structure and the one of the most challenging blocks of the system.Thanks to this, the circuit should be able to respond to the very short time differences as well as to consume the least power. Due to the basic problems which exist in analogue structures [9], this design employs a novel digital structure called PEC. The proposed structure offers a new pulse to digital circuit which could be implemented digitally with less surface occupation. Also this circuit has the no reasonable sensitivity to the element mismatch-originated nonlinear signs as well as to the change in temperature, noise and process.

The main core of this circuit is rest on a mono stable circuit. Contrary to the most analogue mono stable circuits, the proposed circuits which takes the power delivery task is completely digital one. The proposed PEC structure is shown in fig.9.In order to simulate the proposed PEC, two signal whose frequencies are 40 MHz and delays 5 and 500 p sec are exposed to circuit. As fig. 10 shows, the proposed PEC circuit is able to convert the very small phase differences to two edges with the same phase difference between them.To provide a clearer prospective on the total occupied chip surface, the circuit layout is drawn with Cadence medium (see fig. 11). As shown, the total occupied surface is less than 0.35 mm^2.

CONCLUSION

In this paper first an investigation on a novel signal processing method called time domain processing is given. In this regard the primary core of time domain processing is introduced as time to digital converter and their applications. To cope with the issue of low time resolution of this converter, a high gain, high resolution analogue time amplifier with a wide linear dynamic band is designed and is simulated in ADS and Cadence considering 0.18 um CMOS. To design the pre-detector, a high resolution digital pulse to edge converter is introduced. The total power consumption of the circuit is 1.7 mw, the occupied chip surface is 0.35 mm^2, and the resolution is 5 psec, the approximate gain is 200 and the dynamic band without nonlinear signs is 350 psec.

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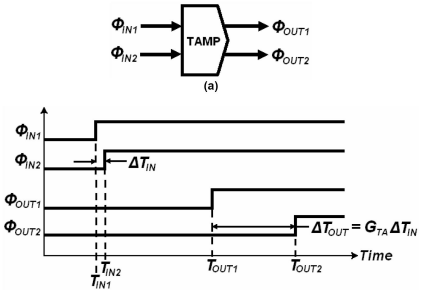

Fig.1. performance of a time amplifier

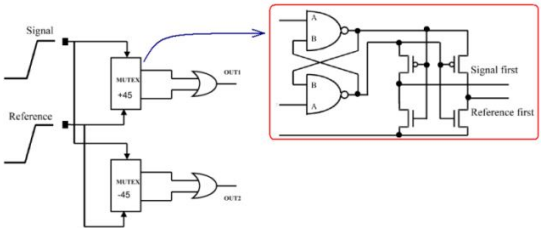

Fig.2. the first ever proposed time amplifier [6]

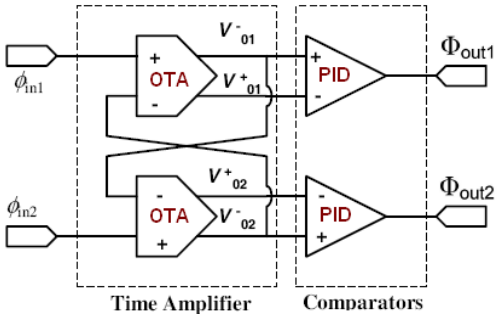

Fig.3. Conceptual model of analogue time amplifier

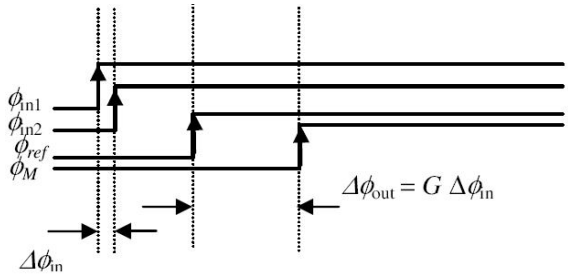

Fig. 4. Time diagram in amplification mode

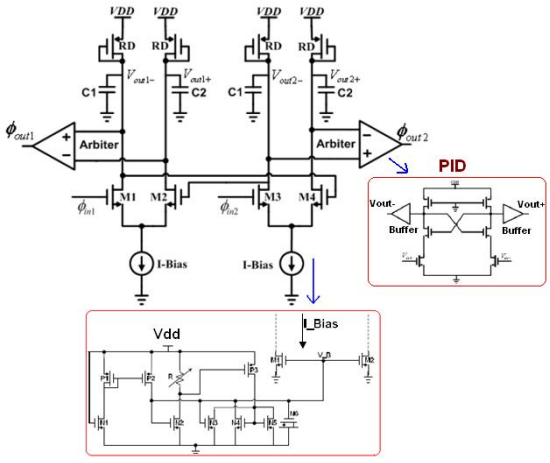

Fig. 5. Designed time amplifier

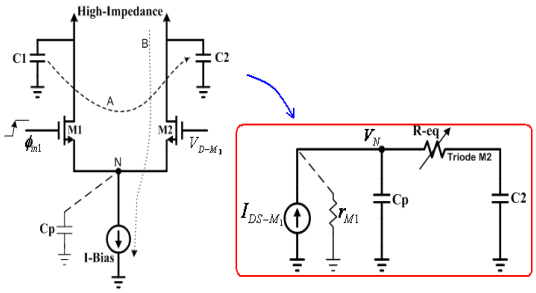

Fig. 5. The current flow of one of circuit cells and the equivalent circuit

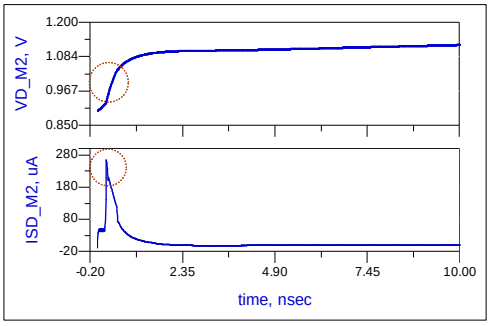

Fig. 6. The source to drain current and the M2 drain voltage once the step signal triggers M1's gate

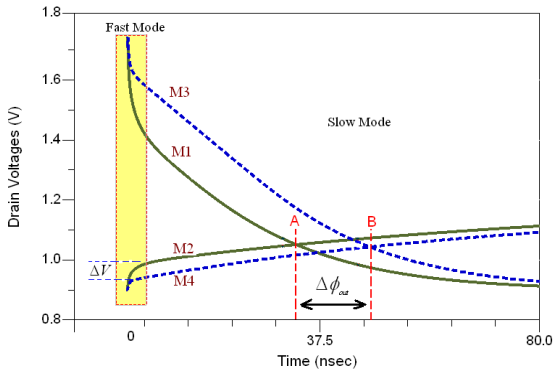

Fig. 7. The behavior of output nodes in two slow and fast modes

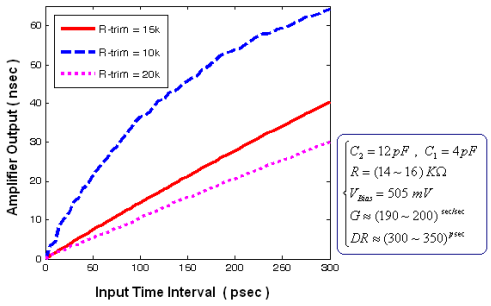

Fig. 8. The transfer function of amplifier designed for changes in control resistor

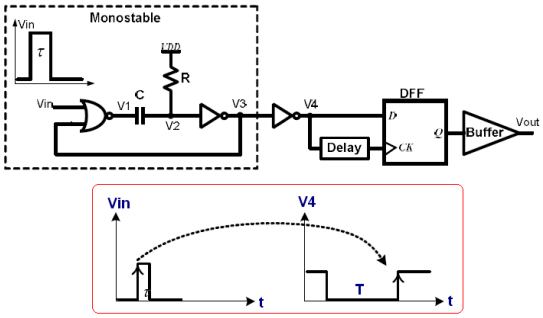

Fig.9. the pulse to edge converter based on mono stable.

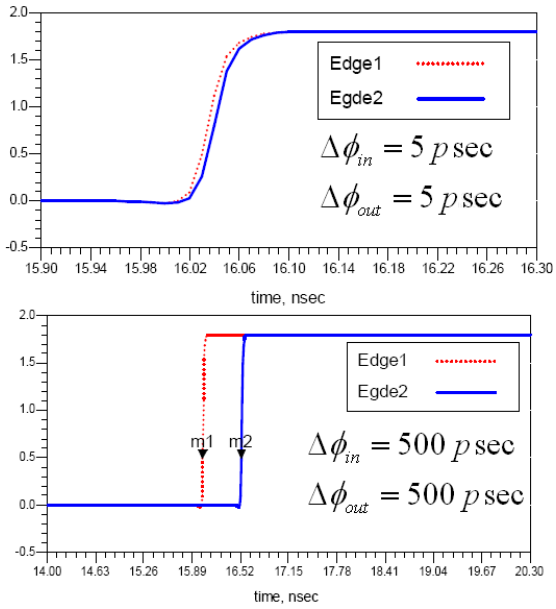

Fig. 10. PEC simulation results for two 5 and 500 psec inputs

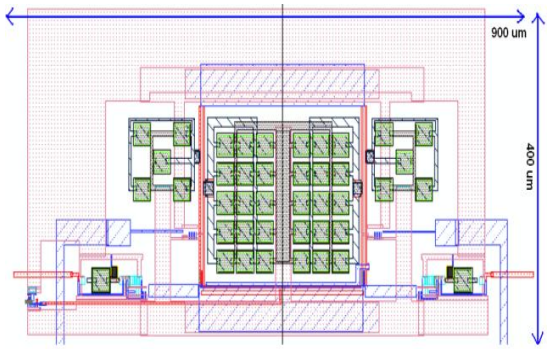

Fig. 11. The layout of time amplifier structure and biasing source and PEC converter

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RESEARCH ARTICLE

Traffic Measurement and Evaluation Method of the Road Network Capacity by the Electronic Eye Sensors

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ABSTRACT

The purpose of this study is the investigation of electromagnetic, optical, infrared, and the electronic eye sensors to measure the traffic and road network capacity and evaluate the road network capacity in urban management. This research has practical purpose and its nature is the analytical and descriptive. Based on the findings, electric eye sensor can be more efficient than other sensors for measurement of the amount of traffic passing through the passages and pathways and as a result their optimal management,. But if we consider the cost, the optical sensors can be used. Optical sensors that can cover up to 10 meters width of the passages may be used for application in local area networks with narrow width.

Keywords: Electromagnetic Sensors, Electric Eye Sensor, Traffic, Road Capacity, Urban management

INTRODUCTION

The industrial revolution in 1960, especially in agriculture, causes rural to urban migration and increase of urban population. In Iran, the population growth rate in recent years has have explosive growth of 3.4 percent and during the 20 years from 1960 to 1980, the population of Iran has been2 folded. This growth rate was not proportional to the growth of facilities and infrastructure and causes many problems in the country, including the lack of housing, lack of educational facilities, environmental pollution, energy shortages, traffic problems, etc. But this growth is not unique to Iran, and a look at the past 200 years shows that the world's population is 6-foldbigger than 200 years ago but the world's urban population has increased 85 times (Salehi et al., 2012). Today, due to population growth and the physical, social, economic and cultural development of cities, and increase citizens' movement in the city, urban transport systems and urban street network for traffic capacity of citizens have faced serious challenges. Hence proportional to the increase in the populationin many cities of Iran, transit infrastructure is not developed and this causes serious congestion in the urban streets (Alipour, 2003).It Seems the most practical approach to problem solving of citizens are urban traffic control and creating the necessary infrastructure platforms, in order to apply modern control methods in better urban traffic control. Accurate and timely information about the performance and capacity of the street network is an important element of development especially in this era and increased demand and unplanned construction have caused that urban management pay more attention to this matter.

Now one of the basic research questions is what tools we can choose to monitor network traffic urban streets?
How we can evaluate the capacity of the street network based on our urban traffic?
It seems an important factor in urban street network control is traffic monitoring by electromagnetic, optical, and electronic eye sensors, to measure the amount of traffic in Street network and as a result have better management of traffic thorough the city.It seems that among sensors the optical sensors are desirable to evaluate the performance of the road network capacity.The purpose of this study is the investigation of electromagnetic optical and infrared electric eye sensor, to measure the traffic and road network capacity and evaluate urban management.The method of this research is in terms of objective and its nature is analytical and descriptive.

Theoretical bases of the research

Although traffic is a common pain that most populated cities in the world suffered from its problems, but the traffic in various cities in coordination with social, cultural, industry, geography and planning are different status and have different reasons. Actually the traffic based on the definition and nature is composed of three factors of the human, road and the vehicle. As if one of these factors was absent, the traffic is nonsense and each of these three factors, coordinates with different features in different cities, which makes a variety of traffic reasons in cities (Ravanbakhsh, 2009).

Road capacity

In general, if we want to have comprehensive define of road capacity, the capacity of the road is the maximum number of vehicles that cross from one of the lines or the entire width of the road, in one direction or in both directions of the road with acceptable quality in a certain period (ZakerHaghighi, 2013). Road capacity is a function of several factors such as geometric design, pavement type, climatic factors, drivers and traffic characteristics.Geometric design deals with issues related to road geometry and physical characteristics of the road such as gradients, curves, arcs and radii of the arcs. Characteristics of drivers and driving culture also effect on the capacity of the road (ibid).

The introduction of the smart urban transportation system (ITS) for optimal control of urban traffic

From The 1990s, scientists discovered that new possibilities and capacities are ingested by consumers in the short term and by racing between road construction and production of comfortable and cheap cars, development efforts have low-impact and road safety are steadily being reduced. On the other hand, advances in technologies has brought suitable conditions for uninterrupted communication (On-line) between decision makers, traffic management centers, vehicles and road traffic conditions through sensors and electronics devices and thus create a smart, targeted and coordinated management in order to improve productivity and increase network performance. Thus in beginning the 1990s Intelligent Transport Systems (ITS) in its modern concept was born (jamejam newspaper, 2011, 12). Intelligent Transportation Systems, or ITS is a general term for application of a combination of technologies for communication, control and data processing system in transport system. The ITS encompasses all modes of transportation and all transportation system elements such as a vehicle, the driver or operator. The general task of ITS task is to decide improvement for transportation network controllers and other users, and in overall the application's transportation system improvement.

This definition covers a wide range of techniques and strategies that can be achieved with the use of technology or by improvement a set of technologies in transportation. In fact, ITS is the rule and order that offers the batch of new and modern solutions in the past to improve safety and traffic flow smoothly and respond to transportation needs with the use of new technologies in the fields of information processing, communications, control, electronics worldwide (Iraqi, 2002).More new ITS technologies have been developed originally for use on roads with traffic lights control systems such as SCOOT and SCOTS system. But now the ITS encompasses all of transportation systems, including public transportation systems. Strategies such fees in congested areas (value pricing) could encourage drivers to not use cars,but it is necessary to simultaneously make public transportation attractive and convenient.US, Europe Union and its member states and Japan have done huge investments in research and development as a basis for the implementation of ITS in urban and intercity. Today, a new generation of ITS technologies have emerged and regions and countries worldwide have established their ITS organizations to provide these industry for their own that is in relation to their government and share experiences with each other; so that developing countries can also benefit from it(ibid). Currently, many ITS applications are used alone.

Because its use in short-term application is often cheaper and there isn’t concerns of data exchange, communication and hardware requirements for the integration of a comprehensive ITS system. However, before ITS take the next steps to increase its efficacy, the integrating and synthesizing systems should consider (ibid). Introduction to ITS applications will clarify the definition of it. In fact the ITS is a broad range of applications in such a way that it covers the advanced control systems, traffic lights, congestion control through freeway entrance ramps and accident alarm systems. ITS applications can be divided into two main groups: the "intelligent infrastructure" and "intelligent vehicles". Each of these categories contains a different subset of ITS applications in which it is clearly marked (Iraqi, 2002).

Introducing the inner-city transit system management (TSM) for optimal control of urban traffic

TSM has generally four modes. The first case is the possibility of demand reduction. The second case involves ways to increase supply. The third mode is how you can reduce demand and supply. The fourth case also includes methods that increase supply and reduce demand.

The introduction of electronic magnetic, optical and electro-mechanical sensors to measure the road network capacity

Electromechanical sensors

These sensors are the simplest and most used sensors among the different types of protective systems. Usually these types of sensors are mounted to the other contact via elastic springs so these sensors can be used in pavement and if it is beaten, the resilient spring contact is shaken and two contacts are taken apart in a short time and cause a momentary short circuit resistance and the resistance in the circuit is changed and the importance of changing is reported to the sensor processing unit. Finally, the counter is enabled and it will count the number of cars that passed over it.

Diode Optical Sensors

When two bonded silicon bias reverse, the leakage current and their internal impedance become sensitive to light. Impedance of the sensor in very high in darkness and in the presence of the light is very low impedance. Ordinary diodes connection counteracts this effect in a dark body but in the optic diodes this effect is evident. Building of light emitting diodes is designed in a way in which some of them are sensitive to visible light and some are sensitive to infrared light (Shirvani, 2011).

Ultrasonic sensors

The ultrasonic sensors work similar to radar or sonic sonar by analyzing the reflection of radio waves or acoustic of the target. Ultrasonic sensors generate high frequency sound waves and receive and analyze reflected waves. The sensor calculates the time between sending and receiving reflected signals and calculate the distance of the object. Typically, the transmitters and receivers are used that convert electrical energy into sound waves above 20 kHz and by receiving the reflected sound waves, converts them into electrical energy again to be measurable and displayable. The main problems of this technology are the various shapes and objects density or concentration of the substance. For example, the presence of foam on the surface of a liquid interferes with the operation.

Electronic eye sensors

Electronic eye is a sensor device that reacts to change in the visible or non-visible light (infrared). In the timing of traffic lights at an intersection, the first thing that comes to mind is that if the device can act as an experienced police, it can run the ideal timing on intersection to minimize the stop times. Obviously, this requires an electronic eye (sensor) at the routes of intersection to detect the volume of incoming and stopped traffic at each end and accordingly regulate the amount of time of the green light. The local intelligent command devices have this capability. These devices decide proportional to the volume of traffic at any time, and of course, their accuracy depends on the accuracy of the electronic eye that reads the traffic volume.

One of the most popular electronic eyes for traffic is the sensors that are square or rectangular with approximate dimensions of 2x2 meters installed under asphalt and with each passing cars on it, the device sends a pulse so that based on the distance between consecutive pulses, traffic density is indicated and green lights is regulated. These sensors are known as induction Loop or Loop Detector Sensor. However, in recent years, video sensors are also marketed and are gradually replacing inductive loops.Local intelligent systems have good performance on intersection with large fluctuations in traffic volume so that traffic is not predictable and also in the retreats and other crowded intersection. However, the cost of installation, operation and maintenance of these systems is much more

than a simple device and this is mainly due to the costs of operations in conjunction with their requirement of installation and wiring of sensors.

Traffic image sensor

With the expansion of urban and motorway networks and the impossibility of closing the route for the construction of inductive loops as well as high maintenance costs of loops, it is few years that the image sensor based on a new technology have been marketed. These sensors have a very high price in the early years and in addition had errors in the automotive detection in poor weather conditions and at night, but in recent years the image sensors offer considerably lower prices and on the other hand, their affection by weather conditions have been eliminated. These factors caused that induced loop to be replaced by the image sensors gradually. In each of the paths leading to the intersection, a camera is installed that its received image can be defined as the 8 detection zone (Detection Zone) that is quite similar to the loop that combine pair wise and 4 output command sent to the intersection controller (totally 16 outputs to the intersection). Each of these areas is replaced by an induction sensor (loop) and the presence of vehicles and machinery on the pulse of the intersection is detected. Adjusting the size and position of the detector zones on the image sensor simply is performed by software program that has the programming responsibility.

BS-NET central intelligent control system

Main pillars of the Central Intelligent Control System
- Management and Control Center
- Data transmission system
- Local traffic lights control

Levels of the control of traffic lights in intersections
- Independent level without considering the effect of the adjacent intersection
- Synchronized level: Green Wave and network

User program Features
- Single user (Single User) or multi user (Multi User) application
- Client / Server Structure
- Monitoring of ongoing information of intersections individually or as a group
(Timing and phasing lantern, the timing of green phase, and the road traffic plan)
- Write a variety of command and the intersection scheduling scheme by user:
- flashing Actions, all off, all red, and instant green
- Fixed date projects, smart, intelligent and half green wave
- Configuration of all tables and parameters of the control center without going to intersection
- Definition the user-level privileges in experts and managers and operators levels with distinct Username and Password
- Display a variety of events and errors
- Access to the database and display the data in tables and charts and their printing
- Display information of system maintenance and repair
(Informing the kinds of failures such as system, sensor, and light line failure)

The comparison of strengths and weaknesses of various sensors

Technology of identification and monitoring of vehicles consists of three basic components: transducer, signal processing devices and data processing devices. Transducer detects the presence or passage of a vehicle. Signal processing devices converts output of transducer into an electrical signal. Information processing device, usually consists of a hardware and software system, converts electrical signals into electrical parameters. Some of the applications of these sensors are described in the following table.

RESEARCH FINDINGS

Based on the theoretical base of the study, findings can be shown as a scheme below. In fact, the purpose of this structure is to establish a unified approach to assess the capacity of the network traffic and urban streets. In this model, the electronic eye sensor is used.

Output image analysis of the electronic eye sensors by AIMSUNNG software

There are a variety of methods and tools for traffic analysis. These tools are divided into the following groups; instruments of approximate planning, travel demand models, analytical tools, optimization tools, traffic lights and macro-and micro oriented simulation models. Simulation models are detailed model type. These models are based on theories of AIMAUN NG work to change lane. This is the general trend of these models is that every vehicle that enters the network based on probability distribution and at the very least tracking is followed until it remove from the network. Network modeling is one of the most important capabilities of this software that can solve issues of urban networks, freeways, expressways, arterial roads and a belt, or a combination of the above networks. Another advantage of this software is to help traffic engineers in the design and analysis of traffic systems (Khalil et al., 2010).

The software capabilities include:

- Simulation of coordinated traffic control systems such as SCATS
- Modeling of advanced traffic management systems.
- Auto navigation systems
- Schedule a public transportation system
- Ability to calculate environmental factors such as air pollution and fuel consumption.

Input of this software includes passages characteristics such as volume and geometry of roads, junctions and control of the public transportation lines. Two-dimensional and three-dimensional representation of network traffic, network performance metrics such as total network travel time, imposed delay on vehicles; average vehicle speed, road density and the information of detectors are the outputs of this software.

The analysis of computer simulation of traffic flow

Computer simulation is dynamic presentation of the real world using a computer model. Simulation history go back shortly after the introduction of the first digital computer in the 1930s.Generally, traffic simulation models have the ability to evaluate projects of transportation under various conditions. Therefore, simulation models are very useful tools for assessing traffic. Application of simulation to modeling the traffic flow has increased due to the current development in computer hardware and software technologies. For example, today there are several high-level object-oriented programming language and a powerful computer processors that can easily formulate models and simulate traffic. For example, object-oriented programming languages like Java and C ++ can develop interactive objects, so that the simplification for problem solving is well done (Alavi et al., 2011).

Many traffic simulation tools have been developed to study the ecological functionality and performance of transport facilities. Measures of performance efficiency of simulation models are used to evaluate system performance in terms of capacity, travel time and delay. Of environmental performance measures used to evaluate the impact of traffic on air pollution. By using Environmental efficiency criteria, air quality and noise related models produced. The advantage of the use of simulation in transportation system is very high due to its ability to test and evaluate the system without disrupting existing traffic or putting the crew in danger In addition, the use of simulation to analyze the traffic system has several advantages (ibid).

CONCLUSION

Based on the findings, electric eye sensor, for measurement the amount of traffic passing through the passages and pathways and as a result the optimal management can be more efficient than other sensors. But if you consider the cost factor, the optical sensors can be used. Optical sensors that can cover up to 10 meters wide passages can be important for use in local area networks with a narrow width. But the electronic eye sensors due to their wider field of view have high accuracy performance. One of the drawbacks of the conventional electronic sensors is the error in the car detection at night and in poor weather conditions. This problem can be solved using inductive sensors because this kind of sensors have a desirable operation in harsh weather conditions too and by creation of every pulse, send commands to the controller. In general by a combination of these types of sensors, the amount of traffic passing and the city's street network capacity can be assessed.

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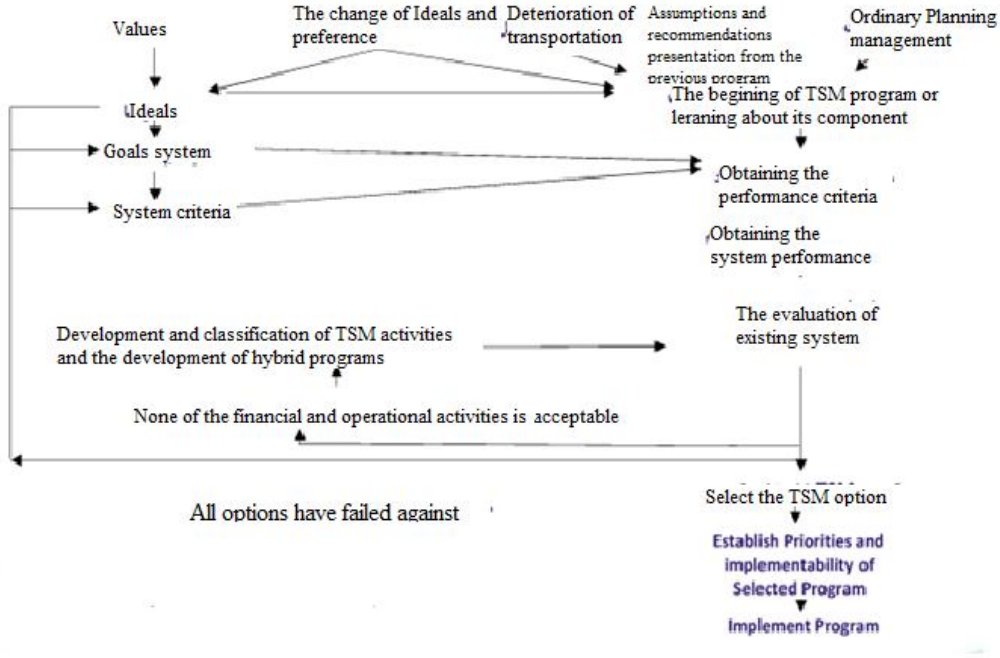

Figure 1: Architecture of Urban Transit Systems Management (TSM)

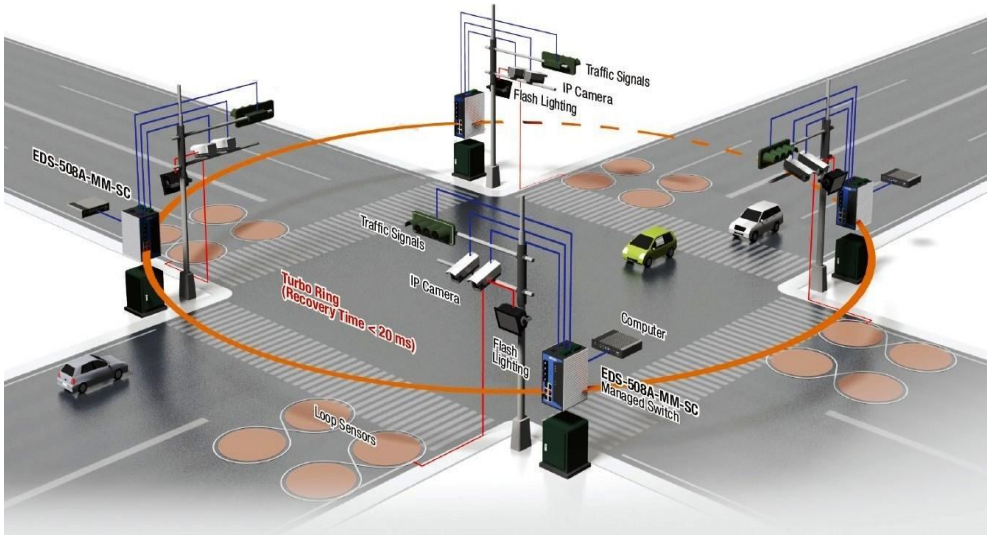

Figure 2: The local intelligent traffic controllers

Table 1: Measurable traffic parameters of sensors

Technology	Strengths	Weaknesses
Induction Loop	Flexible design for various applications Technology developments Ability to gather the basic traffic information (size, speed, distance, time and place, BOR, etc)	Need to dig the pavement Reduce pavement life Need to close the lane to install and maintain Exposed wire loop weights Transport and heat Need to install multiple computed for Full coverage
Magnetometer	Traffic stresses is less than the Loop The ability to transfer data through links	Need to dig the pavement Reduce pavement life Need to be close the lane to install and maintain Restriction of the identification
Magnetic	Using in places that loop are not allowed to install Installed in the roadway pavement without cutting Traffic stresses less than the Loop	Need to dig beneath the surface of the pavement or roadway tunnel Inability to detect stationary vehicles
Microwave radar	Insensitivity to harsh weather conditions Direct measurement of speed Ability to cover multiple lane	The need for adaptation to the beam width of the antenna and transmitted waveform Inability to identify vehicles inhabited by the Doppler sensor
Infrared	It emits light by the number of active sensors to determine the exact location, speed and vehicle class Measurement of the speed by several areaPassive sensors Ability to cover multiple lane	Involvement of functions activated by sensors in the snow and fog When visibility is less than 20 feet Reduction in the sensitivity of passive sensors in the rain and fog

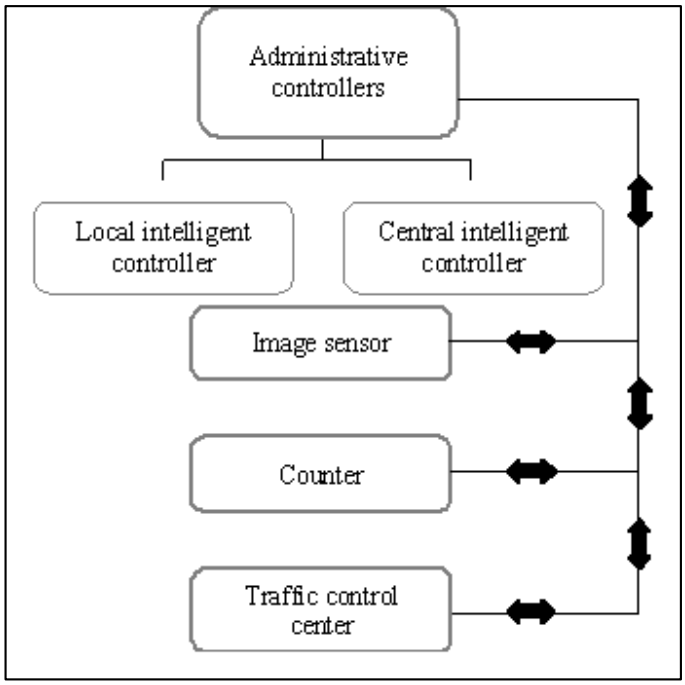

Figure 3: The model of measurement and evaluation of the capacity of the street network traffic by electronic eye sensors

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RESEARCH ARTICLE

The Approaches of Authoritative and Dictator Government

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ABSTRACT

This study was done based on documents research. The present study aimed to compare the nature and approaches of authoritative and power-based government. The data collection was library method. The data analysis was descriptive-analytical and it was done based on the variables and questions of the study. Three study questions were raised in which some keywords as the elements providing power, positive and negative benefits of power and determining the powerful government was raised. To achieve the results of the study, the approaches of powerful and power-based governments were compared. The powerful government is the one that achieved its political legitimacy based on logical-legal foundation and applied power to provide public services and the development of the society and the power-based government is the one achieving its political legitimacy based on coercion and threat and applies the power to dominate others and provide their personal and group benefits. These two governments have different approaches and performances and power tools are different in these governments. Based on the results of the study, the power elements are natural resources, human population, army, materialistic facilities, land, mental resources and value system. The positive and negative benefits of the power in two powerful and power-based governments are different. In the powerful government, power is used for the benefit of the society and their development but in power-based government, power is used for providing personal and group benefits. The power with government in the powerful government is used for social justice and presenting the services. But in the power-based government, it is not for the benefit of the people and only the government benefits.

Keywords: Powerful government, Elements providing power, Power-based government, companionship of power and duties of the government

INTRODUCTION

Power is one of the important concepts in political and social literature in contemporary era and it is along with the government. For their survival, the governments use power as appropriately. According to the experiences, some governments use power for threat and coercion of others but others use it for the management of the society, development and defending the country. In recent decades, power is divided into soft and hard types. Soft power is "The capabilities and abilities in the country that by using some tools as culture, ideals, moral values affect the others behavior or benefits indirectly. This power promotes political legitimacy in the country and increases the public trust and also improves national unity (Mahpishanian, 2010:382). It is worth to mention that soft war is the information and knowledge that are used by the elites as intellectual basics to provide national benefits and stability of government-nation relation. In such conditions, national security is improved, social capital is developed. In 21th century, the information and technology were effective in social and political relations of the economic and cultural relations and political literature is affected. National power was already divided into materialistic and spiritual but now it is divided into hard and soft. In soft power, it is effective also on social justice besides creating legitimacy. The authoritative government is the one using this tool for national unity and increasing social participation and economic prosperity (Moradi, 2010:70).

Morgenta (1987) classified national power into 9 items as geography, national resources, industrial capacity, military preparation, population, national attitude, national morale, diplomacy and government qualities. He considered these elements affected by hard power (ibid, 72). Soft power is complementary to hard power and it turns probable hate into empathy and participation. Today, these are complementary elements and the governments are obliged to use them.

Democracy is the true example of these governments and they mostly emphasize on communication with people. Such government is authoritative and it has the influence. Various changes are made in determining national power and its different types. The formation of soft power, its classification and elements as social, cultural and scientific elements (Skirz, 2008) changed the power nature. Schwartz (2008) considered the main element of soft power cultural element including absorbing ideology, stable values, acceptable norms, ethical values, predictability of authorities' behavior. We can see how the authorities defined power nature and its elements in political and social fields (Eliasi, 2010:152). Based on the mentioned evidences and presenting the new definitions of power, its elements and tools, we can say defining the national power and authoritative government are defined again. In the past, the power in the government was based on coercion, ideology, providing the materialistic benefits and services, but now it is reviewed based on each of them. The present study evaluated the relationship between power and government duties and also dealt with the requirements of the power government. Government is the society of people living in a country and they have government making law and they are under the dominance of the sovereignty assuring their freedom and independence. In most of the resources, government is executive power or the board of ministries as the real symbol of government (Ghazi, 2004:24).

Literally, power means power and authority (Bashirie, 2001:27). Power has different functions in government. Some authorities divided these functions into positive and negative and others mentioned it as the original power and dictator power. Original power is the one in which the government has people legitimacy and considered the society and people benefits on the priority and the dictator government is the one that achieves its benefits via coercion or imposing democratic solutions and less considers people (Monavarian, 2000:21). Determining the power of government is different by theorist. Marxists defined the government and its function based on economic structures and used it for the government dominance. The pluralists considered the government as indifferent power being formed in elections and attempts to attain equal opportunities for groups via negotiations. The followers of postmodernism consider the government power to organize the economic activities and re-distribution of the wealth of government activities. Thus, they believe the governments can notdo positive responsibility to establish the benefits of economic classes in the society. The government legitimacy views believed that the government power is

arising from legitimacy to run the government well (Timothy, 2006:179). The followers of divine legitimacy consider the source of the power God and the followers of logical-legal power legitimacy consider the government authority Max Weber introduced these three sources of legitimacy; the government that took power based on the current rules and democratic methods is justified based on the rules. The modern governments are mostly formed based on this model (Wallerstein, 1999:228). Although power is diverse in a government, materialistic and spiritual use for developed, legitimate and legal functions is the best kind of imposing power from the government. This study attempted to determine such power in the government and considered the government in the form of executive power. The main question is that: What is the relationship between power and duties of the governments and which amount of the power is necessary and unavoidable for doing the duties by the government?based on legal-logical basis passing a legal process. Others consider charismatic and relational groups as legitimacy.

Research questions

1. What is the relationship between power and duties from the government and how much of the power is necessary for the duties of the government?
2. What are the elements providing power and what are the most important ones?
3. What are the positive and negative benefits of power in government?
4. What is the powerful government and how does it applies power for doing its duties?

Theorists had various views about the relationship between government and nation. The most common definition of government is Max Weber view who believed government is a political-obligatory.organization with central government and it attempts to establish power exclusion of law making in a realm (Salmon, 2008:54). Gerameshi defined government-nation as civil society is the initial center of the political activity and all the identity information, theoretical arguments and hegemony are formed in this place. Civil society is the link between political and economic space and it is also called political community. It is the policy of civil organizations to make state institutions as conditional (Zalski, 2008:50). Based on these theoretical basics of defining government-nation, its functions are presented as classified. One group of theorists viewed the government as a neutral nature to the society and economy. The theories determining the government function are various but some of the important types are mentioned here. Anarchists considered the government as immoral phenomenon and considered it a tool to dominate people (KristoyanPolous, 2010:124). Marxists considered government as eliminated and talked about the society without class. They didn't present any unique idea to explain the government. The pluralists considered the society as the set of people and groups competing on political power and government is impartial that only tries to give power to the group who were appointed in elections (ibid:126). The followers of post modernism as Habermas and Foucault believed that: the governments cannot have positive role in establishing the benefits of economic classes and their function is organizing the economy via organizing economic activities and wealth redistribution arising from the government activities. Foucault believed that government is possible via centralized government. This centralization is based on subjective institutions (Melossi, 2006:6). The institutionalists believe that government is not penetrated to the economic and social effects. The authorities follow their benefits and as they have coercion tools, they impose their benefits to the society (Christoyannopoaulos, 2010:125). Max Weber believed that modern governments are formed based on the third type legitimacy, logical-legal power (Melossi, 2006:9). It can be said that the theorists in defining the government and in relation to nation and its power with the different types of legitimacy according to their views showed theircomments and now, more theorists emphasized on the democratic process of government and logical-legal legitimacy.

METHODOLOGY

This study was done by document method. The data were analyzed via referring to the published resources. The data collection instrument was library notes; the data analysis was descriptive-analytical. The variables in the study are: The elements providing power, positive and negative benefits of power and dictator government. One main question and three sub-questions are raised in this study.

The benefits of government power and its tools

To determine the power benefits, limitations and its tools, it is required to deal with the different types of power. When the nature of this concept is clarified, its features and attributes are defined better. Morhed classified different types of power in the form of some items as legal power, reward, coercion, reference and specialization. He wrote that legal power is based on organization position and emphasizes on the formal position of a person. Thus, the source of power is organization. The power of the authority is proved via honesty, trust and confidentiality. Another type of power is reward in which reward is presented based on its value for others. Finally coercion power is the one applying power via punishment or threat and terror of others (Morhed and Grifin, 2007:382-388). It is said, if the government attains its power via potential power as legally and by proving authority and specialization, it can be turned into a powerful government and also accepted the support and people participation. If the government attained its power via coercion, is not permanent as it only considers its benefits and people will resist against it (Ibid, 391). The power that is attained via coercion and other capabilities is imposed on people and resistance against it is considered. The power that is achieved the high position via legal legitimacy is the authoritative government and its power is original and is supported by people. This authority shows the general law independency and determination. The government that is based on logical-legal legitimacy, the first tool is law and law making and they have making law on the priority and they punish those violating the law. The decisions are based on knowledge management in such government and elites are of great importance as mental and spiritual resources. Other tools of powerful government are meritocracy and democracy to continue political legitimacy of the government. Emphasizing on soft power is of priority. And it is considered social unity and public participation are possible via the influence of soft power.

The dictator government has various tools. The government is formed based on coercion and the decisions are based on organization pyramid and they are individual. Applying perspective commands is common and management is based on hierarchy. This government punishes those violating law. The major tools in government are materialistic resources. Centralization is common in this government and hard power is used only for duties and system control. This government believed on forces centralization and it tried to provide individual and group benefits. The outcomes of such performance of government are public distrust, public resistance and government vulnerability and developing tension and arguments in the society. The tools of these two governments are compared in Figure 1.

Legitimate and legal power

The legitimate power means “authoritative” and it is the power established based on people satisfaction. This power is efficient and effective and motivates public participation. The nature of this authority is its legitimacy. This influence manifests the leadership capability at the center of governance and acts as stable. Leadership in authoritative government is based on spiritual abilities but leadership in other governments is based on materialistic capabilities. The authoritative government has collective nature and thinks about optimal roles of human being and this guarantees its survival but in other governments in which coercion is used, individual benefits are considered and are faced with people resistance and such government is vulnerable (Javani, 2013:3). In powerful government, civil society is original and by controlling the power, the government provides the public benefits and its

continuance. Thus, legitimate and legal power is observed in the powerful government with authority. In such government, the skill, knowledge, specialization and efficiency of the authorities are emphasized (AkhavanKazemi, 204, 122).

Original and dictator power

The original power is the one with logical-legal source and the dictator power is the one with the source of coercion and materialistic facilities and dominance on the society. Clearly, there is difference in the source, nature and content of these two elements. Today, there are three approaches in determining power as: 1- Allocating the resources, 2- The capability of using resources, 3- The results of using power. In other words, the new theorists analyze the power with the resources, solutions and results. When the power is perceived as resource and is considered as the capabilities of each person to influence others. These resources are natural resources, population, army, equipment and etc. In the second approach, instead of emphasizing on empowerment, the solutions are considered. In the third approach, we know whether the power owner applied the suitable reactions as well along the existing benefits? In these three approaches, we can not ignore the role of intellectual resources and value system in national power production. Thus, in new methods of national power evaluation, the national resources field, national performance and military capacity are considered. The intellectual resources, value system that are called ideological and intellectual resources are of great importance. The leaders, authorities and managers of the society mostly emphasize on economic, social and cultural development. IN such process, preferring national benefits to personal and group benefits, resistance to external pressures, strong morale all depend upon using intellectual resources, value system and underlying ideology on society. Original power is linked with the features arising from the spiritual issues based on divine and legal power. These features and elements are not observed in dictator power (Ibid, 2-3). Dictator power is based on materialistic resources and coercion legitimacy and providing the personal and group benefits are on priority. Ignoring the collective benefits leads to the society resistance.

This dictator power is inhibited or destroyed by social forces. In the history, there were various experiences of such destiny. It can be said that there is a difference between original power and dictator power. It can be said that authoritative government has original power and the power-based government uses dictator power. The former has influence at national level and the latter is without any influence in the society and is doomed to destruction.

Power bases

Executive power as executive institution of the country that is called government in political and legal literature has complex relations in social interest and benefits and social relations. These interactions are based on four main bases and based on the nature and legitimacy has a relation of these bases. These cases are including the belief and ideological basis, coercion, public view or providing services, materialistic benefits or private view (Ghazi, 2004, 64). It can be said that each of these cases guarantee power creation for the government. It is necessary to have at least two bases for each government. But the governments improve these bases depending upon the fact they attain their power of which source and the nature of legitimacy (Zalksi, 2008). The government attaining its power with coercion and imposed itself to the society is obliged to use negative and positive forces for survival. Also, it acts based on perspective principles to do the duties and services. An authoritative government attains its power via legal and logical tools and by belief and ideological bases and forming public groups presents the services and have acceptable image in the society. Another difference in power bases applied by the governments is that in authoritative government, we have forces separation. Avoiding power centralization and using work division at national level are the requirements of this government. In a dictator government, it applies the maximum dominance on the existing forces for its survival and proving the benefits and it is not based on forces separation. Thus, authoritative government that is manifested by legitimate rules considers its survival based on law-based power. However, the dictator government considers its survival in coercion and materialistic and military elements.

The interaction of power and doing the duties in government

Executive power is the concept representing the government. As in this study, powerful government is considered; the requirements of using power in this government are emphasized. To start and manage the society and playing the stable role, the government needs legal legitimacy. This, it should be elected via democratic method and elections by people. Thus, the first power in the government is legal power that is recognized completely legally. At the beginning of the formation of the government, the government members are appointed based on the pre-determined, advertised and selected plans by people and organizational power is achieve (in such government, meritocracy is on the priority and the government authorities are elected based on their specialization and knowledge and their duties are based on knowledge management. The government with adequate legitimacy and influence at national level via gathering the resources, absorbing public participation and improving the social unit applies the social capital well and presents the services and applies social justice and think about public benefits and the power bases are stabilized and applied the tools to develop and progress the society well (Nami, 2010:308-310).

Makiavli in determining the virtue of power of the government said:" The virtue of power is that it provides the order and law in the society. The authoritative government acts in accordance to the desires of the people and protects them against the enemies as the public trust is absorbed and their participation in various fields is provided. They behave as with their competitors as prefer its existence to destruction and help it. Such government should honestly and truly manage the society (Shariat, 2002:114). It can be said that according to Makiavali, the power interacting with government is the one with value, culture, ethical and ideological intentions and it is based on soft power. Power is necessary in the government on condition that it is used not to apply pressure, coercion and threat and it is used for supervision, control, protection and security. When power is centralized, dictator culture is promoted and it is the main barrier of developing participation and healthy competition. Power, law and freedom are three elements providing the progress of the authoritative government and if the power is centralized without two other elements, the dictator government is created (Bashirie, 2001:154).

