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Determinants of Capital Structure in Iran

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Abstract: Most shareholders, investors and financial controllers are concerned about company's capital structure because the combination of company's capital structure would affect profitability. Determinants of capital structure have been studied by many researchers worldwide but not the determinants of capital structure in Iran. Hence this study is conducted to determine the factors that influence the capital structure of the 129 listed companies in the Tehran Stock Exchange from the period of 2001 to 2008. This study is also to find the relationship between tangibility, profitability, liquidity and firm size with capital structure. The findings indicate that liquidity is the most significant factor that influenced the capital structure, followed by tangibility, size and profitability. Tangibility, liquidity and size are significant and positively related to capital structure but profitability is not significant and negatively related to capital structure of the listed companies in Iran.
[Ali NEMATI, Joriah Muhammad. **Determinants of Capital Structure in IranForests**. *Life Sci J* 2012;9(4):4623-4627] (ISSN:1097-8135). http://www.lifesciencesite.com. 696

Keywords: capital structure; tangibility ;firm size ;profitability ;liquidity

1. Introduction

The objective of the capital structure determinant policies is to specify composition of financial resources in order to maximize the wealth of stockholders. Optimal capital structure is needed to maximize firm value. Each firm sets a target for the debt to equity ratio in order to attempt to obtain it (Noulas & Genimakis, 2011). Hence it is important that the managers made good decision in determining the component of the company's capital structure. Capital structure is a mix proportion of a firm's long-term debt, short-term debt, common stock, preferred stock, and other sources of funds that a firm needs to finance its operations. The capital structure is a way a firm finances its assets and overall operations in addition to some combination of owners' equity, debt, or a combination of securities (Riaz. & Afzal, 2011). These decisions must be made correctly in order to increase firm values (Aghaei, Nadem, Noroozi, & Madin, 2011). Modigliani and Miller (MM) (1958, 1963) created the foundation of the capital structure theory. MM indicated in a perfect and frictionless capital markets that firms could issue riskless debt but firm capital structure was not relevant (Fazlzadeh, Hendi, & Mahboubi, 2011). There are four major theories that influence capital structure are: trade-off theory (Myers, 1984), pecking order theory (Myers and Majluf, 1984), agency cost theory and market timing theory. In order to determine the optimal capital structure, these modern theories take into consideration such issues as taxes, financial distress costs, agency costs, information asymmetry, effects of market imperfections and institutional constraints of firms (Jensen & Meckling, 1976; Modigliani & Miller, 1963; Myers, 1984). Trade-off theory (TOT) states that a target debt–equity ratio is approached at the point where the tax advantage of debt is offset by the costs of financial distress and the costs of prevailing market imperfections are minimized (Kraus & Litzenberger, 1973) . Pecking order theory (POT) (Myers, 1984, Myers and Majluf, 1984) explains that firms follow financing hierarchy to minimize the problem of information asymmetry between the firm's managers (insiders) and the shareholders (outsiders). Agency cost theory (ACT) says that the optimal capital structure is settled by agency costs, which contain the costs for both debt and equity issue. The costs which are related to equity issue consist of monitoring expenses of the shareholders and bonding expenses of the managers (Afrasiabi & Ahmadinia, 2011; Jensen & Meckling, 1976). The ACT showed that agency costs between equity and debt play a major role in determining optimal capital structure. The prime cause of agency costs is the principle agent conflict and asymmetric information (Fawad & Zaheer, 2011; Jensen & Meckling, 1976). Market timing theory (MTT) argues that firms set timing of their equity issues in the sense that they issue new stock when the stock price is perceived to be overvalued, and buy back own stocks when there is under valuation. This will cause fluctuations in stock prices and affect capital structure. The remainder of this paper is organized as follows. Section 2 provides literature review which includes capital structure theories and capital structure determinants. Section 3 describes the methodology and variable measuring. Section 4 discusses the findings, and section 5

describes the conclusion of the study, and section 6 describes the suggestions for future research.

2. Literature Review

2.1 Capital structure theories

The MM theorem (1958) first constituted the basis for contemporary thinking on capital structure by stating that in a perfect capital market (no transaction; bankruptcy costs and perfect information) firms and individuals can borrow at equal interest rate; no taxes; and investment decisions do not influenced by financing decisions. Nonetheless, there is a big difference between debt financing and equity financing in the real world with corporate taxes and dividends paid to the shareholders; commonly recognized as interest tax shield. Based on TOT, the target debt to equity ratio is determined by firms. Firms try to balance between the costs and benefits of equity and debt. Firms consider the optimal capital structure that maximizes value and help to decrease external claims. The debt is set with tax shield .Informational costs related to debt are less than equity, and resulted in lowering the cost of capital and maximize the value of the firm (Titman, 1984). According POT, there exist asymmetric information between outsiders and insiders. Outsiders have less information than insiders. This theory states that firms follow financing hierarchy to minimize the problem of information asymmetry between the firm's inside managers (insiders) and the outside shareholders. (Myers, 1984; Myers. & Majluf, 1984). Market timing theory (MTT) has increasingly challenged both TOT and POT. The market timing states that firms prefer external equity when the cost of equity is low, and debt otherwise. According to the market timing theory, corporate executives sometimes perceive their risky securities as devalue in the market. Firms issue equity when they perceive the relative cost of equity is low, and issue debt when they perceive the relative cost of equity is high(Huang & Ritter, 2004).

2.2 Determinants of Capital Structure

Researchers have conducted several studies on the determinants of capital structure. Among the important variables used in the previous research are: tangibility, liquidity, firm size and profitability.

2.2.1 Tangibility

Tangibility refers to fixed assets to total assets. Trade off theory TOT and POT suggest a positive relationship between tangibility and leverage/borrowing. The firm's high fixed assets ratio can afford to go for higher debt because of the high collateral value of their assets. Fix assets can be utilized as collateral and therefore can lower the risk of a creditor and enlarge the value of the assets in case of bankruptcy. The greater its ability to issue secured debt, the more tangible is the firm's assets, so there will be a positive relationship between debts and fixed assets.

2.2.2 Liquidity (LIQ)

Liquidity is measured by current assets to current debt .The greater this ratio, the less the amount of financing from the debts. Liquidity is considered as negative debt since it reduces the need to take on debt. According to Ozkan (2001) such negative relationship eliminates potential conflicts between debt holders and shareholders. The rationale is that the greater the liquidity level, the more the shareholders could manipulate the liquid assets of the firms at the expense of debt holders. However, liquidity can produce a positive influence in case high liquidity where high liquidity eases the availability of debt (Ramlall, 2009).

2.2.3 Firm Size

Size can be measured by the natural logarithm of total sales. The general understanding about the size is that large firms can afford heavy debts because of the high asset base. However previous studies found a positive relationship between firm size and capital structure. (Abor, 2008; Rajan, 1995; Riaz. & Afzal, 2011). POT expresses that there is a negative relationship between firm size and leverage. The larger the size, the more information will be revealed by firms to the outsiders as compared to the small sized firms. Firms with less asymmetry information may issue equity more than external financing (Rajan and Zingales, 1995).According TOT larger firms are well diversified and they will have stable cash flows and their chances of bankruptcy are less as compared to small firms. Thus large firms will prefer high leverage.

2.2.4 Profitability

Profitability is measured by earnings after tax to total assets. TOT assumes a positive relationship between profitability and leverage. Firms with more stable cash flows are more profitable and they prefer to use debt as they have more debt servicing capacity and more earn profits from tax shield. Likewise, profitable firms having free cash flows should gain from debt to meet their requirements and should not waste free cash flow to maintain firm liquidity (Ahmad & Abbas, 2011; Brendea, 2011). POT considers that firms should use their internal first funds from retained earnings and then must go for leverage. Companies with high profits should not obtain financing through debt .Firms with higher profits should utilize more internal financing and reduce external financing. Such firms have enough funds in the firm and they don't need external financing. Therefore there is a negative relationship between leverage and profitability.

Jensen (1986) Al-Sakran, (2001); Chen, (2004) and Chakraborty, (2010) have empirically proved to show a negative relationship between leverage and profitability.

3. Methodology

The study utilizes the financial data of the listed companies in Tehran Stock Exchange from 2001 to 2008 (8 years).129 firms were identified from different industries of Tehran Stock Exchange.

Table 1: Selected industries of the Tehran Stock Exchange

N	Industry	Number of firms	Percent
1	Machinery and equipment	22	0.17
2	Food products & Beverage	20	0.16
3	Textiles	9	0.07
4	Chemical and pharmaceutical	19	0.15
5	Petroleum chemical products	18	0.14
6	Non-metallic mineral products	11	0.09
7	Automotive Parts Manufacturing	17	0.13
8	Metal products and Basic metals	13	0.10
Total		129	

Source : ("datastreem ,Tehran Stock Exchange," 2012)

To examine the relationship between tangibility, profitability, liquidity, firm size and capital structure, panel data are used. Time series and cross-sectional data are integrated. The firms chosen met the following requirements .They are:

1. Actively traded companies from 2001 to 2008 in Tehran Stock Exchange.
2. No changes in their main activities and their financial year.
3. Fiscal year ended March.

Two regression models are used. To investigate the relationship between the four independent variables with capital structure. Current debts constitute 85% of the total debts, the ratio of current debts to total asset is considered as a dependent variable and its effects on the determinant of capital structure are studied by the following model:

$$CS_1 = a_0 + a_1 TANG_{it} + a_2 EAT_{it} + a_3 SIZE_{it} + a_4 LIQ_{it} \quad (I)$$

$$CS_2 = a_0 + a_1 TANG_{it} + a_2 EAT_{it} + a_3 SIZE_{it} + a_4 LIQ_{it} \quad (II)$$

CS_1 = Book value of debt to total assets

CS_2 = Current debt book value to total assets.

Debt ratio the dependent variable and the independent variables show in the table 2.

Table 2. Independent variable

Variables	Proxy
Tangibility	Total fixed assets to total assets
Profitability	The earnings after tax to total assets
Liquidity	Current assets to current liabilities
Firm size	Natural log of sales

3. Results

1.3. Descriptive statistics:

The Table 3 and 4 present the summary of the descriptive statistics of the capital structure.

Table3: Descriptive Statistic (CS_1)

Volatility Title	Dependent variable	Independent variable			
	Capital structure	profitability	Liquidity	Tangibility	size
Mean	0.802	0.205	1.151	0.346	5.425
Median	0.710	0.189	1.062	0.325	5.352
Variance	0.600	0.033	0.264	0.030	0.491
Standard deviation	0.77	0.18	0.51	0.17	0.70
Max.	11.340	2.392	3.782	0.842	8.325
Min.	0.216	-0.457	0.070	0.050	2.885
N	129	129	129	129	129

Table4: Descriptive statistic (CS_2)

Volatility title	Dependent variable	Independent variable			
	Capital structure	Profitability	Liquidity	Tangibility	Size
Mean	0.675	0.205	1.151	0.346	5.425
Median	0.616	0.189	1.062	0.325	5.352
Variance	0.339	0.033	0.264	0.030	0.491
Standard deviation	0.58	0.18	0.51	0.17	0.70
Max.	9.649	2.392	3.782	0.842	8.325
Min.	0.140	-0.457	0.070	0.050	2.885
N	129	129	129	129	129

Table.3 shows that total debt to total assets is 0.802, the median is 0.710 and the variance is 0.600.The maximum and minimum of 11.340 and 0.216 respectively. As Table.3 and 4 indicate that the mean earning after tax is 0.205. The mean of current assets to current debts is 1.151 that is at the top of the scale. The mean of total fix assets to total assets show 0.346, it means the relationship between tangibility and capital structure is low, and the mean of size is 5.425, it means the relationship between size and capital structure is high. The Max and Min of earning after tax are 2.392 and -0.457 the Max and Min of current assets to current debts are 3.782 and 0.070, the Max and Min of total fix assets to total assets are 0.842 and 0.050, and the Maximum and Minimum of size are 8.325 and 2.885. Table 4 Shows, the mean of current debt to total assets is 0.675, the median is 0.616, and the variance at 0.339 with the maximum and minimum are 9.649 and 0.140.As mentioned, 67.5 percent of current debt is total debt; the max and min are 11.340 and 0.216.

With regard to high inflation rate, banks and financial institutions pay short term loan, thus companies that take a short term loan cannot pay on maturity, and therefore they have to extend the loan with high interest rate, this results in an increase in debt. Because the inflation rate increases every year, companies revaluate their assets to increase the equity or to decrease debt ratio, thus tangibility is negatively related to capital structure. Companies don't keep all the profit for new financing and a high

percent of the profit is distributed among shareholders, therefore when companies need funds, the retained earning is not enough and they have to finance by loan too, thus there is no relationship between profitability and capital structure.

Regression Results

1.2.3. Table 5, shows the regression results of Models 1and 2

Table 5: Models 1&2

Variable	Coefficient		t-Value		P-Value	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Tangibility	-0.281	-0.353	-7.553	-9.85	0.000	0.000
Profitability	-0.051	-0.036	-1.436	-1. 033	0.151	0.302
Liquidity	-0.498	-0.568	-12.702	-15.02	0.000	0.000
Size	-0.170	-0.138	-4.969	-0.186	0.000	0.000

	Model 1	Model 2
R	0.499	0.549
R^2	0.249	0.301
Adj R^2	0.245	0.297
F-statistic	57.421	74.55

The model (1,2) (Table 5), shows a significant and negative relationship between tangibility and debt ratio. It means higher level of tangibility would decrease the level of debt ratio. The negative relationship between tangibility and debt ratio in this study are in agreement with several studies , Janbaz (2010), Yue (2011), Coleman & Cole (2000). Implying that there is not a significant relationship between profitability and debt ratio. Gurcharan (2010) found insignificant relationship between profitability and debt ratio .This study doesn't agree with Deesomsak et al (2004), Gurcharan. (2011), Huang and &Song (2005), Elashker &Wattanasuwannee (2003), Riaz &Afzal, (2011) Jensen (1986) Al-Sakran, (2001); Chen, (2004) and Chakraborty, (2010) . Liquidity is significant and negatively related to debt ratio, this study agree with several studies such as, Deesomsak et al. (2004), Janbaz (2011) and Ozkan (2001).There is a significant and negative relationship between size and debt ratio. Pecking order theory (POT) expresses that there is a negative relation between firm size and leverage. The larger the size the more information will be revealed by firms to the outsiders as compared to the small sized firms. Firms with less asymmetry of information may issue equity more than external financing (Rajan and Zingales, 1995). The negative relationship between size and debt ratio agrees with Riaz &Afzal study (2011) . According to Gurcharan (2011), size has a negative relationship with capital structure in Malaysia and Thailand and positive relationship with capital structure in Indonesia and Philippine, The result about size in this study doesn't agree with , Mayers and Majluf (1984), Chin Huat (2008), Mayers and Majluf (1984) , Janbaz (2011) , Wiwattanakantang (1999) and Deesomsak et al. (2004). The models 1 and 2 show the correlations between three variabels of tangibility, liquidity and size and capital structure presented a p-value lower than 0.05 (0.000 < 0.05). Thus this analysis finds out a significant relationship between each of tangibility, size and liquidity with the capital structure. The correlations between profitability with the capital structure presented a p-value higher than 0.05 (0.151, 0.302 > 0.05). Thus this analysis finds out there is not a significant relationship between profitability and capital structure at the 5% level. The amount of R2 is always between 0 and 1, when it equals 1, means that estimated regression explains the whole changes in the dependent variable, and when it equals 0, means that estimated regression could not explain any of the mentioned changes. $R^2$of model 1 showed at 0.249. The independent variable is 24.9 percent of the variation of the dependent variable. R^2 of model 2 showed is 0.301 .It means that the independent variable can explain 30.1 percent of the variation of the dependent variable.

Table 6: show the summary ANOVA of model 1&2

Regression	Total square errors	Degree of freedom	Mean square errors	F	Significance of level α
Model 1	104.045	4	26.011	57.421	0.000
Model 2	71.143	4	17.786	74.55	0.000

Significant at 5% level

Variable	Coefficient	Ranking	
		Model 1	Model 2
Tangibility	Sig	2	2
Profitability	Not Sig	4	4
Liquidity	Sig	1	1
Size	Sig	3	3

Table.6 shows, the important level of α is less than 5%, that is, the model is 95%.Total square error stood at 104.045 and 71.143.Which imply that there is a relationship with mean square errors. The degree of freedom is 4 that equal 6.39 according to Fishar (F) table. With regard to the fact that F-number (57.421and 74.55) is bigger than the number in the Table (6.39) and also "α" is less than 5%, it can be included that independent variable affects depended variable and create a meaningful relation.

4. Discussions

In Model 1 & 2 liquidity is the most significant variable, following that tangibility is the most significant variable and after them the size is the most significant variable. Profitability coming last and not significant variable .This study aims to find the determinants of capital structure and examine the relationship between tangibility, profitability, liquidity and firm size and capital structure .The in the data are collected from the129 listed companies in the Tehran Stock Exchange from 2001 to 2008.

Analysis of the data is based on the two models; tangibility has the significant effect on capital structure. Trade of theory (TOT) and pecking order theory (POT) suggest a positive relation between tangibility and capital structure. The results show as the tangibility increases it will lead to a positive relationship between tangibility and capital structure. Liquidity is negatively related to debt since it reduces the need to take on debt; therefore, liquidity is negatively related to capital structure. The relationship between profitability and capital structure is examined. As a result is not a significant capital structure. Finally the results show that in both models, the firm's size is negatively related to capital structure.

Acknowledgements:

Authors are grateful to School of management University Sains for support to carry out this work.

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12/2/2012

The Phonetic Processes (Transformations) in the Abadeh Tashk Dialect

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Abstract: The dialect of the village of Abadeh tashk undergoes clear pheonological change.In many words a consonant is changed to another consonant,that is, it undeagoes alteration,or some consonants are omited that is,elision occurs. In some words, two consonants replace each other that is reversal happers in them. In some other case are in a word insertion happens. It sometimes happens that in a word more than one change occur, In other words, elisionand reversal. Alteration and reversal, alteration and insertion and or all happen to gether.In the dialect under study,in most case elision,alteration. Reversal, increase and elision and reversal happen.
[Faranak Ramezani. **The Phonetic Processes (Transformations) in the Abadeh Tashk Dialect**. *Life Sci J* 2012;9(4):4628-4632] (ISSN:1097-8135). http://www.lifesciencesite.com. 697

Keywords: omission, replace, anagram, anagram and omission, addition

1. Introduction

The transformations, which are created as the result of phonetic association In the combination, are called the phonetic procedures (Windfuhr, Gernot. 2009) . The phonetic transformations have been in the ancient, middle, and modern Persian, some of which are, omitting some of the phonemes, replacing (changing some of the phonemes to other phonemes), adding the vowels at the beginning of the word, or between two consonants, the anagram (displacing the words), even in some words, more than one of the above-mentioned procedures take place, such as (replace and omission; transformation, and omission, …). Similar to all the languages, in this dialect the mentioned phonetic transformations take place (Romsdorfer H. and B. Pfister. 2004). Some samples of the phonetic changes are presented in the following lines:

1.1. Omission: the omission procedures of some of the consonants in Abade Tashk dialect

Pomegranate: $anār = nār$

Fire: $ātaš = taš$

Mid omission: omitting *d* in the middle of the word

Wheat: $gandom = gannen$

River: $rūdxāne = rūxāne$

Hanabandan (one of the Persian wedding customs): $hanābandān = henābanūn$

1.1.1. Final omission: omitting *t* in the cluster of *st*:

Yogurt: $māst = mās$

Glass: $estekān = eskām$

Machine: $dastgah = dasga$

Thumb: $šast = šas$

Hand: $dast = das$

Is: $hast = has$

Isn't: $nist = ni$

Drunk: $mast = mas$

Skin: $pūst = pūs$

Embarrassed: $dastpāče = daspāče$

Clusters: $dastedaste = dassedasse$

Handkerchief: $dastmāl = dasmāl$

Right: $rāst = rās$

Correct: $dorost = deres$

Prayer: $dastnamāz = dasnemāz$

Handcuffs: $dastband = dasban$

2.1.1. Omitting *t* in the cluster of $št$:

Had: $dāšt = dāš$,

Eight hundred: $haštsad = haššad$

Put: $hešt = heš$

Breasts: pestān $= pesūn$

3.1.1. Omitting *d* in the cluster *nd*:

Lump of sugar: $ɣand = ɣan$

Measure: $andāze = annāze$

(Replace has taken place as well), Remained: $mānde = monne$

Tall: $boland = belan$

Slave: $bande = banne$

(Omission and replace),

Laugh: $xande = xanne$

Band: $band = ban$

Sheep: $gūsfand = gosban$

Smile: $labxand = low - xan$ (as well as omitting *b* in *lab*)

Harmal=Navand: $navand = nava$

Bracelet: $dastband = dasbav$

Read: $x\bar{a}nd = xon$

Esfand (the 12TH Persian month): $sfand = sfan$

How much: $\check{c}and = \check{c}an$

4.1.1. Omitting *d* in the cluster of *zd*:

Theft: $dozd = dez$

5.1.1. Omitting *d* at the end of tense vowel:

Early: $z\bar{u}d = zi$

6.1.1. Omitting *z* at the end of words after the vowels:

Thing: $\check{c}iz = \check{c}i$

Today: $emr\bar{u}z = emr\bar{u}$

Yesterday: $dir\bar{u}z = dir\bar{u}$

Two days $dor\bar{u}z = derr\bar{u}$

Still: $han\bar{u}z = hani$

7.1.1. Omitting *h* at the end of the word after the vowels:

Sometimes: $g\bar{a}h = ga$

8.1.1. Omitting *h* in some of the words before *r*:

Wrath: $\gamma ahr = \gamma ar$

Mehr (the seventh Persian month): $mehr = mer$

Cabin: $mahr = mar$

Four: $\check{c}\bar{a}h\bar{a}r = \check{c}\bar{a}r$

9.1.1. Omitting *h* in some of the words after the consonant *n*:

Alone: $\tanh\bar{a} = \tan\bar{a}$ Omitting *h* in some of the words after the lax vowel *a*: Vesper: $zahre = zale$

10.1.1. Omitting *h* in some of the words after the consonant *b*:

Morning: $sobh = sob$

11.1.1. Omitting *h* in some of the words after the consonant *l*:

Peace: $solh = sol$

12.1.1. Omitting *b* after the vowels at the end of the words:

Grape juice: $d\bar{u}sab = d\bar{u}\check{s}ow$

Whitewash: $d\bar{u}\gamma\bar{a}b = d\bar{u}\gamma ow$

13.1.1. Omitting *b* at the end of some of the words:

Lip: $lab = low$

14.1.1. Omitting *h* between the two vowels, or after the vowel:

Effort: $zahmat = zamat$

Generosity: $rahmat = ramat$

15.1.1. Omitting *u* between the two *l*:

Bullet: $g\bar{u}l\bar{u}le = g\bar{u}lle$

Old: $kohne = k\bar{a}ne$

16.1.1 Omitting the tense vowel $\bar{a}$ within the word:

Shame: $xej\bar{a}lat = xojelat$

17.1. 1. Omitting the still letter at the end of the words:

Shoulder: $ketf = kat$

Dough: $du\gamma = du$

Bitter: $talx = tal$

Loose: $sost = ses$

2.1. Replacing: in some of the words a consonant is replaced by another consonant, such as:

1.2.1. Replacing *b* with *v*:

Ax: $tabar = ta$ var

News: $xabar = xa$ var

Open: $b\bar{a}z = v\bar{a}z$

Side: $bar =$ var

2.2.1 Replacing *l* with *r*:

Chubby: par vār = pal vār

Damage: $zarar = zalal$

Chain: $zanjir = zanjil$

Dare: $zahre = zale$

Hair: $t\bar{a}r = t\bar{a}l$

Tar: $\gamma ir = \gamma il$

Leaf: $b$arg = balg

Fluff: $kork = kolk$

Hunt: $\check{s}ek\bar{a}r = \check{s}ek\bar{a}l$

3.2.1. Replacing *f* with *b*:

Edge: $nab\check{s} = naf\check{s}$

Record: $zabt = zaft$

Register: $\tan\bar{a}b = \tan\bar{a}f$

4.2.1. Replacing t with z:

Service: $xedmat = xezmat$

Ill-will: $badz\bar{a}t = bazz\bar{a}t$

5.2.1. Replacing *s* with *z*:

Rosary: $tasbi = tazbi$

6.2.1. Replacing *s* to *v* and replacing *b* to *z*:

$tasbi = tavzi$

7.2.1. Replacing *n* with *b*:

Fat: $donbe = dombe$

8.2.1. Replacing *s* with $\check{s}$:

Succor: $k\bar{a}sni = k\bar{a}\check{s}ni$

9.2.1. Replacing *f* with *d*:

Fatemeh: $f\bar{a}tameh = f\bar{a}dme$

10.2.1. Replacing *g* with *d*: kick:

$lagad = la\gamma at$

11.2.1. Replacing *h* with *x*: better:

$bahtar = bextar$

12.2.1. Replacing *b* with *d*: poor:

$badbaxt = baddaxt$

13.2.1. Replacing *x* with *h*: house:

$x\bar{u}ne = h\bar{u}ne$

14.2.1. Replacing *n* with *m*: warehouse:

$anb\bar{a}r = amb\bar{a}r$

Saturday: $\check{s}anbe = \check{s}mbe$

Five hundred: $p\bar{a}nsad = pomsad$

Hoop: $\check{c}anbar = \check{c}ambar$

Pulpit: $menbar = member$

Cotton: $panbe = pambe$

15.2.1. Replacing *j* with $\check{z}$: chance:

$maj\bar{a}l = me\check{z}\bar{a}l$

16.2.1. Replacing *k* with *y*:

Major: $akbar = aybar$

17.2.1. Replacing *z* with *j*:

Manizhe: $mani\ \check{z}e = manije$

18.2.1. Replacing $\bar{u}$ with *i*:

Column: $sot\bar{u}n = setin$

Smoke: $d\bar{u}d = did$

Was/were: $b\bar{u}d = bid$

Berry: $t\bar{u}t = tit$

Chicken: $j\bar{u}je = jije$

Still: $han\bar{u}z = hani$

Reverse: $v\bar{a}r\bar{u}ne = v\bar{a}rine$

Needle: $s\bar{u}zan = sizan$

19.2.1. Replacing *k* with *y*:

Crow: $kal\bar{a}\gamma = \gamma al\bar{a}\gamma$

20.2.1. Replacing *k* with *d*:

Frank: $rok = rod$

21.2.1. Replacing *d* with *t*:

Powder: $gard = gart$

Kick: $lagad = la\ \gamma at$

22.2.1. Replacing *y* with *x*:

Collar: $ya\gamma e = yaxe$

When: $va\ \gamma ti = vaxti$

Role: $na\ \gamma\ \check{s} = nax\ \check{s}$

23.2.1. Replacing *n* with *m*, and replacing the vowel *o* to *e*:

Follow: $donb\bar{a}l = demm\bar{a}l$

Pliers: $anbor = ambor$

Cotton: $panbe = pambe$

Hoop: $\check{c}\ anbar = \check{c}\ ambar$

Lazy: $\tan bal = tambal$

Saturday: $\check{s}anbe = \check{s}ambe$

Pulpit: $menbar = membar$

24.2.1. Replacing *b* with the vowel *ow*:

Last night: $di\ \check{s}\ ab = di\ \check{s}\ ow$

25.2.1. Replacing *f* with the vowel *ow*:

Halter: $afs\ \bar{a}r = ows\ \bar{a}r$

Banner: $deraf\ \check{s} = derow\ \check{s}$

26.2.1. Replacing the vowel $\bar{u}$ with *i*:

Face: $s\bar{u}rat = sirat$

27.2.1. Replacing the vowel *e* with *o* in the word curse: $nefrin = norfin$

28.2.1. Replacing the tense vowel $\bar{u}$ with the lax vowel *o*: knock: $k\bar{u}f\ \tan = kof\ \tan$

29.2.1. Replacing $\check{c}$ with $\check{s}$:

Anything: $hick\ \bar{a}r = hi\ \check{s}\ k\bar{a}r$

What: $\check{c}\ \check{e}cize = \check{c}i\ \check{c}i$

30.2.1. Replacing *h* with *y*:

Fish: $m\bar{a}hi = moyi$

31.2.1. Replacing *p* with *f*:

Capsule: $kaps\bar{u}l = kafs\bar{u}l$

32.2.1. Replacing lax vowel *a* with the tense vowel $\bar{a}$:

Uncle: $am\bar{u} = \bar{a}m\bar{u}$

Daughter-in-law: $ar\bar{u}s = \bar{a}r\bar{u}s$

33.2.1. Replacing lax vowel *I* with the vowel *o*:

Pour: $rix\tan = rox\tan$

34.2.1. Replacing the vowel *i* with the vowel *e*:

cord: $rism\bar{a}n = resm\bar{u}n$

Pour: $rix\tan = rex\tan$

Sift: $bix\tan = bex\tan$

35.2.1. Replacing *b* with *y*:

Wood: $\check{c}\ \bar{u}\ b = \check{c}\ \bar{u}\ \gamma$

36.2.1. Replacing tense wovel $\bar{a}$ with the tense vowel $\bar{u}$:

Cord: $rism\bar{a}n = resm\bar{u}n$
Thigh: $r\bar{a}n = r\bar{u}n$
River: $r\bar{u}dx\bar{a}ne = r\bar{u}x\bar{u}ne$
Bath: $hamm\bar{a}m = ham\bar{u}m$
Corridor: $d\bar{a}l\bar{a}n = d\bar{a}l\bar{u}n$
Knee: $z\bar{a}n\bar{u} = z\bar{u}ni$
Shoulder: $\check{s}\bar{a}ne = \check{s}\bar{u}ne$
Cup: $fenj\bar{a}n = fenj\bar{u}n$
A metal or wooden box for keeping the things: $yaxd\bar{a}n = yaxd\bar{u}n$
Raw: $x\bar{a}m = x\bar{u}m$
Cup: $j\bar{a}m = j\bar{u}m$

37.2.1. Replacing the vowel $\bar{u}$ to *i*:
Squash: $kad\bar{u} = kodi$
Balance: $tar\bar{a}z\bar{u} = terazin$
Chicken: $j\bar{u}je = jije$
Soon: $z\bar{u}d = zi$
Knee: $z\bar{a}n\bar{u} = z\bar{u}ni$
Column: $sot\bar{u}n = setin$
Needle: $s\bar{u}zan = sizan$
Face: $s\bar{u}rat = sirat$
Alley: $kuce = kice$
Reverse: $v\bar{a}r\bar{u}ne = v\bar{a}rine$

38.2.1. Replacing the vowel *a* with *e*:
Balance: $tarazu = terazin$
Henna: $han\bar{a} = hena$
Gold: $tala = tela$
Beautiful; $\gamma a\check{s}ang = \gamma e\check{s}ang$
Chance: $ma\check{z}\bar{a}l = me\check{z}\bar{a}l$
Iron: $\bar{a}han = \bar{a}hen$

39.2.1. Replacing *m* with *n*, and *d* with *n*:
Major: $omde = onne$

40.2.1. Replacing the lax vowel *a* with the tense vowel $\bar{a}$:
Daughter-in-law: $ar\bar{u}s = \bar{a}r\bar{u}s$

41.2.1. Replacing the tense vowel $\bar{a}$ with the lax vowel *o*:
Read: $x\bar{a}nd = xon$

42.2.1. Replacing the tense vowel $\bar{a}$ with the compound vowel *ey*:
Mirror: $\bar{a}yene = eyne$

43.2.1. Replacing *s* with $\check{c}$, and *d* with *t*:
Mosque: $masjed = ma\check{c}\check{c}et$

44.2.1. Replacing the lax vowel *o* with the tense vowel $\bar{a}$:
House: $kohne = k\bar{a}ne$
Cool: $xonak = x\bar{a}nek$

45.2.1. Replacing the lax vowel *o* with the lax vowel *e*:
Spit: $tof = tef$
God; $xoda = xeda$
Girl: $doxtar = dextar$
Column: $sot\bar{u}n = setin$
Loose: $\check{s}ol = \check{s}el$
You: $\check{s}om\ \bar{a} = \check{s}em\ \bar{a}$
Enemy: $do\check{s}man = de\check{s}man$

46.2.1. Replacing the tense vowel $\bar{a}$ to the compound vowel *ow*:
Water: $\bar{a}b = ow$
Sleep: $x\bar{a}b = xow$
Bile: $zard\ \bar{a}b = zardow$

3.1. Anagram
Two consonants are displaced in some words; it means that **anagram** takes place in them.

1.3.1. Displacing *f* with *l*:
Lock: $\gamma ofl = \gamma plf$

2.3.1. Displacing *y* with *l*:
Leaf: $barg = balg$

3.3.1. Displacing *f* with *r*:
Blasphemy: $kofr = korf$
Curse: $nefrin = norfin$

4.3.1. Displacing *f* with *t*:
Shoulder: $ketf = koft$

5.3.1. Displacing *r* with *x*:
Rate: $nerx = nexr$

6.3.1. Displacing *s* with *y*:
Fraction: $kasr = kars$

7.3.1. Displacing *z* with *r*:
Vow: $nazr = narz$

8.3.1. Displacing *t* with *r*:
Umbrella: $\check{c}atr = \check{c}art$
Hump: $ketr = kert$
Perfume: $atr = art$

9.3.1. Displacing *y* with *l*:

Occupation: *s o γl = s ol γ*

10.3.1. Displacing *k* with *s*:

Image: *aks = ask*

11.3.1. Displacing *s* with *x*:

Version: *nosxe = noxse*

Termination: *fasx = faxs*

12.3.1. Displacing *b* with *v*:

Rough: *zebr = zerb*

Sack: *tūbre = terbe*

Patient: *sabr = sarb*

13.3.1. Displacing *t* with *l*:

Bucket: *satl = salt*

14.3.1. Displacing *h* with *r*:

Mahram: *mahram = marham*

15.3.1. Displacing *x* with *l*:

Avarice: *boxl = bolx*

16.3.1. Displacing *l* with *y*:

Hubble bubble: *γaly ān = γeyl ūn*

17.3.1. Displacing *b* with *v*:

Pulse: *nabz = navz*

18.3.1. Displacing *f* with *y*:

Ceiling: *sa γf = saf γ*

19.3.1. Displacing the vowel *o* with *e*:

Chad**or:** *c ādor = c āder*

Pitcher: *tong = teng*

Cast iron: *c odan = c edan*

Burner: *ojāγ = ejāγ*

Tail: *dom = dom*

Brick: *ājor = ājer*

20.3.1. Displacing the vowel *a* with *e*:

Henna: *hana = henā*

Iron: *āhan = āhen*

21.3.1. Displacing the vowel *a* with *ow*:

Horseman: *sa vār = sowār*

22.3.1. Displacing the tense vowel *ū* with the lax vowel *i*:

Relax: *āsūde = āside*

23.3.1. Displacing the tense vowel with the lax vowel *e*:

Sack: *tūbre = terbe*

24.3.1. Displacing the lax vowel *e* with the lax vowel *o*:

Final: *āxer = āxor*

25.3.1. Displacing the lax vowel *o* with the lax vowel *i*:

Thin: *nāzok = nāzik*

4.1. Anagram and Omission

In some of the words more than one transformation takes place, i.e. replacing and omission, replacing and anagram, replacing and merging, or anagram and omission, or …, which happen together. Omitting *h* in some of the words before *r* and replacing the lax vowel *o* with the tense vowel *a*:

Piece: *mohre = māre*

5.1. Addition*:*

Adding *g* to the end of the word: reed: *ney = neyg*

Adding the lax vowel *e* to the beginning of the word:

pregnant: *e s kam*

To count: *e s mordan*

6.1. Replacing and addition:

Replacing *n* with *m* and adding *d*:

Saturday: *s anbe = s ambed*

2. Discussion

Regarding the above-mentioned facts in the dialect under the consideration, the most frequent cases are related to the procedures of “omission”, “anagram”, “addition”, and “anagram, and omission”, respectively.