Thus, interaction of power and duties in government with negative or positive view is considered the two required elements complementing each other. The authorities in political-social fields considered this interaction positive and considered the conditions of having power by the government as conditional. As the power is not centralized, the forces separation is considered, the original power that by the society influence can makes the social capital dynamic and developed and this interaction of power with government turns it to an authoritative government.

RESULTS

Three questions were raised in the present study and each one required documented responses. The results were also used to answer these study questions. The first study question: What are the elements providing power and what are the most important ones?The nature of the power elements in governments are including: Natural resources, human population, army, materialistic facilities, country, intellectual resources and value system. Based on their political legitimacy, the governments apply some of the elements more. For example, in power government, it is emphasized on intellectual resources and value system, as democracy and meritocracy are the pre-requirements of the legitimacy of this government and in power-based government, materialistic facilities and Army are on priority. As this government attained its legitimacy via coercion and threat. There are various views regarding the introduction and determining the elements determining the power of authorities. Mahpishanian (2010) considered these elements in some cases as the effect on others behavior, ethical values and intellectual resources that are classified in the form of soft power.Moradi (2010) divided power elements into materialistic and spiritual and in materialistic level, there is hard power and in spiritual level, there is soft power. Schwartz (2008) considered the main element of soft power as cultural element including ideology, stable values, acceptable norms and prediction of authorities' behavior. Ikers

(2008) classified power elements in the form of some items as social, political, cultural and scientific elements. The review of literature showed that the best classification of power elements is such this is based on government legitimacy.

The second study question: What are the positive and negative benefits of power in government?
Determining the power benefits in the governments is different. In the powerful government that is based on logical-legal principles and relies on democracy, power is used for applying law, duties, providing services, manifestation of public and private image. Such application of power leads to the survival of the government and development of nation. In power-based government, legitimacy is based on coercion and threat and power is used to provide the personal and group benefits, control the society and punish those violating the commands. Bashirie (2001) considered power as definite ability to force them for giving up. If the power is used to provide the public benefits, the effects are positive for the development of the society and if this power is used to dominate others and providing personal and group benefits, its results are positive for the government and negative for people but such government are temporary. Timothy (2006) writes, the authoritative government has political legitimacy and its performance effects are positive. The government attaining its power by coercion has negative performance, thus, the interaction of power in authoritative government is positive and this interaction in the power-based government is negative. Third study question: What is powerful government and how does it use power for doing its duties?. This government achieved its political legitimacy via legal and logical means, it achieves its major power via people. Meritocracy, democracy, relying on soft power and law are the features of this government. In this government, power is based on forces separation and hierarchy and its use is developed. Thus, public participation and people trust are considered. The government uses intellectual and spiritual resources as an important power. Morhed (2007) writes, the powerful government attains its legitimacy legally and it has legal power and organizational power and as the government authorities of law-oriented, honest, they have reference power. This government uses the people specialization and reward to others to run the society. The set of these performances lead to the social unity, public participation and society development. Javani (2013) writes powerful government is authoritative and efficient and as it has political legitimacy, it deals with collective actions and applies power to provide services and duties.

Recommendations

Based on the findings of the study and with emphasis on the current society of Iran, the followings are recommended:

- Based on the difference of traditional and new view to power and government to keep the original power in the society, there should be a balance between the citizens desires and government work groups and besides providing social security in the society improves the social unity and public trust.
- The public satisfaction of government and achieving people trust by the government leads to the improvement of political legitimacy, using the social capital is one of the most important issues leading to internal security and stability and improves the government-nation relationship. In democracy approach, the society is run via social participation. It is recommended the hope and solution government attempts to have the public trust.
- As democracy is an operational model to determine the legitimacy or illegitimacy of a government, the power in the society is fixed by democracy model and is protected. It is proposed that the hope and solution government improves its power via democracy.
- As the power bases in the government are mostly based on cultural-value and software aspects, it is recommended the government applies soft power to improve democracy and applies as a guided process via providing the required mechanisms.
- As maintaining internal security and order is not possible without optimal use of soft power, it is recommended the responsibility capacity of the state systems is improved and besides fighting with the threats, the external soft war improves the positive view in government and the society.
- To increase the government efficiency and reduction of corruption in the society, the distance between the true desires or people and state services is reduced. If there is corruption in administrative, economic and cultural

system, the formal structure of the power is disturbed and it leads to the destruction of social capital and corruption should be prevented in the power structure.

- To control and eliminate the structure conflicts in power, there should be required coordination in decision making forces and besides attaining unity inside the formal structure of power and its improvement, stabilize the social capital.

DISCUSSION

Based on the theoretical basics, Max Weber believed in law making power exclusion for government while Gerameshi considered the civil society as the initial center of political activity. He believed that civil society is the link between political and economic space. Although Marxists considered the first role of government giving services to the high classes of the society, most of the pluralists believed that giving power and formation of government is possible via election and law. The theorist analyzed the interaction of power and government differently based on their thinking views. They had different views but most of the new theorists believed that government authority is in getting legitimacy and legitimacy is logical-legal power. Most of the modern governments that are called developed countries had such legitimacy.

The legitimate power is the power established based on people satisfaction. This power is efficient and effective and motivates public participation. This power is called also “authoritative”. In the new theories of the government, mostly it is emphasized on its public image. Three are three approaches in determining power as resources allocation, the capability of using resources and results to use power. It can be said that in the power re-definition, the role of intellectual resources and value system is considered well. The elites have high position in decision making. Meritocracy is of great importance as an approach in keeping the power. In such government creating national commitment to follow the national goals with emphasis on such approach is possible. Briefly, the intellectual and ideological resources have important role in powerful government. But the government that is based on coercion and threat via dominating the resources and providing the personal and group benefits attempts to impose itself on the society. This government spends considerable costs for its survival. The dictator power can not focus on public opinion and people participation. Thus, it is faced with people resistance. In this centralized government, forces separation is unimportant and social security is disturbed. Thus, the effects of such government are temporary and problematic. By comparing the original and dictator power, we can understand that if power is with the government, it is used for the development of people and providing the public benefits and it is the authoritative government. If the power is used to stabilize the situation and threatening the rivals and providing individual and group benefits and the government is based on such power, a dictator government is formed. In the powerful government, we can find about the variety of some powers as legal, personality and organization power and in dictator government, the power is applied via threat and military tools. Thus, the interaction between the power in government to do the duties and presenting the services is necessary and efficient and besides forces division for supervision and control, protection, providing the security and management and public encouragement are used. In this way, the powerful government is formed and by social capital leads to the development of the society. Continuous and stable loyalty of the citizens to government besides reducing the extra costs, eliminates the foreign threats and increases its population. But illegitimate governments by gathering the national resources to guarantee their security reduce the national benefits to the ruler benefits and by deceiving a special class, these resources are distributed unequally and tension and argument are increased in the society. Thus, the interaction between the power and government by ignoring the mentioned items if it for the development of the society and social justice is justified.

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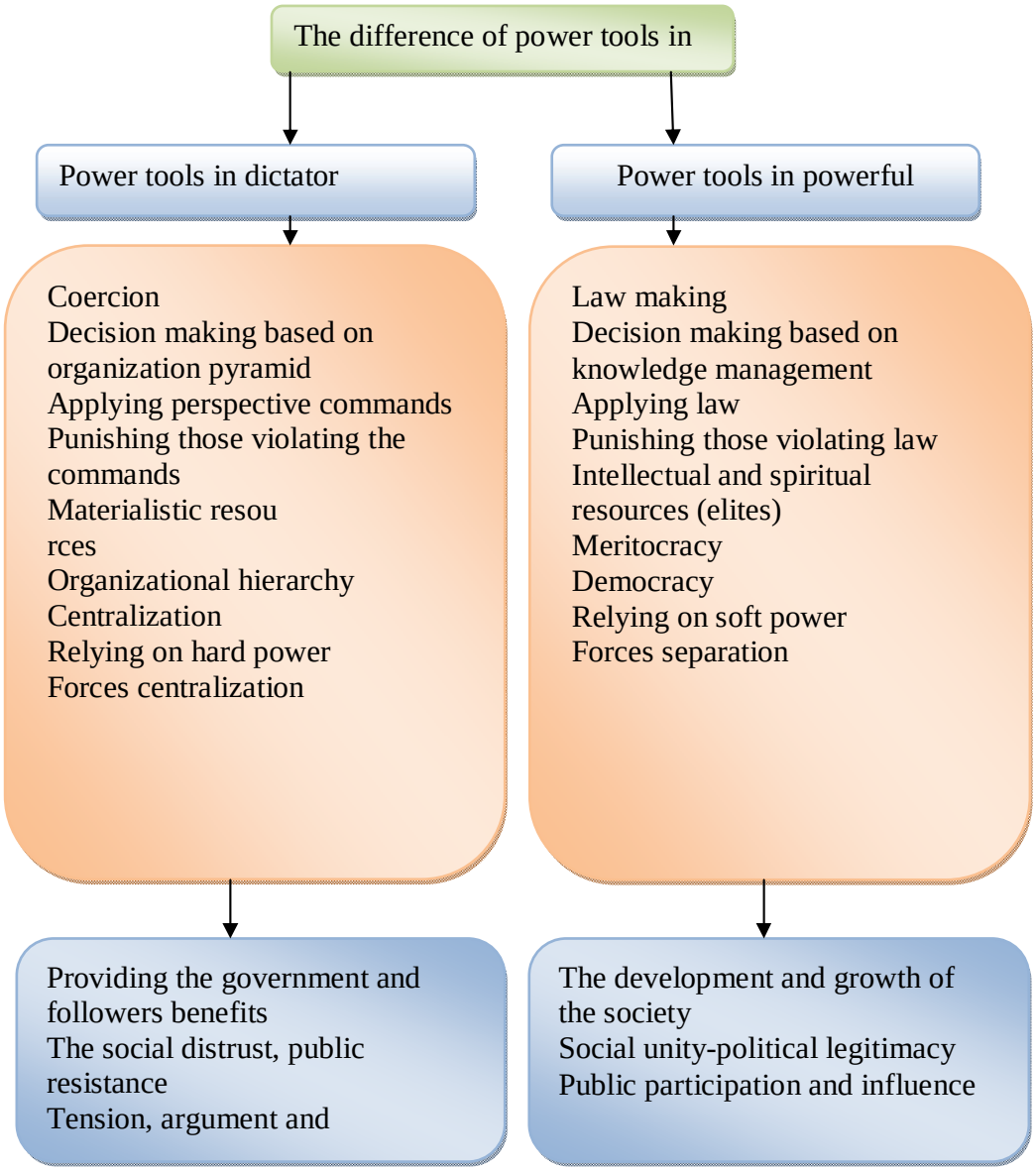

Figure 1- The difference of power tools in governments

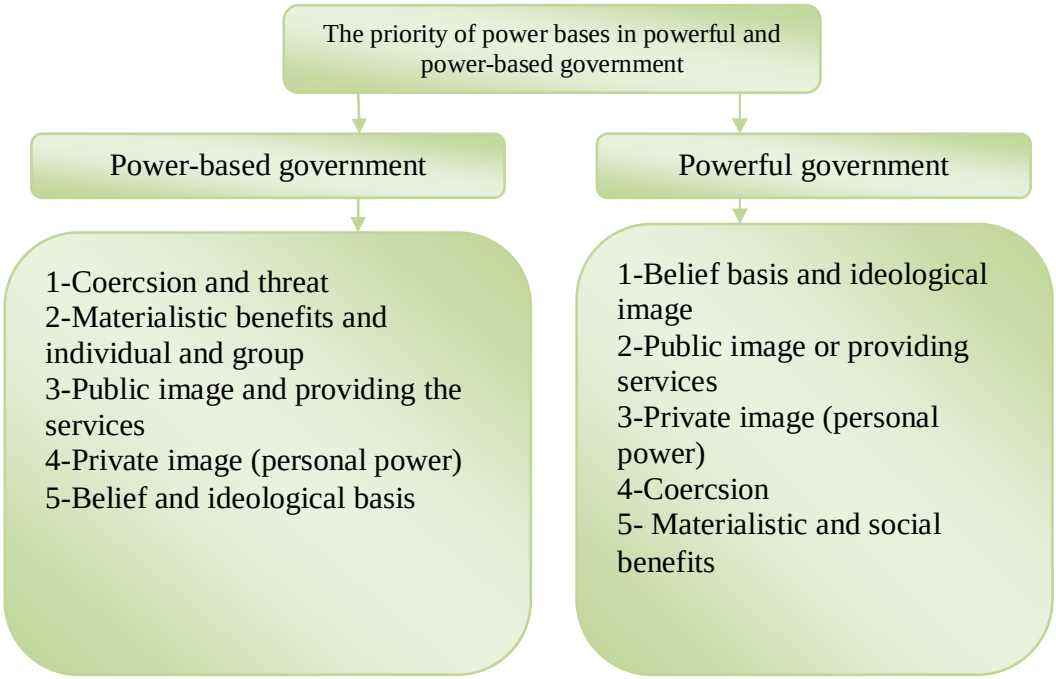

Figure 2- Different types of power elements

Power elements					
Natural resources	Population	Army	Materialistic facilities	Country	Intellectual facilities and value system

Figure 3- The priority of power bases in powerful and power-based government

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RESEARCH ARTICLE

Relationship between Information Quality, Liquidity Risk and Capital Expenditure

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ABSTRACT

The purpose of this study is to investigate the relationship between information quality, liquidity risk and capital expenditure. Liquidity risk is the sensitivity of stock return to unexpected changes in the market. Much attention has been given to this risk in the asset pricing literature. Higher quality information is expected to lead to lower liquidity risk and reduced capital expenditure. In the present study, data of 93 companies listed in TSE during 2002-2012 was investigated by correlation analysis and regression models; the obtained results indicated a negative relationship between information quality and liquidity risk, as well as a negative effect of information quality by liquidity risk on the capital expenditure.

Keywords: information quality, liquidity risk, capital expenditure.

INTRODUCTION

Under incomplete liquidity conditions, the demand and supply of stock by some market activists can influence prices in circumstances under which others do not tend to trade stock to the current prices. Although market risk exists in market with complete and incomplete liquidity, liquidity risk is an important systemic risk which the investors will deal with when the market has incomplete liquidity (Akins et al, 2011). Currently, there is no accepted theoretical model which relates information quality (or systematic risk) to liquidity risk in Iran; however, the existed attitude is that the stock with higher systematic risk will have more adverse situation in the market under adverse macroeconomic conditions, while it improves under appropriate macroeconomic conditions (Campbell et al, 1997).

When the market liquidity reduces, stocks of different companies experience different degrees of exit of market makers and investors. Exit flow of investors is significantly higher for the stocks with lower information quality,

because investor demands will experience higher drop for stocks with greater uncertainty and ambiguity. Market makers will less tend to direct liquidity toward this kind of stocks. This, in turn, reduces investor demands for these kinds of stocks. In contrast, more investors and market makers enter the market when market liquidity increases, whereby demand and liquidity of stocks with more ambiguity and uncertainty increase. As a result, cost changes (return of stocks) are expected to respond higher to changes in market liquidity in companies with lower information quality (or higher information risk). In other words, information quality is expected to influence liquidity risk (Akins et al, 2011).Thus, the main problem of this research is whether the quality of accounting data can influence capital expenditure by liquidity risk. The purpose of this study is to investigate the relationship between information quality and liquidity risk. Moreover, the role of liquidity risk will be investigated on the relationship between information quality and capital expenditure.

Theoretical Background

Information quality

The quality of accounting information refers to the precision which is expected by the financial reporting in explaining accounting information in connection with the firm operations, particularly cash flows in order to inform the investors. Dichev and Tang (2009) and some researchers used predictable variables and economic parameters to assess information quality and accounting information.Kohlbeck and Warfield (2005) used power of evaluation models based on the balance sheet and profit and loss data, error and dispersion of analyst predictions and profit stability in order to examine the quality of accounting data. Some also used accruals as a measure of accounting information quality. Barth et al. (2008) used three variables including profit management, quicker recognition of balance sheet and relevance of accounting numbers to assess the quality of accounting data.

Liquidity

According to Vernimen, liquidity refers to the ability to change a financial market quickly without reducing the price into cash. Liquidity allows trade of a financial market at a price (market price) in large volume without disrupting the market (Udomsirikul et Al, 2008).

Liquidity risk

The sensitivity of return on stock to sudden changes in market liquidity is called liquidity risk which is measured by $LIQ_t = 1/100U_t$ model (Pastor & stambaugh, 2001; Acharya & Pedersen, 2005; Sadka, 2006). A stock will be less attractive for investors when liquidity of that stock is lower, unless the holder earns more return. Some investors may quickly need their financing investment. In this case, liquidity can be very important. Liquidity means the ability to convert investments or assets to cash as fast as possible. Securities which are largely traded in the stock exchange can demonstrate the rate of their liquidity. In fact, the lack of liquidity may negatively influence stock value (Ahmadian, 2011).

Capital expenditure

Minimum rate of return by which the value of business remains constant is called capital expenditure (Salimi, 2007). Usable models to estimate capital expenditure are: A) capital asset pricing model, B) multi-agent model which is called the Arbitrage pricing model, C) return on bonds plus risk premium, D) the ratio of earnings to price (E/P), and E) price cash flow (PCF).

Literature Review

Akins et al (2011) studied the effect of financial information quality on liquidity risk and capital expenditure. The results showed that information quality by reducing liquidity risk can reduce capital expenditure. Pereira and Zhang (2010) studied the relationship between return on equity and the liquidity fluctuations. They concluded that return on equity will be higher when liquidity fluctuations are low or the liquidity of a firm stock is high. Fang et al (2009) studied the relationship between liquidity and firm value. Their results showed a positive relationship between liquidity and the ratio of operating profit to assets and the rate of equity in companies with higher liquidity level. Lipson and Mortal (2004) studied the relationship between stock liquidity and capital structure in the stock market. They found a significant relationship and concluded that increase in stock liquidity reduces capital expenditure and firms prefer financing through stocks.Kim et al (2008) examined whether the accounting information quality influenced stock prices. They found that increase in the quality of accounting information (accrual quality) reduces price fluctuations and their dealing price approaches to their essential value.

Lipson and Mortal (2007) found a strong relationship between liquidity and decisions related to capital structure. In addition, increase in liquidity increased the rate of stock issue. Fujimoto and Masahiro (2005) found a positive relationship between illiquidity and fluctuations of return on equity at firm level as well as the level of all companies existed in their sample. The results showed that fluctuations of return on equity will increase when illiquidity increases. Dichev and Tang (2009) studied the relationship between earnings fluctuations and expected return and found a negative relationship between earning fluctuations and capital expenditure, in which increase in earning information leads to decrease in capital expenditure. They also found a negative relationship between earnings fluctuations and expected return on equity. Dianati et al (2011) studied the relationship between financial information quality and risk factors in Tehran Stock Exchange (TSE). The results showed that the risk factors of stocks decreased when financial information quality increases. In other words, there is a negative relationship between quality of financial information and risk factors of stock. Saqafi et al (2011) studied the relationship between accounting information quality, overinvestment and free cash flow in exchange companies. They concluded that lower overinvestment occurs when the accounting information quality of companies is higher; this relationship widely exists in companies with high free cash flow and effect of overinvestment is higher through the quality of accounting information.

MATERIALS AND METHODS

The studied group includes all companies listed in TSE. For selecting samples, the following conditions were applied:

1. The fiscal year of the companies should end to 20 March and the companies should not have changed the fiscal year during the studied period.
2. The sample companies should not be of investment, broking, bank and insurance companies.
3. Companies should be listed in TSE before 2002 until 2012.
4. The sample companies should not have trading intervals lasting for more than 6 months in a year.
5. The desired data is available for data extraction.
6. Companies with negative equity are removed.

By considering the above conditions, 93 companies listed in TSE were selected as samples and their data were extracted for the research.

Methodology of this study is practical correlation for experimental researches of accounting. Chronologically, it is a prospective research.Data related to literature and data related to the hypotheses and variables were extracted from documents. In addition, the data related to the hypotheses and variables were extracted from financial statements, notes, databases of TSE, documents of TSE as well as Nowin Rahavard software.Data analysis and tests were conducted by Excel and Eviews software. Thus, the data was primarily categorized by databases in Excel software and then transferred to Eviews software in order to perform the desired statistical tests.

The statistics used in analysis included descriptive statistics for describing and presenting the statistical properties of variables and parameters as well as tables, diagrams, and various figures of data and tests (without analysis, and merely for classification); the analytic statistics included estimation of coefficients.

Hypotheses

The purpose of this study is to find a significant relationship between information quality, liquidity risk and capital expenditure. In this context, two hypotheses were formulated as follows:
First hypothesis: There is a negative relationship between information quality and liquidity risk.
Second hypothesis: Information quality negatively influence capital expenditure through liquidity risk.

ANALYSIS

The first hypothesis was tested by the model (1).
Model (1):

$$\varepsilon_{i,t} = \psi_{0,t} + (\psi_1 \text{info Quality}_{i,t-1} + \psi_2 \text{Market Characteristics}_{i,t-1} + \psi_3 \textit{Firm Characteristics}_{i,t-1})\ \text{LIQ}_t\ (\varphi_{0,t} + \textit{Info Quality}_{i,t-1} + \psi_2 \text{Market Characteristics}_{i,t-1} + \psi_3 \textit{Firm Characteristics}_{i,t-1}) MKT_t + \omega_1 \text{ Info Quality}_{i,t-1} + \omega_2 \text{Market Characteristics}_{i,t-1} + \omega_3 \textit{Firm Characteristics}_{i,t-1} + \vartheta_{i,t}$$

The dependent variable

$\varepsilon_{i,t}$ (residual error of the model of return on equity) is the dependent variable that is calculated by the model (1):
Calculation: the model (1) is calculated in six stages using the following five models:

The first stage:
Model (1.1):

$$r_{i,t} = \alpha_i + \beta_{i,t}^{M} MKT_t + \beta_{i,t}^{s} SMB_t + \beta_{i,t}^{H} HML_t + \beta_{i,t}^{L} LIQ_t + \varepsilon_{i,t}$$

Liquidity as a new factor is added to three-factor model of Fama and French (1993).
In the second and third stage, $\beta_{i,t}^{M}$ (beta market risk) is calculated based on the model (1.2) and $\beta_{i,t}^{L}$ (beta liquidity risk) is calculated according to the model (1.3), as follows; in the fourth stage, it is substituted in the first model.
The second stage:
Model (1.2)

$$\beta_{i,t-1}^{M} = \psi_{0,t} + (\psi_1 \text{ Info Quality}_{i,t-1} + \psi_2 \text{Market Characteristics}_{i,t-1} + \psi_3 \textit{Firm Characteristics}_{i,t-1} + \varepsilon_{i,t})$$

The third stage:
Model (1.3)

$$\beta_{i,t-1}^{L} \psi_0 + (\psi_1 \text{ Info Quality}_{i,t-1} + \psi_2 \text{Market Characteristics}_{i,t-1} + \psi_3 \textit{Firm Characteristics}_{i,t-1}$$

The fourth stage:
Model (1.4)

$$r_{i,t} = \beta_i^0 + \beta_{i,t}^s SMB_t + \beta_{i,t}^M MKT_t \psi_{0,t} + \psi_1 \text{ Info Quality}_{i,t-1} + \psi_2 \text{Market Characteristics}_{i,t-1}$$
$$+\psi_3 Firm \text{ Characteristics}_{i,t-1}) \text{LIQ}_t + (\varphi_{0,t} + \varphi_1 \text{Info Quality}_{i,t-1} + \varphi_2 \text{Market Characteristics}_{i,t-1}$$
$$+\varphi_3 Firm \text{ Characteristics}_{i,t-1}) MKT_t + \varepsilon_{i,t}$$

The fifth stage:
Model (1.5)

$$\varepsilon_{i,t} = r_{i,t} - \beta_t^0 - \beta_{i,t}^s SMB_t - \beta_{i,t}^H HML_t$$

At this stage, the model (1.1) is set equal to $\varepsilon_{i,t}$ (the residual error of the model of return on equity); in the sixth stage, then, $r_{i,t}$ is substituted and factors with opposite signs are removed; finally, the model (1) is obtained.

The sixth stage:
Model (1)

$$\varepsilon_{i,t} = \psi_{0,t} + \psi_1 \text{Info Quality}_{i,t-1} + \psi_2 +$$
$$+\psi_3 Firm \text{ Characteristics}_{i,t-1}) LIQ_t +$$
$$(\varphi_{0,t} + \varphi_1 \text{Info Quality}_{i,t-1} + \varphi_2 \text{Market Characteristics}_{i,t-1}$$
$$+\varphi_3 Firm \text{ Characteristics}_{i,t-1}) MKT_t + \vartheta_{i,t}$$

Finally, the model (1) is obtained; the variables are described in Table 1.

Calculation of HML and SMB

SMB and HML variables are calculated as follows.

1. At the end of each year, all the sample companies are sorted based on the firm size (market value of stocks).
2. Middle size of the companies are calculated and the companies bigger than the middle size are considered Big and the companies smaller than the middle size are considered Small.
3. At the end of each year, all sample companies are sorted based on the ratio of book value to market value (B/M).
4. Companies sorted in stage 3 are categorized in three groups: the companies in the top (30%), the companies in the bottom (30%) and the companies in the middle (40%). To calculate the marginal points of groups, companies with negative book value of equity are not considered when forming size-based portfolios. This categorization leads to the formation of three portfolios based on the ratio of book value to market value. Firms are considered High by high B/M, Median by median B/M and Low by low B/M.
5. By combining calculated portfolios, six portfolios were formed based on commonality of two size-based portfolios and three portfolios based on the ratio of book value to market value. Table 2 shows the combination of six portfolios.
6. By formation of the six portfolios, their annual returns were calculated and used to obtain SMB and HML variables:
7.

SMB_t- Risk factor of the return on equity which is related to firm size and refers to the difference in simple average of return on three small portfolios (S/M, S/H, S/L) and simple average of return of three big portfolios (B/H, B/M, B/L) of SMB factor, is calculated annually. Therefore, SMB is obtained by the difference in returns on equity of small and big portfolios which weigh equally in terms of the ratio of book value to market value; therefore; it is largely independent of the effect of this ratio.HML- Risk factor of the return on equity which is related to the ratio of book value to market value of the companies and it is defined as the difference in simple mean of return on two portfolios with the highest ratio of book value to market value (B/H, S/H) and simple mean of return on two portfolios with the

lowest ratio (B/L, S/L). HML factor is calculated annually. Each two parts of HML is return on portfolios with the highest (lowest) ratio of book value to market value which have the same mean. Therefore, the difference in return on two portfolios primarily is independent from the effect of the size factor in the return on equity (Kurdish & Alevi 89).

Independent variables

Accounting information quality is the independent variable. To measure the accounting information quality, as other studies (Francis et al, 2005), adjusted accrual quality was used; the variables related to its calculation are shown in Table 3.**Accruals were measured follows:**

Model (2) (however, this model should be divided by total assets for homogenization of the variables)

$$TCA_{i,t} = \phi_i^0 + \phi_i^1 CFO_{i,t-1} + \phi_i^2 CFO_{i,t} + \phi_i^3 CFO_{i,t+1} + \phi_i^4 \Delta REV_{i,t} + \phi_i^5 PPE_{i,t} + \vartheta_{i,t}$$

Model (2) was estimated annually for all the companies. Special residuals of these estimation were used for quality of accruals. In particular, quality of specific accruals is equal to the standard deviation of residuals for the past 3 years of each firm.The capital expenditure is independent variable; the ratio of net income (loss) after taxes to equity is used to measure capital expenditure.

Modifier variable

In this study, the market liquidity risk is the modifier variable which is calculated as follows. Gamma model of Pastor and Estamba (2003) is used to calculate market liquidity:

Model (4)

$$LIQ_t = \frac{1}{100} u_t$$

In this model, stock liquidity γ_{it} is calculated to measure u_t (sudden changes in market liquidity), using the model (3.1). To calculate $r_{i,t}$ of each stock, the following regression model is used. Its variables are described in Table 4.

Model (1.4)

$$r^e_{i,t} = \theta_{i,t} + \theta_{i,t} r_{i,t} + \gamma_{i,t} \operatorname{sign}(r^e_{i,t}) \times v_{i,t} + \varepsilon_{i,t}$$

In this model, $r_{i,t}$ is the stock return of firm i in month t. $r_{i,t}$e is calculated as follows: $r^e_{i,t} = R_{i,t} - R_{i,m}$, where, $R_{i,t}$ is the return on equity and $R_{i,m}$ is the market return and $v_{i,t}$ is the volume of transactions (in Million Rials) and $\gamma_{i,t}$ represents the sign of transaction values which coincides with the sign of excess return on equity $\operatorname{sign}(r^e_{i,t})$.In the second stage, market liquidity and its variations are measured. To do this, the model (3.2) is used. In calculating mean market liquidity γ_t (by equal weight), liquidity of sample companies are averaged.

Model (3.2)

$$\gamma_t = \frac{1}{N_t} \sum_{i=1}^{N} \gamma_{i,t}$$

In the third stage, the market value (total market stocks) which reflects the cost of transactions is used to develop an appropriate scale for market liquidity. Here, each γ_t is a scale to obtain $\gamma_{i,t}(\frac{m_t}{m_1})$; in this sequence, m_t is the total market value of sample firms in each year. m_t and m_1 are used as a scale. The third stage reflects the growth of stock market value. The sequence reflecting liquidity cost (called back return) shows mean of all stocks at one point of time. u_t denotes the sudden changes in the market liquidity.

Model (3.3)

$$\Delta\gamma_t = a + b\Delta\gamma_{t-1} + c(\frac{m_t}{m_1})\gamma_{t-1} + u_t$$

Or

Model (3.4)

$$\Delta\gamma_t = (\frac{m_t}{m_1})\frac{1}{N_t}\sum_{i=1}^{N_t}(\gamma_{i,t} - \gamma_{i,t-1})$$

In the fourth stage, the u_t obtained in the third stage is substituted in model (1) and market liquidity is obtained.

Variables related to calculation of liquidity for the second, third and fourth stages are shown in Table 5.Because the independent variable is not fully able to predict the dependent variable, substitution of the controlling variables in the model leads to a reduction in prediction error. In the regression model, controlling variables include the market characteristics and the firm characteristics, respectively described in Table 6 and 7.Model (3) is used to test the second hypothesis. This model uses risk premium of a single beta liquidity obtained from calculation of liquidity risk to test the effect of information quality on capital expenditure by liquidity risk. Then, effects of capital expenditure is determined by the difference between the highest and lowest levels of information quality in market risk and liquidity risk.Model(3) CoC through liquidity (market) risk = Difference in liquidity (market) risk between quintiles X risk premium per unit of liquidity (market) risk

Econometric model: according to the variables and analyses, the econometric model is used in framework of the hybrid data to estimate parameters and test the hypotheses. Quantity of the independent and dependent variables is related to different industries and companies during 2003-2011. The hybrid data method is used in such cases to obtain reasonable results.The quantitative results of the descriptive analysis indicate the values of average stock liquidity, information quality and market return (-0.0207, -0.0018 and 0.1020, respectively). Mean value of the return on equity was 0.2872 in the previous year. By studying the criteria of standard deviation, *coefficients* of elongation and skewness to verify the normality of data distribution, the data related to the dependent and independent variables have a normal distribution, because variables have the minimum distance of the value presented for elongation.

Correlation of variables

To determine the type and size of the relationship between explanatory variables such as independent variables and control variables, Pearson correlation coefficients were calculated as shown in Table 8:Results of reliability test using Levin, Lin and Chu and Phillips-Perron tests indicate that the variables are reliable at 95% confidence level and the parameters can be estimated without worrying about their falseness.Primarily, the constrained Chow test was used to estimate the model during 2003-2011 in the framework of hybrid data. This test determines the utilization of Pooled model or fixed effects model. If the F-statistic is significant at 5% error level, the null hypotheses (Pooled Model) is rejected and the fixed effects model is accepted. According to Chow test results, F-statistic is not significant at 5% error; therefore, Chow test is not rejected the similar intercepts in all periods. Hence, fixed effects method is not accepted. Therefore, pooled model was used for estimation of the model.

RESULTS

First hypothesis

According to the results from estimation of parameters, Durbin-Watson statistic is 1.99; autocorrelation of the disruption term is rejected at 5% error level. The probability of the F statistic is 0.000 for specification, which is less than 5%. Hence, null hypothesis based on the specification error is rejected. Therefore, the model is significant at 95% confidence level. Specified coefficient of determination 0.48, which indicates that about 48% of the variations in the dependent variable can be described by the independent variables. Because the statistics are not rejected, the

hypotheses are examined. Variable coefficient of liquidity risk related to the first hypothesis regarding the effect of information quality on liquidity risk is -0.3978; according to the theoretical background presented in the second section on the negative relationship between these two variables, it can be argued that the first hypothesis is not rejected. Therefore, there is a negative relationship between information quality and liquidity risk.

Second hypothesis

In order to examine the second hypothesis on the effect of information quality on capital expenditure by liquidity risk, the premium capital expenditure. Then, the obtained premium is multiplied by the coefficient of market risk and liquidity risk. To obtain the premium risk, variables are sorted based on their historical liquidity risk; then, variables are categorized based on their deciles. It is noteworthy that liquidity risk is calculated based on regression of the last 59 months (the last 5 years). In other words, liquidity risk is calculated based on previous risks of the firm and substituted in the model. In the next stage, the deciles are classified based on the models; then, the correlation coefficient is calculated for each decile and each model. So that, the correlation coefficient is the coefficient of liquidity risk for the main model, and the market risk coefficient for Fama and French model. The estimations of this stage are performed based on sectional regressions.In the next stage, the coefficients obtained for the first and tenth deciles and for the main models and Fama and French model are compared with each other and their t-statistic is calculated. In order to obtain the premium amount with regard to information quality and liquidity risk, the total coefficient of Fama and French model is divided by the main model coefficient to obtain the premium amount of liquidity risk.Premium amount of market risk is also obtained with respect to the average market risk presented in Table 9. Finally, the coefficients (obtained from estimating model 1) is multiplied by the related premium. The results are as follows:Obviously, the premium risk is 30 considering the ratio of Fama and French coefficient to total coefficient of liquidity risk.Finally, the final table of second hypothesis is obtained by substituting the premium risk in the following table:10

CONCLUSION AND RECOMMENDATIONS

This study examined the relationship between information quality, liquidity risk and capital expenditure of companies listed in TSE during 2005 to 2011. The main objective of this research which was presented in the form of two hypotheses was to find a significant relationship between information quality, liquidity risk and capital expenditure. The dependent variable was $\varepsilon_{i,t}$ and independent variables included information quality and capital expenditure and liquidity risk was the modifier variable. In this study, two control variables were considered to control other factors effective on the dependent variable, the market characteristics and firm characteristics.According to the scientific classification, this research was a practical descriptive study. To examine the above subject, financial information of companies listed in TSE (2002-2012) was used. Statistical sample was selected by elimination method according to the desired features. The required data was collected from various sources by documentation method. Data was analyzed by multiple regression using panel data. In this regard, the assumptions of classical regression were examined; then, they were accepted or rejected using the regression results.According to the hypotheses, a negative relationship was predicted between information quality, liquidity risk and capital expenditure. Results from testing hypotheses showed a negative relationship between information quality and liquidity risk; it was also found that information quality negatively influenced capital expenditure by liquidity risk.The results of the present study are consistent with Akinz et al (2011). They found a negative relationship between information quality and liquidity risk. Thus, increase in information quality leads to decrease in liquidity risk. He also tested the effect of information quality on capital expenditure by liquidity risk and found a negative effect of information quality on capital expenditure by liquidity risk.

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Table 1: Variables of the model

	Variable	Symbol	Calculation
1	Information quality	Info quality*	Accruals are used to calculate the information quality.
2	Market characteristics	Market characteristics$_{i.t}$	** Including stock liquidity, daily transactions, return on equity in the past, the standard deviation of daily returns and firm size.
3	Firm characteristics	Firm characteristics$_{i,t-1}$	* Including the ratio of book value to firm value, sales growth, operating cycle, capital-intensive business, financial status and liquidity of the firm (quick ratio)
4	Market liquidity	LIQ_t	**** $LIQ_t = 1/1000U_t$
5	Market risk premium	MKT_t	$MKT_t = R_{m,t} - R_{f,t}$

6	Excess return	$r_{i,t}$	$R_{i,t} - R_{i,t} = r_{i,t}$
7	The risk factor of return on equity is related to firm size.	SMB_t	$SMB = \frac{(S/L + S/M + S/H)}{3} - \frac{B/L + B/M + B/H)}{3}$ *****
8	Risk factor of return on equity related to the ratio of book value and market value	HML_t	$HML = \frac{(S/H + B/H)}{2} - \frac{(S/L + B/L)}{2}$ *****
9	Beta market risk	$\beta_{i,t}^{M}$	$\beta_{i,t-1}^{M} = \psi_{0,t} + (\psi_1 \text{Info Quality}_{i,t-1} + \psi_2 \text{Market Characteristics}_{i,t} + \psi_3 Firm \text{ Characteristics}_{i,t-1} + \varepsilon_{i,t}$
10	Beta liquidity risk	$\beta_{i,t}^{L}$	$\beta_{i,t}^{L} = \psi_0 + (\psi_1 \text{Info Quality}_{i,t-1} + \psi_2 \text{Market Characteristics}_{i,t-1} + \psi_3 Firm \text{ Characteristics}_{i,t-1} + \varepsilon_{i,t}$

Table 2: combination of the six portfolios based on size and value of the stocks

Size \ B/M	LOW	Median	High
Small	S/L	S/M	S/H
Big	B/L	B/M	B/H

Table 3: variables related to calculation of information quality

	Variable	symbol	Calculation
1	Accruals	$TCA_{i,t}$	$CFO_{i,t} = NIBE_{i,t} - TCA_{i,t}$
2	Operating cash flow	$CFO_{i,t-1}$	Operating cash flow of the current year of firm i in the past year
3	Operating cash flows	$CFO_{i,t}$	Operating cash flow of the current year of firm i in year t
4	Operating cash flows	$CFO_{i,t+1}$	Operating cash flow of the current year of firm i in the next year
5	Income fluctuation	$\Delta REV_{i,t}$	Sales of previous year-sales of current year
6	fixed asset	$PPE_{i,t}$	Finished cost of fixed assets of firm i in year t
7	Error	$\vartheta_{i,t}$	The standard deviation of estimated annual residual
8	Operating profit	$NIBE_{i,t}$	Operating profit of firm i in year t

Table 4: Variables related to calculation of liquidity in the first stage

	Variable	Symbol	Calculation
1	Excess returns of market returns	$r^{e}_{i,t}$	$r^{e}_{i,t} = R_{i,t} - R_{i,m}$
2	Excess return on portfolio	$r_{i,t}$	$r_{i,t} = R_{i,t} - R_{i,\mathrm{f}}$
3	Sign	sign	The sign obtained from $r_{i,t} = R_{i,t} - R_{i,\mathrm{f}}$
4	Volume of transactions	$v_{i,t}$	value of transactions divided by 1.000.000
5	stock liquidity	$\gamma_{i,t}$	$-1\times(\mathrm{ILLIQ}_{i,t} = \frac{\lvert R_{i,t}\rvert}{VOLD_{i,t}}\times 10^{6})$

Table5: variables related to calculation of liquidity in the second, third and fourth stages

	Variable	Symbol	Calculation
1	Market liquidity	LIQ_t	$LIQ_t = \frac{1}{100}\times u_t$
2	Sudden changes in market liquidity	u_t	$\Delta\gamma_t = a + b\Delta\gamma_{t-1} + c(\frac{m_t}{m_1})\gamma_{t-1} + u_t$
3	Mean changes	$\Delta\gamma_t$	$\Delta\gamma_t = (\frac{m_t}{m_1})\frac{1}{N_t}\sum_{i=1}^{N_t}(\gamma_{i,t} - \gamma_{i,t-1})$
4	Mean with equal weight	γ_t	$\gamma_t = \frac{1}{N_t}\sum_{i=1}^{N}\gamma_{i,t}$
5	Number	N	Number of sample companies

Table 6: variables forming market characteristics

Calculation	Variable	
$-1\times(\mathrm{ILLIQ}_{i,t} = \frac{\lvert R_{i,t}\rvert}{VOLD_{i,t}}\times 10^{6})$	Including the stock liquidity	1
Transactions in Rial divided by 1.000.000	Transactions	2
Bonus stock benefits + priority benefits (difference in stock price at the beginning and end of the fiscal year) + gross cash profit per stock / the last stock price at the end of the fiscal year	Returns on equity	3
The result of the standard deviation of returns on equity	The standard deviation of returns	4
Logarithm of assets	Firm size	5

Table 7: variables forming firm characteristics

Calculation	Variable	
The book value / the firm value	Ratio of the book value to the firm value	1
Last year sales / last year sales - current year sales	Sales growth	2
Debt repayment period (collection period + inventory turnover)	Operating Cycle	3
Total assets / fixed tangible assets	Capital-intensive business	4
It is considered 1 when the firm experiences loss; otherwise, it is considered zero.	Financial Statements	5
Current debts /inventory - current assets – quick ratio	firm liquidity (quick ratio)	1

Table 8: Results of the correlation between variables of Fama and French model

SMB	HML	MKT	Stock liquidity	Variables
			1.000	Stock liquidity
		1.000	0.0412	MKT
	1.000	0.0143	-0.0321	HML
1.000	0.5992	0.0052	-0.0337	SMB

Table 9: premium risk

1-10	10	9	8	7	6	5	4	3	2	1	
89.92 (2.465)	0.082	-2.50	-4.06	-1.60	14.34	5.49	-29.07	-14.82	18.86	-89.92	Historical liquidity risk
											Premium liquidity risk
23.33 (2.854)	48.48	-0.13	43.47	-19.01	49.78	99.56	20.43	76.73	27.88	25.15	Fama and French model

Variations in the models in terms of deciles are shown in the following diagram:

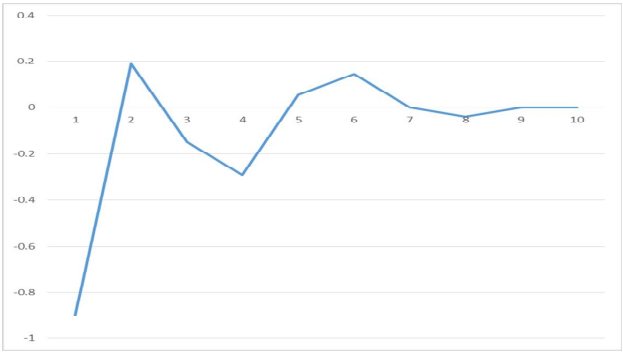

Figure 1: variations of the main model

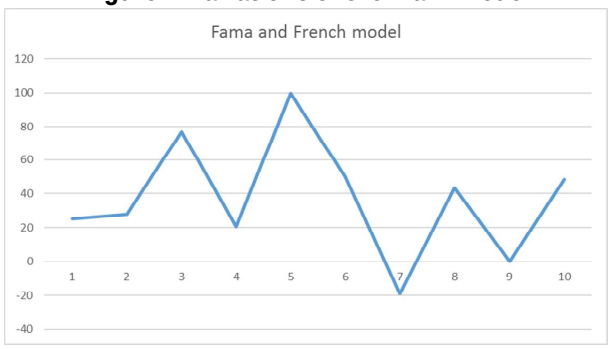

Figure 2: Fama and French model

Table 10: Final result of second hypothesis

The effect of information quality on capital expenditure		**Premium risk (unit)**		**Coefficients obtained from the models**		
Market risk	Liquidity risk	Market risk	Liquidity risk	Market risk	Liquidity risk	
-91.8	107.4	122.4	30	-0.75	3.58	Information quality

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RESEARCH ARTICLE

Rural Livelihood Improvement through Dairy Farming

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ABSTRACT

The present study was carried out in distress prone Akola district of Vidarbha region in order to assess the improvement in rural livelihood through dairy farming. The data were collected from 100 randomly selected dairy farmers from 5 villages by conducting personal interviews with them. The findings revealed that, there was 15.77% increase in overall livelihood status of dairy farmer over the base year 2008 through dairy farming. The highest improvement was seen in social capital (40.83%) followed by human capital (16.38%), financial capital (11.05%) and physical capital (10.59%). No improvement was observed in natural capital. The dairy development departments should therefore focus their efforts on these livelihood facets to make dairy farming more profitable and more viable for improving the livelihood status of farmers in general and dairy farmers in particular of the district and the region.

Keywords- Dairy Farming, Livelihood, social capital, natural capital, physical capital.

INTRODUCTION

Marginal and small categories of farmers, representing more than 86% of Indian farm families with holding size below 1.2 ha are living in risk prone diverse production conditions. Dairy farming contributes significantly in generating employment opportunities and supplementing the income of farmer particularly for those who are marginal and small of rural area besides providing food security. The strength of Indian dairying lies in the facts that in spite of limited physical resources, it has shown consistent and sustainable growth. The present study was therefore planned and undertaken in distress prone Akola district of Vidarbha to assess the improvement in rural livelihood if any through dairy farming already been undertaken by dairy farmers as an enterprise in the district.

MATERIALS AND METHODS

Locale of study: The study was conducted in Akola district of Vidarbha region in Maharashtra state. It lies between 200 17' and 210 18' North Latitude and 760 17' and 770 14' East Latitude. It covers an area of 5417 sq.km accounting for 1.76% of the total area of Maharashtra.