Acknowledgements:

Author is grateful to the Department of Persian literature, Marvdasht Branch, Islamic Azad University for financial support to carry out this work.

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12/2/2012

Mythical Physiognomy of "Hero" in Ibn Hessam Khosfi's Khavar Nameh

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Abstract: In the epic of Khavar Nameh, myths have prominent roles. Like Shahnameh of Ferdowsi, this work includes noble and valuable mythical physiognomies and each one of them is noteworthy. To express his ideas and goal, Ibn Hessam has skillfully used such myths as hero, creation, good and evil, dragon, demon, and etc. which are required for an epic work. In this Article, by examining the mythical physiognomy of "hero" in Khavaran Nameh , it is observed how Ibn hessam has made Ali (PBUH) , who is a religious and historical character , the hero of his own epic , so that he own all the features of a mythical hero , stands against all bad and evil forces , defeats all evils by his extraordinary actions and behavior , and brings goodness for human beings.
[Shahrbanoo Haghshenas. **Mythical Physiognomy of "Hero" in Ibn Hessam Khosfi's Khavar Nameh**. *Life Sci J* 2012;9(4):4633-4636] (ISSN:1097-8135). http://www.lifesciencesite.com. 698

Keywords: Myth, hero, Khavaran Nameh , Ibn Hessam , epic

1. Introduction

Myths are the origin of first stories, specially epic and heroic legends and it could be said that myths are like wide circles that encircle all literary and artistic themes and social, religious, psychological, etc. issues. It should be noted that epic is the best platform to retell narrative myths, tales and legends and it is certainly one of the reasons behind the success of Ferdowsi and Homer in expressing the past culture of their nations through the myths. Epic is highly associated with the myth. Kazazi believes that "myth is like a breeding mother who gives birth to epic and brings it up in her lap. True epic is just created by the myth. Therefore, epic is only generated in the culture and literature of those nations that own ancient history and legends." He believes that myth and epic are the same and says: "epic is identical to myth in nature and structure; whatever myth deserves also does epic…" (Eliade, Mircea. 1963). Myths are the origin of most literary works, especially epics. It is interesting that in most epics, humane heroes are represented in mythical shapes. Myths are global heroes which are found in the history and culture of every nation. In this regard Yung says : " Heroic myths are the most popular and well-known myths which are found in Ancient Roman and Greek mythology , in Middle Ages and in the Far East , and even in the primitive tribes and our dreams." (Foley, John Miles (1999)) He believes that although the myths are apparently different, they are all similar and identical. He adds: "Even though the myths are very different in details, the more thoroughly we analyze them, the better we understand that they have very similar structures and in spite of being created by individuals or groups who had no straight cultural relationship with each other, they all have global identical patterns." (Foley, John Miles (1999). In Persian literature and in public culture, the mythical hero has a remarkable role. The heroes of humane epics are ideal models and examples of favorite humans who save all human beings from evil. By studying public ideas, beliefs and cultures in stories, tales, legends, and epics it is observed that in all ages while facing hardships and frustrations, people have been looking for a superman who could ideally overcome the problems. This superman Is the hero who is introduced by Joseph Campbell in this way: "A hero ignores his life and begins a dangerous journey to supernatural wonders, then faces amazing forces there and will achieve absolute victory. While returning home from this mysterious journey, the hero is able to grant blessing and grace to his companions." Wright, M.R1995). In the epic of Khavar Nameh, myths have remarkable roles. Like Shahnameh, this work contains the physiognomies of precious and noble myths that are all noticeable. To express his ideas and to achieve his goals, Ibn Hessam has benefited from such myths as hero, creation, good and evil, dragon, demon and etc. very skillfully which is the requirements of an epic work. This paper tries to study the mythical physiognomy of "hero" in Khavar Nameh.

1.1. Mythical hero in Khavaran Nameh

Every civilization witnesses and narrates the story of a hero who fights for justice and freedom and sacrifices his own life to save his own society and country mates and endangers his life to death in order to defeat evil forces and as divine forces help him he deals with all dangers and will emerge victorious and proud. A good example of such a hero in Iranian national epic is Rostam. Rostam is a mythical hero and a symbol of physical strength, human virtues, and spiritual force and Great Ferdowsi has brought him up so masterfully in his unique epic that he has still remained in the culture and the people's minds as

a hero and a savior. As it can be seen even until the eighth century when Hafez is suffering from the injustice and inequities of his time, he is still looking for a hero such as Rostam to assist them as he painfully says:

In the well of patience I burned for that flower-like candle The king of the Turk is unaware of us where is a Rostam (Hafez, 1995 :314). In addition to Rostam , Imam Ali (PBUH) is also very popular as a hero . There are many tales and legends among people about the wining and the relationship between these two national and religious heroes. In these stories even Ali's wining is preferred to Rostam's as Ibn Hessam says:

The power of his arm reduced the reverence of Rostam
His loin-killing hands ruined the glory of the King

And it is said since the time Rostam was inspired by Ali, he was never knocked down. In the past literary works to present , Ali's bravery and heroism has been expressed several times and poets such as Roudaki , Kasaee , Ferdowsi , Sanaee , Sa'di , Khajooye Kermani , Ouhedi Maragheie , Hafez , Babafaghani , Ahil Shirazi , Mohtashem Kashani , Hazin Lahiji , Ashegh Esfahani , Hatef , Vesal Shirazi , Forsat Shirazi , Malekoshoara Bahar , and etc. each one has in turn admired Ali very sincerely on behalf of his own nation. It is due to such admirations that ultimately in 9th century Ibn Hessam choses Ali as the hero of his own epic and in fact "the poet holds a real popular character out of his own time and location and takes him into other time and locations". In KhavarNameh , Ali (PBUH) - apart from history- is a myth and a perfect example of an epic human who with his justice fights dragons , demons , wizards , and cruel kings in amazing wars and finally defeats the evils brings justice and goodness for human society and he is in fact the myth which is mentioned by the mythology experts.

Carl Gustav Yung says: "A global mythical hero always refers to a very powerful man or a or semi-divine who defeats the evils such as dragons, snakes, demons, and Satan and saves his people from death and destruction." (SHARIAT ZAHRA, ZAINALI LEILA. 2009). The hero of Khavaran Nameh also owns all those criteria which are specific to an epic or mythical hero. The hero of the epic has some divine and supernatural power so that a hero like Rostam who is the son of Zal is brought up by a Simurgh which has divine power and it protects him in all battles and troubles. In Khavar nameh, Imam Ali is brought up with the holy prophet (PBUH) who has a divine power as well. The holy prophet talks to God and Gabriel (Simurgh in Shahnameh) comes to the prophet in difficulties and saves him from concerns. When Ali was fighting in a difficult war, the holy prophet got worried

Gabriel appeared to him and saved him from concern
God send Gabriel to him
He told him Oh! Guiding Sayid (prophet)
Behold in order not to be worried
Go to the Ivan of the mosque oh messenger
Come to see Ali in the East
In the battle with the enemies

In addition to communication with Gabriel, the holy prophet owns a divine power and in all stories he has the role of Simurgh in Shahname and in the difficulties he assists Ali and the other heroes of his army. An example is mentioned here:
Magnet Castle was a castle in which there were 400 gold idols. The demon of monster was dominating that castle , Imam Ali couldn't capture it after several attacks and throwing stones , and several times he prostrated disappointedly and cried and moaned : " My Lord , I don't know what this condition is. " Then the holy prophet got aware of Imam Ali difficulties through occult inspiration and sent a letter to him and told him to fasten the letter to the spear and throw it toward the castle to break its spell and Imam Ali did so and captured the castle.

During the whole story, this divine force helps the hero. When Imam Ali is worried about his slave Ghanbar , a savior from the hidden world saves him ; Imam Ali worriedly :

He came down the horse and prostrated God and said Oh! The world creator
For the sake of the holy Mohammed who is the light inform me about my slave
A mysterious voice from a hidden place told him what he had to do (Khavaran Nameh , V. 2 : 95)

The hero's height and shoulders and his body are quite different from others:

If Rostam "While sitting is taller than anyone who is standing in front of him" (Shahnameh , V. 2: 65) the hero of Khavaran Nameh is also taller than the tall man (Salsal) who has an athletic body and courageous men are afraid before him. Salsal goes toward the battle field:

The soldiers saw his body and his mane
The length and the width of his spear
From that big body and strong mane
The brave soldiers were amazed
Everyone was afraid of his height
There wasn't any man like him in the world

With such a glory, Salsal was amazed by seeing the height and the body of Imam Ali and called him a wizard:

The tall Salsal approached him
He was short before the tall handsome man (Ali)
When Salsal saw that tall man who was taller than him as a head and neck
He told him "Oh man! Who are a wizard stop doing magic now
It seems as if you were shorter than me but now you are taller than me

The hero of the epic is a supernatural being and his actions are extraordinary. In the battle field Ali (AS) calls on 10000 warriors instead of one and finally he is the winner of the field:

He roared the king that I am fighting you
The fight of the East land and the enemies
Shame on me if I avoid a warrior
Who is fighting me?
Send ten thousands soldiers from famous warriors to fight me in the battle

Ali (AS) fights Amoud who was 700 Man (a unit of measurement equal to 3 kg). The story is like this; Salsal asks Ali to lift 700-Man Salsal in order to try his masculine skill And Ali lifts him very easily and show him to all. Also the hero of the epic encounters an anti-hero in each aspect of his life. It should be noted that familiar myths are the reflection of dualism in nature and in human being and also the reflection of contradictory forces in the world". (Zomorodi, quoted by Bahar, 2003: 377). Antiheroes are the real symbols of evil that the hero (the goodness) fights and saves the humans from them. In Shahnameh , Rostam is facing some anti-heroes such as Afrasyab , demin , monster , and others. But his battle is not only with anti-heroes but also sometimes he is fighting some ideal heroes such as Esfandiar or a hero from his own race and blood such as Sohrab and when he defeats them , the epic turns into tragedy. In Khavaran Nameh , as the battle is just between two opposite heroes (good and evil) , there never happens such tragic scene. But the hero of Khavaran Nameh, Imam Ali (PBUH) always encounters anti-heroes such as cruel kings, demons, monsters, and wizards. The kings of Khavaran Nameh are all cruel idolaters, cannibals, and demon-like and are I summary the true example of evils and the hero of the epic together with the other heroes fight them to save human beings. Some examples are mentioned below:

1.1.1. Navader:

Navader is a cruel king whose soldiers close the path to the caravans by his command and after murdering them, invade their properties:

A cruel king who is a burglar
Has invaded that mountain as a king
The name of that king was Navader banditry was always his fun (Farhad Naqash .2002)

Finally, after a severe battle with Islamic troops:

The body of the king was rolling in blood
His life came to and ends very hard
At the same time he lost his sweet life
you said as if Navader was never born by mother
(Farhad Naqash .2002)

2.1.1. Ghattar:

This king is the twin brother of the bandit Navader , who has a devil nature and like Zahak in Sahname he is eating human body.

Near him was a debased man
Who were both a bandit and a cannibal?
In profanity, this black man was disgraced and
He never did something good
He made wine out of the blood of the braves He made kebab out of the thigh of the prisoners
The name of this cruel person was Ghattar He was malicious and wicked and evil
(Farhad Naqash .2002).

As quoted by Shafiee Kadkani: "perceptions and attitudes of poets towards the myths, historically depends on the political and social atmosphere of their environment as well as their sense of imagination and creativity. Referring to Iranian and non-Iranian mythology has taken various colors in the images of different poets. (Farhad Naqash .2002).

In order to show the evil nature of Ghattar, Ibn Hessam has introduced him with attributes such as malicious, wicked, and cannibal so that it immediately develops the picture of Zahak in the mind of the audience with a different color and image especially when he says in the story:

His body grew up by (eating) human beings he has sucked the blood of brave people (Khavaran Nameh , v. 1 69). But according to the epic perspective that finally goodness defeats evil , (As Freidoon defeats Zahak oe Houshang defeats demon) this evil king is also defeated and Ali (AS) says that he will be save if he believes in Islam.

Ali told him to stop being a pagan don't disobey
The religion of the prophet
You will be saved if you believe in God come to the path of God
I will release you from the prison
I will turn your head up in the high wheel
(Farhad Naqash .2002).

2. Discussions

One of the benefits of the myths is that by studying each nation's mythology, we can know the history of civilization, culture, ideas and development process of that nation better. Ancient beliefs and traditions can be found in the myths. Studying the myths might make us familiar with ancient customs and patterns which are still alive within us. (Esmaeelpour , Myths , symbolic expressions : 16). By studying the mythical hero in Khavar Nameh it is observed how people make Ali the hero of their epics through the strong belief they have to him, a hero who is able to defeat all evil forces even the monsters and demons and be the conqueror of all the battle fields.

Acknowledgements:

An author is grateful to the Department of Persian Language and Literature, farrashband branch, Islamic Azad University for financial support to carry out this work.

12/2/2012

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Analysis of Nevirapine and Lamivudine in human plasma of HIV infected patients by high-performance liquid chromatographic-mass spectrometric (LC-MS-MS)

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Abstract: High pressure liquid chromatographic-tandem mass spectrometric (LC/MS/MS) method was developed and validated for the determination of lamivudine and nevirapine in human plasma. The method was validated over the linearity range of 10–500 ng/ml ($R^2 > 0.99$) using zalcitabine as an internal standard. Blood samples were obtained from HIV patients at two different collecting times which were first blood samples collected when the questionnaire was administered and second blood sample after one month from the collection of the first blood sample. The plasma extraction was performed using protein precipitation of plasma, followed by centrifugation. The lower limit of quantification (LOQ) was 10 ng/ml. Chromatographic separation was achieved on a Zorbax-C18 and the flow rate was kept constant at 0.8ml/min. Mobile phase A was formic acid in water and mobile phase B was 10mM ammonium formate in acetonitrile with pH 5.8. LC-MS-MS in positive mode used pairs of ions of 230.20/111.90, 267.08/226.10, 212.08/112.00 for lamivudine, nevirapine and zalcitabine, respectively. Excellent precision and accuracy were observed. The recovery achieved was 85%. A second sample was collected from the same patients after a period of one month to validate the method. Higher sensitivity and accuracy achieved for this method make it suitable to measure low concentration of lamivudine and nevirapine in plasma of healthy and diseased subjects.

[Umar Yagoub, Bulgiba AM, Didi EM, Mustafa Ali, Peramalah D, Lee C, Chik Z. **Analysis of Nevirapine and Lamivudine in human plasma of HIV infected patients by high-performance liquid chromatographic-mass spectrometric (LC-MS-MS)**. *Life Sci J* 2012;9(4):4637-4645] (ISSN:1097-8135). http://www.lifesciencesite.com. 699

Keywords: Nevirapine; Lamivudine; LC-MS-MS; Validation

1. Introduction

The AIDS epidemic is one of the most destructive epidemics in the history of mankind. In Malaysia, it is estimated 105000 people living with HIV/AIDS and over 14000 AIDS related death has been reported as of December 2009 (Kamarulzaman, 2009; Muchini, 2011). The introduction of highly active antiretroviral treatment and the increase in its availability has improved survival rate and decrease mortality and morbidity among HIV positive patients who adhere to their treatment (Fabbiani, 2009). World Health Organization (WHO) recommends first-line ART to include a combination of nucleoside reverse transcriptase inhibitors (NRTI), non-nucleoside reverse transcriptase inhibitors (NNRTI) and protease inhibitors (PI) and require 95% adherence level to prevent developing drugs resistance, treatment failure and keeps the patients on first line treatment which is cheap compared to the second line of treatment (Becquet, 2009). There are many ways for measuring adherence level, but Therapeutic Drug Monitoring (TDM) is the best objective method for measuring adherence by indicating the concentration of drugs in the serum (Ribera, 2005; Aarnoutse, 2003). There are no published studies on measuring adherence to ART by therapeutic drug monitoring in Malaysia and whether it is at the required 95% level or not, however an analytical methods for HAART determination in blood may represent a useful clinical tool indicating the concentration of drug level (Vervoort, 2009; Ensoli, 2010). In this study we have developed and validated a simple, fast and sensitive LC-MS/MS method to measure the levels of first generation NNRTI (nevirapine) and an NRTI (lamivudine) in human plasma. The simplicity in the extraction method and rapid running time by using short LC column gave an advantage that this method was used to analyse large number of samples in this study.

In the past, there were many published studies that described antiretroviral drugs assay methods in human plasma mostly using HPLC with UV detection (Nageswara Rao, 2009; Sarkar, 2006) and have been reported to quantify HIV drugs level in human biological fluids (Yuen, 2004; Sudha, 2010). These methods had either long running time or lower sensitivity in addition to labour- intensive and time consuming sample preparation either by liquid-liquid extraction or solid phase extraction. Recently a more sensitive, rapid and specific high performance liquid chromatographic-tandem mass spectrometric (LC/MS/MS) method has been used to determine the HAART drug concentration in the plasma by plasma protein precipitation (Mistri, 2007; Elens, 2009; Droste, 2003; Chi, 2003). The advantage of this method was in the running time which was more rapid and also faster and cheaper in sample preparation technique as compared to the previous HPLC with UV detection method (Mistri, 2007; Poirier, 2002; Le Saux, 2008).

In this study we have developed and validated a simple, fast and sensitive LC-MS/MS method to measure the levels of first generation NNRTI (nevirapine) and an NRTI (lamivudine) in human plasma. The simplicity in the extraction method and rapid running time by using short LC column gave an advantage that this method was used to analyse large number of samples in this study.

2. Material and Methods

2.1. Experimental

a) Chemicals

All chemicals were HPLC grade or reagent grade. Nevirapine, lamivudine and zalcitabine (USP-grade) were obtained from LABCHEM SDN BHD, Kuala Lumpur, Malaysia. Acetonitrile, ammonium formate and formic acid were purchased from Fisher Scientific UK, Loughborough and Leicestershire, UK. Drug free human plasma was obtained from the University of Malaya Medical Centre blood bank.

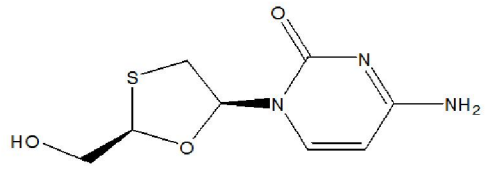
b) Apparatus

The LC-MS/MS system consists of an LC-10A UFLC system with a SIL-HT automatic sample injector (Shimadzu, Kyoto Japan) and an API 3200 Q-Trap LC-MS/MS system (Applied Bio systems, Lincoln Centre Drive, Foster City, CA, USA). The LC-MS/MS system was controlled by analyst 1.42 software (Applied Bio systems).

2.2. Chromatographic System

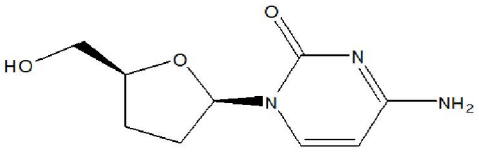
The column used was a Zorbax C18 reversed phase column, 4.6 mm ID 100 mm length with 3.5 µm particle sizes packing and Gemini-NX C18 4mm ID x 2.0mm length guard column. The flow rate was kept constant at 0.8mL/min. Mobile phase A was 0.05% formic acid in water and mobile phase B was 10mM Ammonium formate in acetonitrile with pH 5.8. The gradient flow was initially 80:20 v/v of A: B for 0.10 minute and ramped to 35 % B over 0.50minute then held at this level for 0.80min. The percentage of was ramped to 95% until 2.00min and held for 0.50min. The gradient then return to 20% B at 2.51minutes and this condition was held for further 3.50 minutes.

Scheme 1: Structures of the drugs



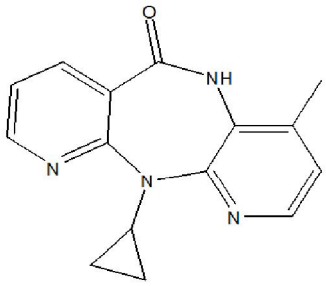
(Lamivudine)

4-amino-1-[(2R,5S)-2-(hydroxymethyl)-1,3-oxathiolan-5-yl] -1,2-dihydropyrimidin-2-one



(Zalcitabine)

4-amino-1-((2R,5S)-5-(hydroxymethyl)tetrahydrofuran-2-yl) pyrimidin-2(1H)-one



(Nevirapine)

11-cyclopropyl-4-methyl-5,11-dihydro-6H- dipyrido [3,2-b:2',3'-e][1,4]diazepin-6-one

2.3. Preparation of Mobile Phase

Mobile phase A was 0.05% v/v solution of formic acid in deionised water. Mobile phase B was prepared by dissolving 770mg ammonium formate in acetonitrile and adjusted the pH to 5.8 with formic acid prior to filtration through a 0.45µm membrane.

2.3. Assay Procedures

a) Preparation of stock solution and control

200 µg/mL of lamivudine, nevirapine and zalcitabine (internal standard) stock solution were prepared in methanol. All the calibrators and quality controls (QC) samples were prepared by appropriate dilution of stock solution with analyte free plasma. All the stock solutions, calibrators and QC samples were stored at approximately -20^{0}C.

b) Preparation of calibration standard

The calibration curve covered the range from 10 to 500ng/mL with seven calibrators. Five batches of calibration curves were prepared for validation purposes. The calibration curve was plotted using the area ratio of nevirapine and lamivudine to zalcitabine versus known concentrations of nevirapine and lamivudine. All the results were calculated using y=Ax+B linear regression. The regression coefficient for all the calibration curves were greater than 0.99.

a) Extraction procedures

Frozen plasma samples from study patients, QC samples and calibration standards were thawed as needed. The same procedure was followed for all samples. Five hundred microliters of IS in Acetonitrile solution was added to aliquots of 100 uL of plasma from calibrators and QC in 1.5 mL micro centrifuge tubes and vortexed for 20s at high speed. The tube was centrifuged at 14800 rpm for 10 min. to pellet the precipitated proteins and give a clear supernatant. Five hundred microliters supernatants was filtered using PHENEX RC 0.25µm syringe filter and transferred to vial inserts and placed in the auto sampler tray for injection onto the LC column.

2.4. Method Validation

All the validation procedures and the acceptance criteria used in this study were adapted from the European Agency for the Evaluation of Medicinal Products (EMEA) guideline for method validation (Milton) and USFDA guideline (Mistri, Jangid et al. 2007).

a) Specificity

Assay specificity was determined by analyzing double blank (plasma sample without analyte and internal standard), blank (plasma sample spike with internal standard only), LLOQ (Lower Limit of Quantification) and ULOQ (Upper Limit of Quantification) sample.

Table 1 Within assay imprecision and inaccuracy of lamivudine and nevirapine in plasma

Drug name	Batch	Nominal (ng/mL)	Mean (ng/mL)	SD	CV (%)	Mean accuracy
Nevirapine	1	10	10.62	0.342053	4.617497	100.74
		30	28.62	2.148721	5.014131	101.8667
		240	222	15.01666	3.216278	98.91667
		400	385.8	15.73849	4.0594	106.9
		500	516.6	47.65816	3.92217	107.12
Lamivudine	1	10	10.074	0.465167	4.617497	100.74
		30	30.56	1.532319	5.014131	101.8667
		240	237.4	7.635444	3.216278	98.91667
		400	427.6	17.358	4.0594	106.9
		500	535.6	21.00714	3.92217	107.12
Nevirapine	2	10	12.42	0.725948	5.844989	124.2
		30	29.62	1.30269	4.398007	98.73333
		240	199.4	8.619745	4.322841	83.08333
		400	332.6	19.33391	5.812961	83.15
		500	493.2	50.30606	10.19993	98.64
Lamivudine	2	10	10.77	1.174521	10.90549	107.7
		30	29.96	2.12791	7.102503	99.86667
		240	233	7.905694	3.393002	97.08333
		400	377.6	15.1096	4.001483	94.4
		500	499	30.11644	6.035359	99.8
Nevirapine	3	10	10.64	0.750333	7.052004	106.4
		30	29.84	0.835464	2.799812	99.46667
		240	246.8	4.438468	1.798407	102.8333
		400	407.6	4.97996	1.221776	101.9
		500	541.8	16.6343	3.070192	108.36
Lamivudine	3	10	11.008	0.786333	7.143289	110.08
		30	34.58	0.460435	1.331505	115.2667
		240	264.6	11.58879	4.379738	110.25
		400	452	6.442049	1.425232	113
		500	540.4	33.50821	6.200631	108.08

b) Linearity

The calibration consists of seven non zero, calibrators assayed in duplicate (nominal values 10, 25, 50, 100,250, 350 and 500ng/mL. Two analyte free samples were analysed, one with the internal standard and one without the internal standard; neither being included when fitting the calibration line. The correlation coefficient (r) between concentration and peak area ratio should be equivalent to, or better than, 0.98. The simplest mathematical model that adequately describes the concentration-response relationship was used.

2.5. Imprecision and inaccuracy

Imprecision and inaccuracy were assessed using three quality control samples with nominal lamivudine and nevirapine concentrations at of 200ug/mL, LLOQ (lower limit of quantification) of 10 ng/mL and ULOQ (upper limit of quantification) of 500 ng/mL.

a) Within-assay reproducibility

The three quality control samples, LLOQ and ULOQ were initially extracted six times in one batch each. Subsequently, they extracted six times in two additional batches. On each occasion a separate calibration curve was extracted. The calibration curve and the percentage for imprecision and inaccuracy including LOQ and ULOQ were all within the accepted range (Table 1).

Table 2. Between assay imprecision and inaccuracy of lamivudine and nevirapine in plasma

Drug name	Nconc (ng/mL)	Mean (n=15) (ng/mL)	SD	CV (%)	Mean inaccuracy (%)
	10	10.61733	0.894926	8.428914	106.1733
	30	31.7	2.555945	8.062919	105.6667
	240	245	16.79711	6.855963	102.0833
	400	419.0667	34.50562	8.233922	104.7667
Lamivudine	500	525	32.74577	6.23729	105
	10	10.64	0.750333	7.052004	106.4
	30	29.84	0.835464	2.799812	99.46667
	240	246.8	4.438468	1.798407	102.8333
	400	407.6	4.97996	1.221776	101.9
Nevirapine	500	541.8	16.6343	3.070192	108.36

b) Between-assay repeatability

The mean concentration from each assay was used to calculate the between assay reproducibility. The CV and the percentage for between assay precision and accuracy including LLOQ and ULOQ were within the accepted range. The within and between-batch imprecision and the percentage inaccuracy were obtained during validation assay. All the results were contained within the accepted range as outlined in the Bioanalytical Method Validation, US Food and Drug Administration (2001) (Shah, 2000) (Table 2).

2.6. Recovery

Recovery of both lamivudine and nevirapine from plasma following sample preparation was assessed by comparing the concentration of the analyte from plasma sample to the concentration from drugs spiked into mobile phase at the same concentration as in the plasma samples. Peak area measurements obtained from extracted samples were compared to the peak area measurements obtained from direct solvent injection of the test compounds. Mean and standard deviations were calculated from at least three measurements at each level.

2.7. Stability

Stability of lamivudine and nevirapine in plasma were assessed for freeze and thaw (three cycles), after 48 hours at room temperature, after 48 hours at 4ºC, and the stability of the sample extract in autosampler for the period of 24 hours.

3. Results

A high-performance liquid chromatographic mass spectrometric method for the estimation of nevirapine and lamivudine in human plasma has been developed and validated according to the principles of EMEA, Milton and USFDA guideline. The pairs of ions 230.20/111.90, 267. 08/226.10 and 212.08/112.00 were monitored for lamivudine, nevirapine and zalcitabine, respectively. The mass spectrum scans for the above two analytes are shown in Fig (1) and Fig (2).Fig (3) shows the chromatogram of zalcitabine, lamivudine and nevirapine with the retention of 1.0, 1.03 and 2.7 min, respectively with a total run time of 3.4 min.

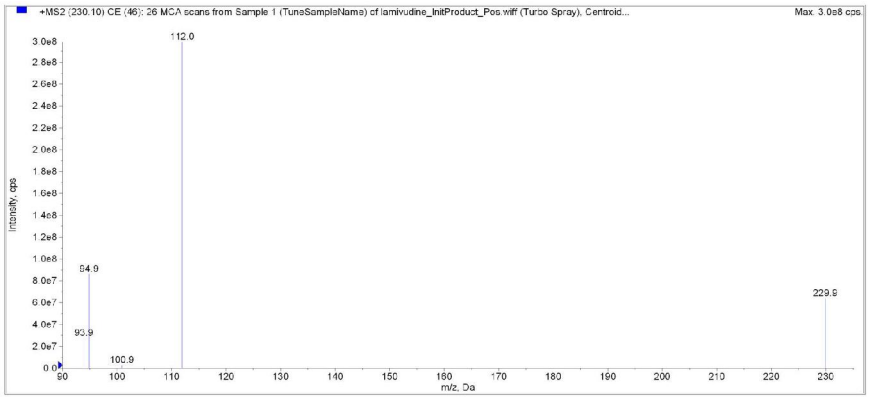


Fig 1 Spectra for lamivudine

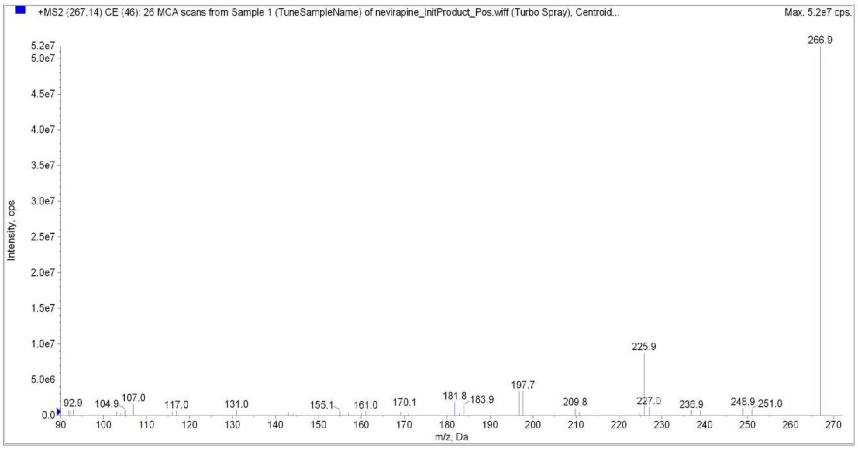


Fig 2 Spectra for nevirapine

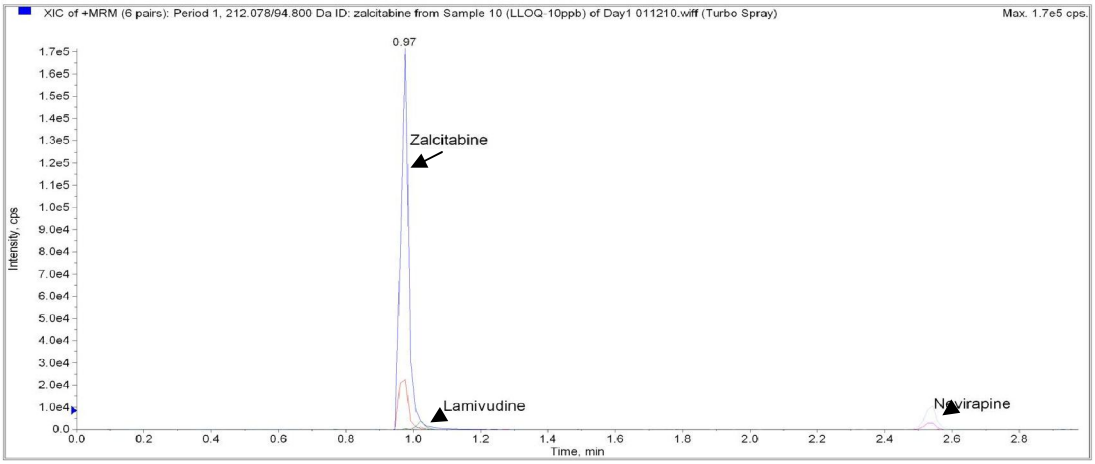


Fig 3 Chromatogram of zalcitabine, lamivudine and nevirapine

3.1. Validation parameters

No significat interfering peaks were found at the retension time of lamivudene, nevirapine and zalcitabine. The signal to noise ratio for the drugs at the lower limit of quantitation was greater than 10. Chromatograms obtained from blank plasma spiked with 10 ng/mL (lamivudine and nevirapine) and 1.0 ng/mL zalcitabine are shown in Figure (4)., Fig 5 and Fig 6 below. The linearity of the method developed in this study was determined by a none-weighted least-squares regression analysis of an eight point standard curve. The calibration lines were shown to be linear from 0.5 to 48.5 ng/ml. Best-fit calibration lines of the ratio of for the drugs examined in this study to IS peak area versus the concentration of calibration standards were determined by least-

squares regression analysis with weighting factors of $1/x^2$. The R-squared values were consistently 0.99 during the course of validation. The imprecision and inaccuracy for intra-assay and inter-assay for both nevirapine and lamivudine were all less than 15%. The absolute recovery of lamivudine, nevirapine and zalcitabine was above 80%. Nevirapine and lamivudine also found to be stable in plasma after three freeze and thaw cycles, after 48 hours at room temperature, after 48 hours at 4ºC, and within 24 hours of the sample extract when put in autosampler.

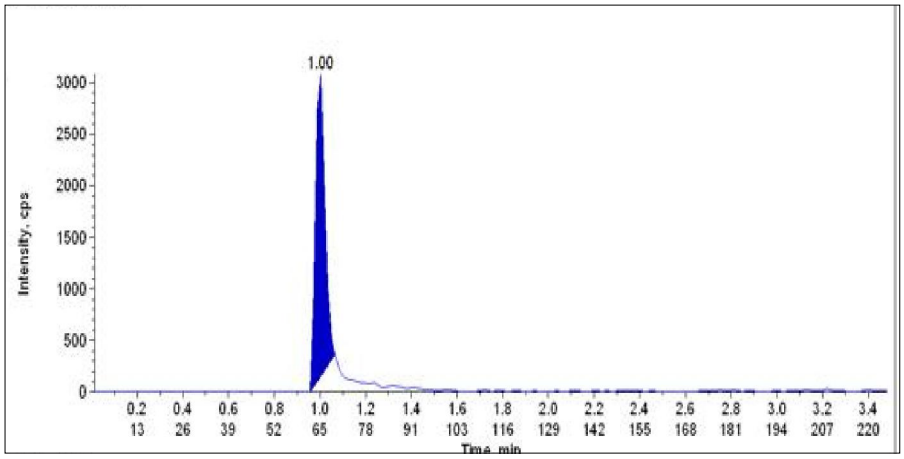


Figure 4. Representative chromatograms of zalcitabine

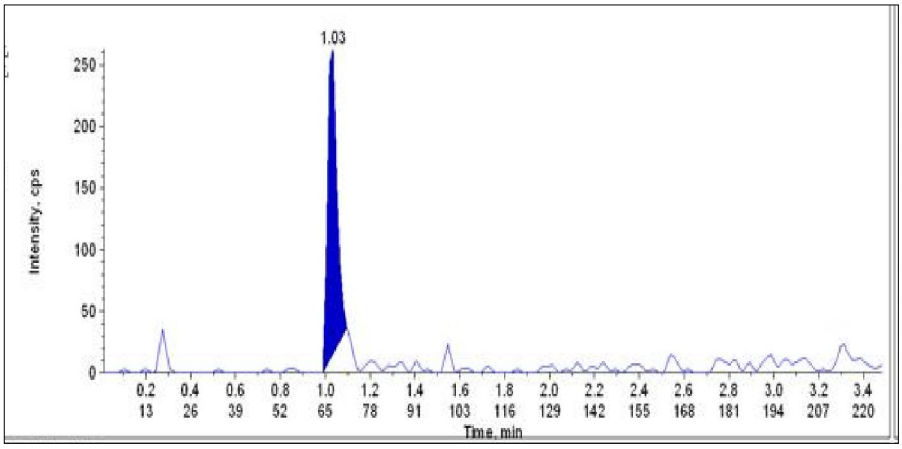


Figure 5 Representative chromatogram of lamivudine

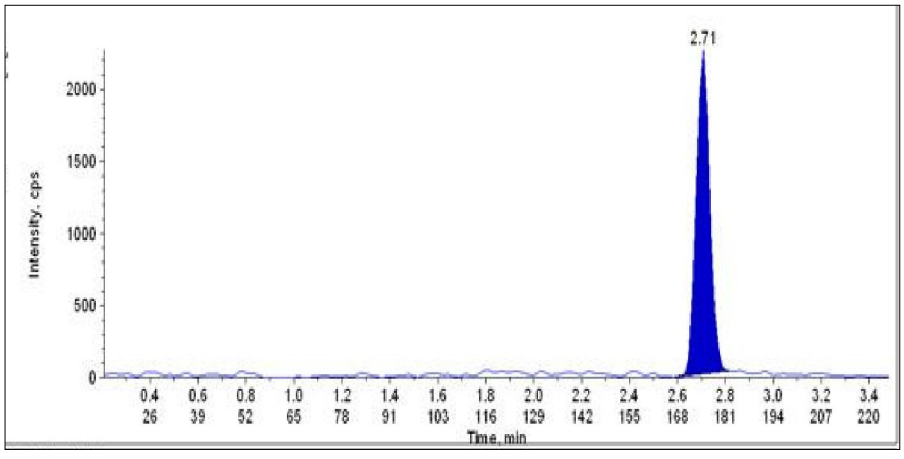


Figure 6. Representative chromatograms of nevirapine

Table 3 below shows the results of nevirapine and lamivudine as analysed in the first and second plasma samples obtained from HIV positive patients. Out of 925 samples analysed 269 first blood samples had nevirapine detected while the remaining 656 samples were negative. The results of lamivudine analysis in the first and second blood samples obtained from HIV positive patients are shown in Table 3. Whereby, out of 925 samples analysed 243 first blood samples had lamivudine detected while the remaining 682 samples were lamivudine free. Fifty two second blood samples were analyzed, the remaining 873 participants did not provide second blood samples for analysis.

Table 3. Analysis of lamivudine and nevirapine in HIV positive plasma samples using (LC-MS/MS)

Drugs	Plasma concentration (ng/ml)			Detection of the drugs in the plasma samples	
	Minimum	Maximum	Mean	Positive	Negative
Nevirapine					
1st sample	11±1.2	11650±12	2734.17±121	269	656
2nd sample	44±2.3	12566±40	3853.3±29	82	13
Lamivudine					
1st sample	12±1.1	43029±308	1534.3±31	243	682
2nd sample	38±1.7	21057±423	4917.1±27	38	14

A second samples were collected from the same patients after a period of one month to be compared with results of the first blood samples. Table 4 below presents the different concentrations of 269 first blood samples and 82 second blood samples containing nevirapine as detected by LC-MS/MS method. Thirty six participants' first blood samples had nevirapine concentrations greater than 6001 ng/ml while 15 participants' second blood samples had concentrations greater than 6001. Ninety five or 35.3% of the participant's first blood sample had concentrations ranged from 1 -1000 ng/mL. while only 12 or 14.6 % of the second blood samples contains nevirapine concentrations ranged between 1 ng/mL to 1000 ng/mL.

Table 4 also shows the different concentrations of 243 first blood samples and 38 second blood samples containing lamivudine as detected by LC-MS/MS machine. Thirty one participants' first blood samples had lamivudine concentrations greater than 6001 ng/mL while 12 participants' second blood samples had concentrations greater than 6001. Ninety two or 37.9% of the participant's first blood sample had concentrations ranged from 1 -1000 ng/mL.

Table 4 Detected lamivudine and nevirapine concentrations in human plasma using LC-MS/MS

Concentration (ng/ml)	Nevirapine First sample		Second sample		Lamivudine First sample		Second sample	
	N	(%)	N	(%)	N	(%)	N	(%)
1--1000	95	35.3	12	14.6	92	37.9	6	15.8
1001-- 2000	34	12.6	7	8.5	35	14.4	4	10.5
2001--3000	41	15.2	13	15.9	33	13.6	6	15.8
3001--4000	24	08.9	15	18.3	19	7.80	3	7.9
4001--5000	22	08.2	13	15.9	14	5.80	3	7.9
5001--6000	17	06.3	7	8.5	19	7.80	4	10.5
> 6001	36	13.4	15	18.3	31	12.8	12	31.6
Total	269	100	82	100	243	100	38	100

N = Number of patient. LC-MS/MS = Liquid Chromatography Mass-Spectro-photometry Conc = Concentration

4. Discussion

The development of the LC-MS-MS method for the detection of drugs from human plasma has received substantial attention in recent years because of its importance in bioavailability and bioequivalence (Solans, 1995). The sensitive and selective analytical method developed here has been used to analyze the concentration of lamivudine and nevirapine in plasma obtained from HIV/AIDS positive patients receiving their treatment and followed up at the Infectious Disease Unit, Sungai Buloh Hospital, Malaysia. In total 151 patients received the two drugs lamivudine and nevirapine for their treatment. Blood samples were collected into heparinized tubes at least 10 hours post dose. Two blood samples were obtained from each patient at one month interval. Monitoring intra-cellular drug concentrations is useful to ensure efficacious

antiretroviral levels in target cells especially for HIV patients on HAART treatment. Consequently, this may help to improve the management of HIV patients.

Since nevirapine is weakly basic in nature (ionizes in acidic medium) so LC-MS-MS was thought to the best choice. C18 column was favored for the separation of the drugs because other column was known to decrease retention of drug and plasma impurities were getting coeluted with drug peak (van Heeswijk, 1998). There was no other interfering peak around the retention time of nevirapine. Blank sample did not show any significant peak at the retention time of the drug. Sufficient resolution between the drugs and internal standard peak was also obtained. The mobile phase was selected after numerous trials with other solvent combinations. Mobile phase choice was based on peak parameters (symmetry, tailing), run time, ease of preparation and cost (Fawzia, 2011; Fan, 2002; Villani, 2001).

A second samples were collected from the same patients after a period of one months to validate the method. The assay described in this article combines a very short run time of 8 minutes per sample with quick and simple sample pre-treatment procedures and is therefore suitable for Therapeutic Drug Monitoring (TDM) purposes whereby very large numbers of samples can be processed quickly and efficiently. This method is also suitable for the analysis of plasma samples for pharmacokinetic studies.

5. Conclusion

A simple proteins precipitation method for the analysis of lamivudine and nevirapine in human plasma using LC/MS/MS has been developed and validated. The method also successfully applied for the analysis of large number of HIV infected plasma samples for the therapeutic drug monitoring. Besides greater precision and sensitivity attained using this LC/MS/MS method, the specificity offered is undoubtedly another advantage compared to the other costlier methods/techniques of analysis.

Acknowledgments:

This study was fully supported by University Malaya (UM) Research Grant (UMRG006/09HTM) and STeMM Programme UM/MOHE High Impact Research Grant (E000010-20001).” The authors are very grateful to the staff in Sungai Buloh Hospital and Department of Pharmacology, Faculty of Medicine (UM) for their assistance in the development and validation of the methods.

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11/23/2012

An Agar-Free Insect Rearing Artifical Diet: A New Approach for the Low Cost Mass Rearing of The Egyptian Cotton Leafworm, *Spodoptera littoralis* (Boisd.)(Lepidoptera: Noctuidae)

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Abstract: A new formula for insect rearing artificial diets without using any of their conventional gelling agents was provided in the present work, for the first time. Larvae of the Egyptian cotton leafworm, *Spodoptera littoralis* (Lepidoptera: Noctuidae) were successfully mass-reared, for nine consecutive generations on an agar-free artificial diet. This suggested medium is based on yellow lentils, *Lens culinaris* and rice, *Oryza sativa* as the basic constituents. An accurately amounted ratio between these two highly nutritive constituents produces, when cooked, a firm gel with desirable physical properties for insect-rearing artificial media. Through 9 consecutive generations, the *S. littoralis* biological results of the developmental durations, pupation %, pupal weights, sex ratio, adult emergency, longevity, fecundity and egg fertility, were either comparable or superior to those recorded for both the reference natural diet, the castor bean leaves *Ricinus communis L*. and the previously reported results on agar-or alginate-based media for rearing the present insect On this diet, *S. littoralis* larvae have been reared for 9 generations with no noticeable decline in their yields of pupae or moths and fecundity or hatchability. The estimated cost of the suggested artificial diet ingredients for rearing 1000 newly-hatched larvae until pupation, was about 6.2L.E. (ca., $1.0). On the other hand, the cost of such an agar-free diet was found to be reduced by 60 to 73% when compared to agar-based diets developed by other authors.

[Alfazairy A, Sadek H, Guirguis G, Karam H. **An Agar-Free Artifical Diet: A New Approach for Low Cost Mass Rearing of The Egyptian Cotton Leafworm, *Spodoptera littoralis* (Boisd.)(Lepidoptera: Noctuidae).** *Life Sci J* 2012;9(4):4646-4653] (ISSN:1097-8135). http://www.lifesciencesite.com. 700

Keywords: *Spodoptera littoralis*; mass-production; low cost diet; agar-free diet; development; pupation; emergence; fecundity; fertility.

1. Introduction

The mass-rearing of insects under controlled conditions represents an important tool for insect pest control. The successful insect culturing in the laboratory is necessary for efficient and productive research on virtually every aspect of insect biology (Knipling, 1966). One important consideration for the mass-rearing of insects is the diet provided to the larvae and adults. Rearing insects on their natural host may not be feasible for a number of reasons including seasonal availability, excessive costs, and variable quality. Therefore, mass-reared insects tend to be provided with artificial diets that bear little resemblance to their natural host or food source but nonetheless permit satisfactory growth and development of the mass-reared insects (Vanderzant, 1966).

Since the first attempt by Bottger (1942) to rear a phytophagous insect, the European corn borer *Ostrinia nubilalis* (Hübner), on an artificial diet, a number of insects have been reared on diets (Shorey and Hale, 1965; Smith, 1966; Dimetry, 1970; Klein *et al*., 1981; Navon, 1985; Singh and Moore, 1985; Alfazairy, 2011). The Egyptian cotton leafworm *Spodoptera. littoralis* (Boisd.) is a key pest of cotton that has a worldwide economic impact. It has been mass-reared on artificial diets in order to establish and maintain a laboratory continuous culture for research on control measures or the effectiveness of its biological control agents (Dimetry, 1970; El-Minshawy and Zeid, 1972; Khalifa *et al*., 1973; Hegazi *et al*., 1977; Garcia *et al*., 1984; Navon, 1985; Simmonds *et al*., 1992; Anderson *et al*., 1995; Mabrouk *et al*., 2001; Amin *et al*., 2006; Khodaverdi *et al*., 2010). These diets have included an array of components such as soybeans, beans, peas, maize grains, wheat or wheat germ, potato, leaf-meals of alfalfa, corn, cotton or castor beans, milk powder, yeast powder, vitamins, and ascorbic acid .

Concerning the preparing of artificial diets for rearing and culturing the insects, the available literature reveals that the most significant cost item is agar which comprises 70% (Mabrouk *et al*., 2001) or 73% (Hegazi *et al*., 1977) of the total price of the diet. Due to the high cost of agar-based diets for *S. littoralis*, there is a necessity for the substitution or manipulation of new diet ingredients and the development of more cost-effective rearing techniques (Raulston and Lingren, 1969; Raulston and Shaver, 1970). For example, Raulston and Shaver (1970) investigated the possibility of reducing the amount of agar needed, in the casein-wheat germ diet used for rearing tobacco budworm, *Heliothis*

virescens (F.) and the bollworm, *Heliothis zea* (Boddie), by adding low cost corn cob grits. It was found that the cost of the subject diet was reduced 25% when the corn cob grits were used (Raulston and Shaver, 1970). Navon and Keren (1980) found that an alginate gel system, as an agar substitute, was useful for rearing *S.littoralis*. The use of this gelling agent in insect diets was less costly than agar, and was firstly introduced by Moore and Navon (1969). In a further attempt to develop a practical-low cost diet for use in the mass-rearing environment, the present study was carried out aiming to develop a practical, low cost an agar-free diet for mass-rearing of *S. littoralis*.

2. Material and Methods

Diet composition and preparation. The suggested diet contain 180g yellow lentils, *Lens culinaris*, 25g rice, *Oryza sativa*, 18.5g brewer's yeast powder, 3g ascorbic acid, 4g sorbic acid, 2.5g sodium benzoate, 1mL formalin (37-40%) and 575mL tap water. In a pot, the yellow lentils, rice, and water were cooked for nearly 9-12 min. Ascorbic acid and yeast were added after the pot had cooled. The mix was then blended in a 1¼ litre electric blendor. Formalin, followed by the remaining constituents, was added and thoroughly blended. The diet was, then, dispensed into 9-11 clear plastic rearing containers (15 × 10 × 7cm).

On dispensing the diet into the rearing containers, the poured diet in each container (ca., 3-tablespoon) needs to be gently agitated to distribute the diet allover the bottom of the rearing container, as well as to achieve the desired diet thickness. The diet-filled containers were left to solidify and cool before each container was covered by its plastic lid. All rearing containers were then stored, at 4-7ºC, until use.

Larval rearing. The egg patches or newly hatched larvae of *S. littoralis* were originated from a collection of 4th-to 6th-instar larvae from a sugar beet field near Alexandria, Egypt, in 2009. For routine rearing, 750-1000 newly hatched larvae, per rearing container, were scattered over the diet surface, or upon hatching, egg-patches were glued onto the inner sides of other rearing containers. Each rearing container, infested with larvae or egg-patches, was tightly covered with a cotton cloth by means of a rubber band; then placed inverted for 7-9 days. Such an upside-down position results in the larvae of the first three instars will move toward the diet and feed normally, as well as the larval feces will accumulate on the cloth cover of the rearing container, which provides an easy means of maintaining sanitary conditions within the rearing container (Fig. 1). Larvae were transferred to fresh diet three times, on the 6th day (750-1000 larvae per container), 9th day (350 larvae per container), and 12th day (100 larvae per container) during the larval development.

For the pupation, full-grown larvae tended to either tunnel through the diet to prepupate and then pupate, or pupate on the surface of the diet. Pupae were weighed and sexually discriminated at the beginning of the stage. Pupae were then put into containers with a layer of sawdust until moth emergence. Newly emerged moths were placed for feeding and oviposition in large jars or containers (sex ratio is: 1 ♂: 1♀). The latter were lined with the A4 writing paper and provided with pieces of the writing paper folded into corrugations (Fig. 1) to be used as oviposition sites and resting places for moths. Any container or jar was tightly covered with a cotton cloth. Moths were fed a 10% sucrose solution. Oviposition was observed and adult longevity was recorded.

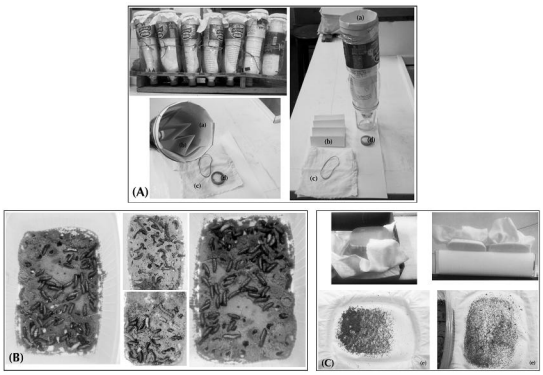

Fig. 1. Technique and facilities required for *Spodoptera littoralis* mass rearing. (A) Rack holding units for a single pair mating and oviposition; (a) plastic bottle (volume: 1.5L) lined with an A4 writing paper, (b) resting and egg-laying corrugated paper, (c) cotton cloth cover and rubber band, (d) bottle screw cap provided with cotton wick saturated with sugary solution for moth-feeding. (B) Larval rearing container showing pupation. (C) Upside-down position of the larval rearing containers, at their first three larval instars to get rid of feces easily from the container cotton cloth cover (e).

Evaluation of some biological parameters. From the previous larval rearing routine on the subject diet, one hundred newly-hatched larvae were used to measure the larval and pupal durations, pupal weight, pupation (%), adult sex ratio, fecundity and longevity of *S. littoralis*. During the larval developmental period, larvae were transferred to fresh diet three times, on the 6th-, 9th-and 12th-day. Developed pupae were weighed, sexed, and counted. For a comparison purpose, a parallel group of larvae had been fed on castor bean leaves and manipulated as done in the tested group.

Fecundity and longevity of *S. littoralis* moths developed from larvae reared on both the artificial diet or the castor bean leaves were compared. One pair of moths taken from the artificial diet or from the reference diet was placed in a plastic bottle (volume: 1.5L). This bottle served as a mating and oviposition unit for a single pair of moths. As shown in Figure 1, the bottle was lined with A4 writing paper, and its bottom was cut and replaced by a tightly fixed cotton cloth cover. In addition to the paper lining, there was a corrugated paper that serves as a resting place for the paired moths. Both papers served as oviposition sites. The bottle screw-cap was provided with a small cotton wick saturated with a 10% sugar solution that served as food for the moths. A wooden rack was designed to hold the oviposition units upright with the screw-cap down and the cotton cloth cover end up (Fig. 1).

Both rearing procedures were conducted under the same laboratory conditions (19-31ºC, 74-92% RH, and 13:11 hours L:D photoperiod).

Statistical analysis of data. Means of each pair of results from the agar-free diet and the reference diet of each generation were compared by using t-tests at the 5% level of probability.

3. Results and Discussion

As it is known, nearly all the artificial diets used for the laboratory rearing of phytophagous insects are agar-based ones. Agar as a gelling agent is one of the most expensive components of the diet (Raulston and Shaver, 1970). Other less costly gelling agents, such as cellulose (Vanderzant, 1966); calcium-alginate and citric acid (Navon and Keren, 1980) have been suggested for the artificial diets of many insects. Therefore, the present new approach for using a much less expensive rearing diet focuses on the possibility of dispensing with agar without changing the physical properties of the diet. Preliminary tests (data not shown) revealed that 180g of yellow lentils, *L.culinaris* and 25g rice could be used successfully as diet nutritive components and gelling agents without affecting the diet physical properties for avoiding a probable negative effect on the larval growth and pupation.

Such a new approach in gelling technique of the artificial diets for rearing phytophagous insects is based on a well known physical property (i.e., solidification) of lentils or rice when cooked with a certain amount of water for a certain time. Therefore, it was very important to estimate, firstly, the amount of lentils, rice, and water to be formulated together; secondly, the time required for cooking. The 180g of lentils, 25g of rice, and 575ml water (cooked for 9 min) were the most suitable formulation in order to achieve the desired firm-gel texture and consistency of the medium. Based on both the nutritional value of lentils and rice, the present diet seemed to be nutritionally suitable, and characterized by proper physical properties that are desirable in an insect artificial diet. The diet has a quite, hard or firm, not sticky, and spongy consistency. In this concern, Moore and Navon (1974) reported that insects normally chewing plant tissues can be expected to adapt to an artificial diet which is nutritionally adequate and has a firm, non-sticky surface and a relatively hard with a spongy infra-structure. The results shown in Tables 1−4 and Figure 1 reflect to how extent the present artificial diet was successful and satisfactory for *S. littoralis* laboratory mass-production.

Moore and Navon (1974) reported that in most of the artificial diets for chewing insects, the requirement for firmness has been met by agar. Agar is a relatively inert binding agent; therefore it produces a stable gel. In the present diet, however, an auto-gelling technique was achieved by means of the diet nutritive components themselves, yellow lentils and rice, not by adding agar or other expensive gelling agents. That makes this diet too cheap and practical, as well as so simple to prepare. Hence, as compared with agar-based diets or alginate-based diets, the present agar-free diet needs markedly less time to prepare where procedures of heat-dissolving of agar or preparing an alginate gel system are not needed. Navon and Keren (1980) reported that, in diets that based on an alginate gel system as an agar substitute, a firm gelled diet was developed within 20-30 minutes. Also, this gelling technique involves a certain time-consuming procedures.

The other nutrients of the present agar-free diet were dried yeast and ascorbic acid. The diet anti-contaminants were sodium benzoate, sorbic acid, and formalin. To evaluate the use of such an agar-free diet as a satisfactory diet for *S. littoralis*-mass rearing, some biological parameters were studied and compared, for nine successive generations, with the corresponding data of rearing it on castor been leaves, as a reference diet.

Larval duration. For nine consecutive generations, under laboratory conditions cited in Table 1, the larval developmental period was, in general, insignificantly shorter as calculated in 0.3−3.5 days (14.8 ± 0.1 to 25.7 ± 0.9 days) on the subject agar-free artificial diet than on the reference diet, (14.9 ± 0.3 to 27.5 ± 0.5 days). The insignificantly (p=0.05) shortened larval developmental period may be attributed to the food constituents (Engelmann, 1970). In this concern, Abdel-Fattah *et al*. (1977) found that the most favourable host plants which shortened the *S. littoralis* larval period had contained more carbohydrates, total nitrogen and microelements. One of these host plants was the castor bean leaves that contain 23.57mg carbohydrates, 5.18g total nitrogen

per 100g, as well as calcium, magnesium and potassium. On the other hand, the USDA nutrient database revealed that the corresponding nutritional value per 100g of the yellow lentils, the main nutritive and gelling constituent in the present suggested artificial diet, seems to be nearly higher by 3-fold and 5-fold for, respectively, carbohydrates (60g/100g) and protein (26g/100g). Also, the yellow lentils, nutritionally, contains high percentages of vitamin B_1, and B_9, calcium, magnesium, potassium, iron, phosphorus, sodium, and zinc. Moreover, the yellow lentils contain 2g sugars, 31g dietary fiber, and 1g fat/100g. Rice as another nutritive and gelling component in the present artificial diet has more carbohydrates (80g/100g) and less protein (7.13g/100g), sugars (0.12g/100g), dietary fiber (1.3g/100g), and fat (0.66g/100g) than the yellow lentils. Rice contains, also, microelements as the yellow lentils, but with different percentages in addition to vitamin B_1, B_2, B_3, B_4, B_5, and B_6. Therefore, the present an agar-free artificial diet appears to be nutritionally superior to the reference diet, castor bean leaves. However, reported results of the *S. littoralis* larval developmental period on both the agar-based artificial diets (Salleh, 1976; Hegazi *et al*., 1977; Mabrouk *et al*., 2001) and the alginate-based diets (Moore and Navon, 1969) may consider the subject diet as a new approach in the artificial rearing of insects.

Pupation and pupal weight. Data presented in Tables 1 and 2 indicate that, through nine consecutive generations of the cotton leafworm, *S. littoralis* on both diets, the percentages of pupation on castor leaves (51-100%) were, in general, a little bit lower than those on the artificial diet (63-100%). Additionally, the pupal duration for larvae reared on the reference diet was prolonged by about 1-, 2-, 3-, or 5- day as compared with the corresponding data of the artificial diet (Table 1).

Table 1. Developmental durations (Mean±SE) of *Spodoptera littoralis* reared, for 9 consecutive generations, on an agar-free artificial diet and on a reference diet, castor bean leaves

Lab. conditions and generation (G)		Duration in days			
		Artificial diet		Reference diet	
		Larval stage	Pupal stage	Larval stage	Pupal stage
		Mean * ± SE (Range)	Mean * ± SE (Range)	Mean * ± SE (Range)	Mean * ± SE (Range)
G_1	23.1 ±1.3ºC; 82.0±6.6%RH	24.3±0.5 (23-27)	13.8±0.6 (13-19)	24.6±0.5 (21-26)	16.6±0.6 (14-19)
G_2	21.3±0.9ºC; 81.4±1.3%RH	24.0±0.3 (23-25)	12.7±0.4 (12-15)	27.5±0.5 (27-32)	13.6±0.3 (13-16)
G_3	25.3±0.8ºC; 81.7±2.8%RH	20.9±0.8 (17-24)	12.4±0.2 (12-13)	20.6±0.8 (17-23)	12.5±0.3 (12-15)
G_4	27.8±1.3ºC; 86.4±3.5%RH	15.5±0.3 (15-17)	5.3±0.2 (5-6)	14.9±0.3 (13-15)	10.2±0.2 (10-12)
G_5	29.9±0.8ºC; 87.8±2.2%RH	15.6±0.7 (14-19)	10.5±0.2 (10-12)	16.2±0.3 (15-17)	10.6±0.4 (9-12)
G_6	30.7±0.5ºC; 85.5±2.0%RH	17.7±0.3 (17-19)	11.0±0.4 (10-13)	17.1±0.5 (15-19)	10.9±0.5 (8-12)
G_7	30.3±0.8ºC; 83.9±2.0%RH	14.8±0.1 (14-15)	11.5±0.6 (10-15)	15.2±0.7 (13-21)	11.4±0.5 (9-13)
G_8	26.8±1.6ºC; 80.5±3.7%RH	20.4±0.5 (19-23)	13.0±0.5 (12-16)	20.1±0.8 (17-23)	12.5±0.3 (10-13)
G_9	19.0±1.2ºC; 79.3±3.3%RH	25.7±0.9 (24-32)	15.2±1.3 (14-19)	27.1±1.2 (22-32)	16.8±0.7 (15-21)

* Results are not significantly different at the 5% level of probability by t-test ($p = 0.05$).

Based on the statistical analysis, those pupae developed from larvae reared on both diets revealed an insignificant difference. However, the pupae obtained from the agar-free diet were, in general, slightly heavier than those produced from the reference diet, castor bean leaves. In general, the pupae recovered from the artificial diet were heavier by 14-103mg than those obtained from the reference diet (for details, see data assorted in Table 2).