Research Design: The Exploratory Survey Research design was used for the present study.

Selection of villages: Five villages from Akola district were selected on the basis of maximum population of milch animals and maximum number of dairy farmers undertaking dairy farming as their main occupation. The villages selected were given in Table 1.

Selection of respondents and collection of data : list of dairy farmers having milch animals was obtained with the help of Sarpanch and Livestock Development Officer of each village. 20 dairy farmers from each village were selected randomly. The data were collected by personally interviewing the dairy farmers.

Measurements of variables: The independent variables were quantified by adopting the scoring procedure. An index was developed to find out the percentage change in livelihood status on social capital, financial capital, physical capital, natural capital, and human capital due to dairy farming for which sub indices were computed and summed up to arrive at the livelihood index for measurement of dependent variable. The livelihood indicators were selected on the guidelines of [1].

Operational definitions of livelihood capitals

In present study Social capital was operationalized as the socio-political participation of dairy farmer which forms an effective social safety network for improving one's livelihoods.

Financial capital was defined as the capital base (cash), credit/debt, savings, and other economic assets, which is essential for the pursuit of any livelihood strategy by the dairy farmer.

Physical capital was defined as the basic infrastructure and production goods needed to support livelihood of dairy farmer.

Natural capital was defined as the natural resource base such as type of land available with the dairy farmer.
Human capital was defined as the good health facilities, education of an individual dairy farmer, important for improving livelihood of dairy farmer.

Percent change in rural livelihood due to dairy farming: In order to assess the percent change in the rural livelihood due to dairy farming in each of the livelihood indicator over the base year. Following formula was used to quantify the percent change.

Percent change in social capital: For quantifying percent change in social capital in year 2013 over the base year 2008, the following formula was used.

$$\text{Social Capital} = \frac{\text{SCS during study year} - \text{SCS during base year}}{\text{SCS during base year}} \times 100$$

Where,

SCS = social capital score

By applying the same formula stated above, the percent changes in financial, physical, natural and human capital were worked out.

Overall Livelihood status (LS): Livelihood status is an index which was computed by summation of percent change in all the capitals (includes human, physical, natural, social and financial) as follows

$$LS = \frac{PSC+PFC+PPC+PNC+PHC}{N}$$

Where,

LS = Livelihood status
PSC = Percent change in social capital
PFC = Percent change in financial capital
PPC = Percent change in physical capital
PNC = Percent change in natural capital
PHC = Percent change in human capital
N = Number of indicators i.e. 5

RESULTS AND DISCUSSION

Livelihood status of dairy farmers: In the present study the outlines of framework for livelihood status defined in relation to five key capitals which could be achieved through livelihood resources (i.e. social, financial, physical, natural and human capitals) which were combined in the pursuit of different livelihood strategies.

Social Capital: The data with regards to the distribution of respondents according to social capital have been presented in Table 2.The result from Table 2 clearly revealed that, in year 2013 higher proportion of respondents (50%) were observed in low and medium category. These findings are similar to the results of [3] and [2]In base year i.e.2008 higher proportion of respondents (88%) had low social capital whereas, only 12 per cent dairy farmers were in medium category .it is quite clear that dairy farming had brought significant change in the social capital of dairy farmer. Perusal of Table 2.1 above indicated that there was 40.83% increase in social capital in year 2013 as compared to base year 2008.

Financial Capital

The data with regards to the distribution of respondents according to financial capital have been presented in Table 3.The bird eye view of Table 3 clearly revealed that, in year 2013 higher proportion of respondents (90%) were in medium category and (10%) in low category. Whereas in base year 2008 higher proportion of respondents (82%) had medium financial capital and (18%) had low financial capital. The results were similar with the findings of [4].
Perusal of Table 3.1 above concluded that, there was increase in financial status i.e. financial capital of dairy owner compared to base year 2008. It was found that, there was 11.05% increase in financial capital in 2013 as compared to base year 2008.

Physical Capital

The data with regards to the distribution of respondents according to physical capital have been presented in Table 4.The bird eye view of Table 4 clearly revealed that, in year 2013 higher proportion of respondents (77%) were in high

category followed by (22%) in medium and (1%) in low category. In year 2008 there was also higher proportion of respondents (56%) but less than 2013 had high financial capital followed by (43%) in medium category and (1%) in low category.

The bird eye view of Table 4.1 above indicated that, there was 10.59 per cent increase in physical capital of dairy owners compared to base year 2008.

Natural Capital

The data with regards to the distribution of respondents according to natural capital have been presented in Table 5.The result from Table 5 clearly conclude that higher proportion of dairy owners (51%) were in high category and (49%) in medium category of natural capital. No dairy owner was found in low category.

The Table 5.1 above also revealed that, there was no improvement in natural capital of dairy owner over the base year 2008.

Human Capital

The data with regards to the distribution of respondents according to human capital have been presented in Table 6.The result from Table 6 clearly revealed that in year 2013 higher proportion of respondents (98%) were in high category followed by (1%) in low category and (1%) in medium category. There was improvement in human capital over the base year 2008.

Perusal of Table 6.1 above indicated that, there was 16.38 per cent increase in human capital of dairy owner compared to base year 2008. In nut shell there was definite increase in all capitals of livelihood of dairy owners except the natural capital. There was improvement in all the sub indicators of all capitals like socio-political participation, accessibility to credit, outstanding loans, savings, affordable transport, energy for household / domestic purpose, type of house, material possession, livestock possession and health facilities of dairy owners due to dairy farming.

Overall Livelihood Status (includes overall five components)

By considering overall five livelihood indicators i.e. social capital, financial capital, physical capital, natural capital and human capital, the overall improvement in rural livelihood status of dairy owners due to dairy farming is given in Table 7 below.The bird eye view of Table 7 above indicated that, there were 15.77 percent overall increases in livelihood status of dairy owner compared to base year 2008. The highest improvement was seen in social capital (40.83%) followed by human capital (16.38%), financial capital (11.05%) and physical capital (10.59%). No improvement in natural capital of rural livelihood was observed through dairy farming.

CONCLUSION

The study findings revealed that dairy farming had brought 15.77 percent overall improvements in rural livelihood status of dairy owners. Highest improvement was seen in social capital followed by human capital financial capital and physical capital (10.59%). The dairy development departments should therefore focus their efforts on these livelihood facets to make dairy farming more profitable and more viable for improvement in livelihood status of farmers in general and dairy farmers in particular in the district and the region.

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Table 1. Villages selected for research study

Sr.no.	Name of Village	Dairy Farmers
1	Kanheri Sarap	20
2	Babhulgaon	20
3	Chandur	20
4	Shivapur	20
5	Vijora	20
	Total -05	100

Table 2. Distribution of respondents according to Social Capital

Social Capital					
Category	Index Range	Frequency		Percent	
		2013	2008	2013	2008
Low	0-33.33	50	88	50	88
Medium	33.34-66.66	50	12	50	12
High	> 66.66	0	0	0	0

Table 2.1 Percent change in Social capital

Sr. No.	Overall score during study year i.e.2013	Overall score during base year i.e.2008	Overall percent change
1.	776	551	40.83%

Table 3.Distribution of respondents according to financial capital

Financial Capital					
Category	**Index Range**	**Frequency**		**Percent**	
		2013	**2008**	**2013**	**2008**
Low	0-33.33	10	18	10	18
Medium	33.34-66.66	90	82	90	82
High	> 66.66	0	0	0	0

Table 3.1 Percent Change in financial capital

Sr. No.	**Overall score during study year i.e.2013**	**Overall score during base year i.e.2008**	**Overall percent change**
1.	1527	1375	11.05%

Table 4. Distribution of respondents according to physical capital

Physical Capital					
Category	**Index Range**	**Frequency**		**Percent**	
		2013	**2008**	**2013**	**2008**
Low	0-33.33	1	1	1	1
Medium	33.34-66.66	22	43	22	43
High	> 66.66	77	56	77	56

Table 4.1 Percent change in Physical capital

Sr. No.	**Overall score during study year i.e.2013**	**Overall score during base year i.e.2008**	**Overall percent change**
1.	2454	2219	10.59%

Table 5. Distribution of respondents according to natural capital

Natural Capital					
Category	**Index Range**	**Frequency**		**Percent**	
		2013	2008	2013	2008
Low	0-33.33	0	0	0	0
Medium	33.34-66.66	49	49	49	49
High	> 66.66	51	51	51	51

Table 5.1 Percent change in natural capital

Sr. No.	Overall score during study year i.e.2013	Overall score during base year i.e.2008	Overall percent change
1.	151	151	00%

Table 6. Distribution of respondents according to human capital

Human Capital					
Category	**Index Range**	**Frequency**		**Percent**	
		2013	2008	2013	2008
Low	0-33.33	1	1	1	1
Medium	33.34-66.66	1	28	1	28
High	> 66.66	98	71	98	71

Table 6.1 Percent change in human capital

Sr. No.	Overall score during study year i.e.2013	Overall score during base year i.e.2008	Overall percent change
1.	611	525	16.38%

Table 7. Overall improvement in rural livelihood status of dairy farmer

Sr. No.	Livelihood Indicators	Improvement over base year (%)
1	Social Capital	40.83
2	Financial Capital	11.05
3	Physical Capital	10.59
4	Natural Capital	00
5	Human Capital	16.38
	Overall Improvement	15.77

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RESEARCH ARTICLE

Using Geostatistical Analysis for Prediction of Soil Texture (Case Study: Shiraz Plain)

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ABSTRACT

Soil texture is one of the most important soil properties.Variability in soil texture may contribute to the difference in nutrient, water retention and transport and binding and stability of soil. It can influence many other soil functions and soil threats such as soil erosion and EC, etc. Geostatistics has been extensively used for quantifying the spatial pattern of soil properties and Kriging techniques are proving for estimating values at unsampled locations in most of the cases. In the study used Ordinary Kriging method to characterize the spatial variation of soil texture i.e. sand and clay content on the basis of 84 samples collected over a study area. The results show that ordinary kriging is one of the methods for prediction soil texture.

Keywords: soil texture, Geostatistic, Ordinary kriging.

INTRODUCTION

Geostatistics is a branch of statistics focusing on spatial or spatiotemporaldatasets. Developed originally to predict probability distributions of ore grades for mining operations, it is currently applied in diverse disciplines including petroleum geology, hydrogeology, hydrology, meteorology, oceanography, geochemistry, geometallurgy, geography, forestry, environmental control, landscape ecology,. Geostatistics is applied in varied branches of geography, particularly those involving the spread of diseases (epidemiology), the practice of commerce and military planning (logistics), and the development of efficient spatial networks. Geostatistical algorithms are incorporated in many places, including geographic information systems (GIS) and the R statistical environment (Krige, 1951). In the method can be used in soil science, and agriculture (esp. in precision farming). Among the soil properties concerned,

soil texture is one of the important soil properties governing most of the physical, chemical and hydrological properties of soils. Variation in soil texture in the field directly contributes to the variation in nutrient storage and availability, water retention, availability and transport hence may influence the yield potential of any site.

Importance of Soil Texture

Presence of each type of soil particles makes its contribution to the nature and properties of soil as a whole

- Texture has good effect on management and productivity of soil. Sandy soils are of open character usually loose and friable.
- Such type of the texture is easy to handle in tillage operations.
- Sand facilitates drainage and aeration. It allows rapid evaporation and percolation.
- Sandy soils have very little water holding capacity. Such soils can not stand drought and unsuitable for dry farming.
- Sandy soils are poor store house of plant nutrients
- Contain low organic matter
- Leaching of applied nutrients is very high.
- In sandy soil, few crops can be grown such as potato, groundnut and cucumbers.
- Clay particles play a very important role in soil fertility.
- Clayey soils are difficult to till and require much skill in handling. When moist clayey soils are exceedingly sticky and when dry, become very hard and difficult to break.
- They have fine pores, and are poor in drainage and aeration.
- They have a high water holding capacity and poor percolation, which usually results in water logging.
- They are generally very fertile soils, in respect of plant nutrient content. Rice, jute, sugarcane can be grown very successfully in these soils.
- Loam and Silt loam soils are highly desirable for cultivation

Reynolds (1970) and Crave and Gascuel-Odoux (1997) all found that variation in soil moisture content were directly related to the soil textural variability. Warric and Gardner (1983) found a significant impact of this variability on soil performances and therefore the crop yield. Similarly, Tanji (1996) has shown that among the different soil physico-chemical properties measured, variability in soil texture component is a primary soil factor influencing crop yield.
Kriging has been used for many decades as synonym for geostatistical interpolation and has been proved as sufficiently robust for estimating values at unsampled locations based on the sampled data. In recent years soil scientists focused on using geostatistics and different kriging methods to predict soil properties at unsampled locations and to better understand their spatial variability pattern over small to large spatial scale. (Yost et al., 1982; Trangmar et al., 1987; Miller et al., 1988; Voltz and Webster, 1990; Chien et al., 1997; Lark, 2002; Adhikari et al., 2009).
In this study, we applied Ordinary Kriging to characterize the spatial variation of soil sand and clay content on the basis of 84 samples collected in the study area.

Case study

The study area is located in Shiraz plain of Fars province, Iran, between latitudes 29° 43' 45" N- 29° 32' 23"N and longitudes 52° 49' 36" E- 52° 57′ 02"E with an area of 281.78 km² (Fig. 1).

MATERIALS AND METHODS

Soil texture is the relative proportions of sand, silt, or clay in a soil. The soil textural class is a grouping of soils based upon these relative proportions. Soils consist of sand, silt and clay that definition of each is in the following:

Sands: The sand group includes all soils in which the sand separates make up at least 70% and the clay separate 15% or less of the material by weight. The properties of such soils are therefore characteristically those of sand in contrast to the stickier nature of clays. Two specific textural classes are recognized in this group sandy and loamy sand although in practice two subclasses are also used Loamy fine sand and loamy very fine sand.

Silt: The silt group includes soils with at least 80% silt and 12% or less clay. Naturally the properties of this group are dominated by those of silt. Only one textural class - Silt is included in this group.

Clays: To be designated clay a soi1 must contain at least 35% of the clay separate and in most cases not less than 40%. In such soils the characteristics of the clay separates are distinctly dominant, and the class names are clay, sandy clay and silty clay. Sandy clays may contain more sand than clay. Likewise, the silt content of silty clays usually exceeds clay fraction.One of the method for determination of soil texture is textural triangle. It describes the relative proportions of sand, silt and clay in various types of soils (Fig.2).In the study used Geostatistical analysis for prediction of soil texture. Geostatistical analysis of data occurs in two phases:

1- Modeling the semivariogram to analyze surface properties
2- Kriging

Semivariogram is computed as half the average squared difference between the components of data pairs (Goovaerts, 1999). The function is expressed as:

$$\gamma(h) = \frac{1}{2N(h)} \sum_{i=1}^{N(h)} [z(x_i) - z(x_i + h)]^2$$

Where N(h) is the total number of data pairs separated by a distance; h; Z represents the measured value for soil property; and x is the position of soil samples.kriging is an important tool in geostatistics. Kriging is a linear interpolation procedure that provides a best linear unbiased estimation for quantities which vary in space (Cressie, 1990). Kriging is a theoretical weighted moving average (Krige, 1951):

$$\hat{z}(x_0) = \sum_{i=1}^{n} \lambda_i z(x_i)$$

Where $\hat{z}(x_0)$is the value to be estimated at the location of x_0, $z(x_i)$ is the known value at the sampling site x_i and n is the number of sites within the search neighborhood used for the estimation (Robinson and Metternicht, 2006).

RESULTS

In the study used used stable, J-bessel, k-bessel, hole effect, rational quadratic, gaussiaan, exponential, penta spherical, tetra spherical, spherical and circular model for clay, sand and silt that results show in Table 1, Table 2, Table 3. Also Ordinary Kriging is employed to estimate the values of sand, silt and clay content at unsampled locations. The continuous maps with their associated uncertaintities for each property over the study area have been displayed in Fig. 3, Fig. 4 and Fig. 5.

CONCULUSION

The spatial correlationbetween data points (soil texture) can be quantified by calculating a geostatistic analysis. In the study for estimating values at unsampled locations used geostatistic analysis in ArcGIS software. The results shows that an application of Geostatistics to the study area and analyze the spatial behavior of soil texture contents. The predicted maps thus obtained could be helpful to the farmers and soil management experts to design land management and soil and water conservation plans taking into account the spatial heterogeneity of soil texture.

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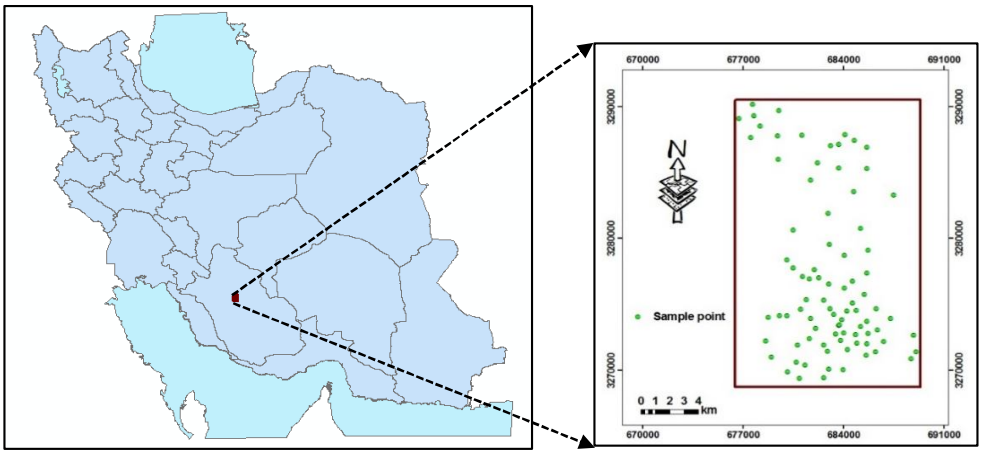


Fig.1.Location of the study area

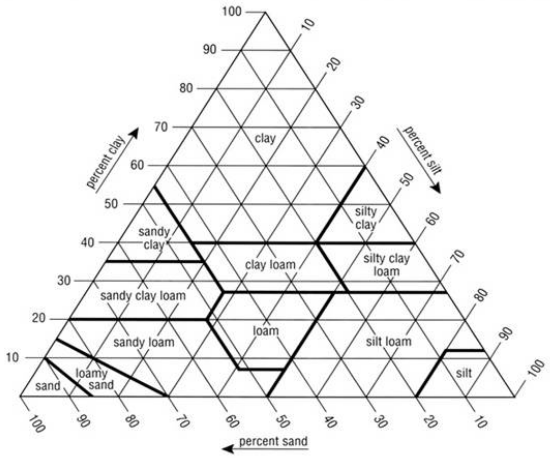
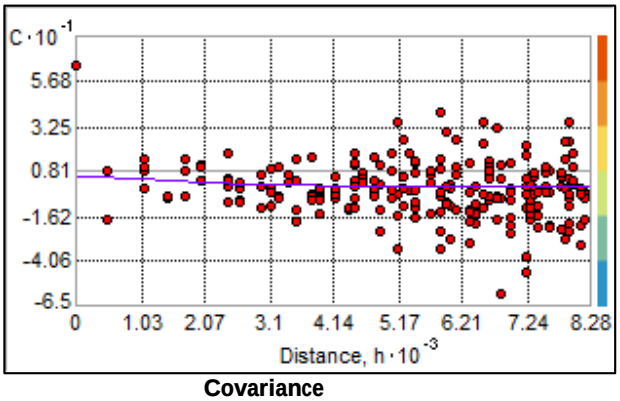


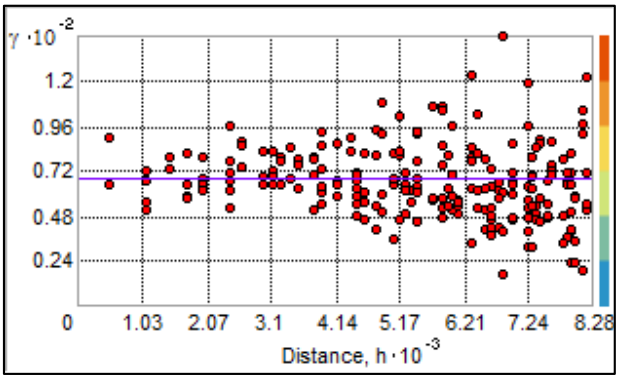
Fig.2. Textural Triangle. The textural triangle describes the relative proportions of sand, silt and clay in various types of soils.

Table 1. Some physicochemical properties of clay

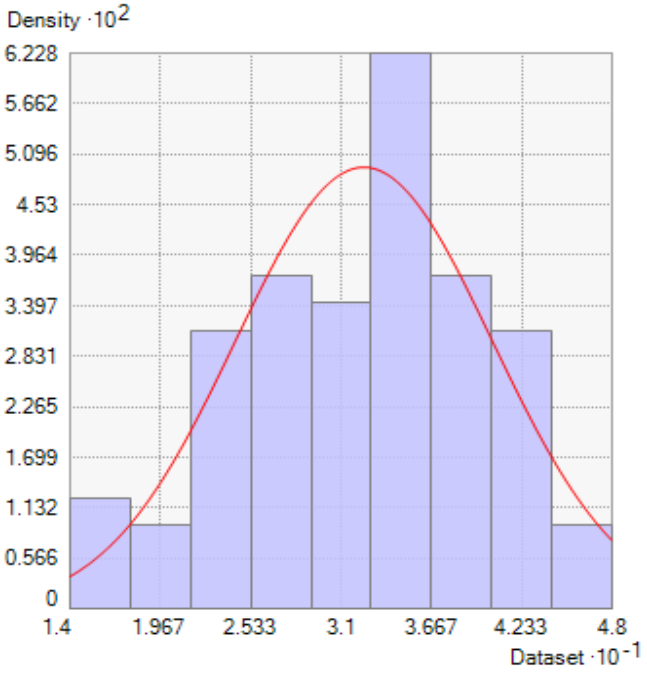
RMSE%											
Stable	J-Bessel	K-Bessel	Hole effect	Rational Quadratic	Gaussian	Exponential	Penta-spherical	Tetra-spherical	Spherical	Circular	Parameter
7.979	7.994	7.98	8.013	8.003	7.98	8.01	7.99	7.988	7.986	7.983	Clay

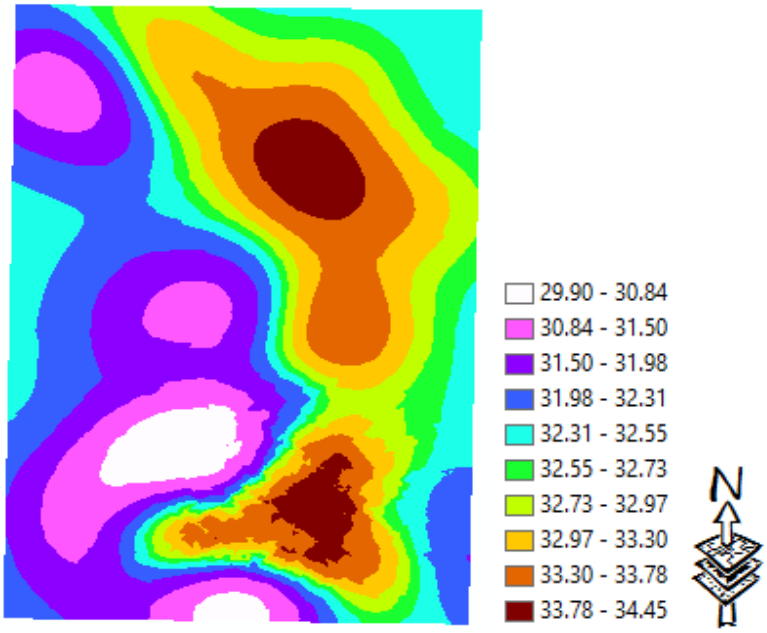


Covariance



Semivariogram



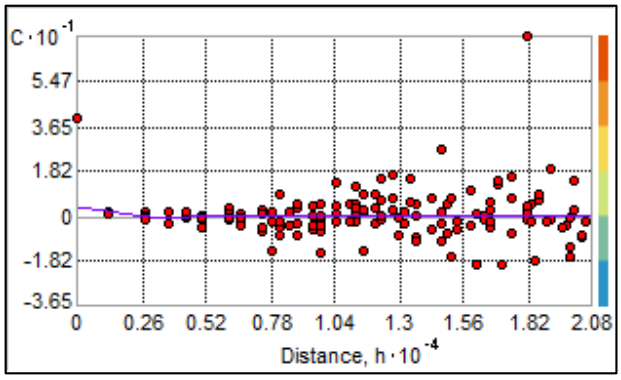


Clay

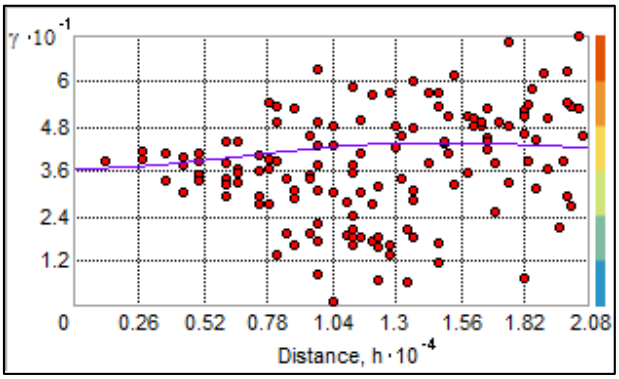
Fig.3. The semivariograms (exponential model of Kriging) and interpolation map of models for clay

Table 2. Some physicochemical properties of silt

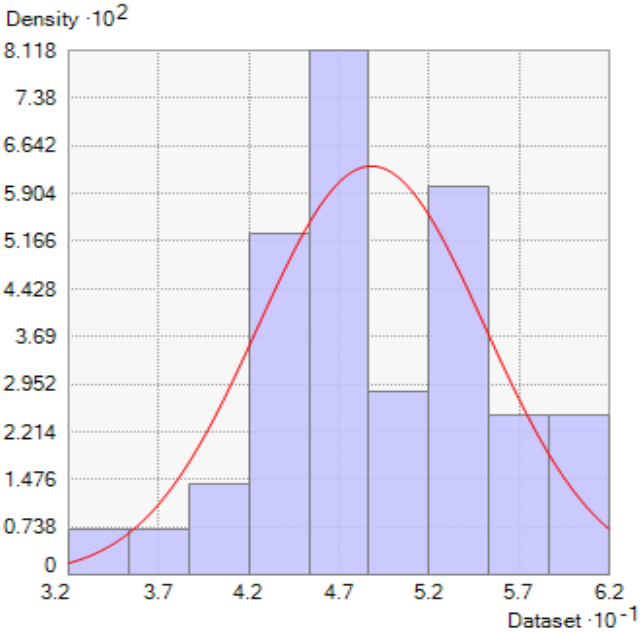
RMSE%											
Stable	J-Bessel	K-Bessel	Hole effect	Rational Quadratic	Gaussian	Exponential	Penta-spherical	Tetra-spherical	Spherical	Circular	Parameter
6.284	6.251	6.259	6.237	6.287	6.304	6.3023	6.298	6.303	6.304	6.304	Silt

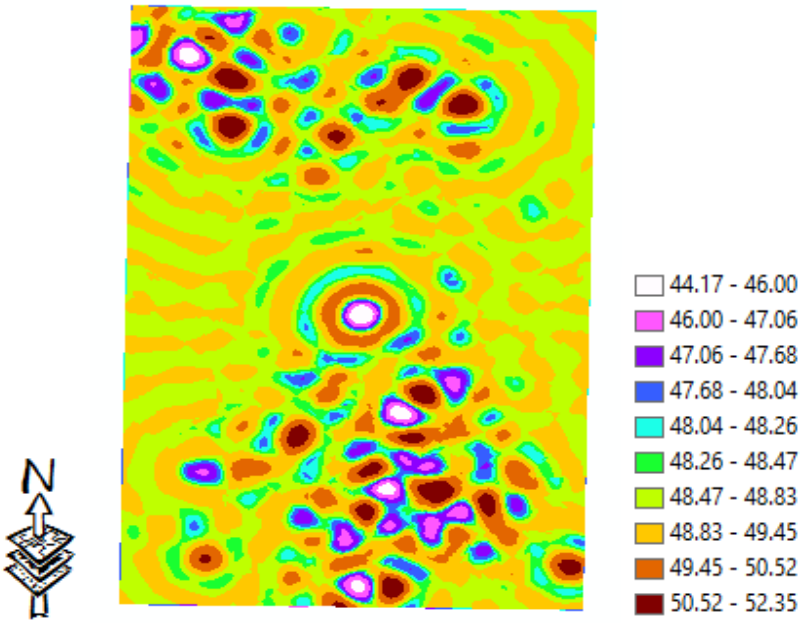


Covariance



Semivariogram



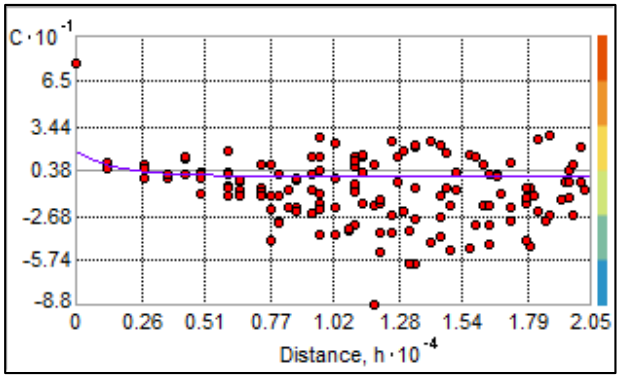


Silt

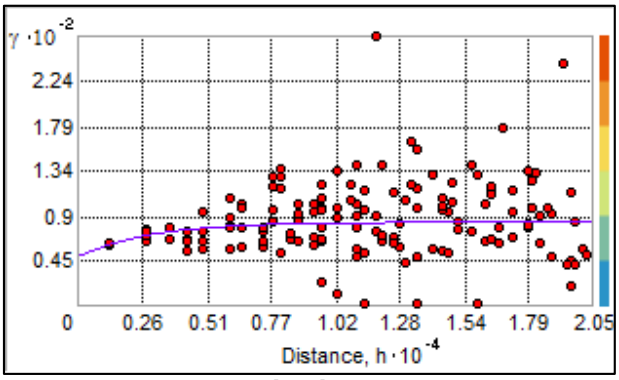
Fig.4. The semivariograms (exponential model of Kriging) and interpolation map of models for silt

Table 3. Some physicochemical properties of sand

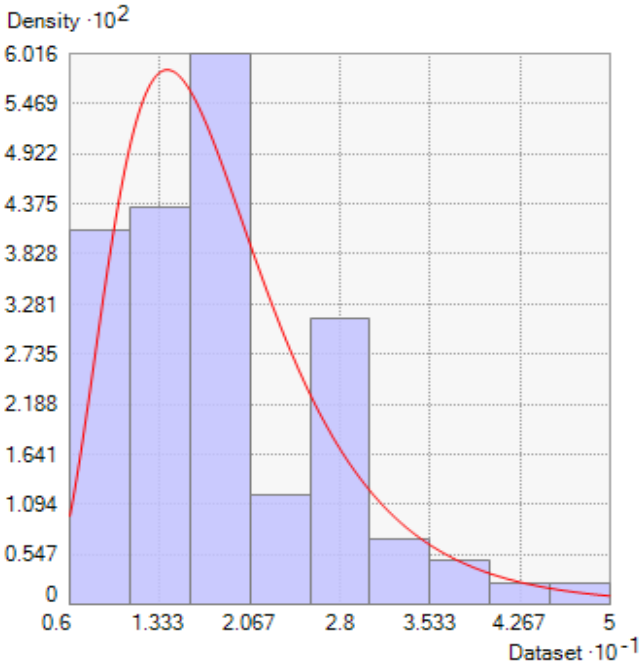
RMSE%											Parameter
Stable	J-Bessel	K-Bessel	Hole effect	Rational Quadratic	Gaussian	Exponential	Penta-spherical	Tetra-spherical	Spherical	Circular	
8.234	8.195	8.233	8.193	8.245	8.234	8.188	8.212	8.214	8.216	8.219	Sand

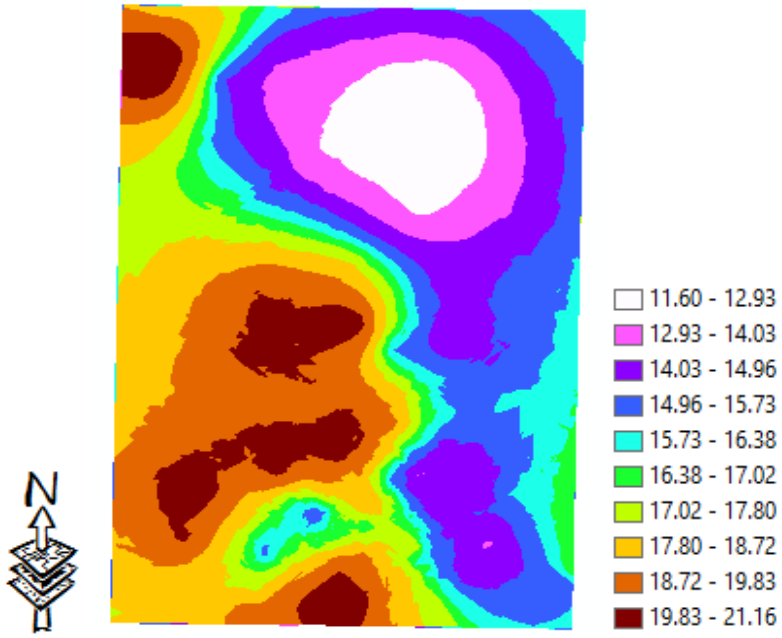


Covariance



Semivariogram





Sand

Fig.5. The semivariograms (exponential model of Kriging) and interpolation map of models for sand

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RESEARCH ARTICLE

The Identification and Ranking of Effective Factors on Strategic Management with the Approach of Management Information Systems in Iranian Offshoreoil Company

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ABSTRACT

To improve the strategic management with the management information systems approach, five factors are evaluated in the study including internal factors to formulate strategy, external factors to formulate strategy, long-term goals to formulate strategy, implementation and evaluation of strategy in Iranian offshoreoil company. Attitude assessment questionnaire based on five-item Likert scale is applied for data collection of these factors. In the next stage, pairwise comparison questionnaire is also distributed to prioritize the criteria and sub criteria among 45 top managers, middle managers and top experts in Iranian offshoreoil company. Finally, the factors “implementation”, “internal factors to formulate strategy”, “evaluation”, “long-term goals to formulate strategy” and “external factors to formulate strategy” achieved first to fifth priorities.To rank the 21 sub-criteria of “production strategies” of “internal factors to formulate strategy”, “human resources” from “implementation” criterion, “mission” from criterion “long-term goals to formulate strategy”, “operational environment” of criterion “external factors to formulate strategy” and “performance calculations” of “evaluation “criterion achieved first to fifth ranks, respectively.

Keywords: Hierarchy process, Management information systems, Strategic management.

INTRODUCTION

One of the most important activities in social life of current human being is management and by this activity, via organized principles and existing resources, we can achieve organization goals. To achieve these goals, managers follow the process composed of planning, organizing, supervision, control, guiding and decision making.

Literally, organizations are main foundations of current society and management is the most important factor in the life, growth or declining of organizations. The manager guides the movement process from existing condition to good condition profit and it attempts to create a better future. The past with all its importance and its effect on future is occurred and no human being power can create it again or differently. Future is coming and most of it depends upon what is occurring now. We should determine the share of children of this county of the world future and we need national determination. The society determination is guided by management of the country. Management is the most important item that should be considered for cultural, economic and political growth of society (Khoshnevis, 2003).

The current managers should learn to manage their firms strategically. They cannot decide based on fixed rules, old policies or similar conclusions of current procedures. During planning and designing organizational goals, strategies innovation and determination of policies, they organizations should think about future. They should think beyond their professional teaching and experiences in job and operational fields as accounting, marketing, production or financial and provide a general and comprehensive image of their environment (Hanger, 2006).

Strategic planning and management of organizations is based on these assumptions that if they want to fulfill their mission in the next years and make the customers satisfied, they should have effective strategies. Strategic management with a holistic view study and analyze systematically all the external and internal elements of organization at the same time in organic and dynamic relation with each other. Also, they determine main and minor goals and take efficient strategies (in various fields) by fundamental planning and optimal solutions and search for good and potential opportunities and creating new visions for organizations and institutions. The present study identities effective factors on strategic management with the approach of management information systems in Iranian offshoreoil company and then rank these factors.

Statement of problem

Generally, statement of problem means the difference between existing condition and good condition. In other words, problem is the distance between where we are and where we want to be. Problem is solved when we can turn the existing condition to good condition (Huber, 1980). After giving some explanations regarding the topic, study problem is defined as:

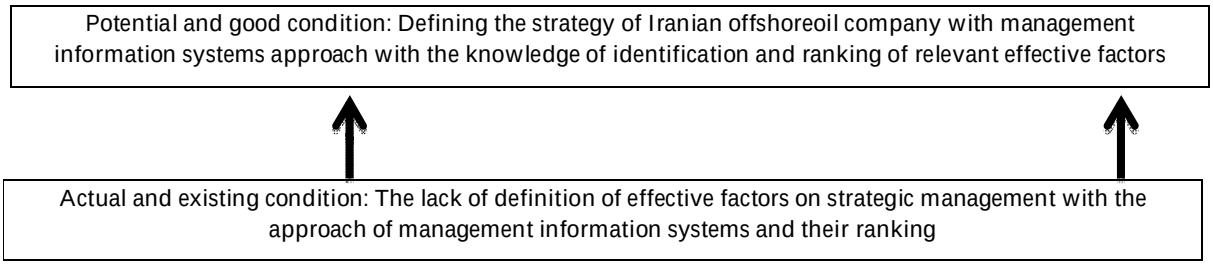
One of the names of current era of human life is information and communication era. This is called due to much attention and extensive activities regarding collection, processing and information transfer. In current era, managers are required to identify the information of the affairs they deal, collect and analyze them, organize it and exchange it by observing three important factors of speed, accuracy and costs observed in all activities of our era (Taleghani, 2003).

The weakness of information causes that management system not only has not a true image of future, but also it cannot understand the past and present strength and condition of organization truly, thus it cannot accurately sets goal and cannot also design appropriate activities for management system and not optimal use of organization resources is made in this regard. One of the major reasons of inefficiency and lack of success of management system

in Iran is weak decision making of management due to the adequate and appropriate information and this can be due to the lack of adequate importance for suitable and exact, accurate, reliable, timely and complete information.

Goal setting and based on exact and correct recognition of existing condition and logical imagination of future visions of organization can be fulfilled, and if the managers ignore this change and define their long-term design based on equipment inconsistent with this new technology, they will have unavoidable problems (Badraghe, 2010). Most of the managers of state organizations are encountered with a mass of data or information history without any effect on decision making, planning, organizing, control, and correct guiding for them. The set of these dependent factors causes that organizations suffer from information crisis but they don't understand this problem. Information management system is an organized system and a good tool presenting the correct and summarized information at appropriate time to organization decision makers and provides correct decision making for organization managers.
The final goal of creating this system is collection, refining, analysis, processing summarizing, storage and transferring all the past and present information of organizations and relevant phenomena in a centralized data basis with rapid access for their managers. The link of strategic management and the investigation of its relation with management information systems despite all the problems in the mentioned company and the lack of management information systems in operational regions and not using the mentioned systems in planning and strategic management of company obliged the researcher to conduct a study in this regard. The main question of the study is "Which factors are effective on strategic management with the app roach of management information systems and what the rank and importance coefficient of these factors is.

The present study problem



Study methodology

The present study is applied in terms of purpose and the present study attempted to respond a practical problem in real world. In terms of data analysis method, it is correlation and based on data collection is descriptive and is survey in terms of the relationship between variables. Also, the data are collected as field and questionnaire. The study population is including 40 top managers, middle managers and top experts of Iranian Offshoreoil Company. The sampling method is total count due to a few number of study population.

After demographic questions (gender, age, education), the first questionnaire is used to identify the effective factors on strategic management with 21 questions and second questionnaire with 49 questions to rank the identified criteria and sub criteria of first questionnaire.

A binominal test of five-item Likert scale was used for all first questionnaires and for second questionnaire, pairwise comparison test was used. Cronbach's alpha is used to compute reliability and the data are analyzed using descriptive statistics and hierarchy process is also used. Also, descriptive statistics is used to explain the sample and hierarchy process is used to rank the criteria and sub criteria.

Study findings

In this section, the identification and ranking of effective factors on strategic management can be investigated and the results are as follows:

The results of binominal test show the support of hypotheses 1-5 as:
1- The internal factors of strategic formulation are effective on strategic management.
2- The external factors of strategic formulation are effective on strategic management.
3- The long-term goals of strategic formulation are effective on strategic management.
4- The evaluation factors are effective on strategic management.
5- The implementation factors are effective on strategic management.

For example, the results of binominal test are shown for hypothesis 1. As significance level in Table 1 is smaller than error level α=5%, by 95% confidence, it can be said, the internal factors are effective on strategic formulation of strategic management.

In this stage, all the sub criteria of main criteria are supported and negative votes are not eliminated- by pairwise comparison questionnaire and hierarchy analysis process, the criteria and sub criteria are ranked and weighted.

As we know, if inconsistency rate of pairwise comparison is smaller or equal to 0.1, the calculation is consistent. Regarding all tables, inconsistency rate is less than 0.1 and this shows the consistency of managers' judgment. Inconsistency rate of each table is shown in attachment.

1) Determining relative importance of sub criteria of main criterion of internal factors to formulate strategic management.Table 2 shows prioritization of 6 sub criteria of main criterion of internal factors for strategic formulation based on the weights of their importance.Table 2- Prioritization of 6 sub criteria of main criterion of internal factors in strategic formulation based on their importance weights

2) Determining relative importance of the sub criteria of main criterion of external factors in strategic formulation Table 3 shows prioritization of 6 sub criteria of main criterion of external factors for strategic formulation based on the weights of their importance.Table 3- Prioritization of 3 sub criteria of main criterion of external factors in strategic formulation based on their importance weights

3) Determining the relative importance of sub criteria of main criterion of long-term goals in strategic management formulation.Table 4 shows prioritization of 3 sub criteria of main criterion of long-term goals in strategic management formulation based on their importance weights.

4) Determining the relative importance of sub criteria of main criterion of implementation.Table 5 shows prioritization of 6 sub criteria of main criterion of implementation based on their importance weights.

5) Determining relative importance of sub criteria of main criterion of relevant factors with evaluation

Table 6 shows prioritization of 3 sub criteria of main criterion of evaluation factors based on their importance weights.Determining the degrees of relative importance of criteria based on purpose.Pairwise comparisons of main criteria based on goal are shown in Table 7. Table 8 shows the prioritization of main criteria based on their importance weights. The mentioned prioritization based on importance is including:

1- Implementation
2- Internal factors for strategic formulation

3- Evaluation
4- Long-term goals for strategic formulation
5- External factors for strategic formulation

Determining the degrees of relative importance of sub criteria based on goal

In this stage, after determining weights of criteria and sub criteria importance, we can prioritize the 21 factors. The mentioned factors are shown in Table 9 based on importance.

CONCLUSION

By considering extension and importance of mission of Iranian offshoreoil company, turning this company to a successful company in management and performing the missions better requiresrelying on a smart strategic plan. Designing such plan requires development of a strategic model (contingency) and it is investigated based on various theories of internalization but also considering the conditions and limitations of internal industry, country and international relations.

Based on the analyses, ranking of five effective factors on strategic management of Iranian offshoreoil company, the followings are considered (internal factors in strategic formulation, external factors in strategic formulation, long-term goals in strategic formulation, implementation and evaluation), “implementation” factors, “internal factors in strategic formulation”, “evaluation”, “long-term goals in strategic formulation” and finally “external factors in strategic formulation” achieved first to fifth priorities, respectively. Regarding the ranking of 21 sub criteria ,“production strategies” of criterion “internal factors in strategic formulation” is in first rank. Sub criteria “human resources” of “implementation”, “mission” of the criterion “long-term goals in strategic formulation”, “operational environment” of “external factors in strategic formation” and “performance calculations” of criterion “evaluation” are in the second to fifth ranks, respectively.

Based on the results of present study it can be summarized as:

- It is better the managers of Iranian offshoreoil company consider production strategies specifically to improve the strategic management of company.
- Using committed and specialized human resources in staff and operational units can be important examples of exact implementation of strategic plan of company.
- In company mission, the managers of company can focus on mission of all staff and operational units as generally and partially to formulate strategy and goal setting.
- Six operational regions of Iranian offshoreoil company are considered as the executive point of the institution in Tehran and considering operational environment in real conditions and existing problems in these regions is one of the important factors of formulating strategy plan of organization.
- TO improve strategic management in company, it is required to perform performance calculations in various time periods regularly of work trend, costs, productivity and etc. and correct the errors regularly.