Table 2. Pupation (%) and pupal weight (Mean±SE) of *Spodoptera littoralis* for 9 consecutive generations reared on the artificial diet and the natural reference diet.

Generation (G)	Pupation (%)		Pupal weight (mg)	
	Artificial diet	Reference diet	Artificial diet	Reference diet
			Mean * ± SE (Range)	Mean * ± SE (Range)
G_1	63	63	230±16 (160-330)	242±18 (150-350)
G_2	74	51	242±15 (210-350)	221±17 (170-320)
G_3	73	59	242±16 (170-330)	257±14 (180-330)
G_4	97	100	257±13 (180-330)	224±14 (160-300)
G_5	100	82	224±9 (180-280)	210±9 (170-260)
G_6	87	66	239±8 (190-280)	240±17 (190-350)
G_7	100	86	253±9 (190-290)	237±10 (190-290)
G_8	100	100	284±8 (220-310)	236±21 (170-360)
G_9	74	68	347±6 (320-380)	244±13 (200-320)

* Results are not significantly different at the 5% level of probability by t-test (p = 0.05).

As a result of the continuous rearing of S. littoralis on the present suggested agar-free diet for nine consecutive generations, there was an obvious increase by 9-117mg in the average weights of pupae recovered from the larvae reared on this artificial diet as compared to the corresponding average for pupae of the 1st generation (Table 2). Hence, no adverse effects were observed from the continuous rearing on the subject agar-free diet. Also, the observed successful pupation and the large yield of pupae recovered from this diet may serve as an indication of the satisfactory physical and nutritional properties of this new diet. Figure 1 shows a successful pupation either on the surface of the diet or in tunnels made by the larvae upon pupation. An overview on referenced data for S.littoralis larvae reared on either certain agar-based artificial diets, which modified from that of Shorey and Hale (1965), or alginate-based diets (Moore and Navon, 1969; Navon and Keren, 1980) may prove to how extent the present new diet is satisfactory for economic mass-production of the Egyptian cotton leafworm, S. littoralis.

Adult performance. The yield of the agar-free artificial diet-reared moths was, in general, slightly higher than that of the natural reference diet (Table 3). The percentages of adult emergence of both diets were comparable and ranged between 74 and 100% for the artificial diet, and between 54 and 100% for the reference diet. The moth emergence was sometimes quite similar on both diets, and other whiles considerably higher or slightly higher than that of the reference diet (Table 3).

Oviposition records for individual female moths recovered from both test diets were statistically compared by using t-test at the 5% level of probability. Egg-production by the diet-emerged females, through 9 consecutive generations, was not significantly different from that of the castor leaves- emerged females. The average yield of eggs per female was statistically comparable on both diets; fecundity of the artificial diet- emerged moths was, in general, 38.9−839.5 eggs more than that of castor leaves-developed moths (Table 4).

Based on the statistical analysis by adopting t-test at the 5% level of probability, the average numbers of hatched eggs from the test agar-free artificial diet and the reference diet were also not significantly different. On the non-agar diet, the percentages of eggs hatched or egg fertility, for 9 successive generations, were sometimes 1.8 to 8.3% higher; or 1.3 to 2.2% lower on the artificial diet than on the natural diet (Table 4).

Table 3. Adult emergence (%) and longevity (Mean±SE) of *Spodoptera littoralis* after rearing larvae on both the artificial diet and the natural reference diet through 9 consecutive generations

Generation (G)	Adult emergence (%)		Adult longevity (days)	
	Artificial diet	Reference diet	Artificial diet	Reference diet
			Mean * ± SE (Range)	Mean * ± SE (Range)
G_1	93.7	63.5	8.2±0.9 (4-11)	7.8±0.7 (5-11)
G_2	74.3	76.5	6.5±0.8 (4-12)	6.3±1.0 (3-12)
G_3	82.2	54.2	7.1±0.7 (4-12)	6.4±0.8 (4-12)
G_4	95.9	100	5.8±0.5 (4-7)	6.0±0.4 (4-8)
G_5	100	80.5	8.2±0.4 (7-12)	5.8±0.6 (2-8)
G_6	100	83.3	5.4±0.3 (4-6)	3.1±0.2 (2-4)
G_7	100	80.2	9.5±1.3 (5-17)	10.2±1.6 (3-18)
G_8	100	60.0	8.5±0.9 (4-11)	7.2±0.4 (4-9)
G_9	74.3	73.5	8.5±0.8 (5-12)	8.2±0.6 (6-11)

* Results are not significantly different at the 5% level of probability by t-test (p = 0.05).

Table 4. Female fecundity (mean number of eggs/female) and egg fertility (hatching %) of *Spodoptera littoralis* after rearing larvae on both the artificial diet and the natural reference diet through 9 consecutive generations

Lab. conditions and generation (G)		Fecundity		Egg-fertility	
		Artificial diet	Reference diet	Artificial diet	Reference diet
		Mean±SE (Range)	Mean±SE (Range)	Mean±SE (Range %)	Mean±SE (Range %)
G_1	23.1 ±1.3ºC; 82.0±6.6%RH	1008.5±95.5 (774-1272)	800.7±99.6 (419-1593)	94.5±1.8 (85.4-100)	94.6±2.2 (83.5-100)
G_2	21.3±0.9ºC; 81.4±1.3%RH	986±106.3 (660-1640)	947.1±190.9 (460-2512)	94.9±1.5 (86.2-100)	97.1±1.3 (86.7-100)
G_3	25.3±0.8ºC; 81.7±2.8%RH	1325±152.2 (829-2245)	520.4±26.2 (420-642)	94.5±1.1 (90.1-100)	92.7±3.3 (70.3-100)
G_4	27.8±1.3ºC; 86.4±3.5%RH	1899±72.1 (1588-2312)	1624.3±185.1 (915-2763)	100	100
G_5	29.9±0.8ºC; 87.8±2.2%RH	2059.8±57.8 (1729-2310)	1220.3±168.4 (412-2118)	100	100
G_6	30.7±0.5ºC; 85.5±2.0%RH	2021.5±79.4 (1644-2416)	2101.7±47.0 (1870-2311)	100	100
G_7	30.3±0.8ºC; 83.9±2.0%RH	1455.2±128.4 (936-2359)	2060.3±22.6 (1980-2173)	95.1±1.3 (88.9-100)	96.5±1.1 (89.2-100)
G_8	26.8±1.6ºC; 80.5±3.7%RH	1905.3±137.6 (990-2205)	1172.1±128.1 (406-1640)	95.6±0.9 (92.6-100)	93.8±3.6 (65.4-100)
G_9	19.0±1.2ºC; 79.3±3.3%RH	1010.7±101.6 (558-1623)	897.6±95.4 (526-1533)	59.4±5.4 (43-100)	51.1±4.9 (28.7-78)

* Results are not significantly different at the 5% level of probability by t-test (p = 0.05).

It was noteworthy that, upon hatching, *S. littoralis*–egg patches of the 9th generation that were maintained at laboratory conditions of comparatively low temperature (19 ± 1.2ºC) and relative humidity (79.3 ± 3.3%) had recorded an obvious decrease in hatchability on both diets (59.4 and 51.1% for the artificial – and reference – diet, respectively; Table 4). Such a remarkable reduction in egg fertility (ca., 35 – 41% or 42 – 49% on the artificial - or natural – diet, in respect) was attributable to the recorded sharp reduction in temperature by ca., 11 to 12ºC; as compared with the results recorded at ca., 30 to 31ºC

where the percent egg hatch was 100%, and about 93 to 97% at ca., 21 – 28ºC, with relative humidity ca., 81 – 88% (Table 4). This is in agreement with previous findings reported by Rockstein (1973) and Navon (1985).

Longevity of adult developed from *S. littoralis* larvae reared, for 9 consecutive generations, on both test diets was not significantly different. For the nine generations, the records of moth longevity of both diets were comparable, but, in general, artificial diet-emerged moths seemed to live, on the average, 0.2 – to 2.4–day more than those of the natural reference diet (Table 3). Also, through the test 9 generations, results indicated that the sex ratio is about 1:1.

An overview on the test adult stage emergence, longevity, fecundity, egg fertility, and sex ratio reveals that the present biological records on the subject agar-free artificial diet were, to a large extent, comparable and recorded similar or superior results to those either obtained on the present natural reference diet, fresh castor bean leaves, or those previously reported by certain investigators on agar-or alginate-based diets (Moore and Navon, 1969, 1971 and 1973; Dimetry, 1970; El-Minshawy and Zeid, 1972; Salleh, 1976; Hegazi *et al*., 1977; Navon and Keren 1980; Amate *et al*., 2000; Mabrouk *et al*., 2001; Khodaverdi *et al*., 2010).

Based on the observed normal growth or development of the Egyptian cotton leafworm, *S. littoralis*, and the satisfactory yields of its pupae and moths, for 9 consecutive generations, and to date, on the present agar-free diet with no noticeable decline in average pupal weights and adult reproductive potential (i.e., fecundity and fertility), as well as adult longevity; also taking into consideration the corresponding data for rearing *S. littoralis* on its natural food (castor bean leaves) and its other previously reported agar-or alginate-based artificial diets, the subject diet seemed to be an acceptable promising artificial mass-rearing diet for the Egyptian cotton leafworm.

Since the present agar-free diet allowed successful growth and development for *S. littoralis*-immature or mature stages with no deformed pupae or adults, that may considerably prove its nutritional adequacy and its desirable physical properties which enhance the insect biological quality.

Undoubtedly, the cost of insect rearing media is an important economic criterion for producing such media. In this study, the estimated cost of the subject artificial diet ingredients for rearing 1000 newly-hatched larvae of *S.littoralis* till their pupation was 6.2L.E. (ca., $1.0). On the one hand, Raulston and Shaver (1970) reported that the cost of a low agar casein-wheat germ diet, for rearing tobacco budworms, by adding low cost corn cob grits was reduced by 25%; on the other hand, the present agar-free diet would reduce the cost of rearing larvae of the Egyptian cotton leafworm, *S.littoralis* by 60 to 73% of the total price of the artificial diet used. As the diet represents one of the most costly components of insect rearing programmes, and is especially important when rearing large numbers of larvae for production of certain bioinsecticides or for release in field trails, therefore, the present estimate reflects the desired low cost which would allow mass-production of insects with minimum costs.

In conclusion, the agar-free artificial diet developed in this study has proved to be satisfactory for mass-rearing the Egyptian cotton leafworm, *S. littoralis* with no noticeable tendency toward a decline of development or reproduction for 9 consecutive generations. This diet costs about 60-73% less than the agar-based diets, and provides a new approach for further investigations of less expensive gelling agents.

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12/12/2012

Organizational Position Properties and its Impact on Purchase

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Abstract: This survey tries to investigate if there is a significant relationship between the essence and pressures of buying center participants' job and their preferences in prioritizing the elements of Marketing Mix. For this purpose, the authors performed a case study on selling the "intracranial pressure monitoring" (ICP Monitoring) _ manufactured by Möller Medical Company, Germany _ in Fars medical centers equipped with neurosurgical intensive care unit (NICU), Iran _ as the buyer organizations _ and extracted the opinions of participants in buying decision making. The results showed that in organizational purchasing, in addition to environmental specifications and characteristics of employees, their "Organizational Position Properties" (OPP) also have significant impact on their preferences on how they prioritize the 4P's of Marketing Mix. The article continued with providing some suggestions to sellers and marketers on attracting the agreement of different buying center participants regarding with their Organizational Position Properties.
[Eyni A, Saeedikiya M, Rabieie P, Abbaszadeh Z. **Organizational Position Properties and its Impact on Purchase.** *Life Sci J* 2012;9(4):4654-4659] (ISSN:1097-8135). http://www.lifesciencesite.com. 701

Keywords: Organizational position properties; business to business marketing; decision making; marketing mix effectiveness; organizational buying behavior

1. Introduction

It could be argued that while a more casual and habitual approach may be typical in less important organizational purchasing decision making, professionalism and rationality are still likely to be characteristics of more exposed buying decisions, particularly in large and publicly accountable organizations (Wilson, 2000). Basically, it is safe to accept that the apparent rationality of any organizational buying decision, large or small, may be profoundly moderated by political, social, cultural, individual, behavioral and perceptual influences_ just as in consumer purchasing decision (Foxall, 1993).

How to motivate participants to coalescence in the decision making unit for their products or services is a vital problem for suppliers and manufacturers (Dadzie et al., 1999). For marketers it is very important to understand when, how, and why buyers make particular choice in order to understand what influences are involved and how they are likely to impact the decision process (Kauffman, 1996).

Developing optimum workable mixture of the elements of the Marketing Mix match with target market's demands and its priorities is an important issue marketers should consider in both consumer marketing and industrial marketing. Therefore, understanding how a market or a customer, figuratively, prioritizes the elements of the Marketing Mix for the product which it wants to buy is vital for producers and marketers. On the other hand, organizational purchasing has a major difference with consumer buying that is different individuals involve decision making, who have various responsibilities in organization. The "buying center" concept has long been used to identify the group of employees who collectively make a particular buying choice decision for a firm (Robinson et al., 1967).

As a result, buying center is an inter-functional unit where different individuals from different units gather to contribute to buying decision. Hence, recognition of the impact of participants' main functional group on ranking the elements of the Marketing Mix is very important, if any. Concept of buying center composition and operation, and decision influences generated by buying centers are very complex (Kauffman, 1996). In fact, the professionalism of organizational purchasing is often known as one of the fundamental factors distinguishing it from consumer purchasing (Wilson, 2000).

2. Theory

Although the state of knowledge about business-to-business structure and evolution remains limited (Backhaus et al., 2011). Nevertheless, studies show that "organizational buying behavior" is the most frequently published research area in B2B marketing, a primary focus of research activity when the field began (LaPlaca and Katrichis, 2009).

Study in organizational buying behavior is exploding (Ward and Webster, 1991). It can be attributed to at least three reasons. First, the shift from understanding and influencing consumers to

customers (industrial, institutional, and trade) has led to a greater focus on organizational buying behavior. Second, both the academic journals and business professional organizations, such as "National Association of Purchasing Management" (NAPM), have encouraged study and, publications on "inter organization buying behavior". Lastly, as Sheth, Grander, and Garrett (1988) recommended, the marketing unit is increasingly affected by the disciplines of organizational behavior, industrial organizations and transaction cost theories in economics (Sheth, 1996). One of the earliest models presenting influence in the organizational purchasing process is suggested by Webster and Wind (1972). According to this model, general social situations, general economic situation, and marketing efforts are key environmental factors that impact on participation in the organizational purchasing process (Dadzie et al., 1999).

Generally, organizational buying has been presented as a logical and rational function of professionals, ignoring the habitual, intuitive and experiential behavior of buying managers and subordinates as uniquely idiosyncratic individuals (Wilson, 2000). In this logical and rational process in company, some individuals have influential roles. In 1967, impactful roles in organizations, assumed or represented by individual and function participants, in the purchasing decision process are recognazed by Robinson et al. (Kauffman, 1996). In an organizational buying project, employees who have significant influence in the buying process are classified in an organizational unit called Buying Center.

The concept of buying center (or "decision making unit" – DMU) in organizational buying is the logical outcome of the analysis of organizational buying as a rational process though the activities of the decision making unit have subsequently been analyzed also from an attitude toward behavior (Wilson, 2000). The decision making unit concept appeared from several surveys of organizational purchasing projects in the UK and USA during the 1960s and 1970s (Kennedy, 1983) which established, *inter alia*, that organizational buying decision usually involved many employees from different functions within a firm (Wilson, 2000). Participants of the buying center have been found to frequently represent different departments or functions in an organization and, thus, brought to the group alternatives regard with making the specific purchase decision (Martin et al., 1988). When participants are brought together to make a decision (e.g. in an organizational buying center), the large part of inputs brought to decision are the cognitions, affects, and behaviors of the participants involved (Staw et al., 1981). The degree of influence of employees is believed to be a function of environmental and organizational elements (Webster and Wind, 1972a,b; Johnston and Bonoma, 1981).

Role conflict is inevitable in buying center participants, particularly, as they must not only achieve a greater portion of department or function, but also they must complete the additional tasks regarding with their roles in the buying decision making unit (Lewin and Johnston, 1996). Within the organizational behavior and organizational buying behavior background, role conflict is frequently presented as the degree of incompatibility among role expectations. Lewin and Wesley (1996) state that the significance of job related role conflict has been recognized and assessed within the organizational background (e.g. Brockner, 1988; Brockner et al., 1987a, 1994b; Staw et al., 1981) and in the marketing background (e.g. Barklay, 1991; Michaels et al., 1987; Qualls and Puto, 1989).

What be revealed from all the studies of organizational buying behavior is a general agreement that, in line with interaction theory, a greater emphasis should be placed on the personal and social dimensions of buying processes, and on the effect of preexisting influences such as experience, personal paradigms, cultural preferences and habituation (Wilson, 2000). But in this study, the main consideration is investigating the impact of Organizational Position Properties on organizational buying behavior.

3. Methods

The impact of participants may vary with their roles in the buying center. These roles include role of initiators, users, influencers, buyers, and gate keepers (Webster and Wind, 1972; Dadzie et al., 1999). For instance, users can decelerate the decision process by refusing to use of the products of certain suppliers for any reason (Bradley, 1995), or similarly, managers influence the purchase decision during the budget allocation process or by confirming the integration of the technology into the organization's operations and because of the strategic importance of product (Dadzie et al., 1999): The technology is highly expensive and involves consideration regarding the substitution of labor for it (Ackerman and LaLonde, 1980).

3.1. Data and Sample

Regarding with given issues and local specifications of present research, we identified the employees who are influential in buying decision making. Because of local difference between Iran and Webster, Wind and Dadzie's research environments, gate keepers haven't any significant role in buying decision process. Therefore, we withdrew low

influence and passive groups in buying process like gate keepers in this survey.

Statistical population of the research includes neurosurgeons, medical engineers, neurosurgical intensive care units incharges, logistics heads and hospital managers that their number is 143. For determining volume of sample, Cochran formula was employed. The sample's volume is 60.

Table 1. Distribution of Statistical Sample Categories

Categories	Frequency	
	Quantity	Percentage
Hospital Managers	11	18.3
Logistics Heads	11	18.3
NICU Charges	11	18.3
Medical Engineers	11	18.3
Neurosurgeons	16	26.6
OVERALL	60	100

The closed questionnaire contains 32 items in the field of the elements of Marketing Mix and its sub elements which reflect respondents' point of view. The items assess some components such as product reliability, ease of use, accuracy of performance, portability, uniqueness, domestic and international standards and certificates, warranties and services, price, noncash sells and types of deposit, distribution and delivery, promotions, effective presentation, familiarity with producer and vendors, advertisements, offers, public relations, personal selling, etc.

Also we employed Test Retest technique and Pearson correlation coefficient in order to assess the reliability of the questionnaire. The results are as follows:

Table 2. The Results of Pearson Correlation Coefficient Test for Determining Reliability of the Questionnaire

Scale	Pearson correlation coefficient
Product	0.87
Price	0.99
Place	0.93
Promotion	0.97
OVERALL	0.96

Regarding with the results, each main components of questionnaire and consequently whole of it are reliable.

Collected data was analyzed by SPSS 16 package after coding and scoring. In order to compare the elements of Marketing Mix, we employed Wilcoxon nonparametric test for non normal distributions, and Student t parametric test for normal distributions. We also employed Friedman test to rank the impact of 4P's on purchase intention.

3.2. Measures

Independent variables. Four main elements of Marketing Mix those are Product, Price, Promotion and Place are independent variables.

Dependent variable. Purchase intention is dependent variable in the present survey.

4. Results

4.1. Comparing Marketing Mix Elements' Impact on the ICP Monitoring Purchase

As results show, the elements Product with mean value of 4.65 and mean rank of 3.38 has the greatest impact on purchase intention in terms of respondents. After that, Price with mean value of 4.50 and mean rank of 3.30 and Promotion with mean value of 4.15 and mean rank of 2.28 have the second and third greatest impact on purchase intention respectively. Finally, Place with mean value of 2.74 and mean rank of 1.04 has the least impact on purchase intention in this survey (Table 3).

Table 3. Comparing the Impact of 4p's Elements on Purchase Intention

Element	Mean Value	Mean Rank	Product	Price	Place	Promotion
Product	4.7	3.4	-----	0.20*	0.00	0.00
Price	4.5	3.3	-1.28*	-----	0.00	0.44*
Place	2.7	1.0	-6.74	-6.75	-----	0.00
Promotion	4.2	2.3	-6.54	-3.55	-6.67	-----

Notes: The numbers under diameter are amount of *Z* and the above ones are significance level.
* Not supported (n.s)

4.2. Comparing Marketing Mix Elements' Impact on the ICP-Monitoring Purchase Intention in Each Functional Groups

As it was said before, respondents are from different positions that are hospital managers, logistics heads, neurosurgical intensive care unit incharges, medical engineers and neurosurgeons. The major question which we want to answer is that if there are any differences between prioritizing of Ps with different functional groups.

The results of Wilcoxon test shows that despite of general pattern which Table 4 shows that Product was the most influential element in purchase intention, managers believe that Price is the most important component (with mean value of 5.00 and mean rank of 4.00) among the four components of the Marketing Mix. Results shows that all elements have significant difference with each other in this position group (Table 4).

Table 4. Comparing the Impact of 4p's Elements on Purchase Intention in Hospital Managers Group

Element	Mean Value	Mean Rank	Product	Price	Place	Promotion
Product	4.7	3.0	-----	0.00	0.00	0.00
Price	5.0	4.0	-2.97	-----	0.00	0.00
Place	3.4	1.1	-2.93	-2.98	-----	0.01
Promotion	4.0	1.9	-2.94	-2.94	-2.70	-----

Notes: The numbers under diameter are amount of *Z* and the above ones are significance level.

Next group is logistics heads. In this group also Price with mean value of 5.00 and mean rank of 4.00 has the greatest impact on purchase intention. After that, Product with mean value of 4.66 and mean rank of 3.00, Promotion with mean value of 4.44 and mean rank of 2.00 and Place with mean value of 2.90 and mean rank of 1.00 have the second, third and fourth greatest impact on purchase intention respectively. The results show that all the elements have significance difference with each other (Table 5).

Table 5. Comparing the Impact of 4p's Elements on Purchase Intention in Logistics Heads Group

Element	Mean Value	Mean Rank	Product	Price	Place	Promotion
Product	4.7	3.0	-----	0.00	0.00	0.00
Price	5.0	4.0	-2.99	-----	0.00	0.00
Place	3.0	1.0	-2.94	-2.96	-----	0.00
Promotion	4.4	2.0	-2.95	-2.97	-2.94	-----

Notes: The numbers under diameter are amount of *Z* and the above ones are significance level.

Neurosurgical intensive care unit incharges group follows the general pattern of whole population so that in their opinion, Product with mean value of 4.75 and mean rank of 3.64 has the most impact on purchase intention. Price with mean value of 4.30 and mean rank of 3.1, and Promotion with Mean value of 4.06 and mean rank of 2.27 have the second and third most impact respectively. Place with mean value of 2.70 and mean rank of 1.00 was the last in ranking (Table 6).

In medical engineers group also Product with mean value of 4.56 and mean rank of 3.82, Price with mean value of 4.25 and mean rank of 3.00, Promotion with mean value of 4.02 and mean rank of 2.18 and Place with mean value of 3.46 and mean rank of 1.00 was the first to fourth influential elements respectively (Table 7).

Table 6. Comparing the Impact of 4p's Elements on Purchase Intention in Neurosurgical Intensive Care Unit Incharges Group

Element	Mean Value	Mean Rank	Product	Price	Place	Promotion
Product	4.8	3.6	-----	0.09*	0.00	0.01
Price	4.3	3.1	-1.69*	-----	0.00	0.02*
Place	2.7	1.0	-2.94	-2.95	-----	0.00
Promotion	4.1	2.3	-2.96	-1.29*	-2.94	-----

Notes: The numbers under diameter are amount of *Z* and the above ones are significance level.
* n.s

Table 7. Comparing the Impact of 4p's Elements on Purchase Intention in Medical Engineers Group

Element	Mean Value	Mean Rank	Product	Price	Place	Promotion
Product	4.6	3.8	-----	0.09*	0.00	0.01
Price	4.3	3.0	-1.69*	-----	0.00	0.09*
Place	3.6	1.0	-2.94	-2.95	-----	0.00
Promotion	4.0	2.2	-2.93	-1.69*	-2.94	-----

Notes: The numbers under diameter are amount of *Z* and the above ones are significance level.
* n.s

For the last group, neurosurgeons, Product with mean value of 4.66 and mean rank of 3.44 was the greatest necessary element and Promotion with mean value of 4.36 and mean rank of 2.81, Price with mean value of 4.03 and mean rank of 2.69 and Place with mean value of 2.31 and mean rank of 1.06 were the second to fourth greatest necessary elements of Marketing Mix respectively (Table 8).

Table 8. Comparing the Impact of 4p's Elements on Purchase Intention in Neurosurgeons Group

Element	Mean Value	Mean Rank	Product	Price	Place	Promotion
Product	4.7	3.4	-----	0.03*	0.00	0.02*
Price	4.0	2.7	-2.24*	-----	0.00	0.24*
Place	2.3	1.1	-3.52	-3.47	-----	0.00
Promotion	4.4	2.8	-2.43*	-1.17*	-3.52	-----

Notes: The numbers under diameter are amount of *Z* and the above ones are significance level.
* n.s

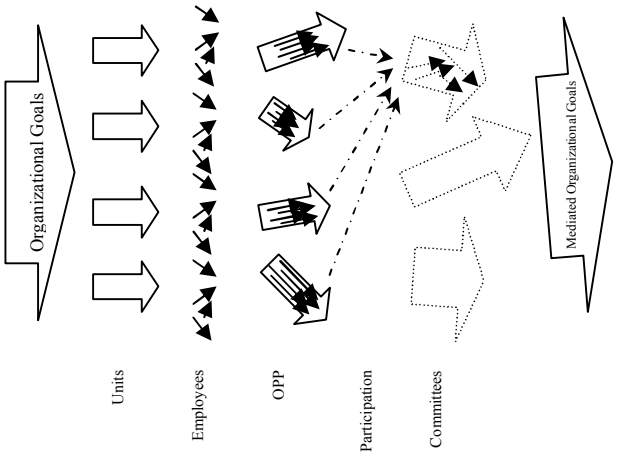

Figure 1. Conceptual Model of Organizational Position Properties and Its Impact on Decision Making

5. Discussions

Regarding with previous sections, it is observed that in the buying centers, priorities of participants working in different functional groups are not similar however; general social and economical conditions are similar for the whole organization. With this situation, all buying center personnel should have had same point of view without any differences in priorities. So why didn't they have it? Why were there different rankings in different functional groups? It could be concluded that apart from general condition of the whole organization, different functional groups also have some sub conditions which mediate their values and decision criteria and make the decision circumstance more complex. For instance, managers and logistics heads have to consider financial and economical issues more because of their posture in firms. So they emphasize on element Price and its sub elements more.

On the other hand, since the ICP Monitoring is used by physicians, medical engineers and neurosurgical intensive care unit incharges, directly, and they deal with patients' health and lives directly, they pay more attention to the element Product and its sub elements. These are local values of each functional group in a firm and I call them Organizational Position Properties (OPP). In this field, Dadzie et al. also agree with us of this research. They believe that buying decision is fairly complex that involves several functional participants at different decision stages, using different decision criteria (Dadzie et al., 1999).

A limitation in Webster and Wind (1972) and Foxall's (1993) suggested model is that they cite the category of organization General Conditions as one of the key independent variables affect participants but they don't mention the Specific Conditions of each functional group and its pressures. Although, participants in buying center get conflict because of their dual roles, which I call them "Primary Role" (the role employees play in their functional group) and "Secondary Role" (the role employees play in buying center as a participant), but still their opinions have root in their primary roles. In conclusion, it is true that, eventually, the final decision in buying center is resultant of the decisions participants make based on their Organizational Position Properties (Table 3 and Figure 1).

As the conceptual model shows, initially, the organization and its founders have their own major goals. Based on such goals, they organize and establish different units with functional goals, in line with the major goals and parallel with each other in order to follow organizational macro goals. In the next step, different individuals with different personal goals and taste are recruited as employees for occupy postures of the units. Since individual goals of employees are not the same with each other and furthermore, are not in line with aims of their units, the whole goals in all levels include individual and functional will be mediated and we will observe some units in where some specific values are created and the staff are persuading them. These values are not the same with other units' values and also they are not exactly the same as organizational goals_ the phenomenon that I call it "Organizational Position Properties (OPP)".

In addition to permanent organizational units, we have some committees such as buying center which is made up with participation of employees from different units with different OPP's for making common decisions. Various OPP's will be mediated and the decisions will be made. As consequence of such large amounts of mediations and changes, the organizational goals will be mediated, finally.

Totally, the decision making process is a complex network of integrations motivated by personal, functional and organizational objectives (Robertson, 1971; Johnston, 1981; Rogers, 1983).

According to the results, it is suggested to marketers and sellers that one of the effective sales strategies in business to business marketing is that in addition to distinguish rules and procedures of buying process in target business, they also should identify _ with a proper plan and according to the mentioned product _ determiners, participants and key influential individuals in buying center. Then they should work out such influential participants' priorities, criteria and Organizational Position Properties _ with establishing an effective relationship _ and adjust a mediated real Marketing

Mix match with mentioned situation. Knowledge of this criteria should allow vendors and third party providers to mediate their Marketing Mix in order to suit the major influencers in the purchase decision process (Dadzie et al., 1999). This issue can provide a desirable competitive advantage in market.

Considerable limitation of this research is to be small of the statistical population volume that can challenge validity of results. The reason is scant medical centers equipped with neurosurgical intensive care unit in Fars province, Iran and consequently, scant persons forming the statistical population. Hence, it is suggested researchers with performing similar research in more extensive domain and larger statistical population, also with performing similar surveys about other products in other businesses and performing similar surveys in other decision making committees and comparing their results with current ones, try to measure the validity and richness of this research.

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12/12/2012

Heavy Metal Concentrations of Drinking Water in South of the Kingdom of Saudi Arabia

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Abstract: Drinking water is an important factor in survival. Many trace elements, both metals and non-metals, in drinking water are capable of causing human diseases if their concentrations exceed certain permissible levels. In this work, the direct determination of some trace heavy metals in the drinking water were carried out by differential pulse anodic stripping voltammetry (DPASV). The stripping current arising from the oxidation of metals were connected with the concentration the metals in the sample. The concentration of some trace heavy metals found in the drinking water sample were determined using acetate buffer (pH: 4.2). This value of elements in this study is between the limit values suggested by WHO, EPA and SASO.

[Asia Alshikh. **Heavy Metal Concentrations of Drinking Water in South of the Kingdom of Saudi Arabia.** *Life Sci J* 2012;9(4):4660-4665] (ISSN:1097-8135). http://www.lifesciencesite.com. 702

Keywords: drinking water; voltammetry; Saudi; trace heavy elements.

1.Introduction:

Human health can be affected by the quality of the food and drink that we take. Water intended for human consumption must be free from organisms and from concentrations of chemical substances that may be hazardous to health. Recent studies show that the levels of trace elements present in drinking water could seriously affect human health (Maroof *et al*., 1990, Moukarzel *et al*., 1992). World Health Organization (WHO) places great emphasis on the quality of drinking water and has recommended upper limits for a number of trace elements for drinking water (World *et al*.,1977,World *et al*.,1980).

This study was directed to measure concentrations of Zinc, Chromium and Cadmium in the commercially available drinking water in Makkah and Jeddah cities using Atomic Absorption Spectrometry technique. A total of 94 water samples were analyzed. The mean concentrations of the metals obtained in this study are within the maximum permissible levels for the drinking water recommended by the World Health Organization (WHO) and Saudi Arabian Standard Organization (SASO). Conductivity and pH of the water samples were also measured to investigate correlation between their values and the concentrations of the three metals. A positive correlation is obtained between the metal concentrations and the corresponding conductivity values, while no significant correlation is seen between the pH values and the metal concentrations (Tayyeb *et al*.,2000).