Recommendations

In this section, research recommendations are presented in the form of applied and research recommendations:

Applied recommendations

Applied recommendations are presented to increase the impact of this study on strategic management with management information system approach as:

- Consideration of Iranian offshoreoil company to strategic management of company based on the importance degree of 21 factors.
- After the decision of the company to prioritize production strategies in organization strategy formulation, it is better to consider this important factor of study priorities and consider the suitable budget to conduct this study in MA and PHD.
- To provide specialized and committed human resources, it is required that the company creates centers for direct education of the employees absorbing in future and train the update and specialized issues to them based on the duties and expectations of company in mentioned centers.
- To formulate the company strategy, all middle managers and top experts by defining their unit mission can help the top managers to formulate organization mission.
- Based on the priority of sub criterion of performance calculations of evaluation criterion, it is required that expert and committed experts for technical and financial calculations in operational regions control these affairs directly.
- Based on the importance of sub criterion operational environment in strategy formulation, it is required to survey the employees of operational regions to improve strategic management. It can be said this survey can be from the top managers and experts of the mentioned regions.
- The investigation of the political conditions on the world to use the opportunities and coping up with the threats help the strategic management improvement.
- The results of the study showed the high importance of implementation criterion in strategic management to other criteria. Considering the correct implementation of strategic thoughts and plans in the expected duration requires much attention.
- Achieving first rank of sub criterion of human resources of implementation criterion shows the high importance of organization staff to improve strategic management and by creating regular plans, qualitative improvement, productivity level and personnel satisfaction of organization can be considered.

Research recommendations

To guide the future studies, the researcher based on the information of the study subject, raised some issues for researchers to use them as a starting point:

Identification of effective factors on strategic management with the approach of management information systems in affiliated companies of national oil company in Iran.
Ranking the affiliated national oil company of Iran based on the relevant model in this study
The identification of effective factors on strategic management with future study approach
The identification of effective factors on strategic management with supply chain approach
The identification of effective factors on strategic management with knowledge-based approach in organization
The identification of effective factors on strategic management with new organizational approach structures

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Table 1- The results of inference statistics (binominal test)-internal factors in strategic formulation

No	Explanation	Grouping	N	Frequency %	Significance level
1	Marketing strategies	≤3 >3	4 36	10% 90%	0
2	Technological strategies	≤3 >3	10 30	25% 75%	0
3	Financial and economic strategies	≤3 >3	26 14	65% 35%	0.002
4	Human resources and education strategies	≤3 >3	4 36	10% 90%	0
5	Production strategies	≤3 >3	14 26	35% 65%	0
6	Management information systems strategies	≤3 >3	4 36	10% 90%	0

Table 2- Determining relative importance of the sub criteria of main criterion of external factors in strategic formulation

Rank	Weight	Sub criterion
First	0.517	Production strategies
Second	0.186	Strategies of human resources and education
Third	0.116	Strategies of management information systems
Fourth	0.085	Financial and economic strategies
Fifth	0.067	Technology strategies
Sixth	0.029	Marketing strategies

Table 3- Determining the relative importance of sub criteria of main criterion of long-term goals in strategic management formulation

Rank	Weight	Sub criterion
First	0.312	Operational environment
Second	0.231	Industry environment
Third	0.210	Far distance environment

Table 4-Determining the relative importance of sub criteria of main criterion of implementation

Rank	Weight	Sub criterion
First	0.401	Mission
Second	0.153	Vision
Third	0.149	Goal

Table 5- Prioritization of 6 sub criteria of main criterion of implementation based on their importance weights

Rank	Weight	Sub criterion
First	0.423	Human resources
Second	0.181	Resources allocation
Third	0.171	Management information system
Fourth	0.138	Supervision, control systems
Fifth	0.045	IT
Sixth	0.042	Culture leadership

Table 6- Prioritization of 3 sub criteria of main criterion of evaluation based on their importance weights

Rank	Weight	Sub criterion
First	0.262	Performance calculations
Second	0.197	Evaluation via management information systems
Third	0.182	Performance evaluation models

Table 7- Pairwise comparisons of main criteria based on goal

Goal	E	M	O	P	S
External factors for strategic formulation	1	0.714	1.2	0.385	1.5
Implementation		1	1.1	1.7	1.2
Internal factors for strategic formulation			1	2.3	0.833
Long-term goals in strategic formulation				1	0.667
Evaluation					1

Table 8- Prioritization of main criteria based on their importance weights

Rank	Weight	Sub criterion
First	0.233	Implementation
Second	0.214	Internal factors for strategic formulation
Third	0.192	Evaluation
Fourth	0.185	Long-term goals in strategic formulation
Fifth	0.177	External factors for strategic formulation

Table 9- Ranking 21 factors effective on strategic management with management information system approach

Rank	Weight	Relevant criterion	Main criterion
1	0.110	Internal- formulation	Production strategies
2	0.098	Implementation	Human resources
3	0.074	Long-term goals –formulation	Mission
4	0.055	External - formulation	Operational environment
5	0.050	Evaluation	Performance calculations
6	0.042	Implementation	Resources allocation
7	0.040	External - formulation	Industry environment
8	0.039	Implementation	Management information system
9	0.039	Internal- formulation	Strategies of human resources and education
10	0.037	Evaluation	Evaluation via management information system
11	0.037	External - formulation	Far distance environment
12	0.035	Evaluation	Performance evaluation models
13	0.032	Implementation	Supervision, control systems
14	0.028	Long-term goals –formulation	Vision
15	0.027	Long-term goals –formulation	Goal
16	0.024	Internal- formulation	Strategies of information management system
17	0.024	Internal- formulation	Financial and economic strategies
18	0.014	Internal- formulation	Technological strategies
19	0.010	Implementation	IT
20	0.009	Implementation	Cultural leadership
21	0.006	Internal- formulation	Marketing strategies

The expected general result of the study is summarized in the form of following figure

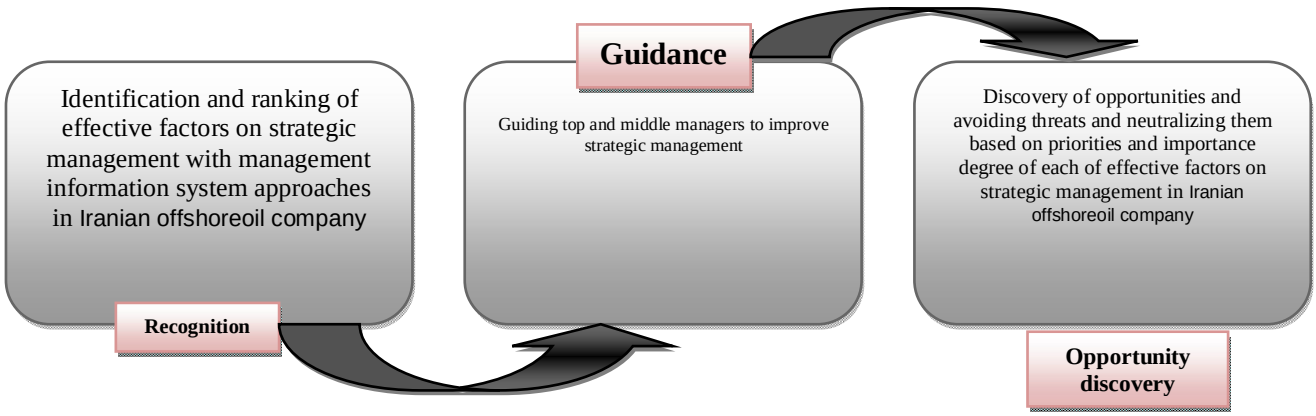

Figure 1- General expected result of present study

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RESEARCH ARTICLE

Using Structural Equations to Assess the Effect of Targeted Subsidies Act Enforcement on Financial Risk of Tehran Stock Exchange Listed Companies

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ABSTRACT

In line with implementing Article 3 of the Fourth Development Plan, bill of targeted subsidies with emphasis on price reform of energy, water and electricity carriers was set by the government in January 2008 and was submitted to Parliament. This law was enacted on 5, January, 2010, and the Guardian Council has approved it on 13, January, 2010. In the recent year, the first phase of targeted subsidies law enforcement was implemented and undoubtedly it was the most important phenomena affecting the economy of this country. Implementation of the second phase can cause large effects on the economy and consequently the Tehran Stock Exchange and the value of its shares of stock. Due to the large uncertainty in predicting the actual effects of implementing this law especially on Stock Exchange and companies active in this field, stock-market participants have faced concern and confusion about the future of the stock market and the value of listed stock exchange companies. In this paper, financial activities of Tehran Stock Exchange listed companies has been studied in a form of financial statements in the period of 2001 to 2013.To evaluate the effectiveness of targeted subsidies law enforcement using structural equations and LISREL software, financial risk indexes of the period before and after enforcement of this law were compared. The results show that with enforcing targeted subsidies law, the financial risk has been increased %415.

Keywords: Financial risk, Stock Exchange, the structural equations.

INTRODUCTION

Today governments consider building and development of social justice in the country as their main task. The program of social protection policies in the world has a wide range and many different countries, according to their social-economic situation, have used a range of mentioned programs to support vulnerable groups of people. Reviewing the experience of different countries in this regard suggests that many governments have reformed their own political and economic development programs in order to achieve maximum efficiency and equity over the period of time including implementing the targeted subsidies programs.It is necessary to note that all states implementing targeted subsidies programs have not fully achieved the objectives relate to the implementation of the program. The primary reason is the quality of the implementation of programs and supporting activities to control it.

In other words, it can be said that in order to implement this program as well as similar reform programs, having a strategic and comprehensive view in planning is vital for policy maker and this can guarantee the successful implementation. During recent years, Iran as other countries has decided to apply the new economic policies in a form of codification and implementation of targeted subsidies law. As mentioned before, How to implement this law and to review the effect of failures and strengths to enforce the law will result in more appropriate decision making for future planning.

In recent years, due to the social-economic crisis in the society, risk management in organizations and businesses has been noticed greater than before. Among the laws that affect the economic activities of enterprises is the implementation of targeted subsidies law. In Iran, Stock Exchange as the main authority to supply stocks and securities is affected by this rule.

The present study examines this issue that how enforcement and implementing this law affected the financial risk indexes of Tehran Stock Exchange listed companies. In this paper, given the importance of this issue, the effort is to identify the most important financial impacts of enforcement of targeted subsidies law in Tehran Stock Exchange listed companies in order to present a suitable pattern to measure financial risk. In this paper, the researcher pays attention to the importance and theoretical background of the research at first and then the research hypotheses are tested and in the end conclude the paper.

Research literature and background

Subsidy is funds are given by one party to the other in order to support or develop. The concept of subsidy is defined with different approaches .OECD (organization for economic cooperation and development defines subsidy as: “Subsidy is a mechanism to keep prices below market for consumers and more above than market price for producers and this will decrease costs for both consumers and producers directly or indirectly .” (Watkins, 2013)
The most common definition of subsidies refers to payments to producers by government. This payment can be in a form of cash funds, interest-free loans ,tax breaks, insurance, discounted rent, trade restrictions and restrictions on access to market. According to experiences of different countries, the main ways to pay subsidies in consumption section is monetary system, product system, the public price system and coupon system. (Barre, 2004)

Despite all planning and careful comments which are done by managers in organizations and companies; there are certain factors that are out of control and with varying degrees of risk it can increase the possibility of not achieving any operational goals. In this regard, the probability of not achieving pre-determined goals is risk. In Longman dictionary, risk is defined as the likelihood of something bad or undesirable. (Longman, 2002)

The term “financial risk” is defined as an umbrella for a variety of financial risks. This term is the concept of reaching to a downturn and it means of uncertainty in the financial return. (Phillips, Michael, 2013)

Nickels has considered the concept of risk based on many dimensions. He believes the word, risk, refers to loss probability, the degree of loss probability and also the amount of loss probability. While pure risk defines just the loss probability and does not include the benefit probability. (Nickels, 2012)

If there is a summarizing of risk concept to be presented, we can say that risk is a danger will be occurred due to uncertainty about a future event. The more this uncertainty is, so the risk is higher. In fact, each factor that causes a problem and does not let the prediction comes true, is considered as a risk factor.Due to the concepts presented, the financial risk can be defined as uncertainty about paying debts and paying pension sat deadline.Anthony Loviscek, in 2013, in an article on the impact of global financial crisis in risk levels of firms, studied the financial risk before and after the financial crisis in 2007 to 2009 in 500 companies. In this study, the single factor model, activity and marketing of each enterprise were analyzed. According to the study, the average correlation coefficient reached from %20 to % 35 and increased %75. Although the results suggest that financial risks have grown significantly but considerable portion of this increase have been in financial firms particularly insurance companies and industrial firms.

Greuning has defined positive and negative changes in future benefits as a value which is on a risk exposure. He refers to all types of effective risks in classification and introduced them in four categories of financial risk, operational risk, business risk and event risk. Financial risk is the risk that directly affects the profitability. Financial risks include the risk of capital structure, revenue structure and profitability, capital adequacy, credit risk, liquidity risk, interest rate risk, market risk and exchange rate risk (Greuning, 2009).

Heiko& Tim &Kim in 2006 studied the impact of risk on the banking process in German banking industry. In this study, the impact of strategic risk, psychological risk, financial risk and performance risk was assessed using structural equation modeling.Based on this idea, "Ho, Abrahamson and Abbitt "in a research they studied the calculating risk-exposure value in bank balance sheet. This group in their article titled as risk- exposure value of balance sheet analyzed the details of bank balance sheet and they defined the items which contribute in calculating the risk- exposure value for bank and they described the managing use of related information in decision making.

Ringhom and Shy and Stenback, in 2004, conducted a research on the measurement of the likelihood of a liquidity crisis and defining the optimal reserve rate of banks. Based on "Liability management theory" banks are to borrow from money and capital market in order to meet their liquidity needs. When a bank is faced with immediate needs, it borrows the funds rather than selling the properties.

Michael F.D, in 2001, studied the relationship between financial leverage and systematic risk of LLP at the London Stock Exchange for a period of four years from 1995 to 1998 using assumptions of MM theory about business risk of companies. He examined this relationship using ANOVA in order to compare the scattering distribution of systemic risk of mentioned companies before and after the debt increase. He has approved the results of this research on more scattering claim of systematic risk of firms before and after the debt increase in compare with this issue before the debt increase for all industries. (Khoram, 2004)Ebadi and Ghavami in 2009 ,in an article titled as "targeting subsidies for medicine , in terms of equity and efficiency " studied the process of targeting subsidies for medicine during 1997 to 2005 in terms of distribution equity in medical section and efficiency changes in pharmaceutical section. The results of this study indicate that despite the increase of efficiency in pharmaceutical industry during mentioned period that expressed as a more competitive pharmaceutical market and the increase of drug manufacturing; there have not been any significant changes in distribution equity in health and healthcare from the perspective of people's ability to have access to medicine. (Ebadi& Ghavami, 2009)

Fateme Haj Babaei in 2009 had her MA thesis on liquidity risk of Saman bank using the risk-exposure value model. In this Study, the hypothesis of decreasing liquidity risk has been assessed annually. To test the hypothesis, the statistical method of Cox-Stewart analysis model has been used. The simple regression model is use parallel to

completely the results with the results of Cox-Stewart test. The findings indicate that decreasing liquidity risk trend has been studied over the years.

Babak Lotf Ali, in 2006, in his MA thesis titled as the risk exposure value criteria studied calculating portfolio risk for bank of industry and mine, subset firms and companies that are members of Tehran Stock exchange. This study was conducted at university of management and economics, Sharif University. In this study, by using prediction model of returns the risk has been measured and risk changes in bank of industry and mine has been discussed. The multi-asset risk exposure value selected as multi- portfolio has been calculated using parametric methods.

AbuAnvari et al in 2006, in an article titled " Evaluating the economic impact of gasoline subsidy on its consumption in Iran , an empirical analysis" examined the impact of subsidies on petrol consumption and they came to this conclusion that targeting subsides is necessary in order to reduce gasoline consumption and efficient use of resources and avoidance of wasting financial sources. (Abu Anvari et al, 2006).As observed, two categories of targeted subsidies law and financial risk have been investigated separately in numerous researches. On the one hand there is a contradiction in the findings resulting from some of them and on the other hand the existence of gaps in the reviews of these two categories simultaneously, has formed the basis of this present research.

METHODS

This research was descriptive and practical and was conducted as a cross-sectional survey. The research plan was expose facto. The research data was quantitative and consistent and were extracted of financial statements and notes of Tehran Stock Exchange listed companies during the research periods.The population in this study includes the financial performance of all executive departments of listed companies in Tehran Stock Exchange from 2001 to 2013. Legally, all listed companies and organizations are required to submit a financial statement. Their financial statements are available through him Stock Exchange each year.

Theoretical basics and theoretical research have been collected based on scientific and research papers and based on library methods. Collecting the data from information systems, software systems and databases of Tehran Stock Exchange.

To evaluate, during 2001 to 2013, the performance of Tehran Stock Exchange has been studied and compared before and after enforcing the targeted subsidies law. To calculate the financial risk, the liquidity ratio and leverage ratio indexes were used. The liquidity ratios the researcher considered are current ratio and quick ratio. The leverage ratios also include debt ratio, current liability- asset ratio and current liability- liabilities ratio.
This study used structural equation modeling to test the hypothesis. Structural equation modeling is a comprehensive statistical approach to test hypothesis about the relationships between observed and latent variables. Structural equation model includes a set of structural equations that describe the casual relationships between variables. In this model, the data form the matrix of correlation (covariance) between variables and a series of regression equations are formulated. In order to analyze the data and to test the hypothesis, it is used the structural equation modeling in LISREL software.

In the first stage, based on the conceptual model, parameters of model were estimated and research model has been fitted by using confirmatory factor analysis. In the second stage, the original and secondary hypotheses of research were analyzed.The risk of the balance sheet structure is one of a variety of financial risks. In this field, this issue is more reviewed that how different compositions of existing assets included in the balance sheet are? In other words, is this composition to the assets that have high possibility of a change in their value in future, or in the terms of value, is there necessary stability in most of the above assets? The current ratio, quick ratio, debt ratio, current liability on assets and current liability on liability are of evaluation indexes of financial risk.

Research model and hypotheses

In this paper, following the study of theoretical principles of financial risk, independent and dependent variables were identified; the following analysis model was designed and tested.

In this model: Table 1.

CB: Cash Balance	CR: Current Ratio
AR: Accounts Receivable	QR: Quick Ratio
CA: Current Assets	DR: Debt Ratio
NCA: Non-Current Assets	CLA: Current Liability – Assets Ratio
TA: Total Assets	CLL: Current Liability – Liabilities Ratio
CL: Current Liability	CLC: Current Liability – Capital Ratio
NCL: Non-Current Liability	LC: Liability – Capital Ratio
TD: Total Debts	CAC: Current Assets – Capital Ratio
OE: Owners Equity / Capital	AC: Assets – Capital Ratio
BSI: Balance Sheet Items	LIR: Liquidity Ratio
LER 1: Leverage Ratio 1	LER 2: Leverage Ratio 2
Delta: Error for observe variable X	Epsilon: Error for observe variable Y

As mentioned above, the main hypothesis of this study is:

1) Implementation of targeted subsidies law has negative impact on financial risk of companies listed in Stock Exchange.
Sub – hypothesis of research are:
2) Implementation of targeted subsidies law influences the liquidity ratio of companies listed in Stock Exchange.
3) Implementation of targeted subsidies law influences the receivables of companies listed in Stock Exchange.
4) Implementation of targeted subsidies law influences current accounts of companies listed in Stock Exchange.
5) Implementation of targeted subsidies law influences non-current accounts of companies listed in Stock Exchange.
6) Implementation of targeted subsidies law influences assets of companies listed in Stock Exchange.
7) Implementation of targeted subsidies law influences the current liabilities of companies listed in Stock exchange.
8) Implementation of targeted subsidies law influences non-current liabilities of companies listed in Stock Exchange.
9) Implementation of targeted subsidies law influences liabilities of companies listed in Stock exchange.
10) Implementation of targeted subsidies law influences the rights of stockholders of companies listed in Stock Exchange.

According to structural equation derived from a basic model of research, the structural equations for the latent internal variables are:

$$LIR = f(BSI, Error)$$

$$LER\ 1 = f(BSI, Error)$$

$$LER\ 2 = f(BSI, Error)$$

The structural equations for obvious external variables are:

$$BSI = f(CB, AR, CA, NCA, TA, CL, NCL, TD, OE, Error)$$

The structural equations for obvious internal variables are:

$$LIR = f(CR, QR, Error)$$
$$LER1 = f(DR, CLA, CLL, CLC, LC, Error)$$
$$LER2 = f(AC, CAL, Error)$$

In above equation, *f* is a linear function. If we want to write the previous equations more detailed, the amount of paying pensions will be a function of liquidity and financial ratios:

$$RISK = W_1(LIR) + W_2(LER1) + W_3(LER2)$$

In this equation, W_1, W_2 and W_3 are parameters to be estimated.

Estimation of model parameters

The goal here is to compute a possible value of the parameter covariance matrix implied to be closer to a sample covariance matrix elements; So the goal is to minimize the difference between the two matrix ($S - \Sigma$). From the difference between these two, we will have the residual matrix. Ideally, the elements of residual matrix should be zero; but practically such things are not attainable. Because of this thee is always error quantities in the model. (Kalantari, 2009).Based on the results presented in table 2 according to the t-value that is not between 1.96 and -1.96 and, significance of impact of all counted variables for financial risk has been confirmed.

The error level for Chi-square test has been calculated greater than %5. The root mean square error of approximation (RMSEA) that is related to residual model has been obtained less than %1. The value of Comparative fit index (CFI) has been obtained more than %99.

The fitting indexes of model with their related amounts are listed in table 3.

Based on results of indexes in table 3, the model has a good fit.
According to calculated correlation coefficient by LISREL software, the structural equations related to the research hypotheses are:

$$BSI = 0.89(OE) + 0.95(TD) + 0.93(NCL) + 0.95(CL) + 0.95(TA) + 0.95(NCA) + 0.95(CA) + 0.89(AR) + 0.94(CB)$$
$$LIR = -0.98(CR) - 0.93(QR)$$
$$LER1 = 0.86(DR) + 0.96(CLA) + 0.89(CLL) + 0.66(CLC) + 0.59(LC)$$
$$LER2 = 0.91(CAC) + 1.00(AC)$$

According to the above coefficients, linear equations were calculated separately based on each year. In order to check the extent of the impact of implementation of the law above, the average of calculated items in the period before and after the implementation of the law were analyzed. With regard to the comparison of equality of feature between two groups, the independent-sample T test was used in SPSS software.

The impact coefficient and t–values for obvious external variables have been calculated at %99 of confidence level. Due to this the equality of variances will be rejected; the difference of means are significant and the average financial risk of before and after enforcing the targeted subsidies law are not equal. By enforcing this law the financial risk has been increased so the first hypothesis is confirmed.

About the sub-hypothesis of this research, the impact coefficient and values for obvious internal variables at confidence level of %99 have been calculated. As a result, the equality of variances will be rejected; the difference of means is significant and the average of risk before and after enforcing the targeted subsidies law is not equal; so all sub-hypotheses are confirmed.

Based on the comparison of the averages for the period before and after the implementation of targeted subsidies law, the financial risk has been increased by %415.

CONCLUSION

LISREL output reports reveals a clear effect of implementing targeted subsidies law on risk management of companies listed in Tehran Stock Exchange; Accordingly the financial risk has increased %415 compared to the period before the implementation of this law. Meanwhile with implementing this law, Balance Sheet items have increased %400/5.After implementing the law, despite the increase in balance sheet items, financial risk has increased more. As it can be seen, the growth rate of financial risk is more than growth rate of balance sheet items.

Due to the effective factor computed by LISREL software, the impact coefficient of liquidity ratio, the leverage ratio1, and the leverage ratio 2 were calculated -0.50,0.85,0.42 respectively. The role of leverage ratio 1 including debt ratio, current liability-assets ratio, current liability-liabilities ratio, current liability-capital ratio and liability-capital ratio, is more effective than liquidity ratio and leverage ratio 2 in financial risk. In other words, the greater the volatility of financial risk of those companies are subject to the leverage ratio1 not liquidity ratio or leverage ratio 2 mentioned before. Obviously the focus on improving leverage ratios in the first group compared with the other ratios reduces financial risk more.

In addition, in the group of leverage ratio 1 the factor of current liability-assets ratio has the greatest impact among others. It is obvious that the effort to improve this ratio will have the greatest impact among other leverage ratios 1 on financial risk. It is crystal clear that if companies supply fewer resources through current liabilities then they can reduce financial risks.About sub-hypotheses, balance sheet items of studied companies have grown significantly after implementing targeted subsidies law.

According to the results, with a comparison of the liquidity in the period before and after the implementation of this law, this ratio has increased %77.282 which reflects the company's improved ability to meet short-term obligations.According to the results obtained, by comparing the leverage ratios in the period before and after the implementation of this law, these ratios have increased %23.83 and this indicates an increase in the amount of debt in the capital structure of the institution itself. In the other word, these debts influence the capital structure of companies listed in Stock Exchange more after implementing this law and capital structure will face more uncertainty.

Despite the high impact of implementing this law on sub-hypotheses, the lowest increase has been in non-current liabilities, and the greatest increase has been in accounts receivable, respectively. According to the results obtained in this study, we can recommend followings to reduce financial risk:As stated in the findings, the leverage ratio 1, compared with the leverage ratio 2 and liquidity ratio have the greater impact coefficient. It is better to express that financial risk of studied companies listed in Stock Exchange are more a function of changes in leverage rations 1 rather than other changes in research. Focusing on these ratios, results in reducing financial risk more.

Among the leverage ratios 1, the ratio of current liabilities - assets has a higher impact coefficient. In other words, companies listed in Stock Exchange will have less financial risk if they reduce their current liabilities.

Due to the comparison of impact coefficient of assets-capital liabilities (AC) and current assets-capital ratio (CAC), in order to reduce financial risk it is recommended that companies increase assets instead of increasing current assets. Due to comparison of impact coefficient of current ratio (CR) and quick ratio (QR), keeping items including inventories and deposits (prepayments) can increase the financial risk.Finally, creating a framework for doing business for enterprises is more principled and logical than paying cash subsidies. After developing a profit margin, we can reduce cash payment of subsidies or even delete this trend.

The relative prices can be real. We can prevent wasting resources and inefficient allocation of production factors. Accordingly, it is suggested to pay the main part of subvention of social security is paid of public resources by government. To the true meaning, all people should been benefited from their portion of public resources, especially those few weaker deciles. This policy can be a good alternative for cash subsidy payment. Of course, a spate research is required for the suggested executive strategy.

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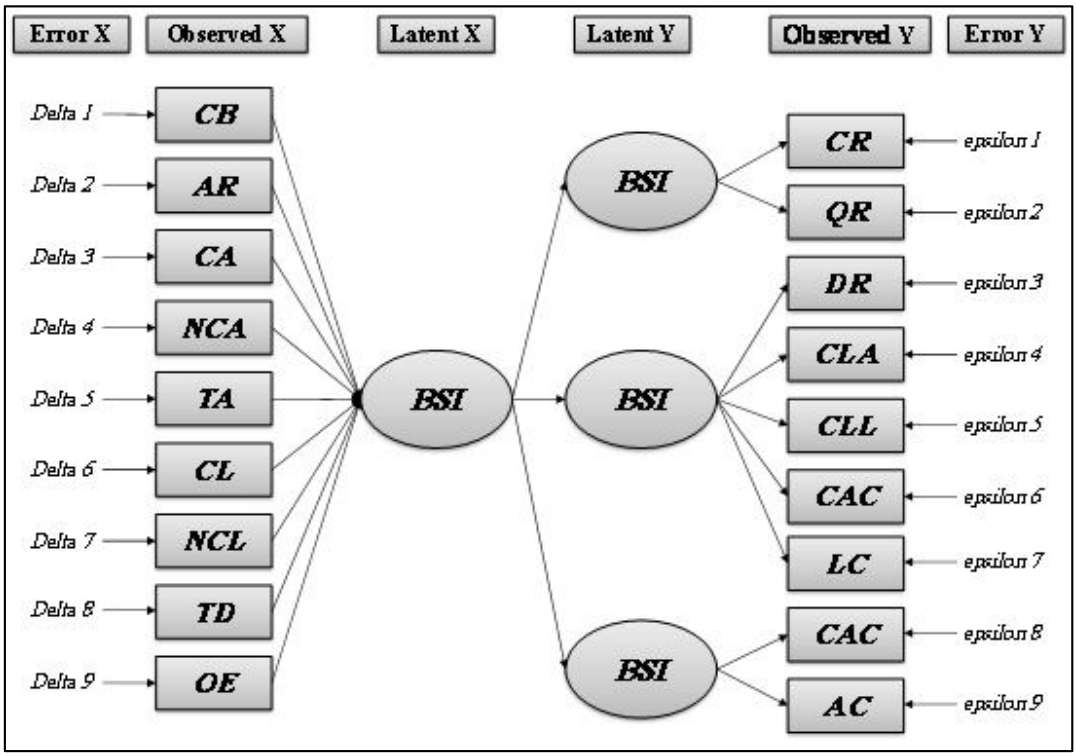

Exhibit 1: the basic model of research

Table 2: Observations of Confirmatory Factor Analysis (CFA)

variable	Index	R^2	t-value
BSI (Latent X)	Cash Balance	0.94	4.37
	Accounts Receivable	0.89	3.93
	Current Assets	0.95	4.47
	Non-Current Assets	0.95	4.43
	Total Assets	0.95	4.47
	Current Liability	0.95	4.47
	Non-Current Liability	0.93	4.25
	Total Debts	0.95	4.47
	Owners Equity / Capital	0.89	3.98
LIR (Latent Y)	Current Ratio	0.98	3.28
	Quick Ratio	0.93	3.68
LER 1 (Latent Y)	Debt Ratio	0.86	3.22
	Current Liability – Assets Ratio	0.96	5.03
	Current Liability – Liabilities Ratio	0.89	4.34
	Current Liability – Capital Ratio	0.66	2.62
	Liability – Capital Ratio	0.59	2.26
LER 2 (Latent Y)	Current Assets – Capital Ratio	0.91	3.11
	Assets – Capital Ratio	1.00	3.17

Table 3: Observations of Goodness of Fit Statistics

Index	Result
Chi-Square	64.65
Square amount to freedom degree ratio $(\chi^2 / df < 3)$	0.4897
CFI	0.997
RMSEA	0.001
Loading factor to standard error ratio	More than twice for each variable
Root Mean Square Residual (RMR)	0.94
Normed Fit Index (NFI)	0.90
NCP	0.001

Table 4: Observations of testing the hypothesis

No.	Hypothesis	t-value
1	Implementation of targeted subsidies law has negative impact on financial risk of companies listed in Stock Exchange.	5.896
2	Implementation of targeted subsidies law influences the liquidity ratio of companies listed in Stock Exchange.	7.327
3	Implementation of targeted subsidies law influences the receivables of companies listed in Stock Exchange.	4.682
4	Implementation of targeted subsidies law influences current accounts of	4.629

	companies listed in Stock Exchange.	
5	Implementation of targeted subsidies law influences non-current accounts of companies listed in Stock Exchange.	5.151
6	Implementation of targeted subsidies law influences assets of companies listed in Stock Exchange.	4.770
7	Implementation of targeted subsidies law influences the current liabilities of companies listed in Stock exchange.	4.663
8	Implementation of targeted subsidies law influences non-current liabilities of companies listed in Stock Exchange.	6.371
9	Implementation of targeted subsidies law influences liabilities of companies listed in Stock exchange.	4.727
10	Implementation of targeted subsidies law influences the rights of stockholders of companies listed in Stock Exchange.	4.651

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RESEARCH ARTICLE

Evaluation of Fuzzy Pavement Condition Index (PCI) using MATLAB Software

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ABSTRACT

Awareness of the road network pavement conditions is necessary and undeniable foe adopting efficient and optimal decisions. It should be done through utilizing a simple and efficient index. Traditionally various indexes have been used for specifying condition in road network pavement including PCI, PSR, PSI, and RCI. Current work attempts to evaluate road network pavement condition using two parameters: 1. Fuzzy pavement quality index (FPCI), and 2. Pavement condition index (PCI) in a case study (District 10 in Tehran Municipality), and compare pavement network condition evaluation by two parameters. According to obtained results, since many parameters are involved in prioritization of road network repair and maintenance operation, and engineering judgment and expert ideas are very important in this sector, fuzzy theory is capability of application in this sector.

Keywords: Pavement management, Pavement condition index (PCI), Fuzzy pavement condition index (FPCI)

INTRODUCTION

Road network pavement plays considerable role in immunization of passages and better direction of drivers, so that its proper, timely, and scientific implementation can help guiding drivers better along the roads and interferences and sometimes accidents would be reduced and delays in passages are considerably decreased (Vahidian and

Tareghian, 2002). More importantly is their timely repair and maintenance operation, since it improves traffic conditions and brings about significant economic savings. Thus, use of an updated repair and maintenance management system is required. The main purpose of infrastructure management systems is finding the most optimal solution to achieve goals with the lowest costs and existing resource allocation within specified time. Analysis of this process for achieving above goal is a complex approach. To achieve this goal, adequate data from infrastructure as well as data analysis and data extraction is needed. Traditionally various indexes have been used for specifying road pavement condition which most of them lost their effectiveness gradually due to inefficiency (Ameri and Eftekharzade, 1999). Since in practice the data which are used as basis for infrastructural decision making are mostly uncertain, ambiguous, and inadequate and engineering judgment and expert ideas are used in analyzing these data (Bandara and Gunaratne, 2001), using existing mathematics for application of this trend is difficulty. However, soft computing is suitable for this trend, because numerical and quantitative data can be used in soft computing and qualitative variables can be included in calculations (Juang and Amirkhanian, 1991). Soft computing are among fundamental tools in Artificial Intelligence techniques. In this case, mathematical calculations are applicable based on qualitative and quantitative data simultaneously. Also, these calculations are able to utilize inaccurate, ambiguous, uncertain, and inadequate concepts in analysis. Soft computing include three main parts of neural networks, fuzzy theory, and calculations inspired by nature (genetic algorithm) (Grivas et al., 1992). Asphalt pavement evaluation methods are classified into two categories, i.e. visual observation ad mechanical, and mechanical methods are always used for measuring indexes with higher quantitative expression. Although, today imaging cameras are also used for measurement of surface failures and calculation of visual indexes. Considering increasing development of measurable technologies, yet visual indexes which consider physical failures in asphalt pavements are considered by road maintenance agencies. Its main reason is importance of surface and visible failures for road operator machines, because these types of failures are concretely understood. Considering ideas of experts and evaluation team are used in visual evaluation of asphalt pavements for qualitative expression of the condition (Mn/DOT, 2004), transforming qualitative concepts to quantitative ones is always one of the problems for accurate evaluation of road pavement condition. Infrastructure management area is suitable for application of soft computing and artificial intelligence techniques (Kulkarni and Miller, 2003). Fuzzy theory is used in this work in combination of various pavement condition indexes and calculations of a general index for pavement condition evaluation and ranking.

Data Needed for Fuzzy Pavement Condition Index Calculation

Needed data should be collected and processed in for practical calculation of fuzzy pavement condition index. According to common methods for data collection, it was done using statistical sampling. To this end, firstly existing road network is divided into homogenous sections and branches. Then, some branches become candidate to collected data. Needed data and information are collected from candidate branches and total branch condition index is calculated following data processing. Considering types of failures, existing failures in the branch can be identified and recorded in terms of its severity. Level of each failure is measured according to expert ideas using terms “Low”, “Average”, “High”, and “Very High”. In order to collect data needed for calculations of the fuzzy condition index, data collection form was developed. Since in the process of data collection for fuzzy conditions index all information are collected in letter form without measurement or need for accurate measurement tools, data collection will be done quickly and easily. Hence, fuzzy condition index is classified as rapid visual inspection index. In this method, firstly it is attempted to define possible failures of asphalt pavements accurately and clearly. The important point in failure definition is considering failures uniquely, so that failures have no overlaps. Following failure definition, severity level of failures is defined quantitatively. Severity levels means classification of each type of failure into internal parts which refers to the condition of break and failure. This classification is defined usually as spectrum manner using such terms as “Low”, “Average”, and “High”. The next parameter is extent of failure should be defined in such a way that it can be measured quantitatively. Definition of above three parameters accurately and clearly is a factor for reduction of systematic errors in these methods. Significance level index is also selected by letters. In this research, the terms “Low”, “Average”, “High”, and “Very High” are used for expressing significance

level parameter. The next step for fuzzy index development is determining membership function for above letter spectrum. The range 0 and 10 was selected for membership function range. Also, membership functions were selected as triangular for ease of calculations if membership functions are selected with classification of 0 to 10 with identical overlap, their values would be as Figure 1.

This membership functions are used for expressing significance level of failures in total fuzzy evaluation index. Also, another letter parameter is used in types of failures for expressing level of severity. It is a scale with low, average, and high scale. Symmetrical trigonometric functions with values between 0 and 10 are used for expressing membership functions of this parameter shown in Figure 2.

CONCLUSION

Use of a management system for road network repair and maintenance requires accurate information about road network conditions instantly. Thus, in order to take continuous and accurate information of road network pavement, a simple and efficient and accurate method should be referred. There are systematic errors in evaluation by usual methods. Current work attempts to eliminate this problem so that information can be taken rapidly without accurate measurement tools so that human factor in information extraction provides less error in information extraction from pavement network. According to the findings, fuzzy theory is well capable for modeling ambiguous phenomena including analysis of descriptive and qualitative values. Also, fuzzy mathematics is a suitable and effective tool for calculations with letter and lingual parameters. Fuzzy mathematics is an efficient and useful tool for asphalt pavement condition index development. Considering minimum data is needed for the developed index, it is applicable as a useful method for quick evaluation of asphalt pavements in network.

Fuzzy theory provides possibility for imposing expert ideas in design, construction, and maintenance of roads in index development. To this end, these ideas can be easily formulated and included in the calculations. It is observed that calculated index enjoys acceptable trend for evaluation of asphalt pavements. Especially, it has acceptable accuracy compared to PCI index. Findings indicate that this match is very good in PCIs above 80. Also, change range increases in PCIs lower than 80. It is due to variety of failures and difference in significance levels and curves of reduction in PCI. Developed index is able to express asphalt pavement condition quantitatively in acceptable accuracy. Thus, this index is a suitable tool for ranking asphalt pavements. It can be also used for planning maintenance operation. Monitoring this value over the time and collecting the trend history helps calculation of pavement failure and deterioration trend.

In order to estimate results and investigate accuracy of developed index, PCI and FPCI were compared. Results of adaptive diagram for both indexes in ascending to descending order are drawn for better analysis. Figure 3 indicates distribution of FPCI and PCI in the branches under study.

It is observed that FPCI has significant difference with PCI in some parts; however, they have good fit in some other parts. As observed, this index has good fit to PCI in high PCIs where branches are in very good and good ranks. But, difference between two indexes is higher in lower PCIs. It is evident in Fig 4. This column diagram represents difference between two indexes. This difference may be due to high variety of errors in low quality pavements and difference between curves of PCI reduction and membership functions of failure significance in PCI.

It is observed that fuzzy condition index is a suitable parameter for expressing condition of pavements. Also, considering lingual parameters are used in this index for calculations, its application is easy and rapid, because there is no need for accurate field measurements or specific tools in data collection process. This method can be classified as rapid evaluation method, which can be useful tool for estimation of pavement condition in road network considering high width of road network and urban passages. It should be noted that since expert ideas are used in

fuzzy condition index development and engineering judgments are involved in estimation of lingual parameters, fuzzy condition index is actually formulating expert ideas. In order to represent conditions involved in data collection from pavement, some diagrams are shown in below. According to Figure 5, taking information from pavements and obtaining pavement condition index depends on various factors, and obtaining accurate pavement condition index requires reduction of errors in information extraction system from road network pavement.

- Estimation of condition index in the day time can represents higher quality index.
- Increased experience of experts provides higher quality for pavement condition index. That is, if experts have lower experiences, declared pavement quality would be lower.
- Extraction of information from pavement using machine provides higher accuracy due to reduced human errors and the index provided in this case is expressed lower than other cases.
- Evaluation of pavement conditions based on fuzzy condition index has higher accuracy.

Factors affecting determining road network pavement condition index generally can be mentioned as follows:

- Information extraction time
- Information extraction agent
- Information extraction expert's experience
- Evaluation index type.

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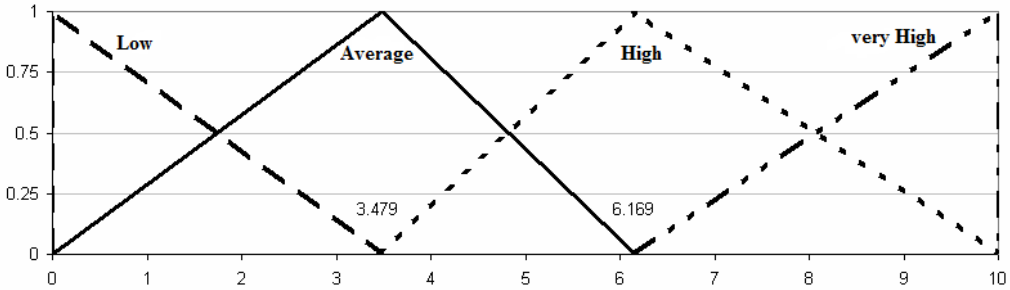

Fig 1. Developed membership functions for significance level parameter

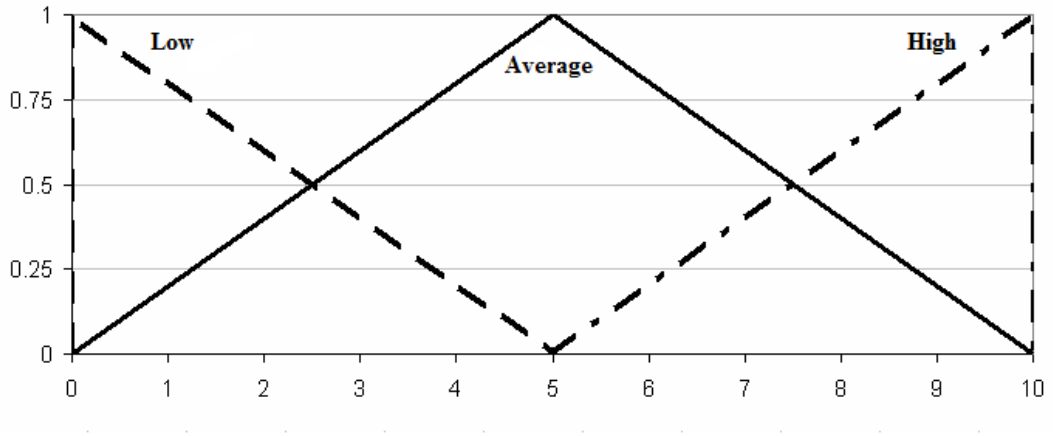

Fig 2. Selected membership functions for severity parameter

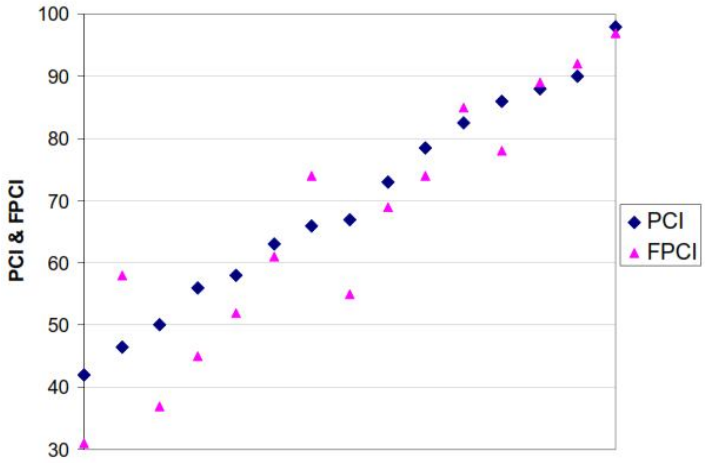

Fig 3. distribution of FPCI and PCI in the branches under study

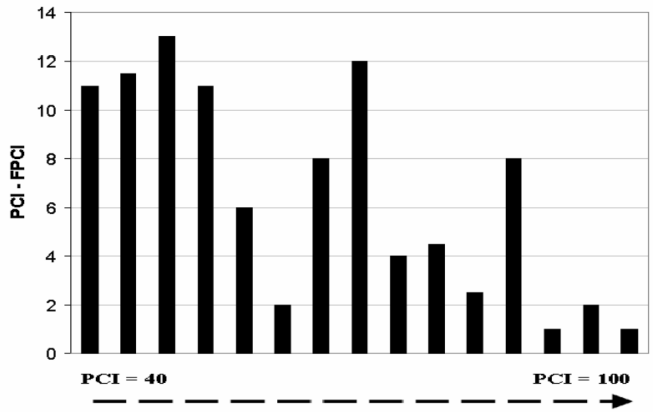

Fig 4. Numerical difference between FPCI and PCI for branches under study

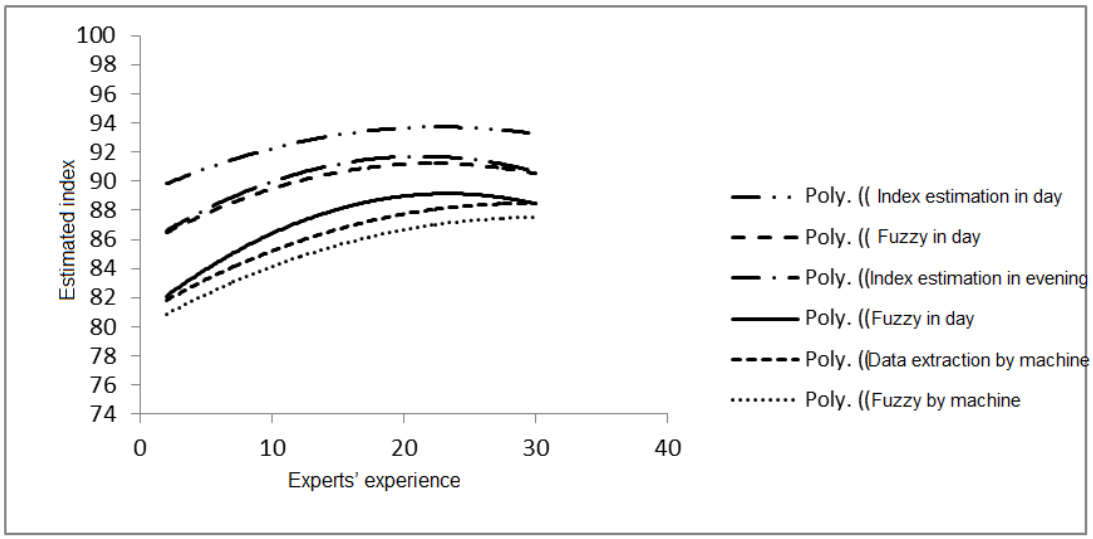

Fig 5. Diagrams of pavement condition index determination based on different hours of extraction and extraction agent

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RESEARCH ARTICLE

Investigating Awareness of Principals on Educational Management Goals and its Relationship with their Occupational Success from Perspective of High School Principals in Rafsanjan City

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ABSTRACT

The main objective of the current work is investigating awareness of principals about educational management goals and its relationship with their occupational success. This research study is applied research in terms of purpose. And it is a correlation work type. Statistical population includes all principals of high schools in Rafsanjan City during 2012-2013 (N = 74). Due to small size of the statistical population, the whole population was considered as the research sample. Theory of GharaeeMoghadam (1996) was used for variable of educational management goals. NekueeMoghadam's (2009) model was used for variable of occupational success. In this research, two questionnaires were used for data collection: an author-made questionnaire for awareness of principals about educational management goals and standard questionnaire for occupational success assessment. Findings indicate awareness of principals about educational management is in optimal level. There is significant relationship between awareness of principals about educational management goals and their occupational success and awareness of principals about educational management predicts their occupational success.

Keywords: Awareness, educational management goals, principals, occupational success.

INTRODUCTION

Today presence of management and its importance is highly emphasized in all organizations, because the main and serious task of the manager is realization of the organization's goals. In other words, every organization has some goals which are constituted because of them, and the management should attempt to achieve these goals. Importance of the management is doubled in educational system, when we know such systems take great budgets annually, are in communication with a large number of students, teachers, parents, etc. and most people have expectations from them (Alagheband, 2001). The main and serious role of educational management in clearly noticeable in developing countries, because although literacy rate in these countries has reached to 75% from 25%, they have a long distance yet to the developed countries where almost all people receive secondary education and 1.2 to 1.3 of them enjoy post-secondary education (Suarez-Orozco and Oin-Hilliard, 2004). Overall goal of the educational system in each community is nurturing people according to its cultural, political, religious, and social values and providing an appropriate individual for the community. Goals of the education play three important roles in educational management: first, they direct education process; second, they create movement and activity motivation; and third, they create control and evaluation criteria for educational activities (Jahanian, 2008). Educational management should understand goals of education and investigate and use them, some of which include:

- Helping educational organization's people to achieve education goals
- Guiding members of the organization to recognize and understand the objectives better
- Guidance, cooperation, support, and strengthening members of educational organization
- Participation in decision making and exchange ideas and establishing joint responsibilities in the educational organization
- Establishing good human relations and mutual respect between the manager and members of the educational organization
- Understanding the needs and problems of students to achieve educational goals
- Paying attention to the individual differences and helping students to discover their potentials
- Helping to improve the education process
- Providing resources and fertile ground for creativity and innovation for intellectual growth and maturity of the members
- Coordination between resources and activities of the educational organization (GharaeeMoghadam, 1996).

Occupational success means positive mental results or advantages related to the work that one has as a result of working experience (Seibert et al., 1999). It seems occupational success includes two components: subjective and objective components. Objective indexes of the occupational success include damages, reinforcements and tangible successes, while subjective components include perspective of people about the job and occupational progresses. Ghazi (1994) defines indexes of occupational success asachieving expected career goals, enjoying the job, job security, having auxiliary activities and hobby, job satisfaction, amenities, good relations and adequate compensationand wages.

Today is the age of management and leadership and success of institutions and organizations depends mostly on the management efficiency and effectiveness (Mirkamali, 2008). Educational system structure of each country includes a collection of its formal organizations' needs and performance of educational system, which is administered by the educational managers, is important both in terms of socioeconomic development and the effect it has on occupational dynamicity and expectations. In addition, educational system is the best way of creating change in the values and behaviors and causes that people are prepared for performing socioeconomic services and gaining jobs and thus personal peace according to their talent and willingness. Hence, since the beginning of the last century, no nation without development in educational institutions and educated and experienced educational managers could pass development and progress process.

Thus, by increasing number of students at different educational levels, establishment of new schools and educational centers, recruitment of more teachers and more investment have become necessary. On the other hand, necessity in decision making and policy making, quality improvement and creating equal educational opportunities for all people shows serious and important role of educational system management (Jahanian, 2008).

In addition, management of educational organizations is much more important compared other types of management and it has strategic role, because all goals and factors of these organizations are human. If other organizations in the community neglect in performing their tasks and mission in the society and do not achieve respective goals, its outcome affects directly the organization or group with which they are in contact. However, if education organization and its managers neglect about its work nature, outcome of such negligence would be manifested in ethical, social and economic aspects of the society and it would have significant role in development or decline of the society. Therefore, responsibility of a manager is very heavy and he should be familiar with basic goals and task and necessary skills of management. By conducting the research study, it is possible to understand current status of the managers regarding educational management goals and to have appropriate planning for increasing these characteristics.

Such research works can helps training efficient managers. It is clear that professional quality of the society can be improved by training competent managers for educational organizations. If incompetent managers are selected in educational centers, educational quality decline would be observed in the Ministry of Education. In addition, status of awareness about educational management and occupational success is identified and it is possible to identify effective and enforcing variables and to take some actions for improvement.

The author attempts to answer following questions: to what extent are principals aware of educational management goals? Is there significant relationship between awareness of the principals about educational management goals and their occupational success? Does awareness of principals about educational management goals predict their occupational success?

Alizadeh (2004) investigated awareness of principals about educational management goals and its relationship with the occupational success form perspective of the teachers in high schools of TorbatHeydarieh City. He found there is relatively high correlation between awareness of principals about educational management goals and their occupational success. Ebadi (2008) investigated awareness and attitude of heath managers about health system management. He found there is no significant correlation between awareness and attitude with education of managers about health management. Nekuee (2011) studied relationship between awareness of the managers about management functions and their performance in public organizations of Kerman City. Findings indicate there is significant relationship between awareness and information of the managers and their performance about management functions (planning and decision making). Golparvar (2010) investigated role of social support and organizational policies and practices in occupational success. His findings indicated: 1. Indigenous and exogenous occupational success has positive significant relationship with personal support of peers, network support and organizational policies and practices; 2. Hierarchical regression analysis showed personal support of peers, organizational policies and practices and network support predict indigenous occupational success and organizational policies predict exogenous occupational success.

In this research study, Theory of GharaeeMoghadam (1996) was used for variable of educational management goals. NekueeMoghadam's (2009) model was used for variable of occupational success.

MATERIALS AND METHODS

Considering the way of data collection, it is a descriptive research study and it is a correlation study. Statistical population includes all principals of high schools in Rafsanjan City who during 2012-2013 (N = 74). Due to small size of the statistical population, the whole population was considered as the research sample. In this research, two questionnaires were used for data collection: an author-made questionnaire for awareness of principals about educational management goals and standard questionnaire for occupational success assessment. Validity of which weas confirmed by the experts. Following modifications, the questionnaires were given to 30 experts for taking

their ideas. After collecting the questionnaires, Cronbach's alpha test was used for determining reality. It was reported as 0.82 and 0.88. Data were collected using library sources as note taking form. Library studies and field studies were used for data collection. Descriptive statistics and inferential statistics were used for data analysis. Single sample t-test, Pearson correlation coefficient and regression analysis were used as inferential statistics. SPSS software was used for distinguishing the questions.

RESULTS

Analysis of Data Related to Research Question 1

To what extent are principals aware of the educational management goals?
Values in the parenthesis are calculated based on score 3 as basis.
According to the above table, average awareness about educational management goals is significantly higher than conceptual average. Considering sig. level (0.000), awareness about educational management goals is in optimal status.
Table 5. T-test table for awareness about educational management goals

Analysis of Data Related to Research Question 2

In order to answer the research question, Pearson regression coefficient was used. As observed in the table, given the significance level obtained from the table, there is positive significant correlation between awareness of principals about educational management goals and their indigenous success. There positive significant relationship between all components of awareness about educational management goals except components of participation in decision making and establishing optimal human relations and exogenous occupational success.

Analysis of Data Related to Research Question 3

Does awareness of principals about educational management goals predict their occupational success?
In order to determine role of awareness of principals about educational management goals in predicting their occupational success, multiple regression analysis was used using entry method. As observed in Table 3, adjusted R 0.48 and F = 31.159 is significant (P < 0.001). Thus, the model can predict occupational success and regression relation is obtained as follows:

Regression Model:
(Awareness × 0.802) + 0.721 = occupational success
Positive sign for the coefficient indicates direct relationship between this variable with awareness of principals about educational management goals.

DISCUSSION AND CONCLUSION

Findings in data descriptive analysis (Underlying variables) indicated:

Considering the findings, 18.9 percent of the subjects were female and 81.1 percent of them were male. In addition, 72.9 percent of the subjects had BA degree and 27.1 percent of them had higher degrees. Average age of the subjects was 43 years. Descriptive test for research components showed level of obtained data follows feature of normality. Thus, considering presence of other assumptions, parametric tests were used for data analysis.

Findings form inferential analysis of data regarding the first research question indicates awareness of the principals about educational management goals is in optimal status. Thus, it can be said principals of the schools have perfect information about educational management and select their management styles with awareness about educational management goals. This finding is consistent with finding by Alizadeh (2004).

Findings about Q2 indicate there is positive significant relationship between awareness of principals about educational management goals and their occupational success. Hence, it can be stated the more awareness they have about educational management goals, they will achieve more success. This finding is consistent with finding by Alizadeh (2004) and Nekuee (2011). By increasing development of knowledge and technology and widespread information flow, today community requires attention to such components which can proceed in pace with knowledge and technology development. One of the main goals of educational organizations in nurturing people which are able to encounter problems with a creative art and innovative manner, solve them and provide strategic solutions so that they step toward a prosperous society. Providing such facilities in schools shows high occupational success of the principal.

Findings on the Q3 show awareness of principals about educational management goals predict their occupational success.

Considering research findings on the relationship between awareness of principals about educational management goals and occupational success, it is recommended educational management goals are fully described for the principals in in-service training and these goals are clearly explained in the educational pamphlets for the educational managers.

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Table 1. Mean and t-test for awareness about educational management goals

Variable	No.	Mean	t	df	Sig.
Awareness of goals	74	103.66(3.56)	13.47	73	0.000

Table 2. Correlation coefficients of relationship between educational management goals awareness and occupational success

	Endogenous Success		Exogenous Success	
	r	sig	r	sig
Awareness of principals about the goal 'Guiding members of the organization to recognize and understand the objectives better'	0.239*	0.000	0.254**	0.000
Awareness of principals about the goal 'supporting educational organization's members'	0.252**	0.002	0.343**	0.000
Awareness of principals about the goal 'Participation in decision making'	0.274**	0.000	0.005	0.256
Awareness of principals about the goal 'Establishing good human relations and mutual respect'	0.258**	0.002	0.063	0.459
Awareness of principals about the goal 'recognizing the needs and solving problems of students'	0.318**	0.002	0.338**	0.000
Awareness of principals about the goal 'helping students to discover their potentials'	0.344**	0.000	0.259**	0.000
Awareness of principals about the goal ' Helping to improve the education process'	0.311**	0.002	0.330**	0.000
Awareness of principals about the goal 'Providing resources for creativity and innovation'	0.354**	0.000	0.239**	0.000
Awareness of principals about the goal 'Coordination between resources and activities of the educational organization'	0.124*	0.025	0.263**	0.000

Table 3. Prediction of occupational success based onawareness of principals about educational management goals

note					
Dependent variable R adj= occupational success = 0.48 R=0.69 RS=0.48					
Variance analysis					
Model	**Sum of squares**	**Degree of freedom**	**Mean of squares**	**F**	**sig**
Regression	52.33	1	52.33	159.31	0.000[b]
Remaining	56.49	73	0.33		
Total	108.83	74			
Coefficients					

Model	**Non-standard coefficients**		**Standard coefficients**	**t**	**sig**
	B	**Std.Error**	**Beta**		
Constant a	0.721	0.199		3.63	0.000
Awareness	0.802	0.064	0.693	12.622	0.000

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RESEARCH ARTICLE

Studying Effect of Financial Reporting Quality and Maturing Liability on Investment Efficiency of Firms Accepted in Tehran Securities Exchange

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ABSTRACT

In societies of present world effect of financial reporting quality and maturing liability on investment efficiency is an important issue. According to Neoclassical theories nowadays firms in order to maximize their value, invest up to the time that fringe benefits are equal to marginal charges of the investment. According to framework of Keynes investment is determined according to priority of growth or financial security and according to agency framework which considers problems of asymmetry of informationfirms may deviate from their optimal investment level and therefore suffer from underinvestment or overinvestment. In the present study the role of financial reporting quality and maturing liability in investment efficiency was tested. The sample used in research included 100 firms accepted in Tehran securities exchange during time period of 2008 to 2012. In order to test and process hypotheses generalized least squares method was used. Research findings showed that financial reporting quality increases investment efficiency. Also, no significant relationship was found between maturing liability and investment efficiency.

Key Terms: Financial reporting quality, Maturing liability, Investment, Investment efficiency

INTRODUCTION

Many changes are happening in the present world and specifically in developing countries which are faced with diverse threats and therefore need to utilize better their facilities and natural resources in order to solve their economic crises. In this regard one of the solutions which is of prime importance is developing investment (Tehrani

and Noorbakhsh, 2006). Considering the resource constraints not only developing investment but also investment efficiency escalationis important. Investment efficiency in one hand requires the prevention of resource utilization in activities in which investment is done more than optimal level (preventing overinvestment) and on the other hand resources need to leaded to activities that need more investment (preventing underinvestment). The first and most important goal of this research, besides investigating potential relationship between financial reporting quality and investment efficiency, is to recognize the effect of maturing liability on this relationship. Nowadays accounting systems play a major role in activity flow of institutes and in have an important responsibility in economic environment of countries. Financial reporting is one of the significant outputs of accounting system and one of its main goals is to provide required information for economic decision-making of users regarding evaluation of performance and profitability strength of economic institute. In order to reach this goal, measurement and information offering is in a way that makes possible performance evaluation of past and also be effective in assessing profitability strength and predicting future activities of economic institute (Sagafi and Arabmazar, 2009). Recently a number of studies have investigated the effect of financial reporting quality on investment efficiency. According to Gomariz and Ballesta (2013) because higher financial reporting quality through providing better supervision facilities, makes managers more responsive and probably decreases information asymmetry and accordingly adverse selection and moral hazards, will be able to palliate overinvestment and underinvestment problems. On the other hand, financial reporting quality through providing better investment decision-making facilities for managers can improve investment efficiency by better diagnosis of projects and providing more honest accounting numbers to domestic decision-makers (Bushman and Smith, 2001; McNichols and Stubben, 2008). Therefore the first question of present research is as following:

1- Does financial reporting quality increase investment efficiency in firms accepted in Tehran securities exchange?
However the role of liability in reducing management prudence and ordering its investment decisions, is discussed in review of related literature (Jensen, 1986; Myers, 1977). There is also evidence regarding reducing effect of liability on overinvestment (D'mello and Miranda, 2010). Related literature also emphasizes that role performed by maturing liability, under condition of information asymmetry, shows that using short-term liability is a mechanism that can weaken agency costs and information asymmetry among stockholders, creditors and managers. From viewpoint of borrower Flannery (1986) predicts that under condition of information asymmetry, firms having good projects prefer shorter maturing liability for transmitting marks to market and palliating problems of information asymmetry. From viewpoint of creditor when there is information asymmetry, in order to supervise firms, using short-term liability is better than long-term liability. Considering overinvestment Childs and et al (2005) predict that higher flexibility of short-term liability can palliate agency conflicts among stockholders and creditors and therefore reduce overinvestment and underinvestment. Furthermore as Gomariz and Ballesta (2013) stated, it is anticipated that effect of financial reporting quality on investment efficiency decreases in the presence of maturing liability; because by short-term liability creditors can perform their supervision role. Moreover short-term liability can also be useful for managers because it makes them able to conduct investment positive net present value under condition of underinvestment. Therefore effect of financial reporting quality on investment efficiency will be weaker in firms having shorter maturing liability. Second and third questions of research are as following:

2- Does maturing liability decrease cause investment efficiency increase in firms accepted in Tehran securities exchange?

3- Does maturing liability affect the relationship between financial reporting quality and investment efficiency?
Nowadays accounting information systems play an important role in activity flow of institutes and have a major responsibility in economic environment of countries. Many economic decisions are made according to information obtained from these systems. Also a major part of securities exchange is allocated to sell and buy of firms' stocks which can itself be affected by accounting numbers and information. Therefore any research in the field of the effect of accounting information on wide range of beneficiary decision-makers in firms will help better understanding of the role of these information and necessity of their revealing (Sagafi and Arabmazar, 2009).

Theoretical Bases

Financial reporting quality: Financial reporting quality is defined as precision of reported information for better explanation of firm operations (Sagafi and Arabmazar, 2009). Researchers have given many definitions for financial reporting quality and each definition is based on the viewpoint of the individual researcher; later some of them will be given. In fact financial reporting quality can be defined as capability of financial statements in transmitting information of firm operations and specifically predicting its expected cash flow to investors (Modarres and Hesarzadeh, 2008). Linsmeier and et al (1998) state that highly qualified accounting standard improves financial reporting through strengthening ability of users in investment and credit decisions. Any infirmity in one of the four rings may damage the whole chain. Therefore high precision and predictability of scrip dividend components are among indices of determining information content and high financial reporting quality (Sagafi and Ebrahimi, 2009).
Investment: Investment is an important economic variable and always major discussions have existed in this filed. Different schools of thought give various definitions of investment. In one of them investment is defined as following: investment is postponing present consumption in order to reach the possibility of more consumption in future. Investment can also be defined as: Investment is expenditure for obtaining an asset which is expected to give a service or income. Long-term investment is a class of investment which is maintained with the goal of continuous use in activities of an enterprise. Investment is classified as non-current asset when the intention of maintaining it for a long time is provable clearly or its disposal capability by investor includes some restrictions (Pakdelan, 2012).

Investment efficiency: Deviance from investment efficiency can be divided into two parts: overinvestment and underinvestment. Overinvestment means positive deviance from expected investment and is in fact investment of manager in weak projects. Underinvestment means negative deviance from expected investment and is in fact lack of investment of manager in projects with positive net present value (Pakdelan, 2012).

Maturing liability: Maturing liability is the ratio of long-term liability to total liabilities of firm. Liability means the commitment of economic interests transmission by an enterprise due to transactions or other happenings of past. The word commitment means that the enterprise can't avoid exit of economic interest. An enterprise may persuade its creditors to receive their debt in a way other than the one agreed in contract, but it can't persist on accepting this suggestion. Liability is classified as current liability when it is expected to be paid off during normal operational flow of enterprise or in one year from the date of balance sheet, the one which is longer. Other liabilities are classified as non-current liability (long-term) (International Accounting Standards Committee, 2007). Over the past 50 years, capital structure and profit sharing policy have been the most significant debates in the field of firm exchequer (Terra, 2011). In the field of capital structure many experimental studies are done from 1960s, but the new branch of capital structure that is maturing liability of firm has not attracted much attention.

Review of Related Literature

Domestic Research

BadavarNahandi and Darkhor (2013) in a study titled as "Investigating the Relationship between Financial Constraint, Cash value and Net Investment" used the financial information of 86 firms accepted in Tehran securities exchange in time period of 2006 to 2010. In order to recognize if a firm suffers from financial constraint or not three indices were used. Also in order to investigate research goals three main hypotheses were proposed. The analysis of first hypothesis showed that in firms suffering from financial constraint compared with firms not having financial constraint, cash increases the value of firm more. Results of second hypothesis showed direct relationship between cash and investment rate. Third hypothesis investigated whether cash fluctuations in firms suffering from financial constraint compared with firms not having financial constraint, causes higher excess return or not and this hypothesis was confirmed finally.

Mahmud Abadi and Mehtari (2011) studied the relationship of accounting conservation and investment efficiency of Tehran securities exchange firms. Statistical population of this research included 96 firms investigated over time period of 1999 to 2008. Research findings showed that there is significant relationship between accounting conservation and future investment of firms and seven groups of industries. Also there is negative significant relationship between firm size and future investment of all firms and in chemical, food and pharmaceutical industries; there is positive significant relationship between the ratio of market value to book value and future investment of all firms and in wood and textile, chemical, metal and ceramics industry; and there is negative significant relationship between financial leverage and future investment of all firms and in food and pharmaceutical industries.

Arabsalehi and Ashrafi(2011) in their research study the relationship between financial constraints and sensitivity of cash flow investment. It should be mentioned that in order to classify firms in two groups of firms suffering of financial constraints and firms not suffering of financial constraints, cash supply of firms was considered as the main classifying variable. Research findings showed that positive role of cash supply is reducing sensitivity of cash flow investment of firms. On the other hand, no specific priority was observed in using optimal cash supplies model compared with traditional criteria of financial constraint.

Sagafi and ArabmazarYazdi (2009) studied the relationship between financial reporting quality and investment inefficiency in firms accepted in Tehran securities exchange. This empirical research tested the relationship between investment inefficiency and financial reporting quality using adjusted model of Verdi (2006). This research was done in 152 firms accepted in Tehran securities exchange according to the information inserted in financial reports of firms over time period of 2000 to 2008. Research findings showed that in Tehran securities exchange, despite findings of Biddle and et al (2009), there is no significant correlation among mentioned variables.
Kashanipur and et al (2009) chose a sample including 96 accepted firms in Tehran securities exchange over time period of 1381 to 1387. Their research showed that firms suffering from financial constraints have higher investment sensitivity to cash flows compared with firms not having financial constraint problems; and emphasize more on internal cash flows when making investment decisions.

Foreign Research

Gomariz and Ballesta (2013) in a study titled "Financial Reporting Quality, Maturing Liability and Investment Efficiency" tested the role of financial reporting quality and maturing liability on investment efficiency using data of Spanish firms over time period of 1998 to 2008. Their research findings showed that financial reporting quality palliates the problem of overinvestment. Also maturing liability can improve investment efficiency by reducing overinvestment and underinvestment. They also found out that firms using short-term liability more (less), have lower (higher) financial reporting quality.

Keefe and Tate (2013) in a study titled " Is the Relationship between Investment and Conditional Cash Flow Volatility Ambiguous, Asymmetric or Both?" investigated the effect of cash flow volatility on investment. Their empirical evidence showed that firms suffering from financial constraints reduce their investment when: (1) experience severe and continuous cash flow volatilities, (2) experience high volatility and negative growth of cash flow and (3) have low rate of cash and experience high volatility and negative growth of cash flow. In firms not having financial constraint problems the abovementioned cases are not observed or are insignificant. Chen and et al (2011) studied the effect of financial reporting quality on overinvestment and underinvestment using data of emerging market firms. They concluded that higher financial reporting quality helps firms having underinvestment problem to invest and also helps firms having overinvestment problem to reduce their investment rate.

Biddle and et al (2009) in a research regarding the relationship between financial reporting quality and investment efficiency stated that higher financial reporting quality increases investment efficiency of capital items by reducing

information asymmetry and accordingly factors such as incorrect selection or moral hazard and leads to reduction of overinvestment and underinvestment. Their findings confirmed that positive or negative correlation between financial reporting quality and investment in higher in firms that their performance atmosphere is apt to overinvestment or underinvestment. These results indicate that existence of a mechanism between financial reporting and investment efficiency can reduce the friction between them which is mainly due to moral hazard and incorrect selection and disturbs investment efficiency. Therefore their findings showed that financial reporting quality is in relation with overinvestment and underinvestment; this means that there is a causal relation between financial reporting quality and investment efficiency and there is significant relation between financial reporting and underinvestment and overinvestment.

Hovakimian and Hovakimian (2009) conducted a study titled "Investment Sensitivity to Cash Flow". This study had a sample of 7176 firms which were studied over time period of 1985 to 2003. After controlling firm size, financial leverage, growth opportunities and profit sharing percentage as financial constraint, showed that capital expenditures are sensitive to cash flows.

Research Methodology and Data Collection

In order to collect data library and documentary research methods are used and the desired data for processing research hypotheses are gathered from RahavarNovin Software and also from investigations of financial statements of firms accepted in Tehran securities exchange by surfing official website of Tehran securities exchange. Data collection tools of this research include databases, extracted data from Tehran securities exchange, theses, domestic and foreign papers and online resources.

Population and Statistical Sample

Statistical population of this research includes all firms accepted in Tehran securities exchange over time period of 2008 to 2012. It should also be mentioned that choosing firms of Tehran securities exchange as statistical population of research is because maximum available information and data about Iranian firms can be found in securities exchange. Statistical sample of research is selected by systematic elimination method. This means that sample includes all firms of population having the following criteria:

1- Their fiscal period end in 29.12 of every year, so it is possible to put data beside each other and use them in format of panel data or data fusion (based on results of default tests).
2- Have no changes in their fiscal period during research, so the results of fiscal performance can be compared.
3- Not to be one of the active firms in the field of financial activities for instance investment firms, banks and financial institute. The reason is that these institutes have different identities and their major incomes comes from investment and are dependent on activities of other firms. Therefore they have different identity from other firms and will be eliminated from research.
4- Required data for research variables is available over time period of 2008 to 2012, so it will be possible to do calculations more accurately.
Considering the abovementioned conditions 100 firms are selected as statistical sample of this research. It should be mentioned that each firm from 1387 to 2012, had 5 series of extractable financial data in their financial statements and other related information resources.

Measurement Tools

In order to analyze data, Eviews 7 Software is used. First to determine the method of using data fusion and their homogeneity and heterogeneity, Chow Test and Limer Test-F are used. Statistical Hypotheses of this test are as following:

H_0=Pooled Data
H_1=Panel Data

In this test H_0 hypothesis is based on homogeneity of data and if confirmed all data must be fused and do the parameter estimation using a classic regression; otherwise data must be considered as panel data. If results of this test regarding data use are in the form of data panel, so in order to estimate research model one of the models of Fixed Effects Model (FEM) or Random Effects Model (REM) must be used. Null hypothesis of Hausman regarding suitability of REM is for estimating regression models of panel data. To do this test using Eviews 7 Software after running estimations of FEM and REM, Hausman Fixed random is run to compare the two models. If the obtained P-value is less than 5 percents this means that null hypothesis is rejected and therefore FEM is used; otherwise more suitable model to estimate parameters is REM.

Research Models and Variables

Main model of research which is used to test hypotheses is as following:

$$InvEff_{i,t} = \alpha + \beta_1 FRQ_{i,t} + \beta_2 STDebt_{i,t} + \beta_3 FRQ*STDebt_{i,t} + \beta 4\ LnSalesi,t + \beta 5\ Tangi,t + \beta 6 QTobini,t + \beta 7\ Zi,t + \beta 8\ CFO\_ATA_{i,t} + \beta_9 Loss_{i,t} + \square_{i,t}$$

Dependent Variable

$InEff_{it}$= Investment efficiency. In the present research investment efficiency is a dependent variable and for its calculation the model proposed by Biddle and et al (2009) is used:

$$Investment_{i,t} = \beta_0 + \beta_1 SalesGrowth_{i,t-1} + \epsilon_{i,t}$$

In which:

$Investment_{it}$= Total investment of firm i in year of t that according to definition of Gomariz and Ballesta (2013) is equal to net increase of tangible and intangible assets divided by total assets of last year.

$SalesGrowth_{i,t-1}$= shows sales growth which is equal to sales growth ratio of firm i in year t-1 compared with year t-2.

If investment of next year is more than sales growth remainder of the above model is positive and this means that there is overinvestment; if investment of next year is less than sales growth remainder of the above model is negative and this means than there is underinvestment. Therefore to calculate investment efficiency, mentioned absolute value multiply (-1) is used. Thereforethe higher the answer the better is investment efficiency.

Independent Variables

FRQ_{it}= Financial reporting quality. To calculate financial reporting quality, calculation model of earnings management of Mack Nichols and Stubben (2008) is used which is as following:

$$\Delta AR_{i,t} = \beta_0 + \beta_1 \Delta Sales_{i,t} + \epsilon_{i,t}$$

In which:

ΔAR_{it}= Annual change of firm accounts receivable,

$\Delta Sales_{it}$= Annual change of sales revenue.

All these variables are divided by total asset of year beginning. Remainder of this equation is indicative of change in accounts receivable which is not explainable by change in sales. Therefore to calculate financial reporting quality the absolute value multiply (-1) is used. Accordingly the higher the answer the higher is financial reporting quality.

$STDebt_{it}$= Maturing liability. To calculate it the ratio of short-term liability to total liabilities is used.

Control Variables

$LnSales_{it}$= Natural logarithm of firm sales revenue.

$Tang_{it}$= Objectivity of assets which is equal to the ratio of fixed asset to total asset.

$QTobin_{it}$= Q-Tobin index which is equal to ratio of sum of market value of stockholders' equity and book value of firm liabilities to book value of firm assets.
Z_{it}= Financial capability criterion of firm which is proposed by Altman (1968) as following:
Z = 3.3 (EBIT/TA) + 1 (Sale/TA) + 1.4 (Retained Earnings/TA) + 1.2 (Working Capital/TA) + 0.6 (Market Value of Equity/TL)
In which:
EBIT= Earnings before interest and taxes; TA= Total asset of firm; RE= Retained Earnings; Working capital; Market Value of Equity= market value of stockholders' equity and TL= book value of total liabilities of firm. In this equation bigger Z value is indicative of higher financial capability (less financial distress) of firm.
CFO_ATA_{it}= Ratio of cash flow operation to the mean of firm total assets.
$Loss_{it}$= Firm being apt to loss. If the firm has net loss it is equal to 1; otherwise it is equal to zero.

Descriptive Statistics

In this section of research, the mean, Median (central criteria) and maximum and minimum (dispersal criteria) of used variables are calculated and given in table 1. It should be mentioned that after elimination of outlier and organizing data, the number of research firms reduced a little.

Research Hypotheses

First Hypothesis: Increasing financial reporting quality causes escalation of investment efficiency in companies accepted in Tehran securities exchange.

Second Hypothesis: Decrease of maturing liability causes escalation of investment efficiency in companies accepted in Tehran securities exchange.

Third Hypothesis: Maturing liability affects on relationship between financial reporting quality and investment efficiency.

Variables' Correlation Test

First Pearson and Spearman correlation of research variables are investigated. Results of Pearson and Spearman correlation test of independent and dependent variables are given in tables 2 and 3 respectively. As can be seen in table 2, in Pearson correlation there is no significant correlation between financial reporting quality and maturing liability with investment efficiency. Of course there is significant and reverse correlation between variables of financial reporting quality and maturing liability.

Results of Spearman correlation test are given in table 3. In Spearman correlation as well there is no significant correlation between financial reporting quality and maturing liability with investment efficiency. Here also there is significant and reverse correlation between variables of financial reporting quality and maturing liability.

Reliability of Variables

Before analyzing research data, reliability of variables must be investigated. Reliability of variables means that the mean and variance of variables over time and covariance of variables during different years remain unchanged. Therefore using these variables in model does not create spurious regression. Regarding this we can use tests such as Levin, Lin & Chu (LLC), IPS test and Dicky Fuller test. In order to do this analysis we use IPS test. The result of this test is given in table 4.

According to table 4, significance of research variables is less than 5 percents and therefore all research variables are reliable during research. Then a suitable method for data analysis must be recognized.

Research Model Estimation

After calculating the values of investment efficiency and financial reporting quality, research model is estimated. In order totest research hypotheses, following model is used:

$InvEff_{i,t} = \alpha + \beta_1 FRQ_{i,t} + \beta_2 STDebt_{i,t} + \beta_3 FRQ*STDebt_{i,t} + \beta_4 LnSales_{i,t} + \beta_5 Tang_{i,t} + \beta_6 QTobin_{i,t} + \beta_7 Z_{i,t} + \beta_8 CFO\_ATA_{i,t} + \beta_9 Loss_{i,t} + \varepsilon_{i,t}$

In which:

InEff= Investment efficiency, FRQ= Financial reporting quality, STDebt= Maturing liability, LnSales= Sales revenue, Tang= Fixed asset, QTobin= Tobin's Q index, Z= Criterion for financial capability of firm, CFO_ATA= Cash flow operation and Loss= Firm being apt to loss.

In order to estimate mentioned model, first to determine method of data fusion and their homogeneity or heterogeneity, Chow test and Limer F statistics are used. Results of this test are given in table 5.According to table 5 results of Chow test show that obtained possibility for F statistics is less than 5 percents, therefore to test this model data are used as panel data. Following (in table 6) by Hausman test, necessity of using fixed or random effects model is examined.

According to table 6, significance level of Hausman test is less than 0/05. Therefore to estimate coefficients of mentioned model, FEM must be used. Result of mentioned model test using FEM and generalized least square method is given in table 7.

According to the results of table 7, t statistics of financial reporting quality variable is bigger than 1.965+(equal to+3.96) and its significance level is smaller than 0/05; therefore there is a direct and significant relationship between financial reporting quality and investment efficiency. Therefore first hypothesis of research is confirmed. On the other hand t statistics of maturing liability variable is smaller than ±1.965 and its significance level is bigger than 0/05 and therefore second hypothesis of research is rejected. Variable of product of financial reporting quality multiply maturing liability is in the same condition and therefore third hypothesis of research is also rejected. It should also be mentioned that from among research control variables only variable of ratio of fixed asset has significant and reverse relation with investment efficiency. As can be seen Durbin Watson statistics is 2/203 which is between 1/5 and 2/5. Also significance level of F statistics is 0/000 which is smaller than 0/05 and is indicative of model significance. Another point to mention in table 7 is model determination coefficient. Above mentioned model determination coefficient is about 50 percents which shows that independent variables have the ability of describing about 50 percents of dependent variable's changes.

RESULTS OF HYPOTHESES TEST

Results of research hypotheses test are given in the following as a unit and with its possible reasons. In order to test research hypotheses a model is used including three independent variables of financial reporting quality, maturing liability and product of financial reporting quality multiply maturing liability, six control variables, data fusion model and generalized least square estimation model. Results showed that there is direct and significant relation between financial reporting quality and investment efficiency. While maturing liability has no significant relation with investment efficiency and also had no effect on relationship of financial reporting quality and investment efficiency. Also ratio of fixed asset variable has reverse and significant relation with investment efficiency. Obtained results of effective independent variables and control variable are summarized in table 8 as: financial reporting quality can improve investment efficiency in two ways. First by reducing information asymmetry between firm and

investors and accordingly reducing financing cost, and second by reducing information asymmetry between investors and managers and accordingly reducing supervision costs and improving project selection. Following in table 8 the positive effect of financial reporting quality on investment efficiency is given based on proposed reasoning of Verdi (2007):

Result of the present research shows there is no significant relation between maturing liability and investment efficiency and also maturing liability has no significant effect on relationship between financial reporting quality and investment efficiency. This finding is in contrast with findings of Gomariz and Ballesta (2013). Gomariz and Ballesta (2013) in a study titles "Financial Reporting Quality, Maturing Liability and Investment Efficiency", tested role of financial reporting quality and maturing liability on investment efficiency using data of Spanish firms over time period of 1998 to 2008. Results of their study showed that financial reporting quality palliates problem of overinvestment. Also maturing liability can improve investment efficiency by reducing overinvestment and underinvestment. They also found out that firms using short-term liability more (less), have lower (higher) financial reporting quality.

Suggestions Based on Results of Research Hypotheses

1) Research first hypothesis stating that increasing financial reporting quality causes escalation of investment efficiency in firms accepted in Tehran securities exchange was confirmed and considering its results we suggest the managers and decision-makers of firms accepted in Tehran securities exchange to pay serious attention to this issue in their financial reporting and financial statement report. Moreover we suggest the investors of Tehran securities exchange to have in mind the financial reporting quality of firms in stock purchase and sale and in investment.

2) Research second hypothesis stating that reduction of maturing liability causes investment efficiency increase in firms accepted in Tehran securities exchange was rejected and according to this result we suggest the managers, decision-makers and investors of firms accepted in Tehran securities exchange to evaluate investment condition of firm regardless of its maturing liability.

3) Research third hypothesis stating that maturing liability is effective on the relationship between financial reporting quality and investment efficiency was rejected and according to this result we suggest the managers, decision-makers and investors of firms accepted in Tehran securities exchange to evaluate direct effect of financial reporting quality on maturing liability regardless of maturing liability of firm.

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Table No 1. Descriptive Indices of Variables of Study

Research Variables	Number	Mean	Median	Standard Deviation	Maximum	Minimum
Investment Efficiency	485	-0.175	-0.107	.228	-0.0007	-1.794
Financial Reporting Quality	496	-0.062	-0.044	0.064	$-5*10^{-3}$	-0.355
Maturing Liability	500	0.858	0.906	0.141	0.998	0.182
Sales Revenue	500	13.137	13.017	1.135	18.492	8.899
Fixed Asset	500	0.264	0. 231	0.173	0.888	0.03
Q-Tobin Index	500	1.273	1.146	0.468	3.598	0.541
Financial Capability of Firm	500	1.793	1.707	1.138	5.665	-1.476
Cash Flow Operation	493	0.117	0.108	0.107	0.404	-0.137
Firm Being Apt to Loss	500	0.124	0	0.329	1	0

Table No 2. Pearson Correlation

Variable	Investment Efficiency	Financial Reporting Quality	Maturing Liability
Investment Efficiency	1	0.002 0.961	-0.046 0.775
Financial Reporting Quality		1	-0.148** 0.001
Maturing Liability			1

*= Significant with error of 0/05; **= Significant with error of 0/01

Table No 3. Spearman Correlation

Variable	Investment Efficiency	Financial Reporting Quality	Maturing Liability
Investment Efficiency	1	-0.032 0.487	0.052 0.25
Financial Reporting Quality		1	-0.152** 0.001
Maturing Liability			1

*= Significant with error of 0/05; **= Significant with error of 0/01

Table No 4. IPS Test

Research Variables	T Statistics	Significance
Investment Efficiency	-19.198	0.000
Financial Reporting Quality	-17.078	0.000
Maturing Liability	-10.657	0.000
Sales Revenue	-7.197	0.000
Fixed Asset	-8.398	0.000
Tobin's Q Index	-11.012	0.000
Firm Financial Capability	-10.336	0.000
Cash Flow Operation	-15.906	0.000
Firm being Apt to Loss	-15.699	0.000

Table No 5. Results of Chow Test

Null Hypothesis	F Statistics	Significance Level	Chow Test Result
Sectional and temporal effects are not significant	2.402	0.000	Null hypothesis is rejected

Table No 6. Hausman Test Results

Null Hypothesis	Chi-Square Statistics	Significance Level	Test Result
Using REM	27.647	0.001	Null hypothesis is rejected

Table No 7. Results of Research Hypotheses Test

Variable	Coefficients	Standard Error	T Statistics	Significance Level
y- intercept	0.911	0.239	3.81	0.000
Financial reporting quality	0.237	0.561	3.96	0.000
Maturing liability	-0.046	0.058	-0.795	0.426
Financial reporting quality *Maturing liability	0.175	0.632	0.277	0.781
Sales Revenue	-0.069	0.017	-0.423	0.672
Fixed Asset	-0.568	0.085	-6.615	0.000
Tobin's Q Index	0.007	0.013	0.573	0.566
Financial Capability of Firm	-0.004	0.009	-0.421	0.673
Cash Flow Operation	0.013	0.035	0.377	0.706
Firm being Apt to Loss	-0.019	0.015	-1.289	0.198
F Statistics	4	Determination Coefficient		0.58
		Adjusted Determination Coefficient		0.456
Probability of F statistics	0.000	Durbin Watson Value		2.203

Table No 8. A Summary of Research Results

Variable	Investment Efficiency	
	Effect	Direction of Effect
Financial reporting quality	√	+
Maturing liability	X	X
Financial reporting quality *Maturing liability	X	X
Ratio of Fixed asset	√	-

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RESEARCH ARTICLE

Description of Projects Cash Payment Control Model using Fuzzy Hybrid Neural Network Logic

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ABSTRACT

Considering the limitation of resources, the projects cash control model ranks among the most important issues in the field of project management. Accordingly, the researchers have always been looking for more efficient solutions to handle these problems. On the other hand, fuzzy logic is one of the widely used methods in the science of humanities.Therefore, this research has made efforts to introduce the theory of fuzzy set or so-called multi-fuzzy sets as a means to deal with the problem of ambiguity and lack of precision in decision-making processes and intends to introduce applications of this theory in accounting.This investigation, as a case study, examines the application of fuzzy logic in accounting; concentrating mainly on a detailed account of fuzzy hybrid reasoning as a tool to control projects cash flow.A comparative study of fuzzy-neural inference systems was carried out to control projects cash flow based on which a sample was selected from the industrial projects undertaken during 2003-2012.The Collection of data and information was a major restriction in this investigation and the statistical population has been restricted as a result.When the information and data were collected and processed by means of MATLAB research pattern (R2014a), the results showed ANFIS high capability in controlling projects cash flow. Therefore, fuzzy hybrid logic provides a suitable pattern for controlling projects cash flow.

Keywords: Fuzzy Set,Financial Accounting, Fuzzy Hybrid Logic-Neural Network, Management Accounting.

INTRODUCTION

Considering the limitation of resources, the projects cash control model ranks among the most important issues in the field of project management and application research. Concerning different industrial situations, this problem is very divers considering target function, activity features, and prerequisite relation and resources. Accordingly, the researchers have always been looking for more efficient solutions to handle these problems (Chuu, 2009).

Yuan (2009) with cost-volume-profit analysis claimed that traditional approaches in accounting are incapable to present the detailed information because of ignoring the clarity and accuracy of variables.Kapalan (1958) believes that performance evaluation criteria are unable to provide a precise definition and measurement of the activity because of ambiguity in the expression of long-term outcomes and focusing on short-term results. Tang and Beynon (2005) also believe that accounting techniques are inexact referring to the importance of capital budgeting in management decisions.Ignoring the ambiguity and lack of clarity in decision models could limit the application of accounting models by reducing the usefulness of the explanatory nature of events and their predictive power.

Professor Zadeh (1999) proposed the "fuzzy sets" theory (multiple values) as a toolsto deal with the uncertainty and imprecision in human systems and decision processes which named it fuzzy method. Fuzzy logic has wide applications in various fields, including economics, management and accounting.Using the economic analysis to fit is important because the amount of profit or loss of the selected option will be a direct result of these analyzes. On the other hand, many economic analyzes try to access the options that will be used in the future. So, these evaluations can be assumed as the most important parts of economic analysis (Dechow and Dichov, 2002).

Lack of attention to the ambiguity and lack of clarity in management accounting techniques, audit procedures and financial accounting reports may lead to ignoring the role of accounting information in the decision-making processes.Despite the different aspects of ambiguity and lack of clarity in accounting, the main idea of this research is to introduce fuzzy logics and its applications on projects cash payment control and also proposing an efficient model based on it. As regards that the information as a basic component of any decision has economic value; the importance of this research appears. One of the main advantages of this study is that it can contribute to the uncertainty in accounting. It also makes accounting users familiar with functions and results of this new technology on projects cash payment controlwhich is one of accounting's subdivisions.

The fuzzy theorem can help decision makers to measure the exact value of key variables which is one of the most important problems in analysis of investment projects. Indeed, the main idea of this research can be stated as using fuzzy theorem abilities in economic analysis of uncertain investment projects. This research is trying to find an appropriate approach for combining the concept of knowledge and experience by integrating of fuzzy methods and economic projects evaluation techniques; because in many cases, the subjective judgments of experts obtain better result in comparison with using false information directly. However, the classical techniques of economic projects evaluation are unable to coverage such judgments. In this research, we are trying to find the answer of following question: is evolutionary fuzzy hybrid neural network efficient for projects cash payment control? The experiments approved better results which achievedby this novel algorithm in comparison with other methods in projects cash payment control.

Theoretical Basic

The evaluation of opportunities and risks of economic activity and management task require an understanding of the nature of business activities, including the creation and use of cash is the business. The balance sheet, statements of financial activities and cash flows provide information about financial situation, financial activity, liquidity, the ability of debts repayment and financial flexibility. Accordingly, making relation between information in cash flow and information in other financial statements is important (Chuu, S.J., 2009).