Several techniques have been used in trace metal analysis with varying degrees of success and convenience. These techniques include UV-visible spectrophotometry , ame atomic absorption spectrometry (Eaton *et al*., 1995), electrothermal atomic absorption spectrometry (percelay *et al*., 1988), inductively coupled plasma atomic emission spectrometry (Eaton *et al*.,1995), total reflection X-ray fluorescence spectrometry (Mukhtar *et al*.,1991) and electrochemical stripping analysis (Adeloju *et al*., 1996). Among the various techniques, stripping analysis offers the advantages of species characterization and of utilizing inexpensive instrumentation and low operating cost. When compared with other spectrometric methods, only electrothermal atomic absorption spectrometry has nearly the same sensitivity but is more expensive. The instrument for stripping analysis is small in size, has very low power demand, and requires no special installation such as cooling or ventilation. These features make stripping analysis suitable for in situ measurement (at which contamination or sample loss from adhesion to sample bottle during storage and transport can be minimized). None of the other techniques for trace metal quantitation can compete with stripping analysis on the basis of sensitivity per money invested (Wang *et al.,* 1985).

2. Materials and methods

Gathering samples Drinking water samples were chosen from The villages in Jazan region, Al-amria, Al-orooj, Zabart-Rashid and Bani-Malik villages. Before water sampling, all the glass bottles were cleaned and rinsed thoroughly with water to be analyzed. All reagents used were of analytical grade. Samples were unfiltered and the concentration of the different parameters could correspond to the total concentration of the drinking water elements was used by the consumers.

The apparatus used in the study:

The concentration of trace elements were measured by Polargraph instrumental 746 VA trace analyzer with 747 VA stand or from Metrohm company (Herisau, Switzerland) with a three-

electrode system consisting of a WE Multi Mode Electrode (MME) , Mercury drop capillary for MME working electrode, a platinum wire auxiliary electrode and Ag/AgCl (NaCl / 3M , Metrohm) reference electrode. After the experimental parameters were recorded, the sample in the voltametric cell was sprayed with nitrogen for 300s. All pH measurements were made with Model Metrohm 744 pH meter (Herisau, Switzerland) at ambient temperature of the laboratory (25-30 °C). The information storage is done by a computer, from Toshiba company 757 VA computracy joined with the device.

3. Results and Discussion: Jizan Region suffers from a shortage of water that is reflected negatively on the citizen's health as a direct result of usage of filtered water and wells. The study has illustrated economical difficulties as a result of buying bottled drinking water. The chemical analysis results illustrate that the region's water is suitable given its main components (calcium - magnesium - sulphates - chlorides) in terms of non-bottled drinking water (701-2000), except for the existence of some organic substances (which have a plant origin) and a tiny amount of sand. We have applied the relationships of the ionic balance based on a reasonable assumption for our studies, and calculated the error range percentage of these assumptions. The value error range which has been estimated is about 1.26%. It was noticed that the drinking water which is used, and where we have analyzed some of its main elements, plus counting the amount of its sodium content, has an amount of total dissolved salts (T.D.S) in the minimum or less than the minimum (100 milligram/liter). These results could have a negative effect on the citizen's health, with the increasing probability of salt deficiency in their bodies. In addition the higher temperatures and moisture content in the area obviously increases the sweat factor. We have calculated mathematically the range of the ionic balance and T.D.S of 12 samples of bottled water from different sources. When comparing them to percentages written on the bottles, it was noticed that the percentage of the different averages between cations and anions is between (0-27.54%). The percentages stated and those we calculated are at odds and thus a cause for concern. This has lead us to the conclusion that the apparatus used in standardizing need to be calibrated periodically if accurate figures are to be determined. It was further noticed from the results of the blood analyses of 101 samples that 16% (17% males and 12.7% females) from the group, whose ages are between 17-40 years, suffered from a lack of calcium in their blood, whereas 52% from that group suffered from calcium excess. Those marked as normal (32%), are between 2-2.6 milimole/litre (AL-Bakri and Break, 2004). In this work, the direct determination of some trace heavy metals in the drinking water were carried out by differential pulse anodic stripping voltammetry (DPASV) technique in Jazan region, Al-amria, Al-orooj, Zabart-Rashid and Bani-Malik villages.

I- Determination of Zinc (Zn) trace elements in drinking water sample:

In this study, the concentration of Zn trace element in drinking water was successfully determined by ASV technique. DPAS voltammograms of Zn element obtained from standard addition technique are given in Fig. 1. The sensitivity was calibrated by standard additions to the sample and the initial metal concentrations were calculated by extrapolation (Fig. 2). (Used voltammetric apparate on quantitative mode a automatically requires one sample to be added to the voltammetric cell and then two standards to be added and finally, the machine plots the value of the current- concentration. Therefore, there are only three plots on calibration curve). Consequently, linear calibration range was automatically obtained as being related to quantitative mode of the voltammetric.

As can be seen from the Fig. 1, the current of oxidation peak of zinc element increased by the addition of the standard solution. A further increase in sensitivity of peak currents was achieved by increasing the deposition time to 300 s. In addition, to increase sensitivity, the optimum pH value in acetate buffer tampon was determined to be 4.2. Under these conditions, the concentration of Zn(II) element in drinking water was found to be between 0.0105 - 0.016 mg/l.

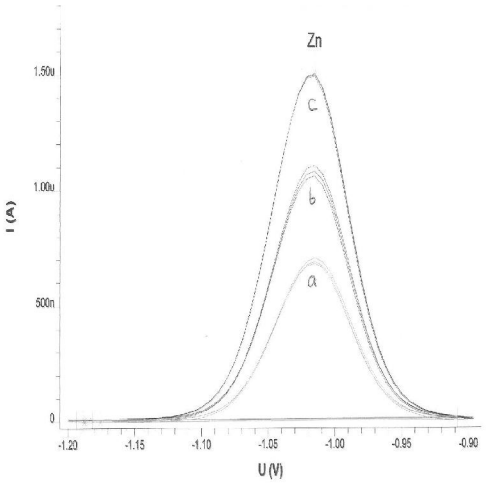

Figure 1. DPAS voltamograms of the Zn element obtained from standard addition technique a) 1 ml acetate buffer (pH = 4.2) + 10 ml drinking water. b) a + 100 µl. c) b + 100 µl standard solution of Zn (10 mg /l).

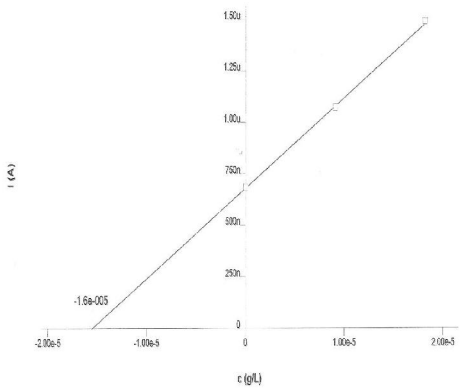

Figure 2. The calibration plot of Zn(II) element obtained from standard addition by DPASV technique.

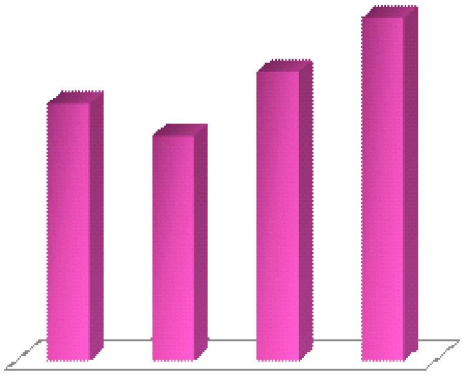

Figure 3. Concentration of Zn element in some village of Jazan region.

Also the study approved that the highest concentration of Zn element was found Al-Amria village drinking water which reached (0.016 mg/l) then Zabart-Rashid village drinking water reached to (0.0135 mg/l) , then Al-Orooj village drinking water reached to (0.0120 mg/l) finally Bani - Malik village drinking water reached to (0.0105 mg/l), figure 3.

This value is between the limit values suggested by WHO, EPA and SASO. In addition, the concentration of Zn(II) element found indicates to be "the first quality water" of the drinking water according to the inland water quality classification consequently, it is understood that the concentration of Zn(II) in drinking water have no influence on the human health.

Also, the analysis has been determined without the interferences in the applied voltammetric method. The advantages of the proposed voltammetric method over the other known techniques were sample preparation, sensitivity, rapidity and cost.

II- Determination of Lead (Pb) trace elements in drinking water sample: In this study, the concentration of Pb trace element in drinking water was successfully determined by ASV technique. DPAS voltammograms of Pb element obtained from standard addition technique are given in Fig 4. The sensitivity was calibrated by standard additions to the sample and the initial metal concentrations were calculated by extrapolatio (Fig 5).(Used voltammetric apparate on quantitative mode a automatically requires one sample to be added to the voltammetric cell and then two standards to be added and finally, the machine plots the value of the current-concentration. Therefore, there are only three plots on calibration curve). Consequently, linear calibration range was automatically obtained as being related to quantitative mode of the voltammetric unit.

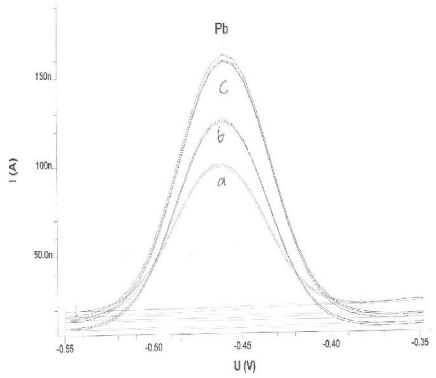

Figure 4. DPAS voltamograms of the Pb element obtained from standard addition technique a) 1 ml acetate buffer (pH = 4.2) + 10 ml drinking water. b) a + 100 µl. c) b + 100 µl standard solution of Pb (10 mg /l).

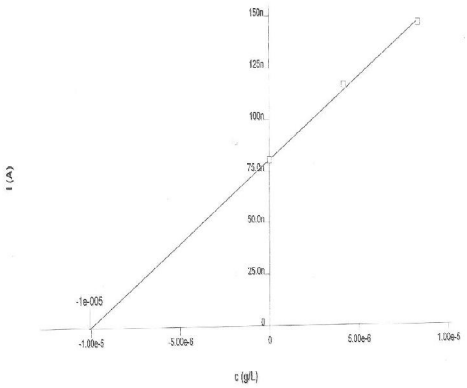

Figure 5. The calibration plot of Pb (II) element obtained from standard addition by DPASV technique.

As can be seen from the Fig. 4, the current of oxidation peak of Lead element increased by the addition of the standard solution. A further increase in sensitivity of peak currents was achieved by increasing the deposition time to 300 s. In addition , to increase sensitivity, the optimum pH value in acetate buffer tampon was determined to be 4.2. Under these conditions, the concentration of Pb(II) element in drinking water was found to be between (0.0085 - 0.0365) mg/l.

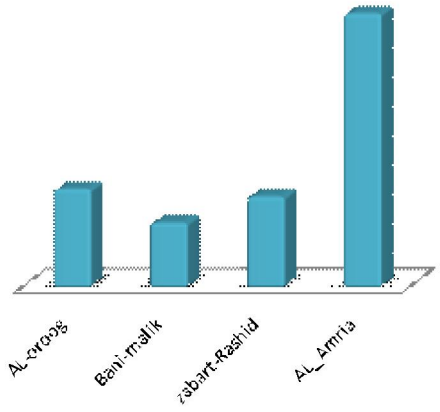

Figure 6. Concentration of Pb element in somevillage of Jazan region.

The highest concentration was found with Pb element noticed is (0.0365 mg/l) in Al-Amria drinking water village, while Bani-Malik village has the lower concentration it reached (0.0085mg/l) figure 6; the order is:

Al-Amria village > Al-Orooj village > Zabart- Rashid village > Bani-Malik village .

This value is between the limit values suggested by WHO, EPA and SASO, it is understood that the concentration of Pb (II) in drinking water have no influence on the human health

III- Determination of Cadmium (Cd) trace elements in drinking water sample:

In this study, the concentration of Cd trace element in drinking water was successfully determined by ASV technique. DPAS voltammograms of Cd element obtained from standard addition technique are given in Fig 7. The sensitivity was calibrated by standard additions to the sample and the initial metal concentrations were calculated by extrapolation (Fig. 8). (Used voltammetric apparate on quantitative mode a automatically requires one sample to be added to the voltammetric cell and then two standards to be added and finally, the machine plots the value of the current-concentration. Therefore, there are only three plots on calibration curve). Consequently, linear calibration range was automatically obtained as being related to quantitative mode of the voltammetric unit.

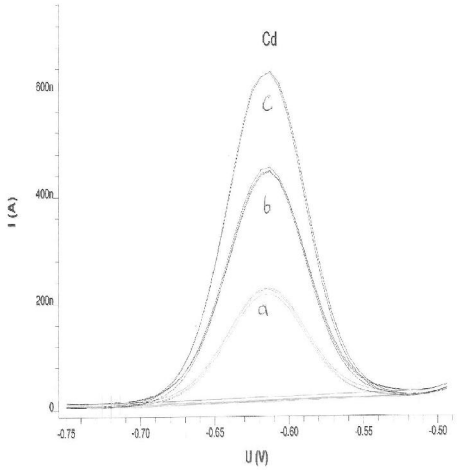

Figure 7. DPAS voltamograms of the Cd element obtained from standard addition technique. a) 1 ml acetate buffer (pH = 4.2)+10 ml drinking water. b) a+100µl. c) b+100µl standard solution of Cd (10 mg /l).

As can be seen from the Fig. 7, the current of oxidation peak of Cd element increased by the addition of the standard solution. A further increase in sensitivity of peak currents was achieved by increasing the deposition time to 300 s. In addition , to increase sensitivity, the optimum pH value in acetate buffer tampon was determined to be 4.2. Under these conditions, the concentration of Cd(II) element in drinking water was found to be between 0.001 - 0.003 mg/l .

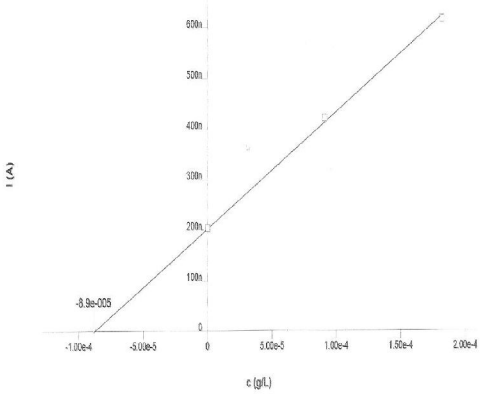

Figure 8. The calibration plot of Cd (II) element Obtained from standard addition by DPASV technique.

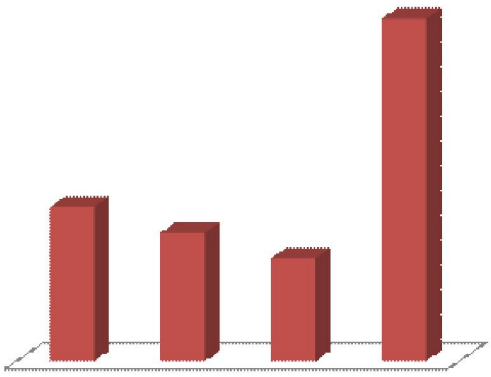

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Figure 9. Concentration of Cd element in some village of jazan region.

Also the study showed that the highest concentration Cd element was in Al-Amria drinking water (0.004 mg/l) then Al-Orooj village drinking water where (0.0018 mg/l), then Bani-Malik village drinking water (0.0015 mg/l) then Zabart- Rashid village drinking water (0.0012 mg/l) figure 9 .

This value is between the limit values suggested by WHO,SASO and EPA, it is understood that the concentration of Cd (II) in drinking water have no influence on the human health .

Also the study clarified the differences between elements concentration, so that it can be seen in:

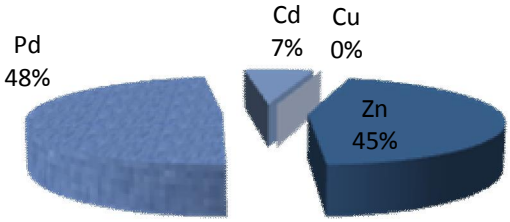

Figure 10 . Concentration of trace elements in AL-Orooj vallige

1. ***Al-Orooj village drinking water***: figure 10, show the highest concentration Pb element is found ,that it reached to (0.013 mg/l) where the less concentration was Cu element , that it reached to (0.0 mg/l) . Zn element reached to (0.012 mg/l) , following that ,Cd element where it reached (0.0018 mg/l).

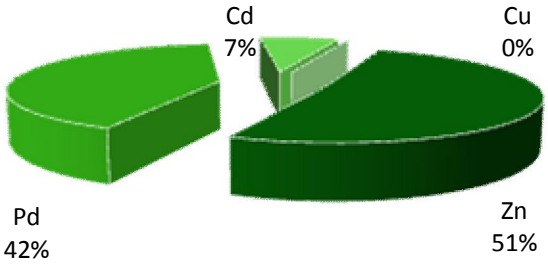

Figure 11. Concentration of trace elements in Bani-Malik village.

2. ***Bani-Malik village drinking water*** concerning Cu element, it was the lowest concentration within (0.0 mg/l) following that Cd element within (0.0015 mg/l) after that Pb element within (0.0085 mg/l) and the highest concentration was Zn element within (0.0105 mg/l) figure 11 .

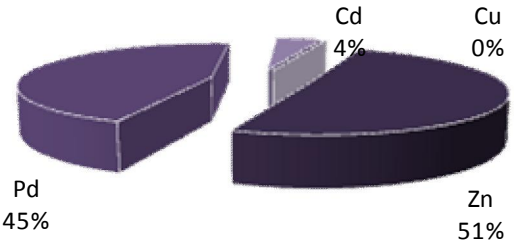

Figure 12. Concentration of trace elements in Zabart-Rashid village

3. ***Zabart- Rashid village drinking water***, in that the highest concentration Zn element was within (0.0135 mg/l) , and it was lower in concentration Cu element within (0.0 mg/l) , and Pb element concentration reached to (0.012 mg/l) while Cd element concentration reached to (0.0012 mg/l) figure 12.

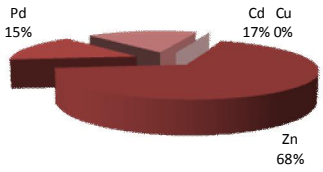

Figure 13. Concentration of trace elements in Al-Amria village

4. ***Al-Amria village drinking water*** concerning Zn element within (0.016 mg/l) and Cd element concentration reached to (0.004 mg/l) while the lowest concentration was in Cu element where it reached to (0.0 mg/l) and the highest concentration was Pb element within (0.0365 mg/l) figure 13.

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12/12/2012

Expression levels of microRNA-21 and microRNA-146a in patients with Oral Lichen Planus

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Abstract: Increasing evidence indicates that microRNAs (miRNAs) play a critical role in the pathogenesis of inflammatory diseases. Oral lichen planus (OLP) is a chronic inflammatory disease involving the oral mucosal tissues. The role of miRNAs in the pathogenesis of OLP has not been investigated. Therefore, the aim of this study was to investigate the expression levels of miRNA-21 and miRNA-146a in oral tissue samples from patients with OLP and matched healthy controls using real-time quantitative reverse transcriptase polymerase chain reaction (qRT-PCR). Our results showed a significant over-expression of miRNA-21(3.2-fold) and miRNA-146a (5.6-fold) in OLP patients compared to healthy controls. These results indicate that miRNAs may be the novel candidate biomarkers for the implication of miRNAs in the pathogenesis of OLP.
[Gihane Gharib Madkour, Hani EL Nahass, Wesam Abd El Moneim Mohamad. **Expression levels of microRNA-21 and microRNA-146a in patients with Oral Lichen Planus.** *Life Sci J* 2012;9(4):4666-4670] (ISSN:1097-8135). http://www.lifesciencesite.com.. 703

Keywords: Oral lichen planus; miRNA-21; miRNA-146a.

Introduction

Oral lichen planus (OLP) is a chronic, T-cell mediated inflammatory oral mucosal disease of unknown etiology [1, 2]. The OLP lesions may coexist with cutaneous and genital lesions, or may be the only disease manifestations [3]. The epidemiology of OLP is not easy to calculate with reported incidence ranging between 1-2% of the general population. Recent meta-analysis calculated a 1.27% incidence in the general population [4]. The World Health Organization (WHO) has classified OLP as a "potentially malignant disorder" with a 0.4-5.6% transformation rate into oral squamous cell carcinoma [5, 6]. Recently, the etiology and pathogenesis of OLP has been the focus of much research, and several antigen-specific and non-specific inflammatory mechanisms have been put forward to explain the disease pathogenesis.

Micro-RNAs (miRNAs) are small, single stranded non-coding RNAs that regulate messenger RNAs (mRNAs) expression at the post-transcriptional level, thus targeting them for degradation or translational repression [7, 8]. To date, thousands of miRNAs have been identified in mammalian genomes, and up to 30% of human genes are regulated by these miRNAs [9]. More than 100 different miRNAs are expressed by cells of the immune system; they have the potential to broadly influence the molecular pathways that control the development and function of innate and adaptive immune responses [8]. Recently, miRNAs have been recognized as a novel player in normal immune function and inflammation [10]. Further-more, it has been suggested that over- or under-expression of miRNAs may induce deregulation of specific mRNAs. These factors may affect human immune response and then result in many pathogenic disorders [11]. In particular, T cell-mediated immune responses are associated with changes in the expression of specific miRNAs. CD4+ T-cells have also been found to express different miRNA subsets that are linked to cell differentiation, maturation, activation and function [12-15]. In the immune system, miRNA-21 is one of the most abundant miRNAs in T-cells indicating that its function is critical for T-cell homeostasis [16]. The expression of miRNA-21 dynamically changes during antigen-induced T-cell differentiation, with high expression in effector T cells in comparison to naive T-cells and memory T-cells [16, 17]. The involvement of miRNA-21 in inflammatory responses is particularly interesting [18, 19]. Over-expression of miRNA-21 was seen in atopic eczema and in psoriasis, the two most common types of chronic skin inflammation [18].

Similarly, miRNA-146a was one of the first miRNAs identified to be involved in the regulation of immune functions and inflammatory responses [17, 20]. Recently, altered miRNA-146a expression has been shown in several inflammatory diseases, including psoriasis [18], rheumatoid arthritis [21, 22], osteoarthritis [23], as well as systemic lupus erythematosus (SLE) [24]. As miRNAs have been shown to play important roles in inflammatory and autoimmune diseases, together with the fact that the pathogenesis of OLP is not fully understood, the aim of the present study was to investigate the expression levels of miRNA-21 and miRNA-146a in OLP lesions and matched healthy controls.

2. Patients and Methods

The present study was conducted on 20 patients, thirteen females and seven males, with a mean age of 48 years (age range: 43-59 years) suffering from OLP. Among the OLP patients, four patients had reticular lesions only, while the remaining sixteen had also erosive and/or atrophic types of OLP. They were diagnosed clinically and confirmed by histopathological examination according to the WHO's clinico-pathological diagnostic criteria for OLP [25]. The control group comprised15 healthy controls, twelve females and three males, with a mean age of 47 years (age range: 42-58 years). The controls were healthy volunteers without any systemic disease or inflammatory oral lesions. They were treated for third molar extraction, and they agreed to donate a sample of healthy oral mucosa.

All patients and healthy controls were selected from the Outpatient Clinic, Department of Oral Medicine and Periodontology, Faculty of Oral and Dental Medicine, Cairo University. A full medical history of each subject was obtained according to the detailed questionnaire of the modified Cornell Medical Index [26]. All subjects were free from any systemic disease and did not receive any topical or systemic medication during the last 3 months before the sample collection. Moreover, patients with suspected restoration-related reaction or gingival inflammation were excluded from the study. All patients and volunteers enrolled in this study gave their informed consent.

Oral mucosa samples from OLP patients were obtained after administration of ring block anesthesia and a surgical double wedge incisional biopsy [27]. Each biopsy specimen was divided into two parts; one part was formalin fixed and paraffin embedded for histopathological examination to confirm the diagnosis of OLP and the other part was kept frozen and stored at -80°Cuntil assayed for RNA extraction procedures.

Quantitative real-time reverse transcriptase polymerase chain reaction (qRT-PCR) analysis of miRNA-21 and miRNA-146a

Total RNA was extracted from tissue samples using TRIzol® Reagent (Invitrogen, Life Technologies Inc., Carlsbad, CA, USA), according to the manufacturer's protocol. TaqMan miRNA assays (Applied Biosystems, Foster City, CA, USA) were used for determination of the expression levels of miRNA-21 and miRNA-146a. Briefly, 10 ng of total RNA was reverse-transcribed using gene-specific stem-loop primers to each miRNA [28] (TaqMan MicroRNA Reverse Transcription kit, Applied Biosystems), according to the manufacturer's instructions. Real-time PCR was performed on the resulting complementary DNA (cDNA) using miRNA-21 and miRNA-146a specific TaqMan primers and TaqMan Universal PCR Master Mix in a 7500 Sequence Detection System real-time PCR machine (Applied Biosystems). PCR cycles were started at 95°C for 10 min, followed by40cycles of 95°C for 10 sec and 60°C for 1min.miRNA-21 and miRNA-146a expression was normalized to endogenous RNU6B (TaqMan Micro RNAassay, Applied Biosystems) as internal control.

Dissociation curve analysis was performed at the end of 40 cycles to verify the identity of the PCR product. The $2^{-\Delta\Delta Ct}$ method [29] was used to calculate relative changes in the gene expression determined from real-time quantitative PCR experiments. The value of each control sample was set at 1 and was used to calculate the fold change in the target miRNAs.

Statistical analysis

Data were presented as mean and standard deviation (SD) values. The differential expression levels of miRNA-21 and miRNA-146a studied in OLP lesions and control biopsy samples were analyzed by independent two-tailed Student's t-test. A p value <0.05 was considered statistically significant. All tests were performed using the GraphPad statistical software (GraphPad Software Inc, La Jolla, CA).

Results

Twenty OLP patients and fifteen healthy controls were included in this study. A total of thirty five oral tissue biopsy samples were analyzed for the expression profiles of miRNA-21 and miRNA-146a by qRT-PCR. Relative quantification of miRNA-21 and miRNA-146a in OLP lesions was higher than in normal oral mucosa in all the studied samples ($P < 0.0001$). Our results revealed that there was a statistically significant 3.2-fold increase in the expression level of miRNA-21 in OLP compared to healthy controls ($P < 0.0001$). Moreover, there was a statistically significant increase in the expression level of miRNA-146a in OLP at 5.6-fold ($P < 0.0001$) above healthy controls (table 1 and figure 1).

Table 1: Changes in miRNA-21 and miRNA-146a expression levels in OLP compared to healthy controls.

miRNAs	Reference sequences	Fold change*(mean± SD)	P value**
miRNA-21	NR_029493	3.2±1.09	P < 0.0001**
miRNA-146a	NR_029701	5.6±1.12	P < 0.0001**

*The values represent the mean fold changes of miRNA-21 and miRNA-146a in OLP compared to healthy controls. **Data were analyzed by independent two-tailed Student's t-test, P < 0.01 was considered highly statistically significant.

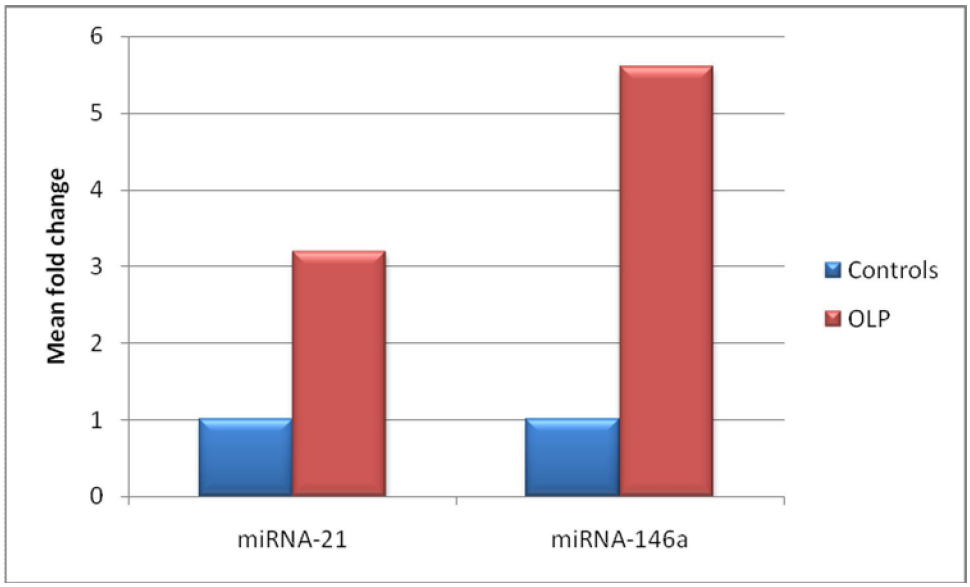

Figure 1: Bar chart representing the mean fold changes in miRNA-21 and miRNA-146a in OLP and healthy controls.

Discussion

In the last decade, many studies of the literature have focused on the role of miRNAs in the immune system. As a matter of fact, miRNAs are involved in T-cell selection, T-cell receptor sensitivity and regulatory T-cell development, suggesting that variants in miRNA gene expressions and their targets may play crucial role in the development of inflammatory and autoimmune diseases [18, 30, 31]. OLP is a T-cell mediated chronic inflammatory oral mucosal disease of unknown etiology [1]. Understanding the etiology and pathogenesis of OLP is one of the major challenges in our field. Therefore, the aim of this study was to investigate the possible role of miRNA-21 and miRNA-146a in OLP immuno-pathogenesis. Results of the present study showed a statistically significant increase in the expression levels of miRNA-21 (~3-fold, $P < 0.01$) and miRNA-146a (~5.5-fold, $P < 0.01$) in OLP compared to normal controls. This increased miRNA expression levels in OLP lesions suggest a participation of these miRNAs in the pathogenesis of the disease.

Results of this study are partially in agreement with those of ***Sonkoly et al.*** [18] who showed increased expression of both, miRNA-21 and miRNA-146a, in the chronic inflammatory skin disease, psoriasis compared to healthy skin. However, they reported increased expression level of only miRNA-21, not miRNA-146a, in atopic eczyma.

Moreover, expression of miRNA-21 [32] and miRNA-146a [24] were also increased in patients with SLE. Furthermore, ***Nakasa et al.*** [33] **and** ***Stanczyk et al.*** [34] reported increased miRNA-146a levels in rheumatoid arthritis. Their results further support our results.

In addition, results of the present study are in accordance with those of ***Wu et al.*** [35] who demonstrated increased miRNA-21 expression in active ulcerative colitis. Similarly, miRNA-21 was also found to be increased in the lungs of mice exposed to aerosolized lipopolysaccharide [36].

Results of the present study can be explained on the basis that both, miRNA-21 [37] and miRNA-146a [38] have been reported to play an important role in regulation of T-helper-1 (Th1) immune responses, which is known to be increased in OLP. Moreover, evidence has shown that miRNA-146a can impair nuclear factor kappa beta (NF-κB) activity [39] and suppress the expression of NF-κB target genes such

as interleukin(IL)-6, IL-8, IL-1β and tumor necrosis factor- alpha (TNF-α) [39,40]. Additionally, ***Li et al.*** [20] reported that miRNA-146a play an important role in the regulation of inflammatory response through a negative feedback pathway. Interestingly, increased miRNA-146a expression was only seen at high IL-1 β concentrations, which indicated that negative feedback is only activated during severe inflammation and that this might be crucial in preventing potentially dangerous inflammation from spiraling out of control [41].

On the other hand, ***Rhodus el al.*** [42] reported significantly higher levels of NF-κB-dependent cytokines; TNF-α, IL-1α, IL-6, and IL-8 in different oral fluids from OLP patients compared to normal controls. They concluded that NF-κB-dependent inflammatory cytokines may have diagnostic and prognostic potential for monitoring disease activity and making therapeutic decisions in patients with OLP [42]. Accordingly, we can speculate that increased expression of miRNA-146a may be involved in OLP pathogenesis through NF-κB pathway that initiate and amplify the local immune reaction which may contribute to the development of the disease.

Previous studies provided explanation for how miRNAs could regulate the immune response in inflammatory diseases through the action of other regulatory mechanisms. ***Lu et al.*** [19] showed that miRNA-21 was the most highly induced miRNA in an IL-13-induced asthma model. They reported thatmiRNA-21 is involved in inflammation, at least in part, by modulating cytokine responses [19]. Moreover, ***Li et al.*** [22] reported a significant positive correlation between miRNA-146a and TNF-α in both peripheral blood and synovial fluid of patients with rheumatoid arthritis. They postulated that the inflammatory milieu may altermiRNA-146aexpression in infiltrated T-cells [22]. One of these previous mechanisms may be involved in OLP pathogenesis.