Because the cash flow is not under the influence of different accounting approaches on similar transactions and events in different business units, it could increase the comparability of financial performance of various business units. The information achieved from cash flow has benefits in comparison with working capital flow such as hiding ability of changes related to liquidity (Zhang et al. 2004).

Cash balance

Cash is one of the most important and vital resource in each economic unit as represents the general purchasing power and also is the crucial parameter in economic exchanges.In accounting, cash plays an important role in two aspects: a measurement unit and a means of exchange.

Based on accounting definition, cash is consists of money in the form of coin and bill, checking accounts, and any investment securities that is accepted as money implicitly (Sexton and Comunale, 2005). Generally, in accounting any item called cash if contains all the following three conditions:

Used as a means of exchange.

- Be available quickly and without spending time.
- There would be no restrictions on its application.

According to the above definition, all types of cash are as follows:

- Bill and currency
- Bank guaranteed checks
- Bank checking accounts
- Short-term deposit, including savings deposits.
- Fund
- Exchange cash
- Transit cash

Fuzzy systems

The term of "fuzzy" is defined as "Vague, ambiguous, imprecise, confused, and uncertain" in Oxford dictionary. Fuzzy systems have exact definition. The fuzzy control is a special type of nonlinear control. Although fuzzy systems describe uncertain phenomena, the fuzzy theory is an exact and well defined theory (Bozbura et al. 2007).In functional systems, the important information achieved from two types of resources. The first one is the expert's knowledge about the system. The second is measurements and mathematical models derived from physical rules. Thus, the type of resource is an important problem in system design. Fuzzy systems are used in a wide range of science and technology such as: control, signal processing, communication, integrated circuit design, expert systems, commercial, medical, and social science. However, one of the most important roles of fuzzy systems is solving the problems in the field of control (Beynon et al., 2004).

Review of Literature

Aranda and Castro (2010) proposed an expert fuzzy system in order to increase the accuracy and quality of information in the decision making process. They used fuzzy rules to simulate the behavior of companies. Finally, they used a special mathematical algorithm to achieve a model with lowest structure. The use of fuzzy expert systems in decision making process reduces the costs of providing information.

Omitaomu and Badiru (2007) used fuzzy present value analysis model on evaluating information system projects. Uncertainties in the estimation of the parameters determining the present value including benefits and costs, as well as the useful life of the project, are the reasons of proposing this fuzzy present value analysis model.

Bayou et al. (2007) also proposed a model based on Fuzzy-Analytic Hierarchical-Process in order to analyze the decisions related to product sales combination. By using hierarchical fuzzy analysis it could be possible to consider following variables in defining the combination of product sales: uncertain prioritization variables, distinguishing products, costs strategy, cash flows, beliefs of the company and owners.Roztocki (2005)combined Fuzzy Activity-Based Costing Approach and chain value model. The combinatorial model is a useful algorithm for evaluation of information technology investments.

Dal-Ri et al. (2005) integrated modeling the subjectivity in the target costing process and fuzzy logic to solve the problems derived from uncertainty and mentality in target costing process. The proposed model indicates additional insights for decision maker about relations between the content and production costs.XuandKhoshgoftaar (2004) with emphasis on the cost of design and implementation of software projects, and uncertainties in the estimated cost of the project, by using a case study tried to propose a software cost estimation fuzzy model and compare it with other methods. According to comparison, this model can consider the uncertainty and qualitative and linguistic variables as well as simplification.

Buyukozkan and Feyzioglu (2004) proposed new decision making approach based on fuzzy sets for new product development. In this paper, researchers first define the points need decision making as well as uncertain factors affecting them on the new product development process. Then, they considered the decision making models and risk reduction techniques. Finally, in order to increase precision of decision making procedure, they used integrated decision making approach based on fuzzy logic.

TangandBeynon (2005)used fuzzy analytic hierarchy process by attention to capital investment inside management decisions which contain uncertainty. Their method is used on evaluation of investment projects to selecttransportation in a car rental company. Applying capital investment by using fuzzy analytic hierarchy process provides more reasonable prioritization of capital investment projects contain different levels of accuracy and precision.Nachtmann and Needy (2001) introduced and compared different methods in order to eliminate uncertainty and ambiguity by using analytical analysis on activity based costing system's input data. Using fuzzy method to eliminate uncertainty on activity based costing system is the most appropriate method in comparison with standard, distanced based and Mont Carlo algorithm with normal input variables.

Dogan and Sahin (2003) used activity-based costing and fuzzy present-worth techniques for supplier selection. They mentioned that, many different selection approaches have been published in the purchasing literature. In these studies, the working conditions of suppliers and purchasers and selection criteria are considered constant and precise at the beginning of the selection process by the purchaser during the relationship period. However, this selection process should be considered dynamically because of the changing working conditions of supplier-purchaser and lifecycle of the product or a project. So it is essential to use fuzzy present-worth technique in supplier selection decision making process.

MATERIALS AND METHODS

In this research a hybrid fuzzy algorithm is used for prediction of cash payment control and is implemented on MATLAB (R2014a) software. In this method, the fuzzy logic produced an exact learner based on past information and then used it for cash payment control. Cash flow management consists of a set of decision which includes costs and project completion rate. According to different application of cash flow, its exact prediction could be effective on

resource management optimization and projects costs. Nowadays, intelligent systems have a lot of applications on prediction of such complicated and nonlinear phenomena. The novel adaptive fuzzy hybrid neural network is one kind of these methods which is a multi-layer perceptron used neural network learning algorithms and fuzzy logic in order to map the nonlinear space of inputs and outputs. According to the ability achieved by combination of fuzzy systems language power and neural network numerical power, it is shown that ANFIS method is very powerful in prediction of economic indicators such as stock market index and bankrupt companies.

Research Model and Hypotheses

The research model is shown at figure 1 which is defined as fuzzification, inference using neural network and difazzification. The general structure of fuzzy system is shown at figure 2. The fuzzy logic control procedure is also shown at figure 3.Accordingly, the research hypothesis is defined as: The fuzzy hybrid neural network model has good performance on projects cash payment control.

The statistical population, sample and sampling method

The statistical population of this research is selected from industrial projects undertaken during 2003-2012. In this research the project's date information is used for projects cash payment control using fuzzy logic. Input data of this research derived from the information of finished investment projects. The statistical sample is selected from all industries. Then, the research information is collected from 13 industrial projects during 2003-2012 and the analysis has been applied on it. In this research, after collecting the projects' cost, we presented them as conversion percentage. In this case, the project completion process is divided to 20 steps. It means that we have defined 20 steps from the project start point to end point and all of them have an exact value of cost. For example, if a project costs 1000 dollar, we will define 20 steps in a way the first step might has 30 dollar cost. The first step is started from the zero point to start point of the second step. So in the second step the costs will produce again and the process is repeated.

Data collection methods and tools

The method of this study is descriptive and attributive. The adaptive fuzzy neural network model will be selected to answer questions and test hypotheses. Then, by using data derived from industrial projects, the models' result will be analyzed.In this study 13 projects and their information will be considered. Accordingly, 11 projects will be used as training set for learning and 2 projects will be used as test set. Then, the Evolutionary Fuzzy Hybrid Neural network (EFHNN) will be ready to use.

We will use a set of information in fuzzy logic based on artificial intelligence. Some of them are input data. However, the other used as research data and output data. The input data used for learning whereas the target is projects cash flow prediction by Evolutionary Fuzzy Neural Inference Model (EFNIM).

RESULTS

Designing fuzzy-neural network system for data generation:

MATLAB software is used to design this system which includes ANFIS toolbox. In this section, the training data and test data should be used and then checking data introduced to the software. The input data in both sections consist of cash flow with one, two and three steps. However, the output data is the cash flow. The input data import to the software as matrix which its columns are equal to the number of input/output variables and its rows are equal to algorithm iteration. The last column consists of output data while other columns include inputs. Another problem is

the number and the form of fuzzy membership functions. There is not an exact method for this problem and it needs many experiments. The membership function's feature is as follows: Number of input membership functions: 5; type of input functions: gaussmf; type of output membership function: linear.

The ANFIS other parts in MATLAB include type of neural network, iteration number for network learning, network precision and etc. After collecting data and analyze them, data processing should be started by MATLAB. For that, data will be divided to several categories as follows: training data, checking data (if it is needed), and test data.There would be one question in this step; is the result precision increased by adding the number of membership functions? This work is done. The number of membership functions increased to 70 functions for each input. As a result, the overall precision was better because it was so close to the number of data. However, for some numbers the difference was very much because by adding the number of fuzzy membership functions the flexibility of neural network comes down and in fact, the system could not synchronize itself with main data.

Research data

In this study 13 projects and their information is used by the way 11 projects are considered as training set for learning and 2 projects is used as test set. Accordingly, the total project period is divided to 20 steps to apply information and then, all the costs information computed in this period of time. According to the graph at figure 4 the cumulative process of this information could be seen.

The Research Framework

In this study, the cash flow data related to the costs is used. For this purpose, after obtaining the cash flow of costs from sampling projects, the first until third steps is used as model inputs of project cash payment prediction. According to this model the information derived from three continuous periods can predict the information of next period. So, the cash flow of costs information will be computed in cumulative form for 20 periods. It means that, all the cash flow related to project costs divided to 20 periods and then they will present as a cumulative form. So, the cash flow's information will be between 0 and 100. The figure 5 indicates the information of each input to produce output. The input's shapes of research model are also between 0 and 100.To design the predictive model, at first as it could be seen at figure 6 a training model using hybrid method is define by input data. Then its error will be computed and decrease as much as possible.

According to figure 7, the first training model is produced and will test for predictive process using test data. This graph is used as test data which turn into the graph at figure 8 after error elimination.
The figure 9 indicates the model and structure of prediction in this research. As it could be seen, there are two hidden layer and one output layer for model structure.

According to figure above, 5 membership functions is designed for each variable while each of them can define the rules between input and output variables. Now, according to each membership function, 5*5*5=125 rules could be written. Also, each of these rules could be written based on and/or/not operators. For example, in figure above the "and" operator is selected.However, many of these rules may be removed because of overlapping. In fuzzy logic system, the human intelligence should define these rules; i.e. the experts should define these rules by providing some questionnaires.

The human knowledge and the experience of experts in this area may not define these rules correctly. So, by using artificial intelligence it could be possible to recognize the correct relation and rules between membership functions. In this study, extreme relation between different functions is formed which all of them derived from artificial intelligence. The appropriate operators also are defined by artificial intelligence.

The artificial intelligence will also obtain this information based on past information inside the input variables. It means, the appropriate decisions is made for defining proper variables and rules with attention to what happened in the past. In figure 10, the commands which are designed in the model and the combination of information is done based on it is shown as membership function graph. They are also said model roles.

The figure above is a part of rules written between membership functions which are shown as graph. Each of the three inputs contains 5 membership functions which their graph are also drawn. Each of these functions can show a behavior while their combination can select a special value as average. For example, according to the results derived from figure 10, the following relation can be expressed as one of the obtained results: if the first input is equal to 47, the second input is equal to 52.5 and the third input is equal to 54.5, then it can be said that the output of the model is equal to 69.3.

According to this pattern, it could be possible to predict other values and by changing any of inputs can achieve new result. Therefore, the output of each of these values can be changed. So, extreme points could be defined according to these relations. In fact, the main shape of this numerical relation is shown in following figures. Now, the 3D graph for predictive model is obtained as figure 11. According to this figure, assuming the constant values for first and third inputs, the second input will be changed and the variation procedure is as follow.In graph derived from figure 11, if the second input increase and third input decrease, the output of the second model will also increase. However, the gradient of second input increase is also decrease. The figure is shown the maximum and minimum points clearly. The first input is assumed constant.

In graph shown in figure 12, the output will also be changed if the third input changed while the first and second inputs are constant. According to obtained graph, the output will increase if the second input increase and first input decrease while the third one holds on fixed. The following graph also shows the minimum and maximum points clearly and the extremum points could be defined according to it.Finally, at last figure by holding the second inputs constant, the first and third inputs are considered. The output of the model also varied according to the first and third inputs. In the graph drawn in figure 13, by decreasing both inputs, the output will increase and the extremum points could be defined according to it.

After analyzing the results, the error of model's prediction is computed to show its power. In table 1, the error for obtained model is computed on training and test sets. The error on training set is 1.08 and the error on test set is 0.67. Accordingly, the error of model on training phase is 1.08 and on testing phase is 0.67.

CONCLUSION

In this research which the main idea is proposing an appropriate method for cash flow control and prediction, the model is derived using MTALAB software by research data and past information. The results are shown that the error of this model is lower than other methods. As the error rate is decreased by repeating the method. In this research, fuzzy hybrid neural network is used for cash flow control and by using the information of implemented projects the method is analyzed and concluded. The general results show the strong ability of ANFIS in project cash flow control. It also obtained that the method based on the combination of neural network and fuzzy logic is a proper method for project cash flow control and could be used as a predictive model by financial managers.

Practical Implications

Using fuzzy hybrid neural network for cash flow control. It also possible to compare the results derived from fuzzy logic based on expert's opinion and the results derived from fuzzy logic based on neural network.The model of fuzzy neural network will be used in prediction of other accounting and finance variables.

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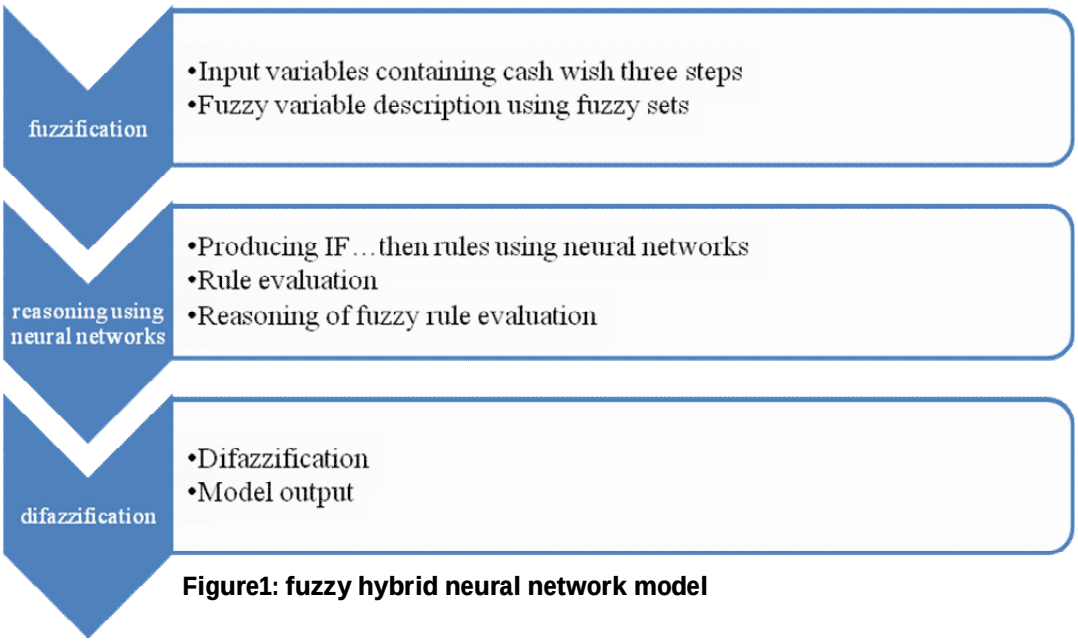

Figure1: fuzzy hybrid neural network model

Figure2: general structure of fuzzy system

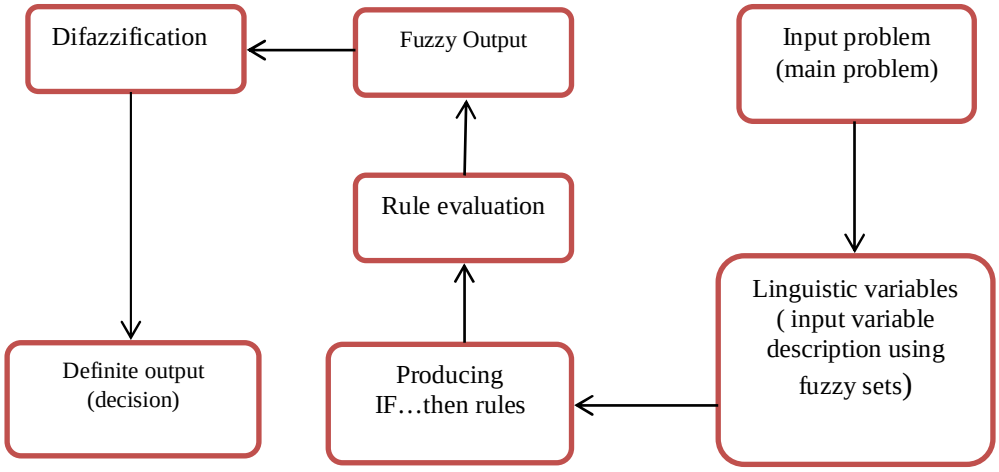

Figure3: fuzzy logic control procedure

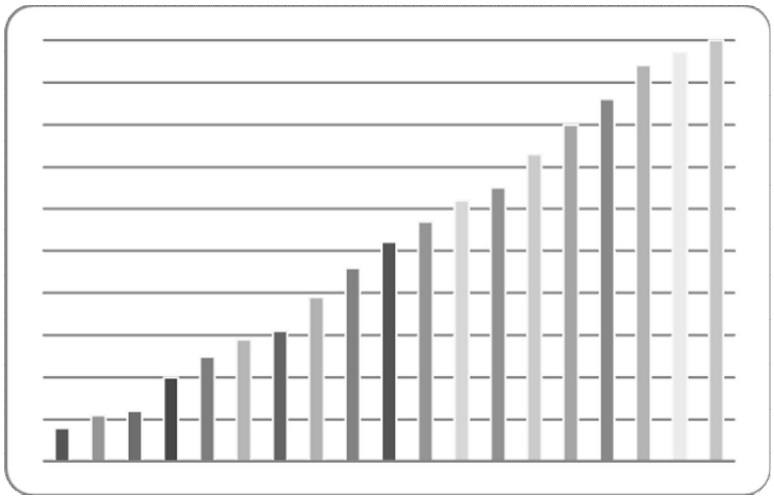

Figure 4: cash flow process in comparison with project activity

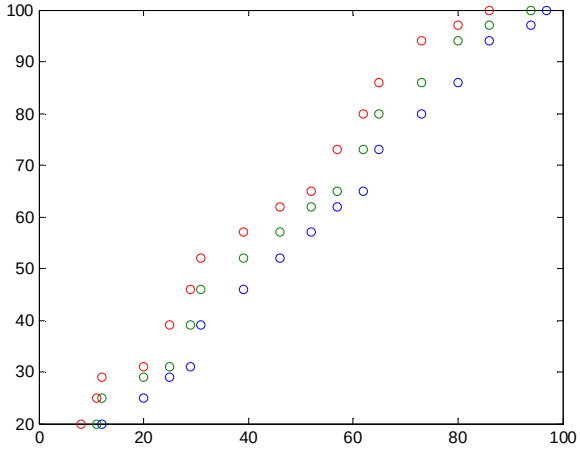

Figure 5: model inputs procedure

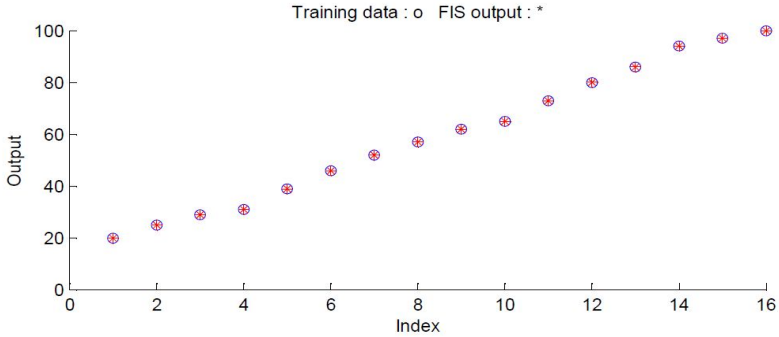

Figure 6: training of model

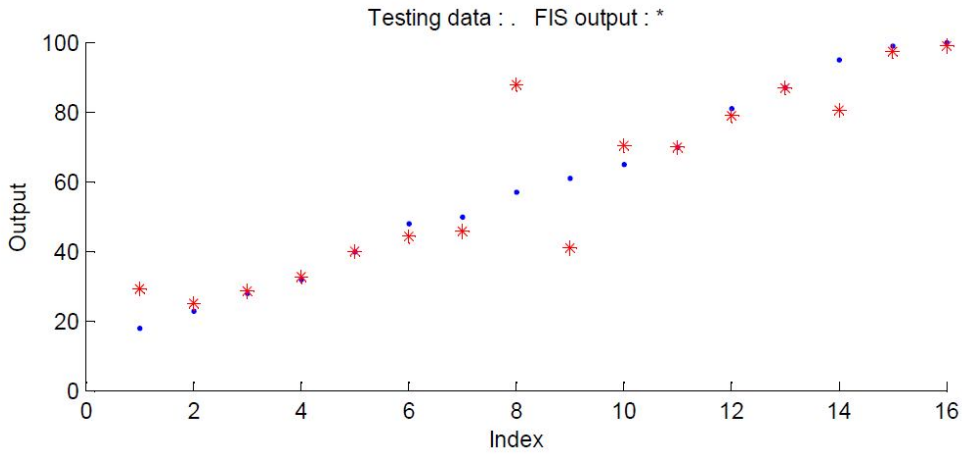

Figure 7: test of model

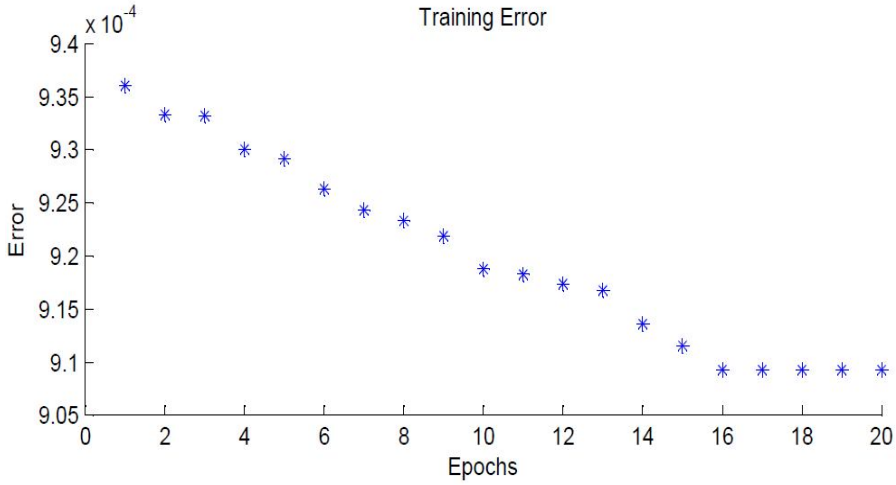

Figure 8: model error procedure

Table 1: Error of model

RMSE	RMSE
Training	1.08
Testing	0.67

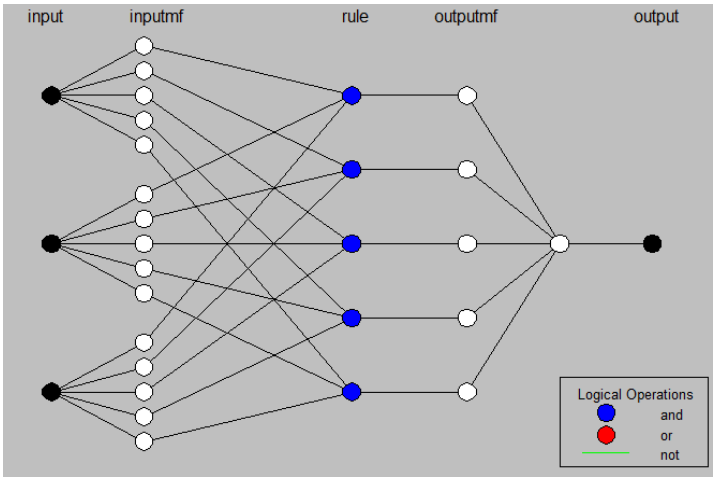

Figure 9: chart of research model

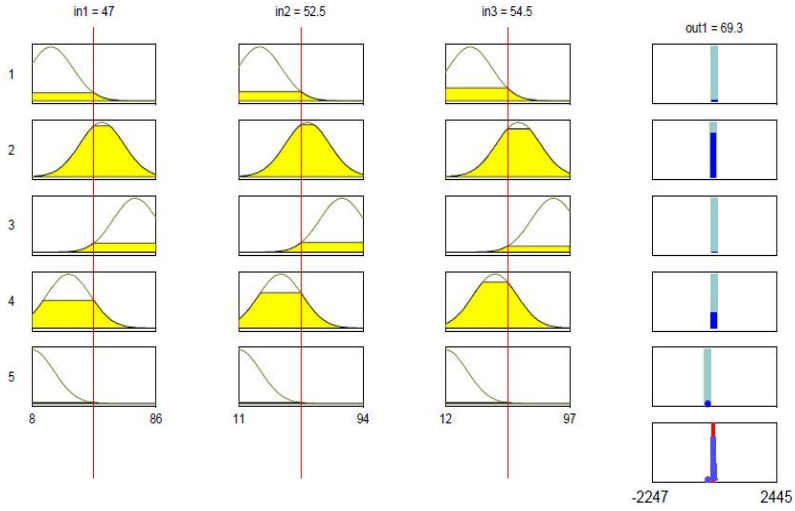

Figure 10: The output of membership functions

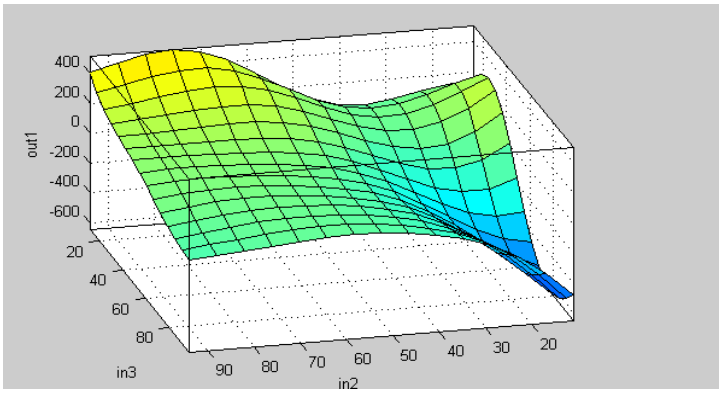

Figure 11: The model output in first case

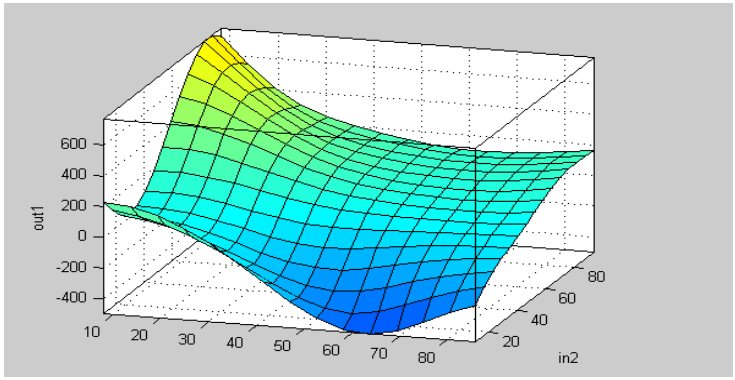

Figure 12: The model output in second case

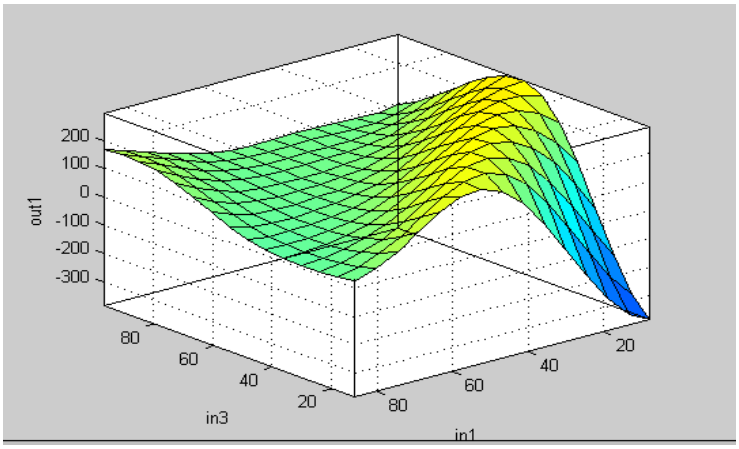

Figure 13: The model output in third case

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RESEARCH ARTICLE

How the Iranian Instructional TV Network uses the Visuals for Instructional Contents

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ABSTRACT

The purpose of this study is to find out how Iranian instructional TV Network uses the visuals for instructional contents. The used methodology was quantitative content analysis and the studied group included programs broadcasted by Instructional TV in the summer 2012. Selected by random sampling, 12 days (equal to 12240 minutes) of the programs broadcasted by the Instructional TV were analyzed. Data was collected by author-developed questionnaires. Tables of distribution and Chi-square test were used to analyze data. Instructional TV has been successful in utilization of shot size related to content, formal costume, orderly arrangement of decoration and the amount of images and writings used in proportion to the content, while it failed in utilization of content related decoration. It is recommended to consider the image, as a key element in instructional programs.

Key words: instructional film and TV, quantitative content analysis, technical structures

INTRODUCTION

All those who are involved in education try to quicken the process of learning for their audience. Among instructional methods used in the modern world, *distance-learning education* is widely used in recent decades due to media growth and progression. This kind of education occurs by various media including television. Because of capabilities such as availability, being multimedia, being used from home and unofficial sites (Olson, 1974), recording programs, showing the images which are impossible to display ordinarily (Shamsaee, 2003), and producing programs which comply with instructional goals (Ahadian, 2002), television is of great importance in education.

UNESCO defines education as all actions, effects, ways and methods for development of mental and cognitive ability as well as skills, attitudes and behaviors and knows education as a lasting consecutive, inseparable part of human life. According to UNESCO, media such as press, radio, television, satellite and internet are of great importance for direct and indirect education due to the role of senses in learning (Shahmohammadi, 2003). In fact, television is one of the outstanding phenomena of the information era. Instructional television can play the most important role in developing culture of societies (Noroozi, 2003; *Nili Ahmad Abadi*, 2003). Considering the evolution of instructional technology from communication media to instructional system followed by learning-problem solving phase and contextualism, media and its extension shifted from formal to informal education (Pakpoor, 2011). A practical instance is US instructional television since 1950s (Olson, 1974). A current example is China which uses this important medium for education (MA and Hawkridge, 1995). At present, Instructional TV Network is accounted as a source of learning and education (*SulaimanNejad **&** Vafaeemehr, 2010*).

The main goal of instructional technology is to facilitate and stabilize the learning process. One of the aspects of instructional technology is to select instructional media considering particular measures of education (Fardanesh, 2006; Khaghanizadeh & Shokrollahi, 2009).

THEORETICAL BACKGROUND

Distance learning: according to Akhter (2011), distance learning includes any organized activity which is helpful for school dropouts, urban and rural adults, male and female youth, administrative and industrial workers to improve their knowledge for employment, revenue or general education. He believes that distance learners are those who cannot leave their workplaces and be in contact with their instructors. In such cases, the media plays a critical role in improving instructional aids for learners who are not continuously in contact with their instructors.

Anderson (2008) believes that distance education existed for 5 generations. As he writes, education was first by mailing between student and teacher. In the mid-20th century, however, television and radio began the third generation by drastic change and support of mass media.

Considering the progress of communication and education technologies, Rezaa'ee and Paakseresht (2008) classified distance education into three generations: 1) correspondence and planned distance education, 2) distance education through radio, television and computer, and 3) virtual distance education.

Theories Supporting Media Learning

Theoretical basics, which can be used as scientific basics of visual-audio media, include:

The role of senses in education

Research found that people learn 10% of what they read ,20% of what they hear, 30% of what they see, 50% of what they see and hear, 80% of what they hear and read, 90% of what they see, hear, touch and say (Yazar & Arifoglu, 2012).

Dual coding theory

According to this theory (Paivio, 1969), people expand their learning mostly in two ways: speech and visual imaginations. The information is made for learning and reminding through visualizing and the symbolic process of verbal communication. Accordingly, objectives remain as images and subjective concepts remain verbally in the mind. Olson and Hergenhahn (2012) and Saif (2006) believed that information is processed through two separate visual and audio channels, which are able to process a limited number of information at a time. Results obtained for

this theory show that learning happens better when the information obtained by both channels is coordinated and interrelated. Cassidy and Knowlton (1983) asserted that visual system and audio system act separately in two right and left hemisphere of the brain. The right one works for images and the left one is related to speech. Daniels (1996) considers the different learning channels as an important theoretical basis for research related to movies and television. As he writes, research has shown that using both visual and audio channels, rather than using one channel, is more effective in learning concepts and problem solving process.

Script Theory

The theory states that memory is generally episodic; that is, more adaptive episodes to the individual experiences will remain in the memory better. There are some general events known as script which helps the individual to understand verbal and non-visual massages. This theory claims that intellectual structures used for understanding and predicting the behavior in social situations are used to produce appropriate responses. The theory believes that people organize their works in the form of script. Instructional films extensively present the various events organized in the form of script; by watching instructional films, events are recreated and scripts are organized in the memory (Barouge, Chen, Burrows, 1996).

Edgar Dale's Cone of Experience

Ahadian (2002) recommends using audio-visual signs such as film and television and finally signs and symbols based on Edgar Dale's cone of experience for instructional experiences particularly at early ages in the lack of direct experiences. The cone contains entire learning experiences. As we move forward from the base to the top of the pyramid, the subjectivity of learning experiences increases and the objectivity decreases.

Theory of Multiple Intelligence

Gardener believes that human being has multiple intelligences including speech, logical- mathematical, spatial, motor-physical, musical, interpersonal, intrapersonal and naturalist intelligences. According to Gardener, people are able to reach a certain level of intelligences. One of the factors to improve multiple intelligences is to use various media which take the individuals discrepancies into account for education (Razavi, 2007; *Amir Teimoori*, 2004).

The image in instructional film and television

Television is known as a multimedia with no interaction. In line with multimedia rules, text is considered as an image. The use of text and image, simultaneously, increases the cognitive load; it is better to use speech rather than text (Mayer, 2009). Razavi (2007) asserts that it is better to use audio speech with image when the learner is not involved in presentation. When the media let the learner to progress by his speed, the text is as effective as voice.
Fardanesh (2006) described the characteristics of instructional films: speech and image are both effective on learning. Using titles and written questions can act as amplifier. Using legible writing can increase the effectiveness. Removing unnecessary visual sources can increase the effectiveness.

Razavi (2008) believes that narration should be coordinated with image. Gunter and McAleer (1997) believe that irrelevant details reduce the ability to remember the main idea. Abdollah, Fack and Lan (2010) noted the coordination between speech and image as factors in instructional videos. To use image in educational programs, special attention is required. Professionals pointed out some factors on how to use image. Ahadian et al. (2001) believe that image is the main factor in television and video; speech completes the image. According to Ahadian, content and visual text attract more attention rather than verbal text.Razavi (2008) believes that visual sings are preferred on verbal symbols.

Excessive use of visual materials is not recommended. Misuse of the images distracts the audience when the text itself or the lecture forms mental images in the audience, when the image provides little information over the subject, and when the image is irrelevant to the provided information (*Amir Teimoori*, 2011).

The instructional designer is provided with noticeable opportunities for concentration on visual-audio cases. The cases such as emphasis on significant sections, coordination of the text and image, presentation of visually attractive materials and addition of special audio effects and music can increase attention of learners **(***ibid*).According to Yazar and Arifoglu (2012), television is a positive factor in a child world, because television contains emotionally influential experiences and enriched images.

Tidhar (1990) asserts that the written text related to image helps to improve learning, because it leads to remembrance and attention to material which may not be addressed verbally. In his opinion, audiovisual attractiveness, presentation of real-life situations, for example in the programs, should be taken into consideration.
Ahadian et al. (2001) found that entertaining shows, which are highly visualized, lead to more mathematic learning. Since all visual factors of TV programs are called images, decorations, clothing, body movements and gestures can be regarded as a bunch of visual factors which are advantageous for clarifying the content. That is why it is interesting to see how integrity of the decoration can be effective on attitudes of the audience. When the actors play their roles in a location such as a classroom, study room or museum, signs of the scene and decorations indicate the imposition of intellectual sense and knowledge acquisition on the program (Millerson & Owens**,** 1999).Shot is also an important factor in television programs, proper usage of which leads to functional improvement. Consider the followings:

Limit the movements of expert's hands in close-ups. For details, it will be better to point by a marker or pen instead of finger. Use close-ups to teach practical instances and emphasize on important details. Before cutting the details in a scene to introduce the subject, start with an opener shot of that scene. In an opener shot, some relationships reveal between subject and the environment in front of camera and between sizes of the environment. To be sure, start with a shot opener than before and edit the close-ups of the detail by open shot (ibid).
In analyzing instructional films, Hauff and Laaser (1996) noted that:

- To attract audience, various techniques are used, such as graphical and real-life images. If there are different figures, they can be used to attract audience.
- To illustrate tables can decrease the details.
- If the audio information is complicated, the images must not be misleading.
- The design must be consecutive. The background color, characters and symbols must help the learner to encode the information and receive the messages. Thus, the familiar images are better to use.

According to Simonson (1999), options of camera zoom can be used to display the details.Abdullah et al. (2010) argue that quality of images, texts, headlines and textual depictions are considerable characteristics of instructional films. According to Abdullah et al, the images must be borrowed from the real world.

Image on Television (technical characteristics of instructional television)

The technical characteristics of TV programs are known as constructs which are categorized in two parts: technical codes and mise-en-scène.

Technical codes involve shot size, camera angles, type of lenses, composition, focusing, lighting codes, and color codes. Mise-en-scène involves formalist codes of the construct including decoration, accessories, body language and

costume codes (Selby and Cowdery, 1995).This study reviews some selected technical characteristics and their application based on content. Metallinos (2013) summarizes evaluation factors of instructional TV programs based on three dimensions: the massage, the medium and the audience. Here, the dimension related to instructional images is medium. The criteria related to medium or image involve factors of production and performance.

Factors of production: lighting effects, colours and visual transparency, camera, lens, framing, decoration, space, interrelation (background, mid-ground and foreground), screen, establishment, step, movement, rhythm, editing techniques, special effects, graphic, continuity, sharpness, unity, integrity, audio expansion, audio-visual synchronization, audio-visual amplification, audio- visual balance.

Factors of performance: appearance, costume and color of the performer; age, gender, personal characteristics; body language, presence at scene of in front of camera; look, eye lens function, natural gestures; the coordination between character and content; expressiveness and credibility of characters (p163).

The research questions are as follow:
The main question: how Iran Instructional TV Network uses visuals for instructional content?

The marginal questions:

Is the shot size fitted to content?

1- Is the costume used in the program fitted to content?
2- Is the decoration fitted to content?
3- Is the shot size fitted to content?
4- Is the used text fitted to content?

RESULTS

1- Is the shot size fitted to content?

According to Chi-square, there is a significant relationship between close-up and content (error $P<0.05$). As the table shows, the lowest amount of close-up as much as required (63%) is related to motor skills and the highest amount is related to attitudes (91%). The highest amount of close-up lower than required is related to motor skills and the highest amount of close-up higher than required is related to motor skills, which indicates the insufficient utilization of close-up in motor skills.

2- Is the costume used in the program fitted to content?

According to Chi-square obtained for any content (error $P<0.05$), there is no significant relationship between verbal information and attitudes as well as formal and informal costume. In other words, the costumes were formal in programs with verbal information (88%), intellectual skills (77%), motor skills (61%) and attitudes (88%) and were informal in programs with motor skills (38%) and intellectual skills (23%). The data indicates that the costumes used in majority of programs were formal.

3- Is the decoration fitted to content?

To respond this question, decoration, their arrangement and composition of the image are discussed.

According to Chi-Square, there is no significant relationship between decoration and content (P<0.05). In the other world, all programs acted similarly in using decorations relevant or irrelevant to the content. The least relevance between decorations and content was related to intellectual skills (47%) and the most relevance was related to attitudes (62%). in other words, nearly half of the programs broadcasted by the network suffer from the irrelevant decorations to content.

According to Chi-Square, there is no significant relationship between mise-en-scene and content (P<0/05). In other words, all programs acted similarly concerning ordered or disordered mise-en-scene. The least ordered mise-en-scene was related to intellectual skills (63%) and the most disordered mise-en-scene was related to attitudes (72%), while mise-en-scene was orderly in majority of programs.

4- Is the used image fitted to content?

According to the Chi-square, there is no significant relationship between content and the used image (p<0.05). In other words, all contents acted similarly in using image. The used image was fitted to content of programs with verbal information (89%), mental skills (86%), motor skills (78%) and attitudes (92%). In other words, image was used as much as required in majority of programs.

5- Is the text size fitted to content?

According to the Chi-square, there is no significant relationship between content and the text size. in other words, all contents acted similarly in using text size. The text size was fitted to programs with verbal information (74%), intellectual skills (68%), motor skills (78%) and attitudes (79%). The text size was fitted to all contents except for intellectual skills.

DISCUSSION AND CONCLUSION

Is the shot size fitted to content? As the Table 1 shows, there is a significant relationship between close-up and content (P<0.05). Close-up is not sufficiently used for motor skills. According to Simonson (1999), close-up is used in programs which provide instructions and require emphasis on a part of the image. Simonson (1999) also believes that camera zoom is used to show the details. According to the table related to content and the figures provided by Pakpoor (2011), the procedure should be noted to instruct contents and concepts (the former is related to psycho-motor and the latter is related to cognitive goals) and details concerning concepts and procedures should be presented.

In response to questions 2 and 3, different points might be considered for analysis of written text. Appearance of a work is an important factor. In this type of texts, font, size, length, space, grammar and images are analyzed. As Millerson (1999) points out, image or visual factors are a set of technical factors such as mise en scène, costume, body language, lighting etc. According to Milerson, all factors should be integrated to convey the meaning. Therefore, all parts of décor, costume, body language, and lighting should be coordinated. This is consistent with Selby who categorizes the TV characteristics called as construct into two groups: technical codes including shot size, camera angle, lens type, composition, transparency and lighting codes and color codes. The second group is mise-en-scène including stage, decoration, body language and clothes codes. As he writes: to convey the meaning, all these factors must be used together effectively. In this regard, Metallinos (2013) notes three dimensions to evaluate instructional television. One of these dimensions is media which is divided into two categories: production and performance. Production includes lighting, color, transparency, camera, framing, decoration, space, interaction between background, ground and foreground, composition, graphic, visual constancy, edition, special effects, movement and integrity. Performance includes appearance and costumes, age and personality, body, eye contact, coordination

between personality and content. For production, the background, ground and foreground must interact; for performance, body movements are considered. The clothes, appearance, age and personality must be consistent to the content. Reviewing instructional films produced by Haugen University studio, Germany, Hauff and Laaser (1996) noted that all the visual factors of an instructional program must be coordinated to convey the meaning. He believes that visual factors include the safe frame and 3-to-4 image, the background color, written characters, lighting, camera motion, camera angle, composition and edition. Meanwhile, Ahadian et al. (2001), Fardanesh (2006), Razavi (2008), Tidhar (1990) and Abdullah et al. (2010), Gunter and McAleer (1997) believe that speech and image should be consistent in an instructional program. For instructional content, what is observed in image should be consistent with what is presented. Considering the factors identified as visual factors, it is noteworthy that image is the first and most important element in instructional TV, as Ahadian et al. (2001**),** *Amir Teimoori* (2011), Razavi (2008) noted, which suggest the accuracy in programs.

Is the costumes fitted to the content? According to table (2) and Chi-square obtained for any content (error P<0.05), there is no significant relationship between verbal information and attitudes and formal and informal costumes. That is, the formal costume is used in both in almost equal amount. The information shows that majority of the programs use formal costumes. According to media professionals, the costumes as other visual factors should be consistent with objective and content of the programs particularly instructional programs to convey its didactic message. This is observed in most programs of the Instructional Network.Is the decoration fitted to content? According to table (3) and the Chi-square, there is no significant relationship between decoration and content (P<0/05). In other words, all the contents acted similarly in using relevant or irrelevant decorations to the content. Approximately half of the programs broadcasted by the network suffer from irrelevance of decoration to the content; meanwhile, decoration as a visual element should be consistent to the content to deliver the didactical massage to the audience, which is not fulfilled in the Instructional Network.

According to Table (4) and Chi-square, there is no significant relationship between mise en scène and contents (p<0.05). In other words, all the contents acted similarly in using ordered or disordered mise en scene. While mise en scene was orderly in majority of the programs. Mise en scene is an important factor in instructional programs, television and instructional films. It is effective in successful delivery of the massage, which is consistent with Metalinus, Hauff and Laaser. The results suggest the successful mise en scene of most broadcasted programs.Is the used image fitted to content? The image is the first and most vital element in instructional programs. Ahadian et al. (2001), *Amir Teimoori* (2011) and Razavi (2008) noted the accuracy in in selecting image. Extreme utilization of image will result in failure in delivering the massage. *Amir teimoori* (2011) believes that improper utilization of image will cause distraction. Biehler (1971) warn us to be careful in presenting verbal materials to children, because the words may be perceived undistinguishable by the child. In this case, in which the image can help the child to understand the image, it is essential to use image.

According to above and Table (5) and Chi-Square, there is no significant relationship between content and the used image (p<0.05). In other words, all the contents acted similarly in using imahe. In most programs, the used image is proportional to the requirements. In addition, it is noteworthy that television as an audio-visual medium (Amir Teimuri, 2005; Aliabadi, *2004*) could be the best medium to achieve psycho-motor skills (Ahadian et al., 2001). Audio and video must be used in their proper place. For more effectiveness of instructional programs, it is essential to emphasize on visual resources. Gunter and McAleer (1997) believe that additional images and irrelevant details will reduce the ability to remember TV programs.

Is the content is appropriate to décor? TV is known as a multimedia with no interaction. In multimedia, text is considered as a visual element. Where the speech and image are complementary, there would be no need to use text, because it is accounted as an unnecessary visual element which must be removed, because it increases the cognitive load on audience (Mayer, 2009). Faradanesh (2006) notes that text titles and questions are required for higher effectiveness of instructional programs. Hauff and Laaser (1996) believe that the text must be summarized in the

instructional programs. They recommend using tables or summaries to present the text in order to reduce the details. He considers the readability of text as a noticeable element.

According to Table 6 and Chi- square, there is no significant relationship between content and text size ($P<0.05$). In other words, all the contents acted similarly in using text. Text was used properly in programs with verbal Information (74%), intellectual skills (68%), motor skills (68%), and attitudes (79%). Except for intellectual skills, the text was used properly in other contents.

As noted earlier, the titles or questions should be written in instructional programs. In some of these programs, this was not fulfilled where it was required to write the subject, title of procedures, meanings of English words for adult audiences. The programs were not planned to use text considering the different contents. Considering the high percentages obtained for application of proper text size in programs, the Instructional Network has been successful in using texts.

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Table 1: The relationship between content and close-up size

Close up	Content			
	Verbal Information	**Intellectual skills**	**Motor skills**	**Attitudes**
Lower than required	36	18	12	11
	46.8%	23.4%	15.6%	14.3%
Row	10.6%	13.0%	29.3%	5.9%
Column				
As much as required	298	117	26	170
	48.8%	19.1%	4.3%	27.8%
Row	87.6%	84.8%	63.4%	91.4%
Column				
Higher than required	6	3	3	6
	17.6%	17.6%	17.6%	29.4%
Row	1.8%	2.2%	7.3%	2.7%
Column				
Total	340	138	41	186
Row	48.2%	19.6%	5.8%	26.4%
Column	100.0%	100.0%	100.0%	100.0%

sig =0.000 df=6 X^2 =25.415

Table2: The relationship between content and costume

Costume	Content			
	Verbal Information	**Intellectual skills**	**Motor skills**	**Attitudes**
Formal	243	94	24	143
Row	95.3%	36.9%	9.4%	56.1%
Column	86.2%	77.0%	61.5%	88.3%
Informal	39	28	15	19
Row	95.1%	68.3%	36.6%	46.3%
Column	13.8%	23.0%	38.5%	11.7%
Total	282	122	39	162
Row	95.3%	41.2%	13.2%	54.7%
Column	100.0%	100.0%	100.0%	100.05
Sig.	Sig=0.603 df=1 X^2=0.002	Sig=0.000 df=1 X^2=14.401	Sig=0.000 df=1 X^2=22.799	Sig=0.160 df=1 X^2=1.352

Table3: The relationship between decoration and content

decorations	Content			
	Verbal Information	**Intellectual skills**	**Motor skills**	**Attitudes**
Relevant	170	62	24	109
Row	46.6%	17.0%	6.6%	29.9%
Column	53.3%	47.0%	58.5%	62.3%
Irrelevant	149	70	17	66
Row	49.3%	23.2%	5.6%	21.9%
Column	46.7%	53.0%	41.5%	37.7%
Total	319	132	41	175
Row	47.8%	19.8%	6.1%	26.2%
Column	100.0%	100.0%	100.0%	100.0%

sig =0.052 df=3 X^2=7.747

Table 4: The relationship between decoration and content

decorations	Content			
	Verbal Information	**Intellectual skills**	**Motor skills**	**Attitudes**
Relevant	170	62	24	109
Row	46.6%	17.0%	6.6%	29.9%
Column	53.3%	47.0%	58.5%	62.3%
Irrelevant	149	70	17	66

Row Column	49.3% 46.7%	23.2% 53.0%	5.6% 41.5%	21.9% 37.7%
Total Row Column	319 47.8% 100.0%	132 19.8% 100.0%	41 6.1% 100.0%	175 26.2% 100.0%

sig =0.052 df=3 X^2 =7.747

Table 5: The relationship between content and the used image

Image	Content			
	Verbal Information	Intellectual skills	Motor skills	Attitudes
Number Fewer than required Relevant to content	30 44.8% 8.8%	19 28.4% 13.8%	9 13.4% 22.0%	9 13.4% 4.8%
Number Fitted Relevant to content	304 48.5% 89.4%	119 19.0% 86.2%	32 5.1% 78.0%	172 27.4% 92.5%
Number More than required Relevant to content	6 54.5% 1.8%	0 0.0% 0.0%	0 0.0% 0.0%	5 45.5% 2.7%
Total	340	138	41	186

sig =0.004 df=6 X^2 =19.080

Table 6: The relationship between content and text size

Text	Content			
	Verbal Information	Intellectual skills	Motor skills	Attitudes
Number Fewer than required Relevant to content	63 48.5% 18.5%	36 27.7% 26.1%	8 6.2% 19.5%	23 17.7% 12.4%
Number Fitted Relevant to content	252 47.9% 74.1%	95 18.1% 68.8%	32 6.1% 78.0%	147 27.9% 79.5%
Number More than required Relevant to content	25 52.1% 7.4%	7 14.6% 5.1%	1 2.1% 2.4%	15 31.3% 8.1%
Total	340	138	41	185

sig =0.070 df=6 X^2 =11.649

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RESEARCH ARTICLE

Literary-Mystical Description of Amir Hosseini Heravi's Kanzoromuz

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ABSTRACT

This paper explains various aspects of *Kanzoromuz* writen by the seventh and eighth century poet, author and mystic, Amir Hosseini Heravi. Consisting of different parts, first part of the study describes life, works and the stylistic characteristics of Amir Hosseini Heravi. Due to rarity of this book and unavailability of new prints, in order to introduce another instance of mystical works to audiences and enthusiasts and according to the necessities of the study, we have stated verses from the corrected version of *Kanzoromuz* by Dr. Mohammad Torabi. Each verse is followed by the comments of Sufi Sheikhs and Heravi's opinion. *Kanzoromuz* is an unannotated book; having been away from periphrastic speeches, the poet has addressed the basic concepts. Despite the small size of the book, the poet tries to familiarize readers with mystical truths and his contemporary Sufi school of thought in one session. Heravi is one of the first mystics who have stated his Sufi concepts with poetic language.

Keywords: Amir Hosseini Heravi, Kanzoromuz, Mysticism; Magham-Hal.

INTRODUCTION

The scope of Persian language and literature is so extensive that the whole lifetime of all scholars and researchers will not provide enough time to discover its far-fetched lands, and there still contains intact and undisturbed grounds calling for the discovery of researchers. One of the far-fetched lands is the kingdom of Persian mysticism and its

beautiful verses that are governed by great kings such as Rumi, Sanai, Attar, Shabestari and others. Of course, there are less famous pilgrims travelled this way and they have been ignored mostly by audiences. One of these pilgrims is Amir Hosseini Heravi who introduced various lands and different positions and moods of mysticism with his simple and pure language.

Hosseini Heravi, which is categorized in the class of secondary poets and writers of Persian language and literature, has tried for his part to fight against the onslaught of false Sufis and to challenge commons having been unaware of the benefit of Islamic mysticism by authorship of works including *Kanzoromuz*, which has been guided the enthusiasts of Sufism and mysticism.

This study arises from the writters' personal interest in Islamic mysticism and Amir Hosseini Heravi who has had little influence on Islamic literature and mysticism – in spite of writing magnitude works such as "The Garden of Secrets" – and aims to describe *Kanzoromuz* with a literary-mystic approach.

Life and Works of Amir Hosseini Heravi

Morteza A'zam Amir Fakhrodin Seyed Rokn Al-Din Hossein Ibn Alam Ibn Hassan (Abolhasan/Abolhossein) was one Ghoravi Sadat of Heravi known as "Hosseini Sadat" or "Amir Hosseini"; he was a poet author, and scholar of late seventh century and early eighth century with the pseudonym of "Hosseini". He was born in one of the Ghor's towns called Ghazio or Qazio located in Khorasan. There are various sayings about the region and its people; some says, "It was the name of a mountainous province in Khorasan located near Ghazni and Ghorjestan that most of its inhabitants were infidel and it had a few Muslim converting to Islam during the caliphate of Ali ibn Abi Talib (peace upon him). The Muslims were assigned to govern the land by the rule of Imam Ali. Some people considered there mountainous, a cold climate, vast and frightening region with moody, inconsistent and unwise people located between Ghazni and Heart" (Dehkhoda Dictionary).

Amir Hosseini spent early years of his life and his youth acquiring knowledge and literature in his homeland; but he spent most of his life and began his spiritual journey in Herat. According to Jami's *Nafahatol Ons*, he acquired the "full knowledge of inward and outward sciences" (Jami, 1957: 605). He was known as Heravi because he had lived for a long time in the land. He is so famous that the place of his living is known still as "Amir Hossein Sadat neighborhood" (Torabi, 1992: 1).

The same as his contemporary poets and mystics like Faghreddin Araghi and Sa'di Shirazi, Hosseini Sadat spent his endeavor period at the classes of "Sheikh Baha al-Din Zakaria Multani", the founder of Multani Suhrawardi dynasty, and his son "Sheikh Sadr al-Din Aref Multani". In this regard, the source of his education is related to Shahab al-Din Suhrawardi (the founder of Suhrawardi dynasty) through the saying of Baha al-Din Zakaria (Safa, 1995: 132).

Amir Hosseini Heravi should be considered as a great scholar and mystic because he had perceived all sciences of his age; it is observable in his poems. In addition, many Sufis have praised his scientific and mystical position; for instance, Jami wrote *Nafahatol Ons*, "he acquired the full knowledge of inward and outward sciences" (Jami, 1957: 605). Amin Ahmad Razi comments, "In monotheism, he is well known so that no one could reach him, he travelled all the paths of knowledge" (Razi, 1961: 124). Sheikh Mahmud Shabistari called him, "A great man among all great men of Khorasan who was master in all types of arts, and all people prefered him rather than other elites of the age" (Torabi, 1992: 3). The famous commentator of "the Garden of Secrets", Sheikh Muhammad Lahiji, named him "the pole of siadat sky and the center of Obedience circle" and said that his prose and poem books are accepted by elites and common people (Lahiji, 1987: 36).

His death has been reported between years 717 and 719. Khandmir has reported 71, Jami reported 718 and Dolatshah reported 719 (Torabi, 1992: 4). Hosseini Heravi is one of the second-class Persian poets with powerful mind to make skillful and memorable descants and expressions. Below is a list of his works:

Kanzoromuz

As Hosseini Sadat has not mentioned the order of composing his poems, we can assess the sophistication and immaturity of his works with regard to his works, his style of writing and his poetic style; the most probable assesses indicate that *Kanzoromuz* is first verse written by the poet. The poem's is written written in 'Bahr-e-ramal Maqsur' meter following the meters in Jalal ad-Din Muhammad Balkhi's Masnavi. At the beginning of his book, the poet states the reason for such composition as his enthusiasm provoked in his heart by god. Then, he praises God and his Prophet the same as other poets and writers. He also eulogizes his mystic leaders and teachers including Shahab al-Din Suhrawardi, Sheikh Baha al-Din Zakaria Multani, Sheikh Sadr al-Din Aref and Seyed Shams al-Din Muhammad.

Zad al-Musafirin

This collection of poems is written in 'Bahr-e-MosadasAkhrab Mahzuf or Maqsur' imitating Hakim Nezami's Masnavi with the same meter as Leili and Majnun. It consists of about 1400 verses arranged in eight chapters; every chapter includes some stories.

Thirteen Letters Masnavi

This Masnavi is composed following the common style of ten-part letters in the seventh and eighth centuries. In composes of romantic letters corresponded between lovers; in this poems, the poet tries to describe mystic love and its various stages. This collection, which consists of more than 1300 verses, is written in 'Bahr-e Hazaj-e Musadas Mahzuf or Maqsur' in the manner and meter of Nezami's Khosrow and Shirin and to some extent the same as Veis and Ramin by Fakhruddin As'ad Gorgani.

Amir Hosseini Heravi's Collection of Poems

In addition to three aforementioned collections, another collection of poems is remained from Amir Hosseini Heravi. It consists of Qasida, lyric, Ruba'i, Tarji Band, tarkib Band and Qet'e. His Qasidas, which are more than 290 verses, is known as Five Treasures. Five Treasures describes ethical, mystical, spiritual and Unity issues and enumerates the virtues of God's friends and pioneers of pilgrimage.

Tarab al-Majalis

This work is a mixture of prose poem and poems combined with pleasant expressions that is derived from the style of texts written by Khwaja Abdullah Ansari - the famous Sufi of Heart. Having been written in flowing prose, this book consists of issues in the field of ethic, wisdom, preaching and divine sciences documented to Qur'anic verses and prophetic traditions arranged with eloquent expression in 5 parts and 55 chapters, usually the author sacrifices content for form.

Nozhat ol-Arvah

The book is written in Golestan style by Saadi Shirazi, Resael by Khwaja Abdullah and Tarab al-majalis documented to Qur'anic verses and prophetic traditions for expressing mystical issues. The book is apparently compiled in 711 Hijri, and it is called Nozhat ol-Arvah by Amir Hosseini:

"At the time that I finish,
I called it Nozhat ol-Arvah."

Mustaqim Serat

A short treatise consists of seven or eight advises about the task of travelers and the description of their pilgrimage. These terse words are written in flowing and simple prose.

Literary-Mystical description some Verses in Kanzoromuz

In this section, some verses of *Kanzoromuz* are presented, and they will be evaluated separately by the help of speeches from great Sufi sheikhs. It also states Amir Hosseini Heravi's opinion about specific mystical terms and phrases.

On Unification

"The mystery of unification will not be recognized,
The result of wise endeavors will be astonishment."
Verse 13: The mystery of unification: genitive description/ mystery: covered, hidden. The mystery resulted from God at the time of one's as a requirement for "انّما قولنا لشيء اذا اردنا ان نقول له كن فيكون" that means, "Our word for a thing when We intend it, is only that We say to it, Be, and it is" (Qur'an, 16:40). Therefore, it is true to argue that Right will be recognized only by right because right is Right's seeker, have its competency, and His mystic.

Astonishment: (Dehkhoda Dictionary, below term). Shibli says "المعرفه دوام الحيره" and astonishment has two types: first, in the being, second, about manners. Astonishment in being is polytheism and blasphemy, but about manners is knowledge because mystic does not doubt about his existence, and reason has not the ability to recognize manners. There remains a certainly about God's existence and astonishment about God's quality. In this regard, the Prophet states "من عرف نفسه فقد عرف ربه" "any one who considers himself as annihilated object, he will recognize God as perpetuity. Since all attributes to annihilation is void because it is not implemented for an object, the only way for His knowledge in astonishment (Hujwiri, 2008: 401-402).

The second verse refers to the Hadith "كلّ ما ميّز تموه بأوهامكم في أدقّ معانيه مخلوق مصنوع مثلكم مردود إليكم" that means "your fancy perceptions about the exact divine meanings [are not recognition of God but] they are created by you, and they will return to you [who are constructed]" (Forouzanfar, 2008: 418-419).

On the Sanctity of Soul

"The objectives for soul, and moody desires
It vanish my life in bother."

Verse 59: soul is spirit, mind and sensuality in contrast with spiritual self. Soul is defined as, "An abstract substance that requires no matter in nature, but it needs matter in actions" (Dehkhoda Dictionary, below term). Abu Yazid utters, "النفس صفه لا تسكن الا بالباطل" "Soul is an attribution that is located only in vain." Muhammad ibn `Ali at-Tirmidhi states "تريد ان تعرف الحق مع بقاء نفسك فيك، و نفسك لا تعرف نفسها، فكيف تعرف غيرها؟"; it means since the survival of you needs the survival of soul in you, how does soul perceive another object when this needs the survival of your soul in you? In other word, one's soul is imprisoned in him for its survival, since he is imprisoned, how can he uncover right.
Abu Solayman Darani says, "لنفس خائنه مانعه و أفضل الاعمال خلافها": Soul is traitor in trusteeship and obstacle for seeking satisfaction, and the best actions are contrary to him; he adds, malversation is alienation and leaving satisfaction is disruption (Hujwiri, 2008: 295, 300-301).

Be aware that soul has four stages: first, inciting self, second guileful self, third, charming self, fourth, the self at peace. Inciting self refers to the stage of soul that ha not experiences austerity, it desires everything for itself, and

moves toward its satisfaction, it is fed from material world and drinks the water of sensuality. Nevertheless, guileful self is lower than inciting self. It cannot stand against men's will; it usually seeks for an opportunity to distort one's attention from community and makes him confuse d and wanderer. It may be successful or unsuccessful.

Charming self aims at the right's friends; as it sees him firm in obedience and austerity, it says, "Show mercy to your soul, your soul has a right on you!" If the seeker is not accustomed to contemplation and scrutiny, it will fall him from right position to formalities, and give him permission. Wherever one is permitted, the self will be relieved; since the mind is strong, the person will return to the first step and he meet inciting self. In short, charming soul does not lead seeker to sin, but lead him to obedience. But the self at peace is the condition in which one becomes God's audience after obedience, austerity, edification and purity. The seeker returns to his God andboth seeker and God are satisfied from each other (Ansari, 2008: 484-485).

Hosseini Heravi said in this regard that self has a beautiful appearance and ugly conscience. It is very glamorous; therefore, one cannot understand it fully. However, if it is perceived fully, it can be a way to understand God. If the conscience of self is perceived, the secrets of existence will be uncovered. Self has three categories: (1) inciting self that is very rebellious and disobedient and brings ruin for men. (2) Self-accusing self, it seeker can meet this position after passing the inciting self. Sometimes, it is rebellious and other times it obedient. (3) The self at peace, it is achieved after passing the self-accusing self and is the best type of self; it is only obedient and away from all rebellions and impurity.

Love and Reason Debate

"Love can checkmate a king,
It may close all taverns."

Verse 229: checkmate is a term in chess, love defeats king with all their powers. Tavern: bar, pub (The Dictionary of Dehkhoda, below word). There are many saying about the term, its root, its meaning and its applications. In short, since selling and drinking wine is prohibited in Islamic law, the sellers and buyers had engaged in this job outside the city in ruins and abandoned places. Then the word was applied for the place of debauchery and butler. However, some argue that the pubs are called taverns (literally means abandoned places) because they cause the intoxication and failure of customers (Iraqi Sufi terminology, below word). Some believe that the word tavern connotes the corruption of material attributes and animal behaviors, outrage power, lust, traditions and reprehensible habits (Sajjadi, 2000: 342).

Lahiji claims "tavern implies unification in creation, or intrinsic and safat unification. It begins by the destruction of actions, and tavern attributes is included in free seeker who is not limited to dualities and differentiation of actions; he considers all attributes around the center f God and divine features, in this case no feature is belonged to others" (Lahiji, 366: 263).

Islam

All hearts in the alley of belief,
They will be comforted due to the light of Islam."

Nasafi states, "There are six things common in all Muslims. He knows them as common stage and claims: praying before maturity depends on the consensus of parents. When the person is matured, then he can convert to Islam, he is obliged to six new things: the belief in God, monotheism and the Prophet's words and sayings, second, obedience and conformity with them, third, avoidance of prohibited behaviors, fourth, repentance, fifth, business and profession, sixth, virtue in business." Abu Said declares, "الاسلام ان يموت عنك نفسك": Islam is the death of tour passions. Its eternal decree is the withdrawal of passions and sensualities, and a Muslim is one who obeys God according to " قالت الاعراب آمنا قل لم تؤمنوا و لكن قولوا اسلمنا و لمّا يدخل الايمان في قلوبهم". Faith is the spirit and truth of Islam (Kashani, 2007: 90).

Heravi believes that Islam means submission, leaving authority in front of God, admission of one's own inability, and denial of all except God. Equality is the requirement for being a Muslim. It means you must favor for others what you have liked for yourself, compliance with boundaries of all entities, and moderation in all affairs so that the person's heart be ready for faith.

Description of Heart

"As the sky of heart lands in the essence,
The sun of soul has revealed in it."

The heart implies that point of circle of essence that causes the first move and the completion of humanity. The secret of Beginning and eternity are merged in this point. The initiation of vision meets the horizons of perception. In this regard, the beauty and greatness of world will be manifested for seeker. Its attributes are the throne of Rahman, the house of Qur'an and Forqan, the Isthmus between hidden objects and visible things and soul and self, the assembly of kings and kingdoms, the king's supervisor and target, the lover and beloved of God, the container and carrier of secret, God's trust and mercy; the purpose of soul and self's marriage, and the result of his existence; the scene of vision and the aim of its intuition (Kashani, 2007: 98).

From the viewpoint of of Hosseini Heravi, heart is the treasures and confidant of God's secrets and it is so valuable that is accompanied by Gabriel and protected by first rational thought it may be a place for both inciting self and the self at peace. Its place is sometimes intimacy, sometimes proximity, and other times unification, and God speaks to his servant through heart's language; its place is between soul and self.

Description of Soul

"The dead men of ignorance,
Could be alive due to the breath of "God's spirit".

Verse 472: God's spirit: the title of Jesus who is one of the great prophets, is called the son of God by the Christians, and is considered as one of the Ulu'l azm Prophets (Dehkhoda Dictionary, below term). The breath of Jesus: it is said that the breath is the healer of patients and a cause for revival of dead people (Dehkhoda Dictionary, below term); it alludes to the revival of dead animals by Jesus. There is an analogy in words like God's spirit, revival, and breath.
Khwaja Abdullah says, "Human beings are body, heart, and soul. Body is the place of trust, heart is the court of address, and soul is the standpoint of visions! All blessings are allocated to body that is fed by foods and drinks and all pains are devoted to heart that its food is remembrance of the friend; all perceptions and observations are assigned for soul that its food is unification with the friend. Body is the prisoner of wrath, heart is confined by attributes, and soul has no destiny except dignity! The table of intimacy is open, the candle of tenderness is glaring, and the eternal friend is uncovered! This is soul, its work, and its ultimate" (Ansari, 2008: 1/580).

Hosseini Heravi believes that God has put spirit in the human body and nobody can see it in human beings. Reason is astonishing in its perception. The truth of soul is the light of honor and dignity; thus, confidentiality has great value in court.

Description of Reason

"Oh, you who enjoy the light of reason!
You are honorable in all worlds due to knowledge."

In the description of Garden of Secrets, it is said, "Reason and soul are spirit, and secret and cryptic world, speaking self, and heart are all the same truth that is called by these attributes according to its manifestations in different places (Sajjadi, 2000: 585). Azizuddin Nasafi comments about reason in this way "Be aware that at first reason is an

essence. But this essence is described by various additions and adverbs. Since the essence is observed to be helper and helped, it is called reason because reason is both document and documented. While it is observed to alive and cause of revival, it is called soul; therefore, it is soul, revived, and reviver…." (Ibid, 586). In Hosseini Heravi's mysticism, reason is the agument and testimony of God for human beings to avoid committing devious deeds. People will not achieve knowledge and wisdom without reason, in fact, human beings are close to Right with reason, and they will not slip. Reason is complementary to heart and soul since heart and soul are incapable without reason. Reason can achieve full wisdom only when it takes the advantages of religion. All the outcomes of cause and effect result from reason.

Types of of reason: (10) blind reason (2) sighted reason.
Blind reason guides human beings to astray, waste and sensuality, and causes his ignorance.
Sighted reason leads human beings to achieve unveiled truth.

Description of Sufism

In his introduction to Mesbah al-Hedaya and Meftah al- Kefaya, Jalal al-Din Homaee says, "In fact, there are many speeches about the mysticism of Sufi sheikhs and prominent figures in pilgrimage so that one can write an enormous treatise including short and pithy remarks cultivated by mature minds of wise figures. Our proper perception of the truth of Sufism leads us to recognize that in spite of their different appearances, they are really close to each other and related to one meaning and truth.

"In this path and from all around,
Great men address their home."

Actually, Sufism has different aspects and dimensions in technical and scientific terms, and maybe, any aspect results in the creation of a definition. In any case, one must know that "in such definitions, we should not look forward to finding a comprehensive and general description, but these definitions, as stated by scholars of logic, are nominal definitions and conventional concepts" (Kashani, 2007: 82-83). Abu Bakr Shebli said in this regard " التصوف شرك، لانه صيانه القلب عن رؤيه الغير و لاغير"; Sufism is idolatry, everything that is protected by heart will be covered by self and another self. It means observing another self is not idolatry in proving non- idolatry, and since another person's heart is not achievable, it is impossible to perceive him.

Heravi believes that Sufism is higher than all other theories; Sufism, which literally means *Tasavof* (تصوف) in Persian, is consists of four letters "ت", "ص", "و" and "ف" that are codes. "ت" implies that the manner of Sufi begins by "توبه" (repentance) and reaches to "ص" or "صدق" (verity); the prerequisite for Sufism is "و" or "" (loyalty). Finally, it ends in "ف" "فنا" (perdition). On the other hand, it may be derived from "صفا" that the first letter (ص) stands for "صدق" (verity), "ف" stands for "فقر" (poverty) and "الف" stands for "افتخار" (honor). Consequently, Sufi achieves the position of submission to God's will and leaving his own authority; thus, as long as a man is the prisoner of himself, he will not be a Sufi.

Description of Repentance Position

Repentance is a generous intercessor, sympathetic lawyer and kind successor, it removes the signs of sin, God will forgive his servant due to it, it clears the records of servants' evil practices, and it leads penitent to be regarded as infallible! As He claims that repentance for sins converts one to a situation so that he has never commit a sin (Ansari, 2008: 2/542). Repentance is a return to God, "توبوا الي‌الله توبه نصوحاً و من لم يتب فاولئك هم الظالمون". Repentance is in three things: regret at heart, apologize by tongue, and avoidance of evil person and evil deeds. Repentance has three parts: the submissives' repentance, the sinners' repentant, and Sufi's repentance. The submissives' repentance: excuse for seeing obedience abundant. The sinners' repentant: excuse for seeing sin trivial. Sufi's repentance: excuse for forgetting God's favor. Seeing obedience abundant has three signs: (1) to see himself savior due to his practices, (2) to see guilty as a result of his ignorance, (3) not to seek for his own taint. Seeing sin trivial has three signs: (1) to consider

one's own competence as God's mercy, (2) to be satisfied with infliction, (3) becoming close to evil persons. Forgetting God's favor has three signs: (1) to forget our humiliation in front of God, (2) to praise our condition, (3) to leave the happiness of intimacy with God (Ansari, 2009: 8-9).
For Hosseini Heravi, the condition of repentance is 'repentance is the first pillar of religion, as the foundation of a house.'

Description of Patience

Verse 657: patience: it has two literal meaning: (1) fortitude and (2) a bitter extract from a tree called Ilva in India (Dehkhoda Dictionary, below the word). In botanical books, patience is categorized in the class of liliums grown in warm climates. It has thick leaves with gummies called red patience that is a very powerful and bitter laxative (Gol Golab, 1949: 281).

About patience, Sufi Sheikhs believe that patience has three pillars: (1) in disaster "اصبروا", (2) from sin "وصابروا", and (3) in obedience "و رابطوا". Patience in disaster is possible because of love, and it results in three things: the vision of heart, sophisticated knowledge, and the light of wisdom. Patience from sin is possible due to fear and results in three aims: revelation of hearts, acceptance of prayings, and the light of infallibility. Patience in obedience is possible down to hope and results in three goals: prevention of disasters, getting sustenance without demand, and join the righteous men (Khwaja Abdullah, 2009: 27-28).

Hosseini believes that human beings should have patience in all affairs to achieve salvation. With patience, the self will be conscious. In fact, patience is like a light for reason. Standing on patience is the base of patience position, it is a difficult action and far-fetched for ignorant men.

Description of Annihilation and Perpetuity

In this regard, Qur'an says, "ولا تدع مع الله إلها آخر لا إله إلّا هو كلّ شئ هالك إلّا وجهه له الحكم و اليه ترجعون". It means "And call not with Allah any other god; there is no god but He, every thing is perishable but He; His is the judgment, and to Him you shall be brought back" (Qur'an, 28: 88).

According to Hosseini Heravi, annihilation is the ground of passage for Sufis and the primary way of lovers. The prerequisite for annihilation and perpetuity is seeking for right and leaving the wishes and demands of the ego. God grants his servant, puts him in the path of annihilation, lays his union in the essence of Sufi, makes him wandering and rapture, and annihilates him in his annihilation to help him to achieve perpetuity; in this way, the servant will meet perfection and magnitude. This condition is satisfied by the will of servant and God's care and attention; Sufi has not affected by world's sorrow or hereafter's sorrow. The truth of annihilation is 'because the servant is annihilated in his own annihilation, he will gain God's perpetuity'.

CONCLUSION

Theosophy and mysticism books are generally written in prose and there are few examples of mysticism books in poetic language. Nevertheless, Amir Hosseini Heravi, the seventh and eighth centuries Sufi, has presented specific Sufi terms in romance manner with poetic language. Some Sufi poets have expressed the most imaginative and complex concepts of Sufism in poetic language. Certainly, Amir Hosseini Heravi is among this group of Sufi poets.
Amir Hosseini Heravi should be considered as one of the greatest figures of his time. In his works and especially *Kanzoromuz*, he portrays all aspects of cultural and political life in his age in addition to explanation of imagination peak in description of in the most subtle concepts of thoughts. *Kanzoromuz* is a work from his maturity period. After praising God and his Prophet, he eulogizes Sufi Sheikhs including Shahab al-Din Suhrawardi, Sheikh Baha al-Din Zakaria Multani, Sheikh Sadr al-Din Aref and Seyed Shams al-Din Muhammad.

This book can be regarded as his first poetic composition for description of theosophical and mystical terms and expressions. However, *Garden of Secrets* is his first attempt in explaining specific romantic terms in Persian poetry; *Kanzoromuz* is supplementary to *Garden of Secrets*. Being aware that poetry is the most proper style for expression of Sufi conditions, Heravi has employed poetry delicately and skillfully to express complexities of Sufi perception from existence, human being, and arising issues.

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RESEARCH ARTICLE

Seismic Performance Evaluation of Irregular Steel Braced Buildings by Knee Bracing Frame Systems (KBF)

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ABSTRACT

The philosophy of design of structures against earthquakes is to meet this criterion that systems resisting seismic loads should be sufficiently hard to control the lateral displacement and enough ductile to prevent breakdown under severe earthquakes. Knee bracing frame (KBF) system in structures is a new way in which bracing is connected to a short member instead of beam and column connection. The short member, called as knee element and designed for failure in bending, prevents buckling of the brace. Yield process of the KBF system can be divided into two stages. First, yield will occur at the knee element under the lateral force (transverse); at the same time, plastic hinges will expand at the beam-knee and column-knee connections as well as the midpoint close to the knee center. Then, the system is biased towards the depreciation of knee element, which means the bracing system has reached its maximum capacity and the main frame will tolerate the load until the plastic hinges develop in beams or columns. Next, secondary phase of energy dissipation will occur. Using the first phase of energy dissipation, the main structural members are able to withstand a severe earthquake without being vulnerable, and the members can remain stable. The purpose of this study is to investigate the seismic behavior of KBF system in structures irregular in plan; for this purpose, analyses are conducted by modelling three regular and three irregular structures with KBF in story 10, 5 and 15 using time history analysis. The results show that hinges formed in braces are more than columns in low and medium structures (5 and 10 stories) and structures exhibit an acceptable behavior. While, the numbers of plastic hinges formed in columns and braces of 15-storey structure are close together in the upper stories, which will eventually cause structural collapse.

Keywords: seismic performance, irregular building, steel frame, bracing, KBF system.

INTRODUCTION

The main philosophy of structural seismic design regulations is to prevent loss of life, damage control and their business plan. Therefore, many studies have been recently conducted on appropriate access to three factors: structural strength, stiffness and ductility in the design of structures. Systems well provided with these three structural parameters have the potential to withstand lateral loads. Each of the conventional structural system have advantages and disadvantages in the process of dealing with the lateral forces in the linear and nonlinear areas. For example, moment resisting frames (MRF) are architecturally good systems because of their considerable open distance between columns for placement of openings, and their ductility and energy dissipation are relatively good; because of low lateral stiffness, however, it exhibits high horizontal displacement against lateral forces; thus, it strongly suffers the effect of P-Δ which changes economics of the system compared to other systems.

On the other hand, Concentric Braced Frame (CBF) has considerably high stiffness; because the lateral forces are transmitted axially by members, this system is economic. However, its ductility and energy dissipation are not good due to buckling braces against pressure. Therefore, these two systems are not separately able to provide good stiffness and ductility; thus, meeting both goals by the systems makes the design uneconomic.

In recent decades, researchers have tried to achieve the above three structural parameters simultaneously, leading to the introduction of new systems such as eccentric braced system (EBF) and knee brace system (KBF). EBF system, first introduced in Japan by Fujimoto and Tanabashy [1] and developed by Popov et al [2] at the University of Berkeley, California, is ductile and economic in addition to its high stiffness in the linear region, if the special regulations are met. This led to quick adoption of this system in design guidelines. Despite advantages, the system had disadvantages such as over-distortion of the roof because of high deformations occurred in the link beams. Because link beams as ductile energy-dissipater elements are a part of the main structural members (beams), fast inexpensive switching of the members is not possible [3].

Knee braced frame (KBF) is another bracing system with advantages of EBF without above problems. This system introduced by Balendra et al [4], University of Singapore, is indeed modified version of another system called as Disposable Knee Bracing (DKB), which was previously suggested by Ochoa in 1986 [5]. Ochoa suggested that the non-diagonal member of this system is designed only to be able to tolerate tension; in this system, the knee member can provide both stiffness and ductility [5].

In the knee braced system, the diagonal braces are connected to an inclined element attached to the beam-column or column-column and the base instead of the intersection of the beam and column. This element called as knee member as ductile element of the system causes severe energy dissipation by its plastic deformation during an earthquake [6]. More importantly, only the knee member experiences damages and yield after the earthquake and the main frame of diagonal braces remains plastic. In this case, the structure can be exploited again only by easy inexpensive replacement of the knee member [6].

Considering the fact that research on this type of braced system has generally been limited and the conducted research has been largely limited to the buildings regular in plan, this study examines the seismic behavior of buildings irregular in plan braced by KBF. Therefore, both regular structures and buildings in which mass is distributed irregularly in the story and causes eccentricity between the centers of mass and rigidity are studied. In addition, this study evaluates the controllability of torsion in these buildings by setting knee bracing specifications.

Literature Review

In 1986, Aristizabal Ochoa, a designer engineering, introduced a system called as disposable knee bracing (DKB) [5] in which the designed brace is connected to a point of the knee member between beam-column or the column-base in an inclined form, instead of the intersection of beam and column. This causes sufficient ductility and energy dissipation under intense lateral loads by yielding the knee member at each end and at the point of contact with diagonal bracing. After the earthquake, only the knee member experiences failure and yield and the main frame as well as the diagonal brace remains elastic. In this case, the structure can be exploited again only by easy inexpensive replacement of the knee member [5].Ochoa assumes that the pressure brace buckles and only tension braces without experiencing yield are responsible to provide ductility and energy dissipation through yield of the knee member. Although the system could provide higher ductility than the coaxial braced system (CBF), it experienced reduced stiffness and pinching phenomenon in the hysteric loops because of buckling in the pressure braces [6].

In 1990, Balendra, University of Singapore, suggested to use only one diagonal brace in order to improve the seismic behavior of the system. In his design, the brace should not experience buckling under the pressure. This system, known as knee brace system (KBF), was named unbuckling knee brace due to the lack of buckling in the pressure brace [3] and it quickly replaced other bracing systems in design of structures. In the proposed system, ductility followed by energy dissipation is provided by the knee member and the diagonal member provides stiffness [6]. By a full scale experiment on KBF, it was determined that the diagonal member is designed against local buckling and lateral torsion when the hysteric loops progress regularly without any reduction in the stiffness [6].

Balendra and Liao (1990) investigated the seismic behavior of knee braced systems to other systems. The comparisons made in multi-story braced frames by knee and off-axis bracing showed better and more suitable performance of knee braces. Based on the results, the graphs showed that the horizontal displacement of KBF was approximately 3.2 of the horizontal displacement of 2 eccentric braced systems. It was also found that rotating ceiling was considerably lower in KBF system than EBF system; using EBF system under extreme lateral forces was certainly followed by ceiling distortion. While the modeling results indicated that the knee element of KBF system was able to reduce ceiling distortions as much as the convergence bracing systems [6].

Balendra and Lee (1991) found that ductility was lower when the knee member was designed for the flexural failure rather than the time when knee member experienced shear failure before flexural failure. To prevent local buckling where the knee member is connected to the diagonal member, it is essential to use a proper stiffener in the heart of diagonal member in the connection area [7].Mofid and Lotfallahi [8] showed that nonlinear behavior of knee brace under lateral loads in the flexural and shear yields depends on their configuration. When the lateral load gradually increases, three plastic hinges are formed in the knee element.By inelastic analysis of knee braces, Huang Zhen et al (2004) [9] showed that stiffness and direction of knee braces influenced energy dissipation. Based on their observation, the ratio of inertia moment in the knee element to the column should be 20 to 40%. In addition, the ratio of the distance between knee element and the column to the length of beam should be 0.15 to 0.3. Change in cross-section of the column imposes greater effect on lateral behavior of the frame compared to behavior of the beam.

Using nonlinear analysis of the constrained members, Zahraei and Jalali [10] studied the behavior of frames braced by DKBF and seismic behavior of frames braced by this bracing system. Their results showed that adoption of short knee members can reduce the negative effects of joint connections between beams and columns. This suggests that exact length of the connector beam can partially eliminate the need for flexural connections, at least for short structures.Moreover, Husseini al-Hashimi and Alami [11] compared the behavior of knee braced frames and concentric braces. Their results showed that stiffness of knee frames was closed to the concentric frames and the amount of stiffness was considerably influenced by the section of knee member. In addition, behavioral coefficients of the two systems were close together; while the knee member had a higher ductility than the concentric brace.

METHODOLOGY

The purpose of the present study is to examine the seismic performance of structures irregular in plan equipped with knee braced system under seismic loads and controllability of the torsion in these buildings by setting the brace specifications. Therefore, a number of residential knee braced steel frames (5, 10 and 15 story) with a two-dimensional medium ductility was assumed and modelled. The studied structures were regular and irregular in plan and dynamically analyzed by 7 pairs of earthquake records for nonlinear time history. For this purpose, the considered accelograms were aligned and then imposed on the structure. Considering the fact that earthquakes had different periods and energy levels, the most critical mode was not expected to happen for any structure under a constant earthquake, which was achieved by observing the plastic hinges.

By concluding discussions and modelling software, this study examines the performance of this bracing system in irregular structures in order to improve their seismic behavior. Summarily, the main methodology of this study is model regular and irregular structures, to examine their nonlinear dynamic behavior by comparing levels of performance and to measure dimensions of knee elements and relative displacements. Frames were designed by SAP software and their Seismic loading was done using the Code 2800 and instructions of Publication 360 and FEMA356. Finally, seismic parameters of the studied KBF systems were presented in graphs and tables. The results of this study can be used to design ductile frames with good stiffness, particularly to determine the proper length of knee element.

Seismic behavior of structures irregular in plan

Seismic regulations usually classify the structures to two regular and irregular groups. Considering the improper behaviour of irregular structures against earthquake, the regulations suggest to use dynamic analysis for such structures. One of the common, widely used structures irregular in plan is protrusive structure.

A review of regulations on irregularity reveals that some regulations of irregular structures suffer ambiguities in the Standard 2800; however, there are essential differences in some cases between these and regulations available in codes such as UBC. For example, the rules relating to deep corners, the Standard 2800 both examines the structural behavior in two directions, unlike other regulations, separately, and considers 25% [6], some others such as UBC consider 15% as the measure of irregularity in these configurations [8]. Given the significant differences in regulations associated with these configurations, therefore, it is essential to investigate the seismic behavior of such structures. Nevertheless, it is not clear how regulations on irregularity of structures have been obtained by standards such as UBC or the Standard 2800; these regulations seem to be a result of judgments made by authors rather than the analysis [8].

Knee Braced Frame (KBF)

In metal structures with cross bracing system, the bearing members, i.e. braces, resist axially against earthquake; this results in the highest stiffness compared to other braces. Consequently, the structure shows the least deformation. This may result in lower adsorbed seismic force and the members may tolerate a higher percentage of the seismic force. To solve this problem, various methods have already been proposed, one of which is knee braces. By forming plastic hinge in the bracing members (according to the required performance level), a part of the forces are adsorbed and thus the structure shows better performance. In knee braced frames, there are some diagonal members which generally provide the system stiffness under low and moderate lateral loads, in addition to a number of knee members as energy dissipater elements which act as ductile fuses. In other words, knee members of the KBF system are the same linking beams which were found in the EBF system, by the advantage that their replacement is simpler and more practical for re-exploitation of a structure after a severe earthquake [1].

Comparison of KBF and EBF systems in multi-story frames

An advantage of KBF system in multi-story frames to EBF system is shown through the analysis of a seven-story frame [8]. In this comparison, three brace systems (first frame with KBF, the second frame with EBF system and flexural links and the third frame with EBF system and shear links) were used [8].The results indicate that the KBF system has a lower horizontal displacement than two eccentric bracing systems. As the figure shows, the horizontal displacement of KBF system is almost 0.67 of the horizontal displacement of EBF system [8]. The figures (2) and (3) present the maximum relative displacement of stories and ceiling rotation in KBF and EBF and the angle Y_s representing the ceiling distortion [8].Obviously, ceiling rotation of the knee braced system is considerably lower than the eccentric brace system. In other words, adoption of eccentric braced system in severe lateral forces will lead to ceiling distortion. In the knee bracing system, the ceiling distortion decreases as much as the distortion in the coaxial bracing system [8].

Design and Analysis of Steel Frames

Static Analysis

Despite many variable parameters in an analytical model, some constant specifications are inevitable in the models, including story height, spans, specifications of materials, loads, etc. In many cases, these factors are dependent on non-structural dimension such as architectural considerations, available materials, usage, etc. In the modellings provided here, the specifications are reasonable, as much as possible, based on practical realities existing in concrete buildings.

The present study modelled three regular and three irregular structures with braces in the story 5, 10 and 15 and evaluated their seismic performance using non-linear dynamic analysis. For this purpose, structures were initially designed under static analysis and their optimal sections were determined. Structures were constructed in an area with very high risk zoning of Type II land. In Table 1 presents the structural characteristics and their gravity loading; Figure 3 shows plans of the modeled regular and irregular structures. Seismic loading was based on the Standard 2800 (I=1); the structures were equipped with knee bracing system. The details are listed in Table 2.

Time History Analysis (Nonlinear Dynamics)

In this method, dynamic analysis assuming nonlinear behavior of materials and using conventional computations of structural dynamics is used to determine the seismic response of the structures under the ground acceleration as a function of time at the baseline. In this method, the structure is analyzed by a number of recorded or simulated accelerogram. Accelerograms should be equivalent to mechanism of seismic source, equivalent magnitude of the earthquake, and distance from the epicenter to the site, geological and tectonic features and layers of alluvium; their compatibility is provided in any case by the range or spectrum of the maximum earthquake. Duration of strong ground motion recorded by accelerograms should be at least 10 seconds, or 3 times the fundamental period of the structure, whichever is greater. The duration of strong ground motion can be determined by validated methods such as cumulative distribution of energy. Forces and deformations, in this way, are determined by assuming elastic behavior. Regular structure with resistant lateral members which are independent in two directions can be analyzed in two dimensions in two independent lines, otherwise the structure must be analyzed in three dimensions.

Elastic Analysis of Two-dimensional and Three-dimensional Time History

If two-dimensional analysis is allowed in accordance with regulations, it is required to use at least three independent horizontal accelerograms (vertical component, if necessary). Scaling the accelerograms, average values of their reflection spectrum (5% damping) within the period ranging from 0.2T to 1.5T should not be less than the equivalent value in the spectrum and or maximum spectrum depending on the case.

The three-dimensional elastic analysis uses at least seven pairs of accelerograms, each consisting of two scaled horizontal components. Each pair of scaled accelerogram is simultaneously given to the structure as two orthogonal components. Scale of the paired accelerograms and their comparison, depending on the range or the maximum range, are based on the following method:

A. Acceleration response of each horizontal component is provided by 5% damping.
B. Values of two ranges of acceleration response is combined by square root of the sum of squares (SRSS) ranging from 0.2T to 1.5T.
C. A and B is done for each pair of accelerograms.
D. Scaling each pair of the accelerograms, average combined values of paired accelerograms ranging from 0.2T to 1.5T should not be less than >10% of 1.3 times the equivalent values in the range and or maximum range, depending on the case.