In contrast to our results, ***Tang et al.*** [24] showed under-expression of miRNA-146a in patients with SLE as compared with patients with Behçet's disease and normal control subjects. They stated that miRNA-146a under-expression contributes to abnormal activation of type I interferon (IFN) signaling pathway in SLE.

OLP has been classified by the WHO as a "potentially malignant disorder". Interestingly, miRNA-21, one of the miRNAs connected to oral epithelial cancer, oral squamous cell carcinoma [43], was up-regulated in our results, supporting a trend towards a malignant connection for OLP. Consequently, we can conclude that, in addition to its role in inflammation, miRNA-21may have a possible role in malignant transformation of OLP. However, further studies are needed to delineate the exact role of both miRNA-21 and miRNA-146a in OLP, and to determine whether modulation of these miRNAs activity in vivo may become a novel therapeutic approach to treat this disease.

Conclusion

The current study demonstrated that there is a significant increase in the expression levels of miRNA-21 and miRNA-146a in OLP lesions compared to healthy controls. These data indicate that miRNAs may be the novel candidate biomarkers for the implication of miRNAs in the pathogenesis of OLP.

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12/12/2012

Review the existing lack of requirement for performance auditing and its impact on improvement in organizational knowledge

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Abstract: Today in economic environment that has several systems with different dimensions management of organization growingly focuses on evaluation of cost- effectiveness, efficiency and effectiveness of organizational operation; operational auditing is used as a tool for such assessment. It necessitates in competitive environments that managers to lead the affairs properly in the path of work progress and toward the strategic goals which considered consciously by the given organization by adopting of performance evaluation process. Performance auditing is a useful tool to adjust these systems and leading the organization toward its objectives. In our country, government is responsible for administration of the majority portion of economic sources and quality of managing them essentially influences in nation's fate. Performance auditing reflects a modern attitude toward auditing, which comprises of common auditing and management consultation. Performance auditing is focused on way of utilization from organization's sources and it deals with information and intra-organizational systems and instructions and mainly acts as an advisor for management. On the other hand, performance auditing may play crucial role in improvement of knowledge management by transferring the possibility for optimal decision making. Given that knowledge management denotes knowledge management for empowerment of personnel and organization to do their activities efficiently so in the present research, 5 dimensions of knowledge management (Knowledge acquisition, knowledge record, knowledge transfer, knowledge creation, and knowledge application) have been investigated. The given study is of descriptive survey type and it is considered as applied research in terms of objective where library and field study method has been adopted for review and gathering information. Furthermore, a questionnaire was prepare and distributed among respondents and the results were obtained after collection data and conducting the statistical computations via SPSS software. 12 hypotheses have been taken into consideration to examine the aforesaid subject and findings from hypotheses were separately mentioned. Statistical population of the present study has been divided into 4 groups as follows:
1- Auditors from Iranian Audit Organization, 2- Auditors of Supreme Audit Court, 3- Experts and professors, and 4- Managers and experts from Governmental Institutions (Public Sector).
Finally, according to regulations of groups, the results of the investigation into the existing deficiencies in requirement of performance auditing are based on this fact that lack of intellectual and behavioral independence in performance auditors is considered as most trivial challenge while lack of an appropriate budgeting system as well as absence of adequate rules and regulations and commitment of governmental managers to traditional techniques are deemed as the paramount challenges. At last, some practical and relevant suggestions have been also presented to continue and follow up the similar researches in the future. And with respect to the results obtained from review of binding nature of any hypothesis in different dimensions of knowledge management suggests that performance auditing may play crucial role in optimization of organizational knowledge.
[Mozhgan Moharrami and Mohammad Afshari. **Review the existing lack of requirement for performance auditing and its impact on improvement in organizational knowledge.** *Life Sci J* 2012;9(4):4671-4683] (ISSN:1097-8135). http://www.lifesciencesite.com.704

Keywords: Performance (Operational) Auditing, Public Sector Institutions, Accountability, Public Administration, Efficiency, Effectiveness, Cost- Effectiveness, Knowledge Management, Human Resources Audit

Introduction and subject interpretation

The economic system remarkably depends on decisions made by management in economic units in a country and it is obvious that such decisions will essentially affect on income- earning, profitability and optimal use of sources (Nokhbeh Fallah, 2005:24). According to legal structures in Iran, State Economic System makes up three sectors: Public Sector, Cooperative Sector, and Private Sector.

Although, during recent years many efforts have been made by the government for privatization of economy, nevertheless all these measures, the major part of national sources are also at government's disposal and under its control. More than 70% of Iranian economy is controlled by Public Sector and as public authorities, governmental directors are responsible for maintenance and exploitation from these huge sources and the quality of their performance plays essential role in fate of country and all people. Public Sector Managers should be accountable against people and their representatives. Have managers properly fulfilled their responsibility in decisions- making? Did they use optimally and efficiently the facilities at their disposal? Did managers take step within the framework of five- year development plans and goals as well as objective of Outlook Document? Have they pay due attention to cost effectiveness in operation and events under their control and management? (Bozorgasl & Saffar, 2002, 2006).

Due to special characteristics of Governmental Organizations and their difference from institutions in Public and Corporative Sectors, performance audit may be employed as a criterion to measure productivity and efficiency in governmental managers' performance. Since, the major portion of governmental organizations consist of non- trade and non- commercial activities and many goals of governmental activities and their subordinates relate to subject of supervision and control and public interests- related issues and due to lack of relationship among revenues that earned by the government and the costs which spent by them or those services that are given by Public Sector, measurement of performance may be considered as a alternative criterion for profit in process of exploration into the quality of performance of Public Sector managers. Similarly, it could be also adopted as a criterion along with determining of management merit (competence) and promotion (Dittenhoffer, 2001: 438).

On the other hand, people expect the managers in the aforesaid organizations to respond to them against taxes which they pay and or national sources at governmental disposal and proprietorship at different levels that belong to all the people in the society (Raaum & Cmmbpe 11, 2006:5).

As an effective tool in fulfillment of accountability task, creation of transparency and acquiring public trust as well as guarding the public properties against mal-managements and kinds of rents, performance auditing may be used.

With respect to quantization issues and selection of Supreme Audit Court, it requires moving from compliance audit toward performance (operational) audit in order to be able to provide appropriate information in the course of making logical and duly decisions (Imani and Jahangiri, 2010:1).

Performance audit, which also called as operational, managerial auditing and performance of management, is one of the relatively new subjects in auditing affairs that its domain exceeds from financial auditing domain and it increase the addressing aspect of auditing and its revisions and recommendations remarkably while focusing on three elements; namely, effectiveness, efficiency and cost- effectiveness (Deputy of technical and auditing affairs for public ministries, institutions and organizations, Supreme Audit Court, April 2009, 3).

Knowledge management is to organize knowledge for empowerment of personnel and organization in doing activities efficiently (Taghizadeh et al, 2010:34). Knowledge management includes 5 following steps:

Knowledge acquisition, knowledge record, knowledge transfer, knowledge creation, and application of knowledge (Watson, 2004: 31);

Four main effective factors that play role in emergence of knowledge management:

1- Transition from dominance age of material capitals to dominance of intellectual capitals;

2- Extraordinary increase in size of information, electronic storage and enhancement of access to information;

3- Change in age pyramid of population and risk of losing organizational knowledge due to retirement of personnel;

4- Becoming activities more specialized (Piri and Asefzadeh, 2006: 124).

From Watson's view, Human civilization possesses 4 steps: Age of agriculture, age of industry, age of information, and age of knowledge (Watson, 2004: 32).

Knowledge management contributes organizations to manage to employ theory knowledge more rational and promptly and to acquire more capital (Rita and Hamilton, 2006: 201).

Knowledge management is acquisition of proper knowledge for appropriate persons at proper time and in appropriate place so that they could use it optimally to achieve organizational goals (Soori, 2007: 135).

Knowledge management includes providing the knowledge, wisdom and experiences with inter-organizational added values so that to facilitate knowledge retrieval and use and secure it as organizational property (Mr. Perez, 1999: 75).

By means of systems outlook at macro level, performance audit examines organizational systems and procedures and it should contribute to the organization by creation of appropriate information that caused by evaluation of money value (Khan, 2005: 105).

In this study, we first identify the challenges against requirement for operational (performance) audit and also examine this issue that how operational audit can contribute to improve knowledge management in organizations.

Interpretation of necessity and importance of subject

With respect to benefits of operational audit and moving of the country toward economic development and

change and creation of competition for attraction of sources, requirement for operational audit is seemed as a necessity. Naturally, these barriers may serve as effective step in the path for their optimal execution. On the other hand, improvement in knowledge management may serve as solution for this purpose and along with requirement for operational audit it can play a collaborative role.

Goals of research

The present study is mainly intended to identify challenges against requirement for operational audit in Iranian Governmental Organizations and to play role by operational audit in improvement of knowledge management in organizations.

Study hypotheses and questions

Main question of research:

What deficiency exists against requirement for operational audit in Iranian public sector organizations and what is its impact on improvement of knowledge management?

Hypotheses

1- Lack of criterion and standard for operational audit is one of challenges against requirement for operational audit in Iranian public sector organizations.

2- Absence of adequate expert and efficient personnel is one of the challenges against requirement for operational audit in Iranian public sector organizations.

3- Lack of adequate managers' acquaintance from governmental organizations with advantages and profitability of operational audit is one of challenges against requirement for operational audit in Iranian public sector organizations.

4- Lack of employing accrual basis in public sector accounting is one of challenges against requirement for operational audit in Iranian public sector organizations.

5- Absence of appropriate budgeting system (operational budgeting) is one of challenges against requirement for operational audit in Iranian public sector organizations.

6- Conflict of priorities and value among law- makers and affairs executives is one of challenges against requirement for operational audit in Iranian public sector organizations.

7- Lack of public asking for response that is better to say absence of appropriate platform for public response-seeking is one of challenges against requirement for operational audit in Iranian public sector organizations.

8- Commitment of governmental managers to traditional and bureaucratic techniques is one of challenges against requirement for operational audit in Iranian public sector organizations.

9- Lack of necessity and tendency for public accountability is one of challenges against requirement for operational audit in Iranian public sector organizations.

10- Absence of intellectual and behavioral independence among operational auditors is one of challenges against requirement for operational audit in Iranian public sector organizations.

11- Outweighing of costs for execution of operational audit over its profits is one of challenges against requirement for operational audit in Iranian public sector organizations.

12- Lack of the strong and effective professional private circles in the field of operational audit is one of challenges against requirement for operational audit in Iranian public sector organizations.

Research domain

Thematic domain:

Recognition of challenge against requirement for operational audit in Iranian public sector organizations

Temporal domain:

Years 2010-11

Spatial domain:

Supreme Audit Court, Audit Organization, auditing institutions, professional associations, governmental organizations and bodies locating in Tehran and Alborz Provinces

Conceptual and operational definitions of variables

Operational audit is focused on three elements i.e. effectiveness, efficiency and cost- effectiveness. UK Exchequer interprets these three components as follows.

Effectiveness: Comparison among the given and real results from projects, plans and activities (smart spending)

Efficiency: The maximum output with input fixed rate or the output fixed rate with minimum input rate as possible (appropriate spending)

Cost- effectiveness: Minimization of final cost for the needed or consumed sources with respect to the necessary quality (spending with economic justification) (Nokhbeh Fallah, 2005: 24)

The Iranian governmental organizations in this study include all ministries, enterprises, bodies and organizations etc, which are controlled by the government and they provide their sources from public budget.

Knowledge management denotes a process that tries to develop organizational capabilities for acquisition of competitive achievements.

Methodology

Information collection techniques

To gather information, questionnaire is used in surveying method and in documentary technique, fiches and printed materials and copies have been employed; therefore, two methods of library surveying and field study are utilized to collect information and data in this investigation.

Library method

This method was adopted for data collection, revision of records and writing theory and theoretical literature of study where in addition to application of Persian books and resources, researcher has enjoyed the books and sources that published in scientific and specialized E-journals rather than benefitting from updated scientific experiences.

Field study method

Field study method was utilized for data collection and or in fact to take community's view regarding studied

variable after using library method and purposing the given theoretical model.

Sampling

Statistical population

Statistical population or community is a group of those units that are common in one or more characteristics. In this study, statistical population is divided into four groups:

Group I: Auditors from Iranian Audit Organizations

Group II: Auditors from Supreme Audit Court

Group III: Experts and academic professors

Group IV: Managers and experts from Governmental Organizations

Sampling Method

In this method, simple randomized sampling technique has been utilized. At this type of sampling, each member of this population has the same independent chance for participation in this sample. Independence means that selection of each member has no affect anyway in choosing other members from this population. In this technique, we initially prepare a list of all members' names and then allocate a score to them and by using tables of random numbers we select the needed quantity of them.

Determination of sample space

To demonstrate sample size of statistical population, Kukran Formula has been utilized as follows:

$$n = \frac{N.t^2.pq}{N.d^2+t^2.p.q}$$

T = 1/96 d = 0/05 p = 0/5 q = 0/5

P: Percent of participants who possess the studied attribute

q: percent of participants who lack the studied attribute

d: The rate of accuracy and amount of difference that are accepted concerning to community's parameter

t: Quoted from the table, t is obtained based on confidence percentage

N: Statistical sample space

In this study, quantity of statistical population from all groups is as follows:

N (*Audit Organization auditors group*) = 120

N (*Supreme Audit Court auditors group*) = 71

N (*Experts and academic professors group*) = 88

N (*Governmental Organizations managers and experts group*) = 107

Therefore, with respect to Kukran Formula, number of samples from the given group is obtained as following:

N (*Audit Organization auditors group*) = 90

N (*Supreme Audit Court auditors group*) = 60

N (*Experts and academic professors group*) = 72

N (*Governmental Organizations managers and experts group*) = 84

Reliability of questionnaire

Reliability is a measurement tool that mainly refers to accuracy of the resultant outcomes from that evaluation. In reliability confidence, stability of the resultant outcomes from measurement tool is discussed; in other words, if we evaluate measurement tool again with the same or similar device which is comparable with them under similar conditions, to what extent the resultant outcome may be similar, accurate and reliable. Confidence ability is called reliability in measurement.

Measurement of reliability

Since the values of Cronbach Alpha Coefficient are greater than 0.7 so this questionnaire is reliable and consistent.

Row	Challenge	Cronbach Alpha
1	Lack of operational audit criteria and standards	α = 0.86
2	Absence of expert (specialist) manpower	α = 0.75
3	Lack the adequate acquaintance of governmental organizations managers with advantages of operational audit	α = 0.82
4	Lack of application of accrual basis in public accounting	α = 0.91
5	Absence of appropriate budgeting system	α = 0.95
6	Conflict between priorities and values among law- makers & executives	α = 0.85
7	Lack of public response- seeking	α = 0.74
8	Governmental managers' commitment to traditional techniques	α = 0.85
9	Lack of necessity and tendency to public accountability	α = 0.93
10	Absence of intellectual and behavioral independences in operational auditors	α = 0.81
11	Lack of adequate rules and regulations in this field	α = 0.78
12	Absence of strong and effective private technical circles	α = 0.93

Measurement of validity

Row	Challenge	Bartlet's Test (KMO)
1	Lack of operational audit criteria and standards	0.83
2	Absence of expert (specialist) manpower	0.95
3	Lack the adequate acquaintance of governmental organizations managers with advantages of operational audit	0.76
4	Lack of application of accrual basis in public accounting	0.84
5	Absence of appropriate budgeting system	0.82
6	Conflict between priorities and values among law- makers & executives	0.91
7	Lack of public response- seeking	0.75
8	Governmental managers' commitment to traditional techniques	0.86
9	Lack of necessity and tendency to public accountability	0.90
10	Absence of intellectual and behavioral independences in operational auditors	0.73
11	Lack of adequate rules and regulations in this field	0.80
12	Absence of strong and effective private technical circles	0.91

In Bartlet's Test of Sphericity (KMO), like Cronbach Alpha Coefficient Test, it is interpreted that if its value is higher than 0.7 then the given variable is valid. Since according to Bartlett's Test (KMO), studied variables are greater than 0.7 so this questionnaire is valid.

To examine reliability for each dimension of knowledge management process, values of Cronbach Alpha Coefficient are calculated as follows:

Variable	Calculated Alpha
Knowledge acquisition	0.842
Knowledge record	0.705
Knowledge creation	0.812
Knowledge transfer	0.796
Knowledge application	0.748

In order to examine validity of questionnaire, Bartlett's Test (KMO) has been utilized in order to study each of dimensions knowledge management. The following data display results of each of knowledge management dimensions in Bartlett's Test.

Variable	Calculated Alpha
Knowledge acquisition	0.86
Knowledge record	0.73
Knowledge creation	0.81
Knowledge transfer	0.78
Knowledge application	0.84

Hypothesis I

First dimension has been interpreted in this study as follows:

Lack of criterion and standard for operational audit is one of challenges against requirement for operational audit in Iranian public sector organizations.

With respect to probability value or significance level that is (0.000) and since this value is lower than significance level (0.05) so Null Hypothesis is rejected at 95% level of confidence. In other words, "Lack of criterion and standard for operational audit is one of challenges against requirement for operational audit in Iranian public sector organizations." Similarly, in test of comparison among comments from four groups (Audit Organization auditors, Supreme Audit Court auditors, experts and academic professors, and auditors from Governmental Organizations), since significance level is (0.000) and this value is lower than significance level ($P<0.05$) so Null Hypothesis is rejected at 95% level of confidence. Namely, there is difference of opinion from four groups about importance of challenge where by means of Tokey Test we concluded that there is difference of opinion among group of Audit Organization and other groups. With respect to diagram of mean comments we came to the result that Audit Organization group **to some extent** but other groups **totally agree** in this opinion that "Lack of criterion and standard for operational audit is one of challenges

against requirement for operational audit in Iranian public sector organizations."

Hypothesis II

In the current research, second dimension has been stated as follows:

"*Absence of adequate expert and efficient personnel is one of the challenges against requirement for operational audit in Iranian public sector organizations*."

With respect to probability value or significance level that is (0.000) and since this value is lower than significance level (0.05) so Null Hypothesis is rejected at 95% level of confidence. In other words, "Absence of adequate expert and efficient personnel is one of the challenges against requirement for operational audit in Iranian public sector organizations." Similarly, in test of comparison among comments from four groups (Audit Organization auditors, Supreme Audit Court auditors, experts and academic professors, and auditors from Governmental Organizations), since significance level is (0.000) and this value is lower than significance level (P<0.05) so Null Hypothesis is rejected at 95% level of confidence. Namely, there is difference of opinion about importance of challenge where by means of Tokey Test we concluded that there is difference of opinion among group of Audit Organization and other groups. With respect to diagram of mean comments we came to the result that Audit Organization group **to some extent** but other groups **totally agree** in this opinion that "Absence of adequate expert and efficient personnel is one of the challenges against requirement for operational audit in Iranian public sector organizations."

Hypothesis III

In the present study, third dimension is expressed as following:

"*Lack of adequate managers' acquaintance from governmental organizations with advantages and profitability of operational audit is one of challenges against requirement for operational audit in Iranian public sector organizations*."

With respect to probability value or significance level that is (0.000) and since this value is lower than significance level (0.05) so Null Hypothesis is rejected at 95% level of confidence. In other words, "Lack of adequate managers' acquaintance from governmental organizations with advantages and profitability of operational audit is one of challenges against requirement for operational audit in Iranian public sector organizations." Similarly, in test of comparison among comments from four groups (Audit Organization auditors, Supreme Audit Court auditors, experts and academic professors, and auditors from Governmental Organizations), since significance level is 0.052 and it is close to (0.05) so it is possible to exist significant difference among two groups. Namely, there is difference in opinions among four groups concerning to importance of challenge. By means of Tokey Test we concluded that there is difference of opinion among two groups of managers and auditors of governmental organizations and experts and academic professors. With respect to diagram of mean comments we came to the result that Audit Organization group **to some extent** but other groups **totally agree** in this opinion that "Lack of adequate managers' acquaintance from governmental organizations with advantages and profitability of operational audit is one of challenges against requirement for operational audit in Iranian public sector organizations."

Hypothesis IV

In this study, fourth dimension is implied as follows:

"*Lack of employing accrual basis in public sector accounting is one of challenges against requirement for operational audit in Iranian public sector organizations*."

With respect to probability value or significance level that is (0.000) and since this value is lower than significance level (0.05) so Null Hypothesis is rejected at 95% level of confidence. In other words, "Lack of employing accrual basis in public sector accounting is one of challenges against requirement for operational audit in Iranian public sector organizations." Similarly, in test of comparison among comments from four groups (Audit Organization auditors, Supreme Audit Court auditors, experts and academic professors, and auditors from Governmental Organizations), since significance level is 0.015 and it is lesser than (0.05) so Null Hypothesis is rejected at 95% level of confidence. Namely, there is difference in opinions among four groups concerning to importance of challenge. By means of Tokey Test we concluded that there is difference of opinion among group of Audit Organization and experts and academic professors group. With respect to diagram of mean comments we came to the result that Audit Organization group **to some extent** but other groups **totally agree** in this opinion that "Lack of employing accrual basis in public sector accounting is one of challenges against requirement for operational audit in Iranian public sector organizations."

Hypothesis V

In the present research, fifth dimension has been mentioned as following:

"*Absence of appropriate budgeting system (operational budgeting) is one of challenges against requirement for operational audit in Iranian public sector organizations*."

With respect to probability rate or significance level that is (0.000) and since this value is lower than significance level 0.05 so Null Hypothesis is rejected at 95% level of confidence; namely, "Absence of appropriate budgeting system (operational budgeting) is one of challenges against requirement for operational audit in Iranian public sector organizations". At the same time in comparison test of opinions from four groups of (Audit Organization auditors, Supreme Audit Court auditors, experts and academic professors, and auditors from Governmental Organizations), since significance level is 0.015 and it is lesser than (0.05) so Null Hypothesis is rejected at 95% level of confidence. Namely, there is difference in opinions among four groups concerning to importance of challenge. By means of Tokey Test we concluded that there is difference of opinion among

group of Audit Organization and experts and academic professors group. With respect to diagram of mean comments we came to the result that Audit Organization group **to some extent** but other groups **totally agree** in this opinion that "Absence of appropriate budgeting system (operational budgeting) is one of challenges against requirement for operational audit in Iranian public sector organizations."

Hypothesis VI

Sixth dimension in this study is interpreted as follows:

"*Conflict of priorities and values among law- makers and affairs executives is one of challenges against requirement for operational audit in Iranian public sector organizations*."

Given that rate of probability or significance level is (0.000) and because of this fact that this quantity is lesser than significance level (0.05); thus Null Hypothesis is rejected at 95% level of confidence; in other words, "Conflict of priorities and values among law- makers and affairs executives is one of challenges against requirement for operational audit in Iranian public sector organizations." Similarly, in testing of comparison among the comments from four aforesaid groups (Audit Organization auditors, Supreme Audit Court auditors, experts and academic professors, and auditors from Governmental Organizations), since significance level is 0.137 and it is greater than (0.05) so Null Hypothesis is not rejected at 95% level of confidence. Namely, there is no significant difference among opinions of four groups regarding importance of challenge; therefore, according to the results came from Tokey Test, there is no significant difference among pair-wise comparisons of groups.

At the same time, with respect to diagram of mean comments, we concluded that Audit Organization group **to some extent** but other groups **totally agree** in that "Conflict of priorities and values among law- makers and affairs executives is one of challenges against requirement for operational audit in Iranian public sector organizations."

Hypothesis VII

In this research, seventh dimension is expressed as follows:

"*Lack of public asking for response that is better to say absence of appropriate platform for public response-seeking is one of challenges against requirement for operational audit in Iranian public sector organizations.*"

Considering this fact that rate of probability or significance level is (0.000) and since this value is lower than significance level (0.05); thus, Null Hypothesis is rejected at confidence level (95%); in other words, "Lack of public asking for response that is better to say absence of appropriate platform for public response-seeking is one of challenges against requirement for operational audit in Iranian public sector organizations." Similarly, in comparison test of comments from four groups (Audit Organization auditors, Supreme Audit Court auditors, experts and academic professors, and auditors from Governmental Organizations), since significance level is 0.012 and it is greater than (0.05) so Null Hypothesis is not rejected at 95% level of confidence. Namely, there is significant difference among opinions from four groups about importance of challenge. So by adoption of Tokey Test, we came to this result in that there is difference of opinion among group of Supreme Audit Court and experts and academic professors group. At the same time, with respect to diagram of opinion mean values, we concluded that group of Supreme Audit Court to some extent but other groups totally agree in that "Lack of public asking for response that is better to say absence of appropriate platform for public response- seeking is one of challenges against requirement for operational audit in Iranian public sector organizations."

Hypothesis VIII

Eighth dimension in this study is stated as follows:

"*Commitment of governmental managers to traditional and bureaucratic techniques is one of challenges against requirement for operational audit in Iranian public sector organizations*."

Regarding rate of probability or significance level that is (0.03) and because of this fact that this quantity is lower than significance level (0.05); thus Null Hypothesis is rejected at 95% level of confidence; in other words, "Commitment of governmental managers to traditional and bureaucratic techniques is one of challenges against requirement for operational audit in Iranian public sector organizations." Similarly, in testing of comparison among the comments from four aforesaid groups (Audit Organization auditors, Supreme Audit Court auditors, experts and academic professors, and auditors from Governmental Organizations), since significance level is 0.346 and it is greater than (0.05) so Null Hypothesis is not rejected at 95% level of confidence. Namely, there is no significant difference among opinions of four groups regarding importance of challenge; therefore, according to the results came from Tokey Test, there is no significant difference among pair-wise comparisons of groups.

At the same time, with respect to diagram of mean comments, we concluded that all groups averagely agree in this belief that "Commitment of governmental managers to traditional and bureaucratic techniques is one of challenges against requirement for operational audit in Iranian public sector organizations."

Hypothesis IX

Ninth dimension of the current study is mentioned as following:

"*Lack of necessity and tendency for public accountability is one of challenges against requirement for operational audit in Iranian public sector organizations.*"

With respect to rate of probability significance level that is (0.000) and because of this fact that this quantity is lesser than significance level (0.05); thus Null Hypothesis is rejected at 95% level of confidence; namely, "Lack of necessity and tendency for public accountability is one of challenges against requirement for operational audit in Iranian public sector organizations." Similarly, in testing of comparison among the comments from four aforesaid groups (Audit

Organization auditors, Supreme Audit Court auditors, experts and academic professors, and auditors from Governmental Organizations), since significance level is 0.536 and it is higher than (0.05) so Null Hypothesis is not rejected at 95% level of confidence. In other words, there is no significant difference among opinions of four groups regarding importance of challenge; therefore, according to the results came from Tokey Test, there is no significant difference in pair-wise comparisons among groups.

At the same time, with respect to diagram of mean comments, we concluded that all groups averagely agree in this belief that "Lack of necessity and tendency for public accountability is one of challenges against requirement for operational audit in Iranian public sector organizations."

Hypothesis X

In the present research, tenth dimension has been interpreted as follows:

"*Absence of intellectual and behavioral independence among operational auditors is one of challenges against requirement for operational audit in Iranian public sector organizations*."

Given that probability value or significance level is (0.000) and since this value is lower than significance level 0.05 so Null Hypothesis is rejected at 95% level of confidence; namely, "Absence of intellectual and behavioral independence among operational auditors is one of challenges against requirement for operational audit in Iranian public sector organizations." At the same time in comparison test of opinions from four groups of (Audit Organization auditors, Supreme Audit Court auditors, experts and academic professors, and auditors from Governmental Organizations), since significance level is 0.000 and it is lesser than (0.05) so Null Hypothesis is rejected at 95% level of confidence. Namely, there is difference in opinions among four groups concerning to importance of challenge. By means of Tokey Test we concluded that there is difference of opinion among group of managers and auditors of Governmental Organization from two groups of auditors in Auditing Organization and Supreme Audit Court. At the same time, by considering diagram of comment mean values we came to this result that in average, auditors of Audit Organization opposed to and other groups relatively agree in this opinion that "Absence of intellectual and behavioral independence among operational auditors is one of challenges against requirement for operational audit in Iranian public sector organizations."

Hypothesis XI

In this study, eleventh dimension is illustrated as follows:

"*Absence of adequate rules and regulations in this field inside country is one of the challenges against requirement for operational audit in Iranian public sector organizations*."

Given that probability value or significance level is (0.017) and since this quantity is lesser than significance level (0.05); therefore, Null Hypothesis is rejected at confidence level (95%); namely, "Absence of adequate rules and regulations in this field inside country is one of the challenges against requirement for operational audit in Iranian public sector organizations." At the same time, in comparison test of opinions from four groups of (Audit Organization auditors, Supreme Audit Court auditors, experts and academic professors, and auditors from Governmental Organizations), since significance level is 0.000 and it is lesser than (0.05) so Null Hypothesis is rejected at 95% level of confidence. In other words, there is difference of opinion from four groups about importance of challenge. By means of Tokey Test, we concluded that such difference of opinion exists among group of managers and auditors in Governmental Organizations and two groups of auditors from Iranian Audit Organizations and Supreme Audit Court. Similarly, with respect to diagram of opinion mean values, we came to this result that all groups have agreed averagely in this belief; namely, "Absence of adequate rules and regulations in this field inside country is one of the challenges against requirement for operational audit in Iranian public sector organizations."

Hypothesis XII

Twelfth dimension of the current study has been described in the following:

"*Lack of the strong and effective professional private circles in the field of operational audit is one of challenges against requirement for operational audit in Iranian public sector organizations*."

Considering this fact that probability rate or significance level is (0.017) and since this value is lower than significance level (0.05); thus, Null Hypothesis is rejected at confidence level (95%); namely, "Lack of the strong and effective professional private circles in the field of operational audit is one of challenges against requirement for operational audit in Iranian public sector organizations." Similarly, in comparison test of opinions from four groups of (Audit Organization auditors, Supreme Audit Court auditors, experts and academic professors, and auditors from Governmental Organizations), since significance level is 0.002 and it is lesser than (0.05) so Null Hypothesis is rejected at 95% level of confidence. In other words, there is difference of opinion from four groups regarding to importance of challenge so that by means of Tokey Test we concluded that such significant difference of opinion exists among group of experts and academic professors and two groups of auditors from Audit Organization and managers and auditors of Governmental Organizations and at the same time between two groups of managers and auditors of Governmental Organizations and auditors from Iranian Audit Organization. Moreover, by considering diagram of opinion mean values, we came to this result that all groups averagely agree in the belief that "Lack of the strong and effective professional private circles in the field of operational audit is one of challenges against requirement for operational audit in Iranian public sector organizations."

Conclusion of discussion in order- preference of challenges importance based on comments from four groups

- From auditors' viewpoint in Supreme Audit Court, absence of intellectual and behavioral independence of operational auditors is the least important challenge while lack of an appropriate budgeting system is the foremost challenge in this field.
- According to opinion of experts and academic professor, absence of intellectual and behavioral independence of operational auditors is the least important challenge while lack of the appropriate expert manpower is the most important challenge.
- Based on managers and auditors' comment in Governmental Organizations, lack of application of accrual basis in public operational accounting is the least important challenge whilst absence of adequate rules and regulations is the foremost challenge in this area.
- According to viewpoint from auditors in Iranian Audit Organization, lack of intellectual and behavioral independence of operational auditors is the least important challenge while commitment of public sector managers to traditional techniques is the paramount challenge.

General conclusion and suggestions

Hypothesis I				
Lack of criterion and standard for operational audit is one of challenges against requirement for operational audit in Iranian public sector organizations.				
Groups	Auditors of Audit Organization	Auditors of Supreme Audit Court	Experts and Academic Professors	Managers and Experts from Governmental Organizations
Acceptance/ Rejection by group	√	√	√	√
Researcher's Suggestion	Any addressing measure should be taken according to standard and criterion. Lack of criterion will be deemed as inefficiency in addressing the problem and the responsible organizations should take step in the course of formulation of appropriate criteria. Without the presence of appropriate standards and criteria, requirement for doing any task will be null and void.			
Hypothesis II				
Absence of adequate expert and efficient personnel is one of the challenges against requirement for operational audit in Iranian public sector organizations.				
Groups	Auditors of Audit Organization	Auditors of Supreme Audit Court	Experts and Academic Professors	Managers and Experts from Governmental Organizations
Acceptance/ Rejection by group	√	√	√	√
Researcher's Suggestion	Operational auditing team should include technical and professional personnel, who enjoy the adequate expertise and experience in this field so that to be able to conduct auditing efficiently and it is an onus on training and professional institutions to train such manpower.			
Hypothesis III				
Lack of adequate managers' acquaintance from governmental organizations with advantages and profitability of operational audit is one of challenges against requirement for operational audit in Iranian public sector organizations.				
Groups	Auditors of Audit Organization	Auditors of Supreme Audit Court	Experts and Academic Professors	Managers and Experts from Governmental Organizations
Acceptance/ Rejection by group	√	√	√	√
Researcher's Suggestion	Managers should be informed about advantages and benefit of operational auditing so that they do not oppose against auditing so this is not practical regardless of their partnership.			
Hypothesis IV				
Lack of employing accrual basis in public sector accounting is one of challenges against requirement for operational audit in Iranian public sector organizations.				