The present study used time history method to analyze the structural behavior. Therefore, 7 pairs of accelerograms were selected, as shown in Figure 4. Table 3 lists specifications of the horizontal and vertical components of these accelerograms. Then, a single combined spectrum was obtained for each paired accelerograms by SRSS. Then, the obtained spectra were averaged.Accordingly, the scale factor of primary accelerograms was calculated as follows Table 4.As the scale factor of accelerograms was obtained, the accelerograms became equivalent and were applied on the structures; then, the structures underwent nonlinear dynamic analysis.

Results of Analyses in the Modelled Structures

Comparison of Shears

Figure (6) presents values of base shear on regular and irregular structures in graphs. In accordance with the Standard 2800, the values obtained from the dynamic analysis were multiplied by I/R, where I and R denote importance factor and behavior factor of the structure, respectively. For dynamic analysis, 7 paired accelerograms were used; the values obtained from dynamic analysis were averaged and presented in a diagram. When seismic force is imposed on the structure, based on the acceleration imposed by the earthquake to the structure, a horizontal force is imposed on the structure that is divided in stories.Based on these results, values of the shear force are higher in irregular structures. This is because of the distance between the center of mass and center of stiffness. It also imposes more force on structures. Moreover, there is an additional force (torsion) in irregular structures. The structures should respond to this force; therefore, sections of these structures are designed stronger than the regular structures. This increases the weight of skeleton and thus the weight of structure. As we know, heavier structures take greater seismic force. In addition, there is no significant difference in values of shear for 5-story regular and irregular structures. As the height increases, the difference increases; therefore, the difference becomes 25% in the 15-story structure.

Comparison of Displacements

The seismic force imposed on the structure causes a displacement in stories. The existing structures, based on their lateral load-bearing system, can separately deform through which can adsorb some of the seismic force. This displacement continues until members are not responsive no longer and linear phase begins. By forming plastic hinges, greater amount of seismic force is adsorbed and displacement increases. Figure 7 compares displacement of stories in different structures.According to the results, displacement is higher in irregular structures than the regular structures; this results from additional torsion caused by seismic force to the structure. The torsion which imposes an additional force to the structure forms more plastic hinges in the structure and finally increases displacement considerably. This as a negative factor against earthquake resistance of buildings can ultimately lead to structural collapse.

Comparison of Drifts

Story drift is actually a relative displacement of the story toward the bottom story. The Standard 2800 limits these values; based on structural period and lateral load-bearing system, this value should not exceed certain limits. Figure (8) shows different values of drift in different structures.

Plastic Hinges Formed in Structures

When the structures are under seismic lateral force, their members absorb some of the force by forming plastic hinges; by increasing the number of hinges, the structure eventually collapses. Regulations based on the performance of the structure allow some plastic hinges form and absorb some force. Here it is noteworthy that the plastic hinges presented to members are as follows:

- For knee sections of braces, the hinges are defined as shears.
- For main sections of braces, the hinges are axial.
- For sections of columns, the hinges are biaxial flexural-axial (PMM).

Accordingly, the above hinges were defined and assigned to the sections; by analyzing models, the following figures show a number of plastic hinges formed in different structures. Figure (9) shows plastic hinges formed in 5-story regular and irregular structures. The results show that most hinges formed in the irregular structure left the exploitation levels and reached failure (yellow and red hinges), while most of newly formed hinges of regular structures did not even reach the flawless function. This is because of the additional torsion previously described. Reviewing the results, it can be found that hinges appeared in knee members of regular structure; this resulted in better performance of the structure, because the knee members here acted as fuse and reached failure before other members. Therefore, failure of other members can be avoided. According to Figure 9 (an irregular structure), hinges formed in column and left the performance levels. Columns are members which stabilize the structure; thus, formation of hinges in columns results in structural collapse, which is not reasonable, and maximizes the damage.
Figure (10) shows plastic hinges formed in the 10-storey regular and irregular structures. As the figures show, the hinges formed in braces appeared in diagonal members, because seismic force increased in structures with greater height and the designer has to design knee members for a high shear force. This is why knee members are designed by strong sections, which ultimately leads to the formation of hinges in diagonal members.
Figure 11 also shows plastic hinges related to a 15-storey structure. As the figure shows, most hinges became red and this type of brace system is not safe in tall structures.
Accordingly, all hinges formed in structures were obtained in the most critical conditions, as follows. Table-5.

RESULTS

The results of the research conducted in this study can be stated as follows:

- Comparing plastic hinges in regular and irregular structures, it is determined that hinges of irregular structures form faster than that of regular structures; this is reasonable because of the torsion in these buildings. Because, an additional force is imposed on members under a seismic torsion record which forms hinges faster.
- In structures with different heights, the more critical mode appears under different earthquakes. Considering the fact that structures have different periods, this is why the seismic period which is the closest to the structural period imposes the greatest effect on the structure and causes the highest deformation.
- In 5-story and 10-story structures, a higher percentage of plastic hinges form in bracing members; this is desirable, because the structure does not eventually collapse.
- In 15-story structure, hinges are equally distributed among braces and columns; because columns are members which stabilize the structure, this may not be good and cause structural collapse.

- By finding plastic hinges in the 15-story structure, it can be seen that the large part of the plastic hinges form in the middle and upper stories and fewer hinges appear in the first stories. This can result from whip effect which occurs in high structures.

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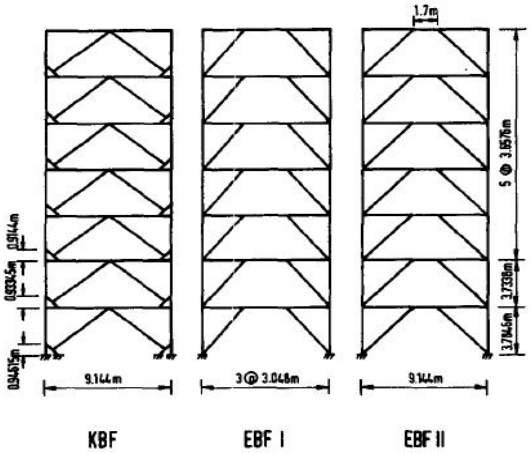


Figure 1: The seven-story frames [8] (a) KBF system, (b) and (c) EBF system with flexural and shear links

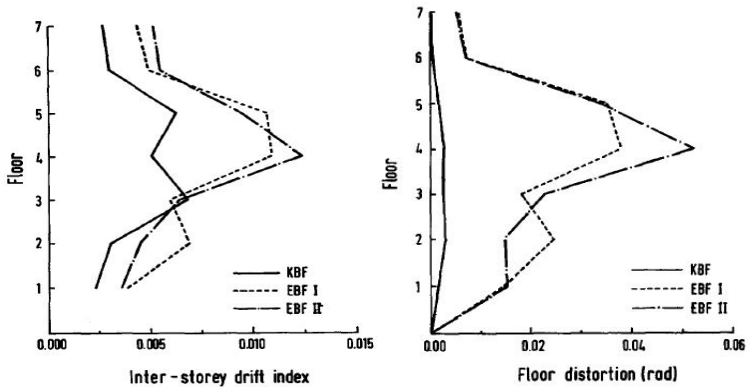


Figure 2: (a) relative drifts of stories for three frames [8] and (b) ceiling rotation in various stories in three systems [8]

Table 1: Specifications of the modelled structures

Dead load of the floors	530 Kg/m	For all buildings
Live load of the floors	200 Kg/m	
Deal load of the stirs	700 Kg/m	
Live load of the stirs	350 Kg/m	
Load of the lateral wall	590 Kg/m	A=0.35
Floor to floor height	3.2 m	I=1
Floor to pilot floor height	3.2 m	R=6

Table 2: Seismic specifications of the analyzed structures

Number of stories	Height (m)	Period (sec)	Reflection coefficient B	Coefficient of behavior R	Seismic coefficient C
5	16	0.56	2.31	6	0.1159
10	25.6	0.753	1.64	6	0.0898
15	35.2	1. 176	1.22	6	0.069

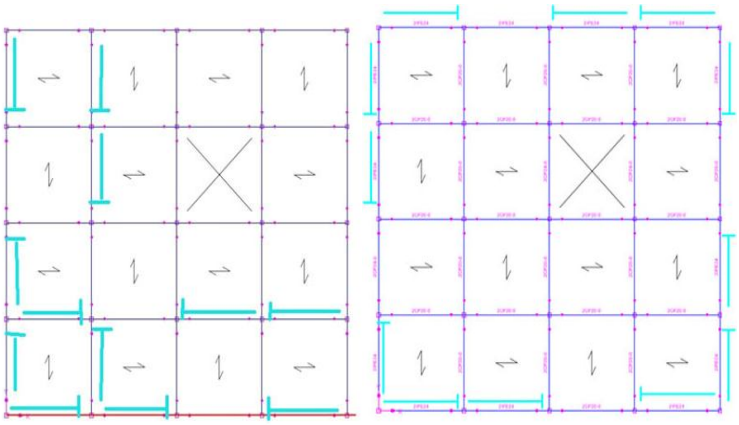


Figure 3: Plan of the modeled regular and irregular structures

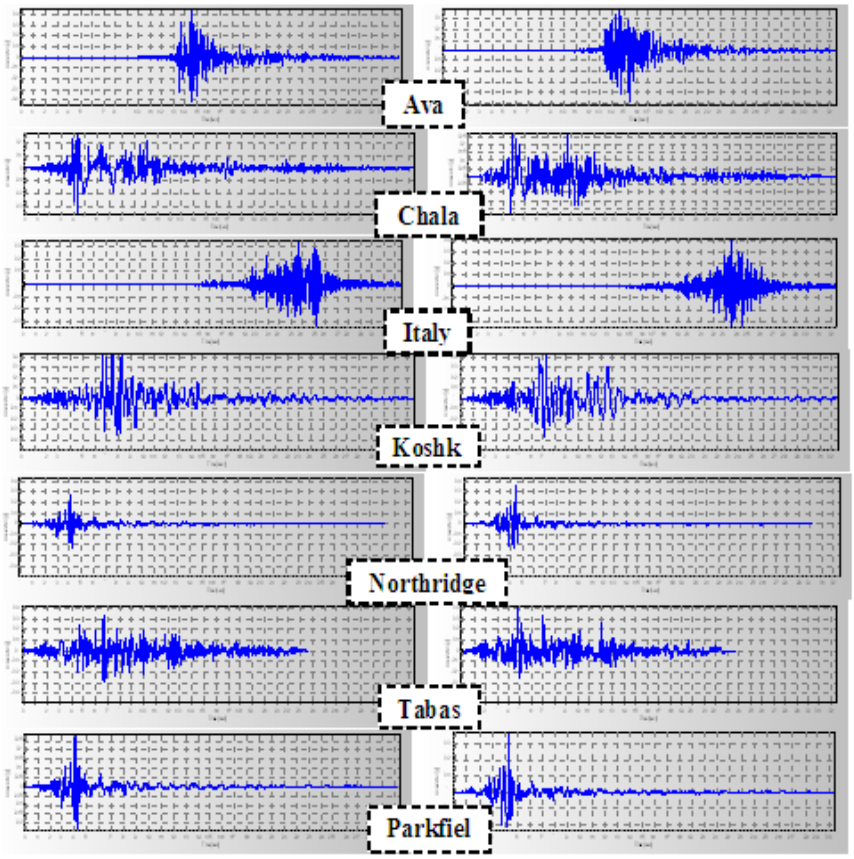


Figure 4: Paired accelerograms used for nonlinear dynamic analysis

Table 3: Specifications of the used accelerograms

Accelerogram	Time (sec)	PGA (g)	
		Component Y	Component X
Avaj	32.46	0.431	0.494
Chalan	32.48	0.347	0.431
Italy	32.74	0.342	0.333
Kooshk	32.28	0.394	0.328
Northridge	39.98	0.514	0.568
Tabas	23.8	0.406	0.327
Parkfield	30.32	0.357	0.272

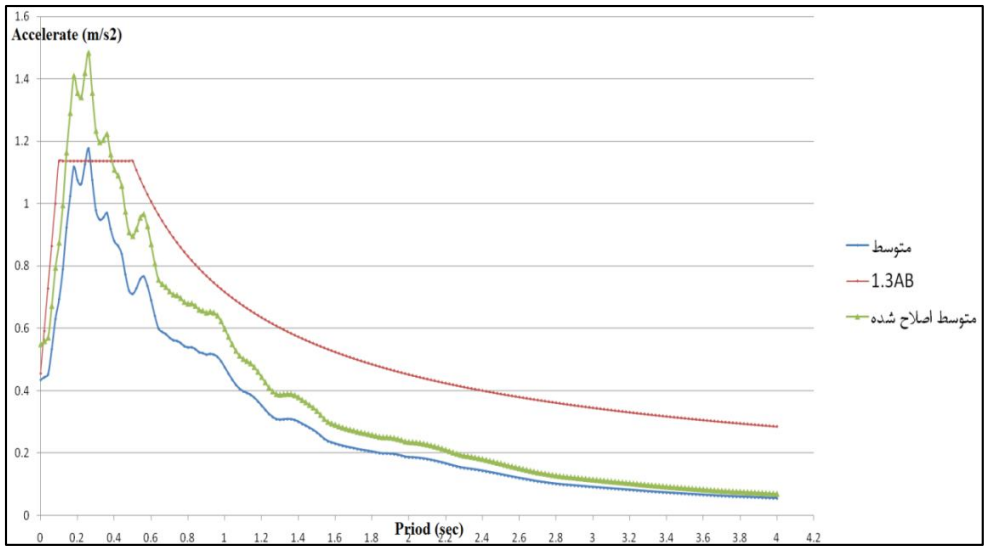
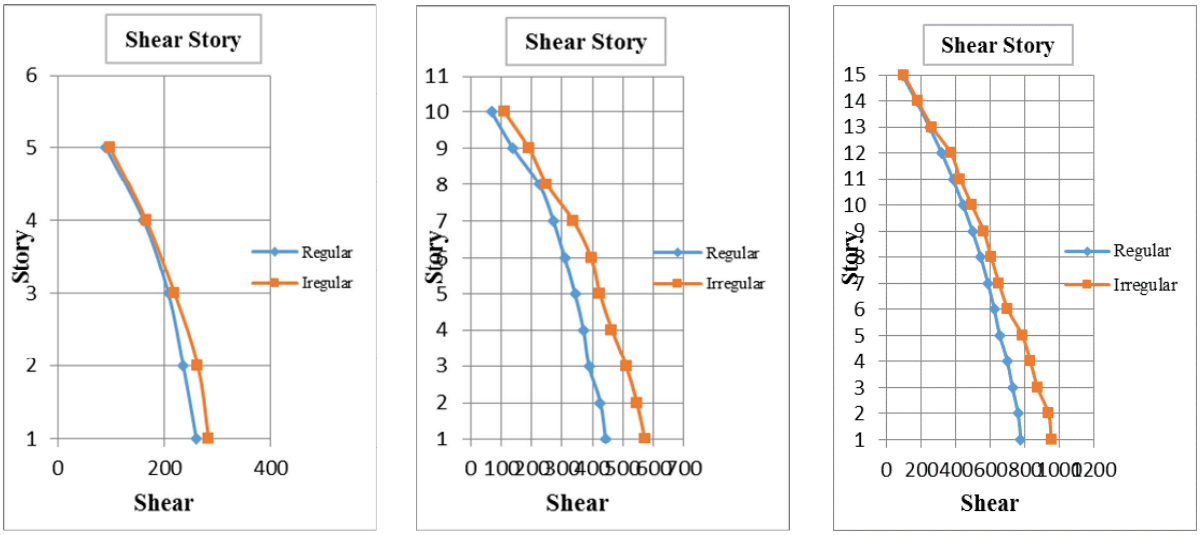


Figure 5: Average response spectra and the standard spectrum and the average modified spectrum

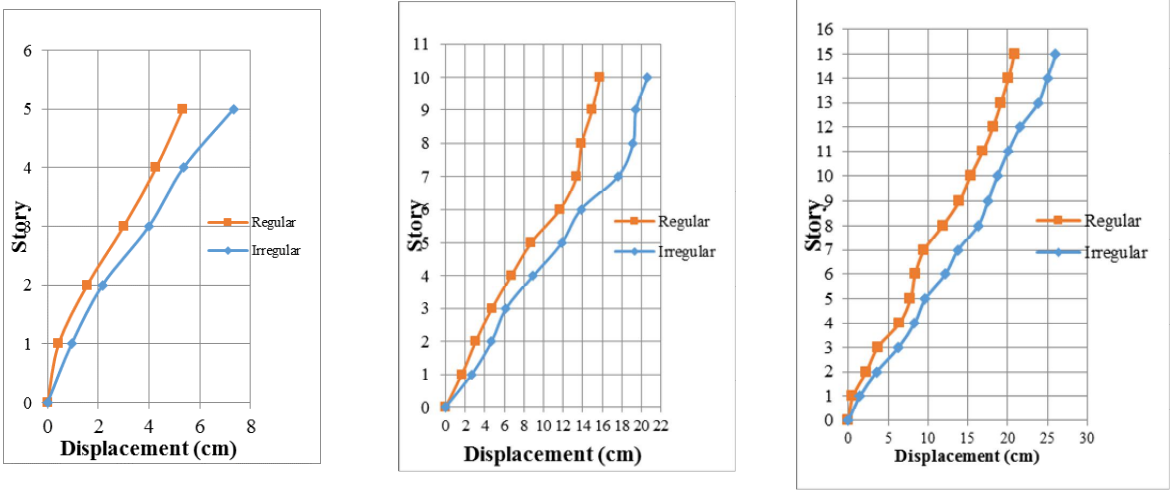
Table 4: Values of scale factor for accelerograms

Taiwan	Tabas	Sanfranando	Northridge	Morgan Hill	Landers	Inpiria Italy	
0.437	1.064	0.829	1.648	0.114	1.222	0.887	Average
2.89	1.19	1.52	0.77	11.06	1.03	1.42	Scale factor



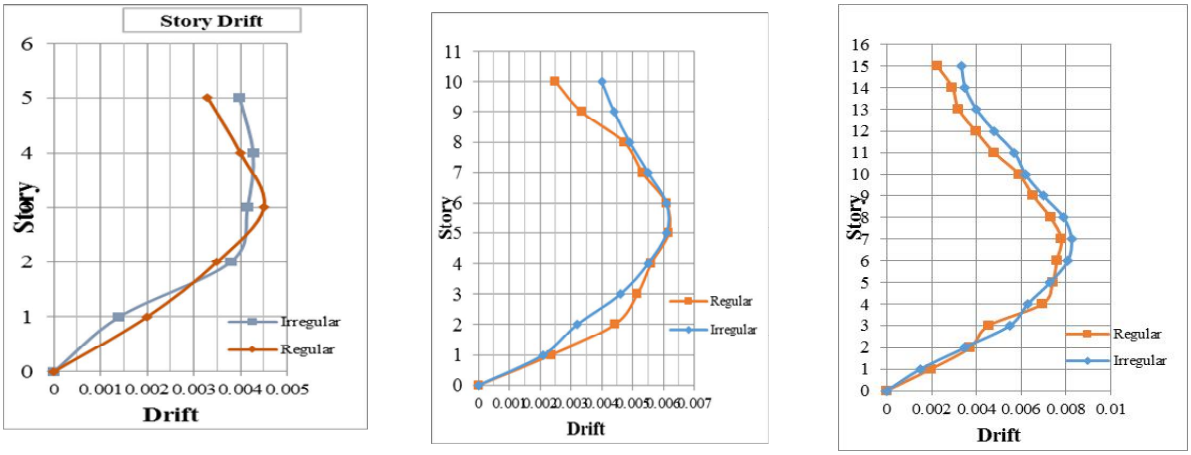
5-story structure 10-story structure 15-story structure

Figure 6: Comparison of shears for regular and irregular structures



5-story structure 10-story structure 15-story structure

Figure 7: Comparison of displacement for regular and irregular structures



5-story structure 10-story structure 15-story structure

Figure 8: Comparison of drifts for regular and irregular structures

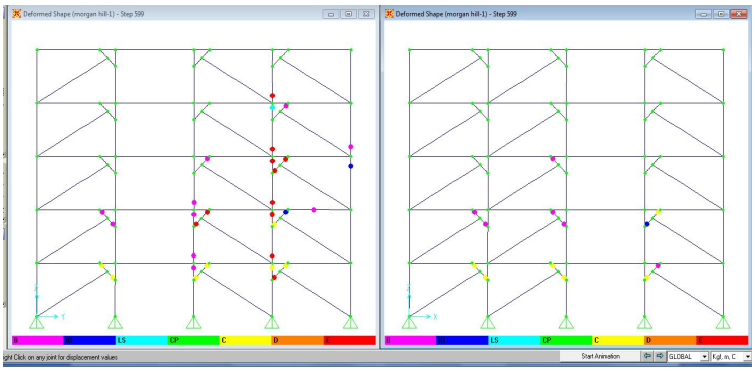


Figure 9: Plastic hinges formed in the 5-story regular and irregular structures

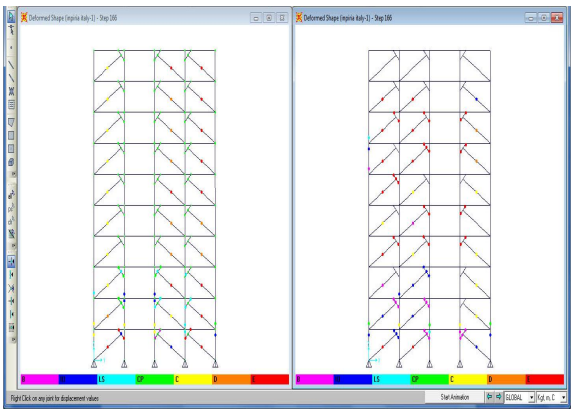


Figure 10: Plastic hinges formed in the 10-story regular and irregular structures

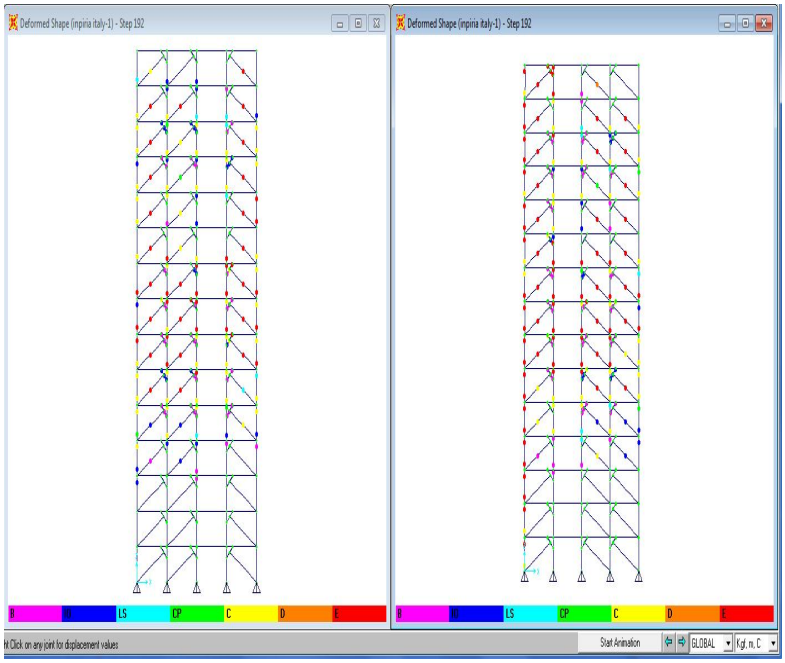


Figure 11: 9lastic hinges formed in a 15-story regular structure

Table 5: Total number of plastic hinges formed in different structures

Structure	Load	Plastic hinges															
		B		IO		LS		CP		C		D		E		total	
		Brace	Column	Brace	Column	Brace	Column	Brace	Column	Brace	Column	Brace	Column	Brace	Column	Brace	Column
5-story regular	Morgan hill 4	20	6	4	1		1	0	0	26	1	0	0	7	6	57	15
5-story irregular	Morgan hill 4	28	7	4	3	2	2	0	0	35	3	6	4	13	11	88	30
10-story regular	Morgan hill 3	18	7	5	15	0	11	4	6	34	20	20	0	47	14	128	73
10-story irregular	Morgan hill 3	18	9	6	20	1	9	6	7	38	25	18	3	53	17	140	90
15-story regular	Inpiria Italy 4	126	22	39	56	1	15	6	13	42	147	7	0	131	145	352	398
15-story irregular	Inpiria Italy 4	140	33	41	62	5	17	6	13	45	150	11	2	143	159	391	436

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RESEARCH ARTICLE

The Exploration of Nurses and Physicians Experiences Regarding their Professional Relationship with each other: Aphenomenological Study

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ABSTRACT

Nursing is a profession that establishes various cultural and socialcommunications in the context of work environment. The importance of collaboration between nurses and physicians has been noted by many researchers. Ithas been shown that collaboration between nurses and physicians increases not only the satisfaction ofnurses but also that of physicians. Nurses and doctors have worked together to manage patients for a long time. Effective communication between physicians and nurses has been shown to enhance patient care, decrease errors, and reduce expenses related to inefficiency. Unfortunately, many health care workers are used to poor communication and teamwork, as a result of a culture of low expectations that has developed in many health care settings. Over the years, there have been repeated cries and admonitions for improving nurse-physiciancommunication and questioning why it is so difficult to achieve. The purpose of this study was to the exploration ofnurses andphysicians experiences regardingtheir professional relationshipwith each other**.**This study is a qualitative research using phenomenology method.Fifteensemi-structured interviews were carried out with 8 nurses and 7 physicians. They described theirexperiences related to professional communication. The interviews were recorded and transcribed and thedata were then analyzed by using the Colizzii analysis method.Four themes emerged from data analysis in whichinfluence the nurse-physicians relationship.Those were: professionalism, perception of the relationship pattern, perception of the factors that influence the relationship,and perception of the communication usefulness.

Inthispaper, we expand on professionalism theme and its subthemes including autonomy,dignifying andrespects,responsibility,and Preparedness.These findings have important implications for support the development of structured communication interventions to improve quality of nurse-physician communication.

Key words: Professional relationship, Nurses,Physicians,Phenomenology.

INTRODUCTION

Communication has defined as "the imparting or interchange of thoughts, opinions, or information by speech, writing, or signs." It is important to consider that communication is not just verbal in form. One study states that 93 percent of communication is more affected by body language, attitude, and tone, leaving only 7 percent of the meaning and intent based on the actual words said(1). Whereas the spoken words contain the crucial content, their meaning can be influenced by the style of delivery, which includes the way speakers stand, speak, and look at a person(2). Collaboration in health care is defined as health care professionals assuming complementary roles and cooperatively working together, sharing responsibility for problem-solving and making decisions to formulate and carry out plans for patient care(3,4). Collaboration between physicians, nurses, and other health care professionals increases team members' awareness of each others' type of knowledge and skills, leading to continued improvement in decision making(5). In today'shealth care system, delivery processes involve numerous interfaces and patient handoffs among multiple health care practitioners with varying levels of educational and occupational training. During the course of a 4-day hospital stay, a patient may interact with 50 different employees, including physicians, nurses, technicians, and others. Effective clinical practice thus involves many instances where critical information must be accurately communicated. Team collaboration is essential. When health care professionals are not communicating effectively, patient safety is at risk for several reasons: lack of critical information, misinterpretation of information, unclear orders over the telephone, and overlooked changes in status(2). Lack of communication creates situations where medical errors can occur. These errors have the potential to cause severe injury or unexpected patient death. Medical errors,especially those caused by a failure to communicate, are a pervasive problem in today's health care organizations. Effective teams are characterized by trust, respect, and collaboration. Deming(6)is one of the greatest proponents of teamwork. Teamwork, he believes, is endemic to a system in which all employees are working for the good of a goal, who have a common aim, and who work together to achieve that aim. When considering a teamwork model in health care, an interdisciplinary approach should be applied. Unlike a multidisciplinary approach, in which each team member is responsible only for the activities related to his or her own discipline and formulates separate goals for the patient, an interdisciplinary approach coalescesa joint effort on behalf of the patient with a common goal from all disciplines involved in the care plan. The pooling of specialized services leads to integrated interventions. The plan of care takes into accounts the multiple assessments and treatment regimens, and it packages these services to create an individualized care program that best addresses the needs of the patient. The patient finds that communication is easier with the cohesive team, rather than with numerous professionals who do not know what others are doing to manage the patient(7). It is important to point out that fostering a team collaboration environment may have hurdles to overcome: additional time; perceived loss of autonomy; lack of confidence or trust in decisions of others; clashing perceptions; territorialism; and lack of awareness of one provider of the education, knowledge, and skills held by colleagues from other disciplines and professions(8). However, most of these hurdles can be overcome with an open attitude and feelings of mutual respect and trust (9).Unfortunately, many health care workers are used to poor communication and teamwork, as a result of a culture of low expectations that has developed in many health care settings. This culture, in which health care workers have come to expect faulty and incomplete exchange of information, leads to errors because even conscientious professionals tend to ignore potential red flags and clinical discrepancies. They view these warning signals as indicators of routine repetitions of poor communication rather than unusual, worrisome indicators(10).

Although poor communication can lead to tragic consequences, a review of the literature also shows that effective communication can lead to the following positive outcomes: improved information flow, more effective interventions, improved safety, enhanced employee morale, increased patient and family satisfaction, and decreased lengths of stay(2,11). Fuss and colleague (12) and Gittell and others(13) show that implementing systems to facilitate team communication can substantially improve quality.Effective communication among staff encourages effective teamwork and promotes continuity and clarity within the patient care team. At its best, good communication encourages collaboration, fosters teamwork, and helps prevent errors(14).The importance of collaboration between nurses and physicians has been noted by many researchers. It has been shown that collaboration between nurses and physicians increases not onlythe satisfaction of nurses but also that of physicians. Moreover, some studies suggest thateffective nurse–physician collaboration is positively related to the quality of medical care, as reflected in low death rates in intensive care units. Accordingly, intervention programs or certain changes in nursing systems have been proposed to improve nurse–physician communication and collaboration.Vazirani reported that introducing a nurse practitioner in to each medical team, appointing a hospitalist medical director, and institutionalizing daily multidisciplinary rounds resulted in better collaboration and communicationbetween physicians and nurses as measured by physicians'reports(15).

In health care environments characterized by a hierarchical culture, physicians are at the top of that hierarchy. Consequently, they may feel that the environment is collaborative and that communication is open while nurses and other direct care staff perceive communication problems. Hierarchy differences can come into play and diminish the collaborative interactions necessary to ensure that the proper treatments are delivered appropriately. When hierarchy differences exist, people on the lower end of the hierarchy tend to be uncomfortable speaking up about problems or concerns. Intimidating behavior by individuals at the top of a hierarchy can hinder communication and give the impression that the individual is unapproachable(2,16).Although some researchershave noted that the quality of nurse–physician relationshipshas improved in recent decades, there remain manybarriers that hinder effective nurse–physician collaboration.Staff who witness poor performance in their peers may be hesitant to speak up because of fear of retaliation or the impression that speaking up will not do any good. Relationships between the individuals providing patient care can have a powerful influence on how and even if important information is communicated. Research has shown that delays in patient care and recurring problems from unresolved disputes are often the by-product of physician-nurse disagreement(17).

A series of publications begun in 1967 describing the "doctor-nurse game" provides insight into the way nurses have historically made treatment recommendations to doctors without appearing to do so, the way doctors have historically asked nurses for recommendations without appearing to do so, and how both participants strive to avoid open disagreement(18-20). Although some nurses have argued that much has changed—and improved—in the relationships between doctors and nurses since that initial 1967 article, there is little evidence, although much wishful thinking, to support that view(21). Additionally, over the years, the literature has contained descriptions of verbal abuse of nurses by physicians(22), disruptive physician behavior(23-24), and advice on how nurses can better "handle" physicians(25-26). So, in spite of much discussion, communication between doctors and nurses often remains contentious and obscure. Over the years, there have been repeated cries and admonitions for improving nurse-physician communication and questioning why it is so difficult to achieve(27). Additionally, nurses and physicians view the level of collaboration very differently, with nurses typically perceiving less collaboration and poorer communication than physicians(28-29).Nurses are typically less satisfied than physicians with the communication or interaction patterns and express the need for their opinions to be heard by physicians(30).There is no shortage of manuscripts in the literature that advocate, based only on opinion, for one or another method of building teamwork, collaboration, or communication, including recognizing corporate culture(31), quality improvement(32), continuous assessment and regular communication(33), and reducing conflict(34).

METHODOLOGY

Study Design

This study is a qualitative research using phenomenology method.Fifteensemi-structured interviews were carried out with 8 nurses and 7 physicians. They described theirexperiences related to professional communication. The interviews were recorded and transcribed and thedata were then analyzed using the Colizzii analysis method. The use of the interview format allowed for the explorationof individual experiences with nurse-physician communication among nurses with variedlevels of experience, language skills and demographiccharacteristics.

Study Population

Our target population was nursesand physicianswith at least5years experience.Nurses andphysicianswere eligible for participation if they providedmore than 5 years of direct patient care in the hospital.

Data Collection

Semi-Structured Interviews: Respondents to the questionnaire were askedif they were interested in participating in a semi-structured interview. Ofthose who expressed interest, we invited a subset to participate in interviews.

Our final sample included 15 (8nurses and 7 physiciansselectively sampled) participants. All participantscompleted informed consent procedures and had their interview tape recorded and transcribedfor analysis. A typical interview lasted about 30-60minutes.During the interview, a trained interviewer asked the following question:

Nursesand doctors, howaredescribe theirprofessional relationship with each other?

Data Analysis

Author reviewed all 15 transcripts andproposed a framework for extracting major themes related to nurse-physician communication. Each investigator then read at least3 transcripts and compared the themes in those transcripts with the proposed framework. Allthe authors met to discuss and revise the framework. This process continued iteratively untilall authors agreed that all themes and dimensions regarding nurse-physician communicationhad been identified, and that the framework provided a reasonable depiction of the process ofcommunication and factors affecting nurse-physician communication as stated or implied byparticipants. Finally, each transcript was re-read by 2 authors, who coded comments using therevised framework. Authors also identified exemplary comments and confirmed that the finalframework accommodated each important comment related to nurse-physiciancommunication.This study was reviewed and approved by Board of the schoolof nursing, Ahwaz JundishapurUniversity of Medical Sciences**.**

RESULTS

Nurses report that still, there is a negative issue between nurses and physicians. Four themes emerged from data analysis in which influence the nurse-physicians relationship. Those were professionalism, perception of the relationship pattern, perception of the factors that influence the relationship, and perception of the communication usefulness. The subthemes of professionalism, were autonomy,dignifying and respects,responsibility, and Preparedness. The subthemes ofperception of the relationship pattern, were grammatical relations and authoritarian, collaborative interaction, coping, and scapegoat. The subthemes perception of the factors that influence the relationship, were personality characters, trust, Logistic Challenges, job stress, ethnicity, observanceof basics of

professional. The subthemes of perception of the communication usefulness, were communication benefits for patients and benefits for nurses and physicians.

Inthispaper, we expand on professionalism theme and its subthemes including autonomy,dignity and respects,responsibility, and of nurse Preparedness.

Autonomy: Theparticipants about these subthemes said: "Physicians believe that nurses do not have any independence and should not do anything without their permission". "Nearly all physicians consider nursing major as aspecialty aport from theirs". "My main problem that interrelates with physicians is his/her attitude toward me as an inferior not an independed co-worker". One of the participants told"Sometimes nurses realize how to treat the patient but she/he waits for physician order due to fear".

Preparedness:"I think if you are calling a physician you should be prepared at least with immediate information. They shouldn't have to wait while you call them back with a set of vitals or something like that…. I think that's a failing on the nurse's side of things".“Anurse could have allinformation andmust be prepared”.“In other words,weshould bemore prepared”.“If youarea expertnurse, surely the doctorkept bragged .becauseournursesarenotconsiderablescientific, doctors are findingthemselvesina higherposition.”“Scientificgaps between doctors and nurses,is cause of the disrespecting of doctors to nurses.” In the Jenifer study the nurses frequently (n=15/21 interviews) described a lack of nurse preparedness for telephone calls as a factor contributing to challenging nurse-physician communication encounters. (35).In our study participants about this subthemes said:"The nurses competency and professionalism prevent the physicians superiority to him/her, otherwise physician find themselves in higher status job." "Lack ofphysicians' awareness about nursing profession is a barrier of nurse-physician communication, even some doctors don't recognize different job rankings of nurses and they need know about their framework." "An effective nurse-physician interrelation depends on the nurse proficiency and competency; otherwise the physician would reprimand the nurse." "The nurse preparedness in relation with physician is really important."

Responsibility: The participants about these subthemes said:"Some physicians are really irregular,for example they don't visit the patients for a couple of days or they're not visiting them properly and timely, but some of them are truly duty-bound and attend". "Some physicians turn their phone off or they make excuse for their broken phones, with no answers and on-call doctors get annoyed of late calls". "In my review I found out that the nurses feel a high sense of responsibility about the patients.
"

Dignifying andrespects: The participants about this subthemes said**:**"A physician who has got humiliating attitudes toward a nurse will fail in nurse-physician interrelation. I wish theseprivacies should be observed." Ibelieve that physicians treat the nurses respectfully. Their behavior approves it." Also only your appearance has changed." "Unfortunately some of ourcolleagues look down on nurse**'**s job status and it doesnot fit their social state.""It is really pleasant when patient hears an honest and respectful nurse-physician conversation."

CONCLUSION

Professionalism refers to professional character, spirit, or methods. It is a set of attributes, a way of life that implies responsibility, and commitment. Criteria of profession include specialized education, a distinct body of knowledge, ongoing research, a code of ethics, autonomy, a service orientation, and professional organization(36). Instructing nurses on communication is a bit like instructing birds on flying. All nurses have been taught communication skills as a basic part of a prelicensure nursing program and then re-taught communication skills in postlicensure programs, continuing education programs, workshops, and meetings. However, the problem with good communication is that it is, ironically, easy to talk about but hard to put into practice. Professional interaction dependent on

interrelationships of preparedness, responsiveness, collaborative and professionalism**.**The result of Jenifer study confirms the findings of previous studies that identify lack of professionalism(37).

A profession is autonomous if it regulates itself and sets standards for its members. Providing autonomy is one of the purposes of a professional association. If nursing is to have professional status, it must function autonomously in the formation of policy and in the control of its activity .To be autonomous, a professional group must be granted legal authority to define the scope of its practice, describe its particular functions and roles, and determine its goals and responsibilities in delivery of its services. To practitioners of nursing, autonomy means independence at work, responsibility, and accountability for one's actions. Autonomy is more easily achieved and maintained from a position of authority. Therefore, some nurses seek administrative positions rather than expanded clinical competence as a means to ensure their autonomy in the workplace(36). Health professionals tend to work autonomously, even though they may speak of being part of a team(37). Efforts to improve health care safety and quality are often jeopardized by the communication and collaboration barriers that exist between clinical staff. However, most often the barriers manifest between nurses and physicians. Even though doctors and nurses interact numerous times a day, they often have different perceptions of their roles and responsibilities as to patient needs, and thus different goals for patient care. However, the most physicians are not considering autonomy for nurses.In our study the nurses frequently described a lack of autonomy for nurses.

In this study preparedness one of the important factor that participants refers to it. This finding is agreement with Jenifer study. In theJenifer study the nurses frequently (n=15/21 interviews) described a lack of nurse preparedness for telephone calls as a factor contributing to challenging nurse-physician communication encounters. Nurse competency and preparedness are key components of nurse-physician communication about patient issues. The quality of nurse preparedness reported in the literature depends, in part, on whether nurses or physicians were asked about its quality(35).Cadoganand et al found that physicians perceived nurse competence to be a significant communication barrier. In our study, interviewed nurses believed that their nurse colleagues were often unprepared when calling physicians, and that this negatively affected nurse-physician communication. Further, nurses in our study agreed that the most important thing a nurse could do to improve communication effectiveness was to be prepared."Jenifer and colleagues found that nurse preparedness one of the most important barriers to nurse-physician communication(35).

The recognition of nursing professional dignity could have a positive impact on patients because the results clearly showed that nurses are more prone to foster patients' dignity, patients' safety, and a better quality of care if their own dignity is respected. If nurses are uncomfortable, humiliated, or not seen in their professional role, it is difficult to give to others good care, good support, or good relationships(38). Respect is an attitude that emphasizes the other person's with and individuality. It conveys that person's hopes and feelings are special and unique even though similar to others him many way. People have a need to be different from others.Being too different can be isolating and threatening.The nurse must show respect for the willingness to be available,desire to work with the client, and manner that conveys the idea of taking the clients point of view seriously (36) .In this study Many nurses and physicians reported that some of our colleagues look down on nurse**'**s job status and it does not fit their social state.These findings are agreed with findings of Jenifer. In Jenifer study alsomany nurses reported encounters that were characterized by rudeness and disrespect from the physician. They reported that the physician interrupted before the nurse had finished reporting on a patient. One in ten nurses reported feeling frustrated after interactions with a physician (35).Nursing continues to gain legitimating epistemologically and ontologically as a scientific discipline throughout the world. If a profession gains respect as a true autonomous scientific profession, then this recognition has to be put in practice in all environments and geographical areas(38). Previous reports have found that nurse input can be poorly received by physicians, even though improved collaboration contributes to better quality of care(40).

Healthcare givers have three separate, inter-depended legal roles, each with rights and associated responsibilities:provider of service, employee orcontractor for service, and citizen. The rights and responsibilities of the nurse in the role of citizen are the same as those of any individual under the legal system. Rights of citizenship protect clients from harm and ensure consideration for their personal property rights, rights to privacy, confidentiality, and other rights.(36).Many nurses described several aspects of physicians' responses to telephone encounters that hindered effective communication. Most notably, many physicians did not call back or were unable to be reached. Some nurses also pointed out that delayed call-backs by the physician contributed to lack of information by the nurse (35). Research shows that disruptive behavior by physicians significantly contributes to nurse burnout, decreased job satisfaction, and decisions to leave the profession (9). In one study, 31% of respondents said they knew of nurses leaving the hospital as a result of disruptive physician behavior(39). Nurses report that physicians may take them for granted, don't know or understand what nurses actually do, don't listen to what nurses have to say about patients, don't take nurses' assessments seriously, fail to incorporate nurses' assessments into care plans, or are difficult to contact(23).These problems may have less to do with the physicians' personality characteristics than their lack of knowledge about nursing responsibilities(39). Many nurses still feel that physicians don't understand, respect, or care to listen to nursing perspectives on patient care. Different perceptions of the patient and the patient's needs often result in misunderstanding and conflict between nurses and physicians and can become a breeding ground for anger and dissatisfaction(39). Many nurses, despite believing their expertise to be more appropriate in a particular situation, still feel the need to defer to physicians. Some nurses have learned and still choose, consciously or unconsciously, to preserve and protect the physicians' traditionally "superior" professional status by deferring to them at all times. However, male nurses have reported that physicians treat them more respectfully and with greater collegiality(41). Communication problems stem from all the factors affecting nurse/physician interaction I've just discussed, but particularly power issues and dismissive attitudes toward nurses. Poor communication persists as long as physicians view their roles and functions as fundamentally superior to those of nurses. When physicians don't understand or appreciate the value of nurses' observations and judgments, they're slow to respond when nurses try to contact them-a common nursing complaint. (39). communication with physicians can be accomplished when nurses feel empowered to approach physicians as equal professional colleagues. This means that nurses must assume responsibility for the quality of their relationships with physicians. Experiencing professional empowerment helps nurses stay focused on approaching all physicians in a collegial, respectful, and problem-solving-based manner, no matter how badly any individual physician may behave. As nurses, we can't let negative behavior by physicians push us into angry communication or discourage further efforts to communicate. Nurses report that these negative behaviors appear to be related to gender issues, power gaps, hierarchical traditions, or an attitude that nurses are their handmaidens rather than valued professional collaborators.

Effective teams are characterized by trust, respect, and collaboration. Teamwork is endemic to a system in which all employees are working for the good of a goal, who have a common aim, and who work together to achieve that aim.It is important to point out that fostering a team collaboration environment may have hurdles to overcome: additional time; perceived loss of autonomy; lack of confidence or trust in decisions of others; clashing perceptions; territorialism; and lack of awareness of one provider of the education, knowledge, and skills held by colleagues from other disciplines and professions. However, most of these hurdles can be overcome with an open attitude and feelings of mutual respect and trust. A study determined that improved teamwork and communication are described by health care workers as among the most important factors in improving clinical effectiveness and job satisfaction(9).

The findings of this study are important for two reasons. First, we have documented that the problem of nurse-physician communication continues to be an important issue despite almost 50 years of research and effort to improve nurse-physician communication (42). We have identified some potential communication barriers that have not previously been well described, such as professionalism, under stream relationship, communication benefits /disadvantage, coping,and scapegoat. Previous studies have described discrepancies between the perceptions of nurses and physicians(37),but in this study were not discrepancies between the perceptions of nurses and

physiciansunlike other studies, our study finds that nurses themselves recommend improved nurse preparedness as a key target for improving the effectiveness of nurse-physician communication. Although our study suggests that improving nurse preparedness is a key target to break the cycle of communication breakdown, also illustrates the importance of improving physician attitudes, professionalism, and responsiveness, autonomy, and observance withrespects. Interventions to improve the effectiveness of communication must target both nurses and physicians to create a culture that facilitates effective communication with improved patient safety and healthcare quality as the ultimate goal.

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