Groups	Auditors of Audit Organization	Auditors of Supreme Audit Court	Experts and Academic Professors	Managers and Experts from Governmental Organizations
Acceptance/ Rejection by group	√	√	√	√
Researcher's Suggestion	Application of cash accounting basis means identifying income and cost with respect to cash deposit and withdrawal, employing this basis in public accounting may be challenging since this causes lowering quality of financial statements; it seems it is high time for State Accounting System to move toward accrual basis.			
Hypothesis V				
Absence of appropriate budgeting system (operational budgeting) is one of challenges against requirement for operational audit in Iranian public sector organizations.				
Groups	Auditors of Audit Organization	Auditors of Supreme Audit Court	Experts and Academic Professors	Managers and Experts from Governmental Organizations
Acceptance/ Rejection by group	√	√	√	√
Researcher's Suggestion	Traditional budgeting system id an inefficient budgeting. Lack of an appropriate budgeting system is one of the challenges against requirement for operational auditing but this does not mean that operational auditing could not be implemented without an operational budgeting system.			
Hypothesis VI				
Conflict of priorities and values among law- makers and affairs executives is one of challenges against requirement for operational audit in Iranian public sector organizations.				
Groups	Auditors of Audit Organization	Auditors of Supreme Audit Court	Experts and Academic Professors	Managers and Experts from Governmental Organizations
Acceptance/ Rejection by group	√	√	√	√
Researcher's Suggestion	Since in public sector, managers follow the policies which have been predetermined by another group called law- makers so this may cause lack of ability for employing financial management knowledge and the related issues in managerial decisions and optimal use of obtained resources and opportunities and it should be tried to reduce such conflict as possible.			
Hypothesis VII				
Lack of public asking for response that is better to say absence of appropriate platform for public response- seeking is one of challenges against requirement for operational audit in Iranian public sector organizations.				
Groups	Auditors of Audit Organization	Auditors of Supreme Audit Court	Experts and Academic Professors	Managers and Experts from Governmental Organizations
Acceptance/ Rejection by group	√	√	√	√
Researcher's Suggestion	Lack of people's acquaintance of community with their own rights and this point that they have every right to know and ask; this task requires making culture for this purpose and cultural measures need to training and consuming time and such culture- making should be implemented by the responsible institutions.			
Hypothesis VIII				
Commitment of governmental managers to traditional and bureaucratic techniques is one of challenges against requirement for operational audit in Iranian public sector organizations.				
Groups	Auditors of Audit Organization	Auditors of Supreme Audit Court	Experts and Academic Professors	Managers and Experts from Governmental

				Organizations
Acceptance/ Rejection by group	√	√	√	√
Researcher's Suggestion	Long run, boring and often redundant and worthless bureaucracy and managers' desire for such thought and adoption of technique to tackle with problems and decision- makings may create challenge in the field of operational auditing.			
Hypothesis IX				
Lack of necessity and tendency for public accountability is one of challenges against requirement for operational audit in Iranian public sector organizations.				
Groups	Auditors of Audit Organization	Auditors of Supreme Audit Court	Experts and Academic Professors	Managers and Experts from Governmental Organizations
Acceptance/ Rejection by group	√	√	√	√
Researcher's Suggestion	There are some of activity fields within government for which the given managers should be accountable to public in many institutions about their activity limit due to security and intelligence reasons and this a task for public top managers to create such a climate. Preparation of ground for public responsiveness in the future and within framework of operational auditing is a necessity.			
Hypothesis X				
Absence of intellectual and behavioral independence among operational auditors is one of challenges against requirement for operational audit in Iranian public sector organizations.				
Groups	Auditors of Audit Organization	Auditors of Supreme Audit Court	Experts and Academic Professors	Managers and Experts from Governmental Organizations
Acceptance/ Rejection by group	√	√	√	√
Researcher's Suggestion	One is permitted to give comment about others and revise their works that is independent from them. Any intellectual and behavioral dependence of controller may affect type and quality of his/ her comment.			
Hypothesis XI				
Absence of adequate rules and regulations in this field inside country is one of the challenges against requirement for operational audit in Iranian public sector organizations.				
Groups	Auditors of Audit Organization	Auditors of Supreme Audit Court	Experts and Academic Professors	Managers and Experts from Governmental Organizations
Acceptance/ Rejection by group	√	√	√	√
Researcher's Suggestion	Establishment of expert professional workgroups in order to take measures after conducting studies on preparation and development of legal platforms and approval of regulations.			
Hypothesis XII				
Lack of the strong and effective professional private circles in the field of operational audit is one of challenges against requirement for operational audit in Iranian public sector organizations.				
Groups	Auditors of Audit Organization	Auditors of Supreme Audit Court	Experts and Academic Professors	Managers and Experts from Governmental Organizations
Acceptance/ Rejection by group	√	√	√	√
Researcher's Suggestion	In private sector, a strong professional circle may possess numerous advantages, ranging from training to standardization and from rising quality to ability in optimization of wages etc. Creation of a professional circle may always be helpful.			

The effect of requirement for any hypothesis on knowledge management dimensions in terms of dimension of organizational knowledge optimization

Row	Knowledge Acquisition	Knowledge Record	Knowledge Transfer	Knowledge Creation	Knowledge Application
1	√	√	√	√	√
2	√	√	√	√	√
3	√	√	√	√	√
4	√	√	√	×	√
5	×	√	√	×	√
6	√	√	√	√	√
7	√	√	√	√	√
8	√	√	√	√	√
9	√	√	√	√	√
10	√	√	√	×	√
11	×	×	×	×	×
12	√	√	√	√	√

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Reviewing of effective factors on current account imbalance: a case study on Iran

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Abstract: This paper examinesfactors that by means of household consumption expenditure effect on current account position, for 1980-2010 in Iran. We foundthat among different factors, transition factors and income distribution indicators were significant, the increase of age dependency ratio, young and improvement of income distribution increased household consumption and had negative effect on current account.
[Zahra Fotourehchi and Davoud Panahi. **Reviewing of effective factors on current account imbalance: a case study on Iran .** *Life Sci J* 2012;9(4):4684-4694] (ISSN:1097-8135). http://www.lifesciencesite.com. 705
Keywords: current account, consumption, age dependency, income distribution

I.Introduction

Explaining the change in the current accountin Iran shown in Fig.1, requires considering a range of other variables. Many of these variables are part of the Iran economy's external sector: the trade account, international financial flows, and the exchange rate. Movements in the current account surplus are due primarily to movements in the trade surplus (box). The current account surplus finance net capital outflows,finally, the exchange rate is related to the current account because international transactions (including trade in goods, services, and financial assets) generally require exchanging Rial for foreign currencies. In other side, behaviors of consumption, investment and government expenditure of internal sector of country, effect on current account.

Although much research has been conducted to detect current account pattern of several developing and advanced countries, there has been no previous research in Iran, After recognizing the lack of research in this area for Iran, among the many different forces that affected the behavior of theIran's external sector from 1980 to 2010, reviewing factors by consumption effect on current account has beendetermined as the main objective of this study.

First, we start by reviewing current account patterns and polices ofIran during last 30 years,thereafter, in literature we introduce classic and modern frameworks of current account, we then conduct anempirical analysis, and finally conclude withan assessment of future trends.

II.Current Account Patterns of Iran

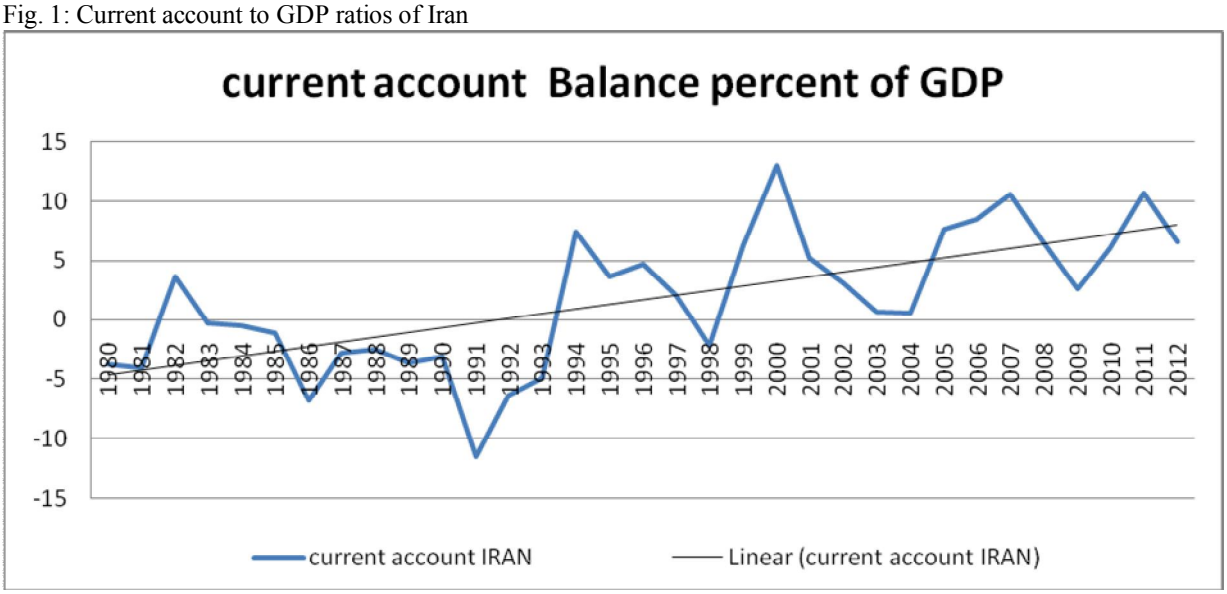
We start by reviewing current account patterns of Iran, andreviewing its political and external behaviors,from new inspection of data,Iran republic revolution had caused oil crisis in 1979 and repressed on oil priceand effectedon Iran's current account. except current account surplus in 1983(%3.6 of GDP, due to increase of oil price),Iran –Iraqwar between 1980-1987 years and negative consequences of warhad caused current account deficit until 1993(Fig.1).

Except1998,Iran had significant current account surplus that had increased persistently from 1994 to 2000(12% of GDP, peak of increment).This was due to its oil incomes, on other hand, with reviewing current account could be observed that during this period, oil and gas export was more than non –oil export and export exceeded to import, Athough with rising of oil incomes, import of capital and intermediate goods increased but their share were low.

Oil crisis in 2000and persistent increase of oil price was important reason ofIran'scurrent account surplus.(Between 2000-2004 years).Iran's current account movedtowards a balanced position during the 2004, current account surplushad anincreasing trend,between 2004-2008 years, and adecreasing trend, between 2008-2009 years(financial crisis led to global recession and had negative effect on oil demand).Oil price increased in 2011 and current account surplus reached to amount 2007 years,(1o% GDP).With respect toIran's autarky and oil dependent economy,we observe that determinant factors of Iran's current account position are more

politicalfactors (war, political agreement, Iranian nuclear plan in 2006, oil price,and economical and political embargoes) than economical factors.

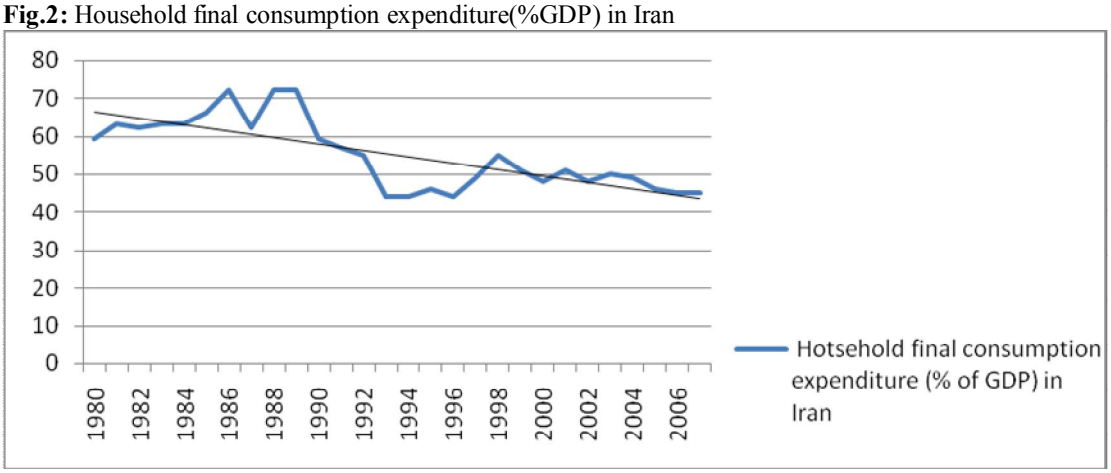
Fig. 1: Current account to GDP ratios of Iran



Source: International Monetary Found

In addition to factors is mentioned in above (political and external behaviors), internal behaviors, for example consumption behaviors of household, firms and government effect on current account position, main goal in this study is evaluation of factors by household consumption effect on current account, this factors are GDP growth, population growth, age dependency ratio-young, age dependency ratio-old,real interest rate,income distribution (by means of Gini,Theil indexes), and etc. In reviewing ofconsumption pattern during last 30 years, we show that consumption is consistently decreasing, so, widely accepted economic theory, current account surplus is expected(Fig. 2).This is one of reasons among different reasons for current account surplus.

Fig.2: Household final consumption expenditure(%GDP) in Iran



Source: World Bank

III.Literature review of Model and Estimation Techniques

The classic elasticities framework

The classic workhorse model for current account is estimating trade elasticities have been used since at

least the 1940s, Adler (1945, 1946) and Chang (1945, 1946). It relates the volume of exports or imports to real foreign and domestic income and relative prices (in log form):

$$\ln trade = \alpha + \beta \ln income + \beta \ln rel.price$$

The model assumes that domestic and foreign tradable goods are imperfect substitutes, that price homogeneity holds (e.g., that an estimated coefficient on the trade price and domestic price are equal, thus allowing for a single relative price term) and that the elasticities with respect to economic activity (e.g.,income) and relative prices are constant over time (seeHooper, Johnson, and Marquez 2000 for a concise summary of the model). The trade balance that is one of elementof current accountresponds positively to foreign income, negatively to domestic income, and negatively to the ratio of domestic to foreign prices.

This framework long has been a workhorse for policymakers and short-term forecasters Krugman (1989). However, the elasticities approach is not helpful in answering the question of what causes current account imbalances over a sustained period of time. The estimated income elasticities are not constant over time or across countries.(Chinnand Prasad (2003), Gruber and Kamin (2007, 2009), Chinn and Ito (2008), and Cheung, Furceri, and Rusticelli (2010).) Important factors such as natural resources, productivity growth,demographic changes, and barriers to trade are not included in the elasticities framework.

A modernframework

With respect to restriction of classic elasticities framework that was mentioned above, a series of recent studies has examined the medium and long-term relationship between the current account balance and its potential determinants, that emerge from the underlying theories, Chinn and Prasad (2003); Gruber and Kamin (2007); Ca'Zorzi et al. (2009) ; Decrassinand Stavrev (2009) ; Cheung, Furceri, and Rusticelli (2010) ; Jaumotte and Sodsriwiboon (2010) ;Aizenman and Sengupta(2011) and Gagnon(2012).

These studies provide fairly robust and consistent estimates (Table 1) of the role played by:

-Country's net foreign asset position (NFA), government budget balance, demographic factors (old and young dependency ratios), domestic credit to GDP ratio (to proxy for domestic financial depth) (Prasad et al., 2006 and Chinn and Prasad, 2003) and world and domestic GDP growth rates, net oil export, official Flow, PPP Per capita and etc. that all of variables expressed as a ratio to GDP.

Table 1: Summary of selected studies of current account balance determinants

Studies	**Countries and Sample**	**Variable**
Chinn &Prased (2003)	89 advanced & developing(1971-1995)	GDP per capita(+), net foreign assets(+), Fiscal balance(+)
Ca Zorzi & et al (2009)	63 advanced & developing(1980-2006)	Age dependency(-), GDP per capita (+), net foreign assets (+) , Oil price(+), Trade openness(+), Financial deepening(-), institutional quality (+)
Gruber &Kaminn(2007)	59 advanced & developing(1982-2003)	Age dependency(-) , Oil price(+), GDP percapita(+), GDP growth rate(-) , Trade openness(+), Institutional quality(+),Fiscal balance(+), Institutional quality (-)
Desressin&Stavrev (2009)	11 eruo (1970-2007)	Age dependency(-), Population growth(-), Oil price (+),GDP per capita(+), GDP growth rate (+), netforeign assets (+), Fiscal balance(+)
Cheung&et al (2010)	30OECD (1194-2008)	Age dependency(-), Oil price(+), GDP percapital (+), net foreign assets(+)
Jaumotte&Sodsriwiboon (2010)	49 advanced & developing(1973-2008)	Age dependency(-), Population growth (-),oilprice (+), GDP per capita(+) ,net foreignAssets(+), Fiscal balance(+), financial deepening (-), EMU membership(-/+)
Koske (2010)	97 advanced &developing (1994-2008)	Age dependency(-), Population growth(-), Structural Rigidity(-)
Aizenman & Sengupta(2011)	Chinn& Germany(1970-2009)	Age dependency(-) , GDP growth rate(-) , netforeign asset (+), Fiscal balance(-) ,Trade openness (-/+), Domestic credit*/GDP(-)*
Gagnon (2012)	G-20 (1984-2008)	GDP growth rate(-),net foreign assets(+), Fiscal balance(+), PPP per capita(+), Officialflow(+), Age dependency(-)

Note :(+/-) are effects of variable on current account.

In this research, we use variables that by means of consumption effect on current account, independent variables defined as:

- Demographic factors (old and young dependency ratios). To recall, the life-cycle theory of consumption and saving Modigliani and Brumberg (1954) and Ando and Modigliani (1963) implies that young households borrow, middle-age households save for retirement, and households in retirement dissave.Therefore relatively young and relatively old countries are more likely to consume and to run current account
- Income distributionis discussed in the context the theory of effective demand. deficits (see Obstfeld and Rogoff (1996, Chapter 3)). These effects may be captured empirically by controlling for youth dependency ratio (the ratio of the population ages 0–14 to the working age population, ages 15–64),and old-age dependency ratio (the ratio of the population 65 and older to the working age population).
- Population growth, led to increase consumption expenditure therefore lower current account balance in samples high population growth country is expected.

Keynes made little more than passing comment on the subject in Chapter 8 (‘The

Propensity to Consume: I') of the General Theory: If fiscal policy is used as a deliberate instrument for the more equal distribution of incomes, its effect in increasing the propensity to consume is, of course, all the greater' (Keynes, 1936, p. 95). Seminal contributions by Friedman (1957) and Modigliani (1966), which provide modern consumption theory, attribute no importance to income distribution. Income distribution does play a role in theories of consumption authored by economists affiliated the Cambridge or Post Keynesian School.[a] Pressman (1997) notes that the dependence of aggregate consumption on the functional distribution of income is the distinctive feature of the Cambridge approach for example Kalecki divided total income between income of workers (W) andprofit or income of capitalists (∏). Let α1 denote the propensity to consume outof wage income and α 2 the propensity to consume out of profits. Thus,aggregateconsumption expenditure (C) is given by:C= α 1W+ α 2∏,If α 1 is greater than α 2, then a change in functional shares in favor of laborincome will boost consumption, So that, for countries with equality income distribution,increment of consumption andlow current account is expected.

- Faster GDP growth may be associated with higher income levels in the future relative to the present and therefore higher consumption out of current income. Also higher growth rates resulting from productivity gains would also coincide with a return on capital, leading to increased investment. For both reasons, higher GDP growth reduces the current account balance, although this result is not very robust across studies.

- Higher long term real interest rates make current consumption more expensive compared with future consumption and therefore decreases consumption. It also increases opportunity cost of investments. For both reasons it is expected to lead to the improved current account balance.

However, quoted studies do not identify statistically significant link.

In generally, if a country increases its demand for imports due to increase of consumption, basic economic theory predicts that the country's current account deficit should widen and its currency depreciates. Holding all else constant(Mishkin, 2001).As a country's demand for imports rises, its trade deficit should worsen, causing its current account deficit to grow larger. On the financial side of the economy, the increased expenditures on foreign goods increase the demand for foreign currencies, putting upward pressure on the value of foreign currencies relative to the value of the domestic currency. Consequently, the country's exchange rate should fall.

In this research due to lack of data for calculatingof real interest rate during 1980-2010, we disregard this variable. We apply earlier literature to estimate of model that is defined by: $CA_{i,t}/GDP_{i,t}=\alpha+\beta_{i,t}X_{i,t}+\epsilon_{i,t}$ where CA is the current account balance(deficit/surplus), GDP is nominal GDP, α is a constant, β a vector of coefficients on theexogenous variables X, ε is an error term, and i and t are respectively the country and time.

Table 2 presents regression results for the model, during last 30 years.Most data are obtained from the IMF International Financial Statistics and World Bank World Development Indicators databases and Central Bank and Statistic Center of Iran (Gini and Thiel).

We conduct unit root and stationary test on all the series first on their level and then on their firstdifferences. Overwhelmingly, all the testing proceduressuggest presenceof unit root in level I(1) for all the variables,for preventing of spurious regression, by use of Engle-granger(1987) co integration test, remaining of equations estimation examine, the result obtained from them show that liner combination of variables are stationary and there arelong-run equilibrium relationship among the variables.

[a]The leading contributor is Kalecki (1943, 1954), but the group also includes Robinson (1954) and Kaldor (1960). See Pressman (1997) for a detailed discussion. Also see Trigg (1994).

Table 2:resulting of Augmented Dickey-Fuller (ADF), and Phillips-Perron (PP)

Variable	**ADF Critical value(5%)**	**prob**	**PP Critical value(5%)**	**prob**
current accunt	-2.55	0.11	-2.51	0.12
GDP growth	-2.57	0.12	-5.25	0.02
Gini	-3.08	0.06	-3.06	0.08
Theil	-1.65	o.44	-1.71	0.41
population growth	-1.31	0.60	-1.16	0.67
Agedependency ratio, young	-1.74	0.39	0.63	0.98
Age dependency ratio,old	-2.90	0.07	-1.74	0.39
ε	4.04	0.004	4.66	0.0008

After estimate equation by Ordinary Least Squares method, wedid not observe heteroskedasticity and correlation in the errors through (Breusch-Pagan-Godfrey and White test, for heteroskedasticity test, Breusch-Godfrey Serial Correlation LM test, Luing-Box test, for autocorrelation)[2]results are as follow:

Table 2: Results of current account model,1980-2010

variable	Income distribution variable is Gini	Income distribution variable is Theil
GDP growth	0.03 (o.25)	-0.03 (0.30)
Gini	**-0.67*** **(2.56)**	**-**
Theil	**-**	**-0.82*** **(2.68)**
population growth	2.99 (0.98)	0.24 (0.08)
Age dependency ratio, young	**-0.13**** **(2.99)**	**-0.28**** **(4.98)**
Age dependency ratio, old	-2.41 (0.57)	-1.44 (0.86)
R-squared	0.58	0.69
Adjusted R-squared	0.49	0.58
F	6.26	8.54
D-W	1.46	1.38

[2]These results are not reported here to conserve space but are made available upon request

The table shows time-series estimation results from ordinary least squares regression over the period from 1980 to 2010. Robust standard errors are in parentheses. **, and * denote significance at the,5%, and 10% levels, respectively

IV.Conclusion

This paper documents statistically robust and economically important effects of exogenous variables on current account balances of Iran, during 1980-2010, among different factors effect on current account, we selected internal factors that by household consumption effect on current account, we observed that among these factors,at 5% and 10%confidence level, transition factors and income distribution indexes were significant respectively. When index of income distribution wasGini, the Iran's current account tended to decrease by about 13 percent (or more) of any increase in, age dependency ratio young and 0.87 percent of any increase in Gini,also when we applied Theil index as incomedistribution indicator, current account tended to decrease by about 0.28 percent of any increase age dependency ratio young and 0.82percentof any increase in Theil. Overall, the regression model provided relatively a good explanation of the data, as implied by relatively good R2,and F statistic showed significance of total model.

Generally, according to theory,we expect relatively young and relatively old countries havemore tendency to consume and to run current account deficits, in Iran proportion of age dependency ratio, young relative to age dependency old is high (Fig.3), therefore the increase of age dependency ratio young, led to increment of household consumption and decrease current account surplus.

Also we show negative effects of income distribution on current account surplus, in recent years by applying of subsides targeted program (elimination of indirect subside and paying of direct subside to consumer by government) improved income distribution(Fig. 4) and relatively decreased rich and poor group gap, according to theory improvement of income distribution led to theincrement of consumption and decrease current account surplus, in other side, paying of direct subside to consumer have inflationary effects and decrease national money value and deteriorate of current account position.

In Iran, based on IMF and World Bank data, we expect that current account move toward thedecrease of surplus, but this moving is not due to the increment of GDP growth and investment, but the increase of household consumption (theincrease of dependency of ratio (young) and improvement of income distribution), and government expenditure are important internal factors of surplus decrease, also mismanagement of fiscal and monetary or external polices and the increase of embargoes and the decrease oil incomes and foreign currency reserves (foreign currency appreciation) is caused by political and external factors will have negative effect on current account.

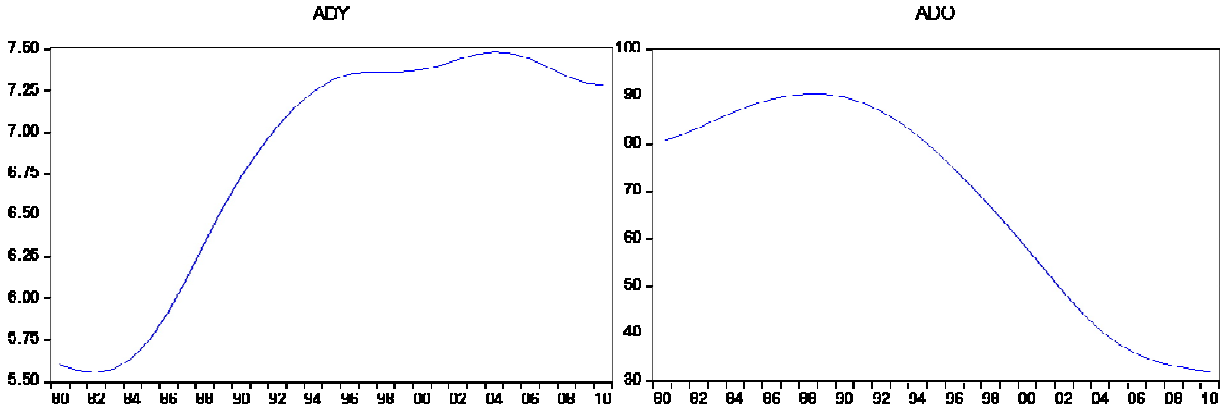
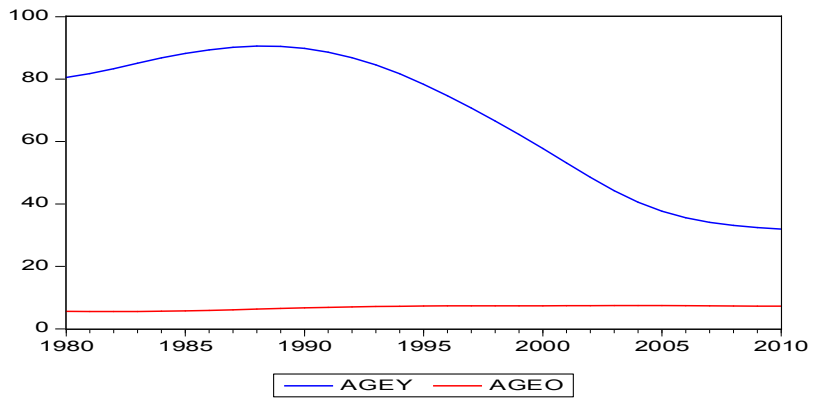
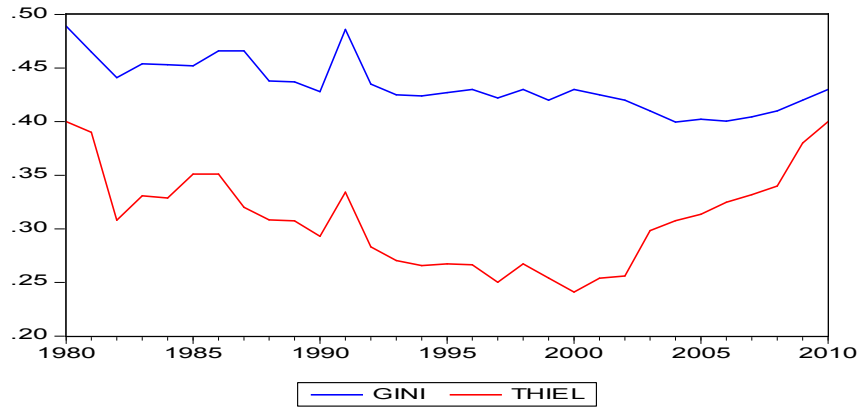


Fig. 3: Age dependency ratio, young and old



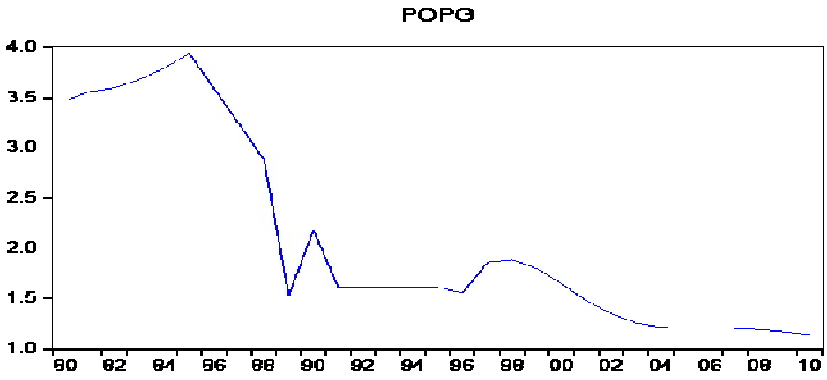
Source: world Bank

Fig. 4: Gini and Theil index



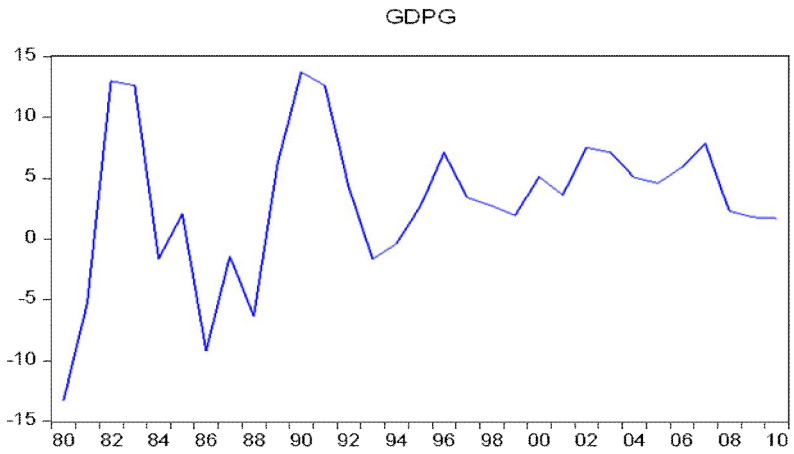
Source: Central Bank and Statistic Center of Iran

Fig. 5: Population Growth



Source: world Bank

Fig. 6: GDP Growth



Source: world Bank

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The importance of knowledge management technologies in performance improvement of organizations

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Abstract: Human systems in every level from its existence to human societies have found knowledge based approach more than before as the basic of sustainable competitive advantage. Based on this belief the precursor organizations give more importance for attracting or training knowledge or learning personnel. Knowledge management has been able to show its effect on appearing and training scholars by its suitable establishment. In present paper, knowledge management technologies by emphasis on its hardware have been discussed. Of course, technology in every area of science, subjects and knowledge of management in organization can be discussed in its four sections, techno ware, human ware, info ware, orgaware.Various tools of knowledge management technology have been able to cause its suitable establishment and continuity with easier better, faster form by mediator and facilitator role. Strengthening of creativity and innovation of personnel in making these tools and application of effective strategies in their power increasing and motivating in optimized using of knowledge management technologies can be one of the most essential and vital duties of leaders and managers of organizations who have not had methodological and objective actions.

[Shahram Mirzaei Daryani, Yadollah Khodaverdi, Eshagh Rasouli, Bahman Shareghi. **The importance of knowledge management technologies in performance improvement of organizations .** *Life Sci J* 2012;9(4):4695-4699] (ISSN:1097-8135). http://www.lifesciencesite.com. 706

Keywords: knowledge management, technology, knowledge management technologies, success and dynamics of organization.

Introduction

By studying and analyzing knowledge and importance of its features in organization performance we can find that having update knowledge and information has been changed in to undeniable necessity for life continuity of organizations. Today, knowledge is considered as a strategic resource and wealth and presenting product, with suitable and economical quality, is difficult and impossible without correct and suitable management and application of this valuable resource. Ultra industry society is information society in which, power increase technologies are replaced with knowledge increase technologies are replaced with knowledge increase technologies [Ahmad poor daryani, (2002)]. Critical and study resources, and competitive perspectives of organization, indicate the effects of this view point in strategic fields of social organizations, especially commercial organizations. Today in knowledge management it is emphasized that the people must have the ability to think and analyze the problems, they must be leaded to think about duties and improvement more than handy activities, the personnel should have thinking freedom to comment on their works:

Evolutional and transitional process of knowledge management

In 1979, A Swedish accountant, Carl Eric Siobi understood that the value of physical wealth can be considered as two forms, physical and intellectual wealth by thinking about calculation of organization values. According to his idea, the real value of organization depends on personnel's merit and what the all personnel form as a collaborative thought. Siobi at al, introduced this finding as intellectual wealth and intangible wealth. The number of literatures, seminars, etc in this field developed and the subject has discussed by management scientists and managers of organizations [Afrazeh, (2005)].

Skandia financial Service, a precursor Swedish company in financial services thought to quantify intellectual wealth and show its importance in quality and calculation aspects [Roding. Allen, (2004)].

By this way, the importance of knowledge as an intangible and spiritual wealth developed fast. Stewart believes that the intellectual power has not been very important in the past, but in present condition, companies rely on knowledge, invention registration, processes, management skills, technologies, and their own experiences. Wriston expresses that the position of

new economy and technology is not the same as micro processor and world communication network but it is in his/ her mind and knowledge [Wriston,. (1992)]. Rading, of main knowledge management consultant defines knowledge as two types: knowledge which according to information gets content.
Researchers who believe in this definition are grouped in object- knowledge group and consider the knowledge information based which produced through information management. The other group defines knowledge as contextualization process which is grouped in knowledge – process group.
This group considers the knowledge as an entity.
Based on the increasing importance of knowledge, the early papers and books about knowledge management published in 1991 and 1993.
The first conference of knowledge management was held in 1994 [Afrazeh, (2005)]. About growth and development of knowledge specialists defined knowledge and its position. In spite of various definition of knowledge, specialists defined knowledge and its position. In spite of various definition of knowledge, thinkers believe that there is a close relationship between data, information, and knowledge. Sharp believes that data are simple realities which are changed into information by processing and when these structures are places in specific field to be used are changed in to knowledge.
Dovenport and Prusak have defined knowledge as a combination of experience, values, existent information and systematic approach which provide a framework for evaluation of experiences, values, and new information [Davenport etal ,.(1998)]. Doutta (2001) has discussed knowledge in 3 levels of individual, group and organizational levels [Doutta, (2001)].
Polanyi has divided knowledge in two implicit and explicit groups [Polanyi,. (1997)]. Malborta (1997) has discussed knowledge as two forms of centralized, and generative [Malbotra,. (1997)]. In conceptualization of knowledge and determination of its position in organization, it was the time for discussing structure, planning, evaluation and continuous improvement in the organization. This phenomenon has been proposed as knowledge management in new designs and theories in recent two decades.
Haws expresses that the content of knowledge management has been formed of researches related to organizational learning approach includes facilitating creating and dividing knowledge, together with providing suitable work environments and effective rewarding system [Haws,. (2001)]. Gansy believes that knowledge management can be known as a dynamic cycle process including recognition, obtaining, ordering, combining, dividing, developing, applying, keeping, and evaluating knowledge [Gansy,. (2004)]. Ovol indicates that knowledge management determines principle policies for finding, understanding, using value and creating it [Adlesberger, ,etal. (2002)]. By reviewing and studying above definitions, we can consider a definition of knowledge management which concentrate on human, structure and technology.
Knowledge management is a process of discovering, obtaining, developing, creating, dividing, keeping, evaluating, and applying suitable knowledge in suitable time by suitable person in the organization.
Which are done by making a link between human resources, information and communication technology, and making a suitable structure for achieving to organization objectives [Afrazeh, (2005)].
In studying definition and settlement models of knowledge management, each of modelers based on their researches, considered some factors as the elements of knowledge. Although in form structure of definitions and models, technology element is observed less, but when the specialists take an action to explain and describe knowledge management and related models, they have considered creating and developing technology as important elements of settlement, continuity and effective elements of knowledge management.

Knowledge management technologies

Alvin Toffler writes that world modern economy and its work environment cannot be last without computer more than 30 seconds [Toffler,. (1990)]. Technology requires that management must mange knowledge instead of people. Technology changes what the personnel learn, how they learn and why they learn. Human resources requires to learn themselves by self directed learning, on work place learning, is not done within the group in fixed times, in specific places and only for some specific objectives, but is done based on needs on time and only where it is required [Markwart, (2006)].
We are accustomed to a world in which, Virtual realities, audio-video and interactional technologies are usual. Personalized digital hardware, personalized Digital assistants, telecommunication and network developments, group wares, video conferences, neural networks, intranet, internet, integrated services digital network (ISDN) lines, are progressive technologies which have changed our lives and workplaces.
Knowledge management tools and technologies are powerful search motors or browsers, marketing, and processing of data and communications. They can search wide variety of structured and nonstructured information resources. Information technology and information and communication technologies of subset tools of organization technology and knowledge management technology by using computers have been effective in structure, levels of organization, power concentration degree, the quality of personnel

promotion, management styles of improving processes, creativity and innovation, optimizing personal or group decision making, forming marketing and electronic commerce, growth and development of information systems of management and personnel, increasing performance and effectiveness and improving competitive power or capacity of organizations.
Obtained capabilities of information and communication technologies include:
- Information presented simultaneously in most of needed sections.
- Generalists are been able to do specialists works
- Organizations can have the advantages of centralization and lack of centralization simultaneously.
- Decision making can be a part of each employee job.
- Operational personnel can receive or send information from every place.
- Designs can be reviewed permanently.
Markwart believes that technology in organization can be classified and studied in two subsystems under titles of knowledge management technology and learning development technology. Technology for knowledge management includes computer based technology for collecting, coding, processing, saving, transforming and using information in machines, people and organization, learning development technology includes video, audio learning, multimedia learning based on computer and sharing knowledge and development of skills in every place and time [Markwart, (2006)].
Knowledge management technology can be studied and discussed under technology elements such as orgaware, info ware, techno ware, and human ware in related to knowledge management.
Management style and leader and manager view points, rate and quality of data and information, feature of personnel such as their attitude, personality perception and learning, techniques, methods, and systems in knowledge management technologies can be recognized, evaluated and studied. Some of these elements are explained in this section.

Orgaware and knowledge management
Believing in coaching and leadership role, continuous learning and teaching, creating reliance, motivation, using liberalized management style, taking action to new structures such as team and network structures of power distribution through cooperation of personnel, suitable and on time feedbacks for desirable efforts and results, improving and strengthening creativity and innovation are of cases that are placed in orgaw are technology and are effective in settlement and desirable continuity of knowledge management.

Info ware and knowledge management
Data is as identical and abstract facts of symbols, picture, sounds, about occurrences and happenings, information as an objective, formed, summarized, organized, structured, translated, classified data and knowledge as a combination of experiences, values, guider of decisions and actions, arrangement and combination of networking of power making information, group and organization in taking action of activities are cases that are placed in info ware technology and are very effective in dynamics of knowledge management.

Techno ware and knowledge management
Management and organizational methods, procedures, techniques, and systems such as decision making and problem solving, programming, establishing new designs, performance evaluation, trans portion, reserving, producing, presenting products, creativity and innovation, learning and teaching are placed in techno ware technology and have specific importance in suitable establishing and continuity of knowledge management.

Human ware and knowledge management
Human ware and knowledge as the most essential elements of technology according to view points of some scholars and is very important in every change such as optimized establishing and keeping of knowledge management and accessing to profits and effectiveness. Factors such as job satisfaction, obligation, motivation, self reliance, self changing, perception, attitude, learn ability, and learning compatibility, flexibility, hard working, having multi dimensions of intelligence, such as emotional intelligence, cultural intelligence, moral intelligence are required to be studied, indentified, and evaluated in management level and personnel level. The collection of these elements leads in mental changes of people, so that managers and personnel change their mental models methodically for realization of organization strategy. Balanced and compatible combination and effective and objective interaction of these elements of technology in optimized form results in appearing knowledge personnel or scholars. Knowledge management technologies are discussed by emphasis on hardware tools. Hardware technology is discussed in two kind of technologies, presentation technology and distribution technology. These two technologies which classified and introduced by American education and development association in 1998 are:

- Electronic text or publication: Distribution of text through electronic tools
- C. BT: computer based training
- Multimedia: Using computer for textual, audio-video / animation works
- Television: One sided video which may be combined with two sided audio systems or other electronic responsible systems.

- Tele conferences: fast audio, video or text exchange between people or groups in two or several places.
- Virtual reality: Using computer for presenting interational, deep and three dimensional learning experiences by using completely application or functional and real models.
- Electronic performance support system: Using integrated computer by using aware systems, hypertext or hypermedia for helping for doing work duties.

Distribution technologies are the following:

- Cable television: Transforming television signals through cable technology.
- CD. Rom: A type of tool and system for recording, saving, and restoring electronic information on compact disk which is read by optical drive.
- Electronic mail: Exchanging message through computer
- Extranet: A cooperation network which uses internet technology for making a connection between organizations and suppliers, customers or other organizations which have common information needs or objectives.
- Internet: Free confederations of computer networks in world wide which are connected with others.
- Local area network (LAN): A network of computers which shares the resources of one or several processor within a relatively small geographical area.
- Wide area network (WAN): A network of computers which shares the resources of one or several processors or servers in relatively large geographical area.
- Satellite television: Transferring television signals through satellite.
- Simulator A tool or a system which replaced with a real tool or system.
- World wide web: All resources and internet users use hypertext transmission protocol:
- Each of presentation technology can use some of distribution technologies. For example, computer-based training can be done by local area network or wide area network, web, internet, intranet, CD-RAM, CD-ROM, computer disks.
- Groupware: This tool provides means for collecting and distribution of implicit knowledge and is smoothing more than electronic mail. Group ware provides means for collecting, saving of information, organizing, searching of information and accessing information in a general form or selective base in addition to sending message [Roding. Allen, (2004)].
- Fulcrum knowledge network: This enables users to do unique search in all of different and multi information resources such as Lutus nutus, Microsoft Exchange server, websites and other resources. Users can make factors, monitor data resources, use related information automatically based on defined measures. This network presents a preview page from summary of documents without opening document itself by the user.

This tool can Search the matter, which are similar to previous matters and highlight related sections of documents. The main key of fulcrum is its knowledge map which is an usual information model.

- Verity search of 97: It allows users to organize and study different kinds of information resources.

This tool searches the created documents by usual desktop computer such as Adobe Acrobat, ASCII, E-mail, HTML, Lotus nutus, Micro soft exchange, Micro soft office, lotus SmartSuite folders, compliant ODBC data bases. Users can use review devices and filters to set them in more than 200 formats through the contents of saved documents. Verity search of 97 tool is based on contents and data and use FUZZY logic for searching and presenting and restoring.

- Interactive distance learning system (IDIS). It has features such as mechanization and multitasking control desk. Control desk is used for maximizing interaction by a teacher as a multimedia interactive platform (MIP) and response key page provides the possibility of continuous interaction with learners.
- Interactive video training system: It is a combination of video- Television with high quality, analogue and digital audio, text and graphics by using laser and CD-ROM disks. Users interact with system by using touch monitors or keyboards.
- Quality using Electronic systems Training, QUEST: This program is run by creating focus groups consists of teachers, managers, learner. These groups based on their knowledge, design questionnaires which cover key job duties or functions. Then ask personnel to order their job duties or functions based on their importance. Computer does all works related to scoring, recording, saving, analyzing the cases, and reporting the scoring. QUEST program causes a lot of time to be saved during the activities of personnel and managers.

Conclusion

The organizations which don't have knowledge management technologies or the capability of using them, they have loss of getting, saving, and transferring knowledge. If knowledge is considered as a trip, the technology is a road which it cannot be done without it knowledge management technologies, make collection, getting, saving, processing and updating of data and information simpler and provide the access of people better. Electronic performance support systems are being usual as a hardware role of knowledge management in the organizations.

These systems enable people to have learning and teaching in every time or place which is the best for them. Success in using knowledge management technologies along with other factors related to knowledge management have been able to change organizations into learning organization faster and better, the organizations which have shown suitable reactions against environmental actions and have the ability of continuous reform or modification of existent status. Success in establishing and continuity of knowledge management and using suitable technologies are required to develop human resources which this development results in optimized use of technologies. Making a unit which can establish knowledge management and its related elements, specially the related technologies, is a guarantee for success in this matter. Under these conditions, knowledge base and knowledge increase in organizational condition will result in knowledge personnel, who will be self aware, self motivation, self change and will guide their organizations in dynamic route with existent knowledge a long with managers, leaders of organizations, more comfortable, better and faster.

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The Survey of Effective Factors in Sustainable Exporting of Export Manufacturing Enterprises

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Abstract: The main objective of this paper is to help development of exports of Ardabil province in Iran through identifying effective factors in sustainable exporting of export manufacturing enterprises province and presenting empowerment solutions for it. so this paper is applied research in terms of objective, and descriptive in terms of method, and for method of study porter's comprehensive model which believes that the interaction of three important factors named government, market and enterprises lead to sustainable exporting and global competitiveness, has been used. Data for this study were collected by questionnaire and interview. The questionnaire was in three parts, first part relates to the characteristics of export manufacturing enterprises, second part evaluates effective factors of exporting of enterprises, and the third part of the questionnaire is dedicated to evaluate internal effective factors of exporters (strategies and operations of enterprises), to evaluate these barriers, 40 questions in five spectral Likert scale have been designed. To test designed questionnaire reliability, the views of experts and university professors in the field of research subject have been used, and for questionnaire validity testing, Cronbach's alpha have been used. Collected data from the population, have been analyzed by descriptive and inferential statistical techniques. Research findings indicated that the most important factor influencing the failure of enterprises to export activities is government, according to theoretical basis, by legislation and regulation, developing the right strategies for exporting and creating conditions for easy trading, plays an essential role in the development of export.

[*Shahram Mirzaei Daryani, Farzad Sattari Ardabili and Bhaman shareghi*. **The Survey of Effective Factors in Sustainable Exporting of Export Manufacturing Enterprises .** *Life Sci J* 2012;9(4):4700-4713] (ISSN:1097-8135). http://www.lifesciencesite.com. 707

Keywords: exports, export manufacturing enterprises, porter comprehensive model, Ardabil, Iran

Introduction

Since the 1970s, industrialization has played an important role in the development of the Iran economy, both small and medium scale industries have been valued because of their participation in every aspect of the financial system. In addition, their input on regional development, effect on unemployment, flexibility in the field of manufacturing, and mobilization of untapped capital make them necessary for continued growth.

These companies show remarkable stability and skill while navigating through political, economic and social structure. They maintain positive responses to advancing technologies and economic fluctuations. According to reporting Ardabil industries office, majority export production companies are of small and medium-sized enterprises. Small - and medium-size enterprises in Iran are defined as companies with fewer than 200 employees. These companies represent 90 percent of manufacturing industries, 80.3 percent of total employees and have value add of high. On based activity these companies have entirely change volume and composition of the Ardabil trade. The export volume index show that export trend has grown continually and Europe, shine and some countries Asia are the most important market for Ardabil products. In spite of this growth there are the export barriers versus these enterprises.

The percent article, therefore attempts examine empirically effective factors in sustainable exporting of these companies.

Literature review and background

In today's changing and competitive world sustainable export is one of the most major challenges that requires the cooperation and coordination of wide range of components and sub-systems. Strategic management theories believe that, sustainable export achieving depends on the interaction of three elements: a) the government, as the responsible of major infrastructure, b) appropriate business environment, c) operations and strategies of enterprises. Government as a major force, has always been effective in competitiveness, and with intermediating in various political, economic and social affairs and enforcing rules, has a positive and even a negative effect on the competitiveness. Monetary, financial and trading policies, tax legislations, supportive policies, organizational and administrative policies, rules concerning imports and exports, exchange rate, money and interest rates, inflation, government spending and other decisions at the micro and macro economics, formal and informal political agreements, the establishment or development of commercial or political relations and or cutting-off trade and economic relations with other countries, are the most significant factors influencing the competitiveness of enterprises, industries and countries, that are associated directly with governments. On the other hand, enterprises with their capabilities enhancing and appropriate strategies adoption, provide competitive products worldwide and play an important role in the sustained presence in world markets. Finally, market appropriate conditions, including internal market demand conditions, appropriate

production factors supply conditions and related to and supportive activities as movers have undeniable role in the success of enterprises in foreign markets. In this study, the role of each of the three components have been studied and Ardabil province export enterprises requirements for sustainable presence in the global markets have been extracted. Global markets have open their gates to the free flow of goods and services, investment and other economic activities and obstacles in the past in the way of worldwide trading have been taken and with developing means of communication, the effect of time and distance on trade has been reduced. Extensive developments in various fields, dramatically changed the nature of economic activity and market is in such conditions which is very susceptible to any trading activity. However, utilization of this ready space for international trade requires export enterprises capabilities development, so that they understand the requirements of the new situation, know their weaknesses and try to repair and strengthen them, accordingly several standards have been developed to ensure the enterprises ability to export and extensive programs are held to enhance the capabilities. Since the beginning of the 80th in developed countries, major programs were designed to develop enterprises capabilities, and one of the important requirements for governments to grant permission to enterprises to enter global markets are their appropriate conditions meeting. However, in our country recent studies indicates that an average of ten Iranian exporters who come to experience exporting, 8 individual aren't able to survive stably in the market (Senobar, 2003, 73) and any program related to its pathology and providing ways for its troubleshooting have not been developed in enterprises level (same, 91). This study intends to use advanced techniques to the pathology of this and with suggesting some solutions for improving the ability of enterprises to export, play a small role in achieving the national critical objectives of export sector. In addition to great benefits such as increased GDP, employment and international competitiveness, supply of foreign exchange, improving level and quality of internal activities, optimal resources allocation and infrastructures strengthening and developing, exports has also additional benefits to enterprises. Exporting by enterprise, increase its productivity index, and simultaneously by getting environmental legitimacy, lead in organizational excellence (Imani Rad, 1999, 39). Enterprises that successfully extend their activities beyond the borders, will learn how to draw consumers' satisfaction. Their accumulated experiences, gives them the ability to survive and will be able to achieve economies of scale in production (porter, 1985, 212). These benefits can be achieved when the enterprise has such preparation that ensure its survival in international markets and protect it against environmental pressures. However, unfortunately, our export statistics in comparison with the volume of global trade is hopelessly low. Total annual non-oil exports of our country is less than sales volume of many top companies in business week magazine list of top thousand companies. It must be said that each pace in order to participate for transformation of this situation is important. So this study intends to survey effective factors of sustainable exporting of export manufacturing enterprises of Ardabil province for successful participation in global markets and simultaneously will study their obstacles and problems in the field of exporting, and provide them with empowerment solutions. Henderson in 1993 in a study entitled "east Asia's export success factors" has noted some of the most important factors for the success of these countries:

- The role of foreign aids in the early years of the industrial development these countries
- Direct investment of multinational corporations
- Existing unique rituals and traditions in this area known as Confucius custom
- Efficient, semiskilled and inexpensive work force
- Important role of free market
- Governments effective policies

Simon and Thompson (1995) believe the combination of four characteristics of east Asian countries prosperity:

- Free market and trade economy
- Special conditions of these countries such as appropriate and developed structure and infrastructure, relatively skilled and trained workforce and U.S. And Japan aids to them in the early stages of industrial development
- Confucian custom that emphasizes hard work, discipline at work, frugality, saving and coordination
- Strong and effective government economic planning in close cooperation with the private sector

A study by Holdon Saghbil in 1966 on factors affecting the export of cotton yarn and fabric in turkey with the purpose of investigating factors in cotton yarn and textile exports of turkey to the Europe common market. Export effective factors as supply and demand factors have been described. In terms of demand, price, income elasticity, substituting artificial ingredients, quality and import policy Europe economic community has been studied. Domestic capacity and consumption Turkish export policy and the emergence of other suppliers, forms demand aspect of the issue. In yarn case, import policy of Europe common market, low demand elasticity, lack of adequate marketing and increasing the number of suppliers have played an important role in failure of this product exports. Low income elasticity, substitution of artificial elements, relatively low quality, lack of adequate marketing and increasing the number of suppliers are also effective factors in reducing export of cotton fabrics. In yarn export case, import policy of Europe common market and turkey's unsuccessful marketing policy are more important in terms of role and importance. However, the only issue in textiles export is marketing, that there is hope to its settlement in short-term. Another important issue is the quality of exports that at least in the short-term, its settlement is very low.

Easterly (1995) also refers some of success factors of the newly industrialized countries of east Asia: high investments in human resources, the enormous costs allocated to public education and high rates of private and external investment. He adds: "it is better the

miracles be achieved through correct policies adoption so that not to be impossible by incorrect policies adoption".
Leipziger (1996) also refers some of special characteristics of these countries, considered as most important factors for their success: outward-looking and market-oriented strategy adoption, providing a stable environment with economic stability and high investment in human resource in these country. He also believes that the main factor of their success is government's effective role in export promotion policies guiding. In his view, the governments of these countries have act not only as an alternative but as a supplement of private sector activities. According to another theory, some of the most important factors in the success of the newly industrialized countries of east Asia were the: relatively high rates of domestic and foreign private investment, high-level productivity and specific industrial and economic policies adopted by government for transfer of appropriate technologies, increasing workforce skills and expanding exports.
Outstanding work of Penros (1959) is the landmark study relating to the causes of success (or failure) in foreign markets. In his book entitled "analysis of enterprise biological development" indicated that internal factors especially capabilities, are considerably more effective than external factors and assets in the success. In 1977, queen gave similar result with his studies, and in 1985 porter indicated that the basis of competitive advantage in trade turbulent world lies in the capabilities of enterprises. Recently during an extensive research, Bernard and Wagner (1998) claimed that in addition to factors such as politics, economy, currency, and so on, up to 70% of a causes of success in exporting are enterprises abilities.
Hakan Altintas and et al in 2007 have researched about relationship between export barriers and the peceived export performance of Turkish SMEs. The findings suggest that procedural barriers and competition in foreign markets have the most effective impact on export performance. Both structures have negative effects as expected. In other words, as the procedural and competition barriers decrease, export performance also increases.

Porter's theory of competitive advantage
This theory is synonymous with porter's name because of his extensive attempts, really has a long history and beginning of the studies at this field returns to Harvard school appearance in the late 1950s. In some industrial economics references has mentioned as the theory of industrial development and in some international trade references has mentioned as new or evolutionary theory of international trade. According to this theory, porter believed that for a country's success in international trade it can't rely on revealed comparative advantages but economies should create advantages through identifying its situation and structure and capacity building and with providing global superiority contexts and competitive efficacy conditions, allow economic actors to allocate new areas in global trade to themselves consistent with the guidance of the government. In this view, the role of production factors in traditional concept will decline and the opportunities which globalization environment provide for enterprises and governments will remove the previous limitations. What is important in porter's view is partial centrality of reforms on economic actors and related institutions (Moradi, 2001). Michael porter sees the success of a company in the international scene due to its competitiveness and believes that sources of competitiveness are divided into four categories of:
1- production factors status in terms of factor supplying (human resources, physical resources, capital resources, infrastructure and technical knowledge), the efficient use of these factors, using advance factors such as information technology, skilled workforce, research and development, and etc.
2- demand market structure in terms of composition of domestic demand and customers, the size and pattern of growth in domestic demand and market saturation rate, how customers access to global markets and etc.
3- status of suppliers and related industries in terms of competitive advantage and efficiency.
4- the fourth determinant factor of national competitive advantage in an industry, is the framework in which enterprises are came into existence, are organized and compete with each other in it.

Aim and Questions
Research main objective is to help development of Ardabil province export by identifying effective factors of sustainable exporting of export manufacturing enterprises of Ardabil province and providing them with empowerment solutions. In this regard, the project will pursue the following specific objectives:
1- identifying strengths and weaknesses of export manufacturing enterprises (effective internal factors) in the enterprises strategies and operations aspect.
2- identifying market conditions and government functions (effective external factors)
3- providing export manufacturing enterprises with empowerment solutions in form of exporting step by step guide
Main question:
What are the effective factors of sustainable exporting of export manufacturing enterprises of Ardabil province and empowerment solutions for them?
In direction of main research question, following questions will be answered:
1- what are strengths and weaknesses of export manufacturing enterprises (effective internal factors)?
2- what are external factors affecting export manufacturing enterprises in market conditions and government functions aspects?
3- how to increase the ability of export manufacturing enterprises of province?

Methodology
This research is applied, in terms of its objective and descriptive, in terms of research method, the data has collected by survey and library method and using questionnaire. Research statistical population was the export manufacturing enterprises of Ardabil province.

For analysis of surveying of effective factors of export manufacturing enterprises, porter's comprehensive model which believes that the interaction of three important factors named government, market and enterprises lead to sustainable exporting and global competitiveness, has been used. Data for this study were collected through a researcher-made questionnaire, presently. The questionnaire was in three parts, first part relates to the characteristics of export manufacturing enterprises, including the type of manufacturing unit, date of creation, date of operation, starting in exports, property type and number of employees. Second part evaluates effective factors of exporting of enterprises, to identify these factors, 32 questions were designed. These questions were dedicated to evaluate the effects of inappropriateness of export external factors on the enterprises export performance and these effects have evaluate in five spectral Likert scale as very low, low, somewhat, high and very high. The third part of the questionnaire is dedicated to evaluate internal effective factors of exporters (strategies and operations of enterprises), to evaluate these barriers, 40 questions in five spectral Likert scale have been designed. To test designed questionnaire validity, the views of experts and university professors in the field of research subject have been used, and for questionnaire reliability testing, Cronbach's alpha have been used. Since the Chronbach's alpha value of 0.87 were obtained, it can be stated that the questionnaire has good validity.

Findings

Collected data from the population, have been analyzed by descriptive and inferential statistical techniques. In descriptive statistics central indices such as mean and standard deviation and in inferential statistics, nonparametric sign test to compare the differences of opinion with the mean value (3) and the Friedman test have been used to rank the export barriers of exporting enterprises. The same number of 42 distributed questionnaires have been collected, about 21 percent of the export manufacturing units of province have less than 5 years exporting experience, 50% with 5 to 10 years experience and about 16 percent have more than 10 years export experience. It indicates that most export units are novice in exporting. In this research the export manufacturing units size criterion, is the number of their employees. Size surveying of export manufacturing units of the province indicates 98 percent of them are small, i.e. Have less than 100 employees and only 2 percent are in average size (between 100 to 1000 employees).

Main question of study is: what are the effective factors of sustainable exporting of export manufacturing enterprises of Ardabil province and empowerment solutions for them? This question is described using descriptive statistics including central tendency measures and dispersion indices of study variables in terms of internal and external factors of enterprise and revolving around three components named government, market and enterprise. Base of exporters' views by earning score with 46.3, government has the greatest effect on enterprises exporting and the other two components of the market, with a score of 43.3, and enterprises with a score of 38.3 are less than that.

Responder's views summation in terms of internal and external enterprise factors indicates that enterprise internal factors with scores of 38.3 compared to enterprise external factors with score of 45.3 is at low rank. In other words, the role of enterprise internal factors is less important than enterprise external factors in export activity. To answer questions in analysis of enterprise external factors, collected data on research main and subsidiary questions has been analyzed.

Analysis of differences of variables relating to government role with mean value

Results of analyses of differences of government role variables with mean value i.e. 3, using sign test are described below.

Table 1: results of analyses of differences of government role variables with mean value

Components	Evaluated variable	Mean	SD	Sign test result					
				Negative	Positive	Equality	Sum	Test statistic	Significance level
Rules and regulations	1- stability of laws and regulations relating to exports	3.87	1.41	6	25	8	39	-3.233	0.001
	2- inclusiveness and exclusiveness of laws and regulations relating to exports	3.62	1.25	9	23	8	40	-2.298	0.022
	3- simplicity and transparency of laws and regulations relating to exports	3.35	1.28	11	21	7	39	-1.591	0.112
	4- flexibility of rules and regulations relating to exports	3.51	1.01	7	22	8	37	-2.6	0.009
	5- coordination of laws and regulations relating to exports with each other	3.53	1.18	6	23	10	39	-2.971	0.003
Developing appropriate export strategy	6- exchange policies (stable exchange rate policy, the real exchange rate, exchange arrangements)	3.57	1.27	6	20	14	40	-2.55	0.011
	7- tax policies (proper taxation system, justice of tax system, affordable rates, payment methods, tax cuts)	3.39	1.15	10	18	10	38	-1.323	0.186
	8- customs and tariff policies (tariff system stability, tariff reinforcements system, administrative processes facilitation)	4.2	5.37	8	21	10	39	-2.228	0.026

	9- credit policies (appropriate system of financing, crediting, ease access to credit, covering and guarantees mechanism, credits interest rate)	3.33	1.05	8	18	13	39	-1.765	0.078
	10- availability of proper strategy and planning of country for export development	3.07	1.24	11	17	12	40	-0.945	0.345
Create conditions to facilitate trade	11- country adherence to global agreements and protocols	3	1.20	15	15	8	38	0.000	1.000
	12- using international standards in exporting	3.23	1.20	13	20	6	39	-1.044	0.296
	13- availability of national centers for trade facilitation	4.31	6.74	14	18	6	38	-0.530	0.596
	14- supporting exporters considerably by information providing	3.32	1.38	12	19	9	40	-1.078	0.281
	15-availability of facilities and incentives in country for export	3.33	1.32	13	16	10	39	-0.371	0.710
	16- holding fairs by government and facilitating participation in abroad fairs	3.10	1.46	14	18	6	38	-0.530	0.596
	17- availability of easy means for controlling and inspection, clearance, licensing, storage facilities and etc	3.41	1.29	9	22	8	39	-2.155	0.031
Other factors associated with the government	18- cooperation of embassies, consulates and commercial belonging of foreign countries with exporters	3.30	1.37	10	18	11	39	-1.323	0.186
	19- development of market economy and free trade by the government	3.34	1.04	10	17	11	38	-1.155	0.248
	20- country accompaniment with regional and global developments	3.44	1.10 7	7	19	12	38	-2.157	0.031
	21- government investment for the development of export culture	3.35	1.32	8	19	12	39	-1.925	0.054
	22- political- trade relations with most countries and reducing economic sanctions	3.02	1.45	16	14	9	39	-0.183	0.885

Above table data analysis indicates that the significance level for all variables except for the variable number 3, 7, 9, 10, 11, 12, 13, 15 and 16 is less than 0.05. This indicates that it is significant difference with mean value. As can be seen, number of positive signs (differences) in these variables except for variables15 are more than negative signs. This indicates that most of the evaluators responds are more than mean value i.e. 3. However, the significance level of variables with numbers listed above are more than 0.05 indicating that these variables are evaluated at mean level i.e. Value 3, by evaluators. Also negative signs of the variable number 15 is equal to positive signs and it is equivalent to mean level evaluation of evaluators. So it could be stated that from the exporters view, the government role variables are effective factors on their exports and are important. In order to prioritize the variables related to the role of government in exporting, Friedman ANOVA test has been used. This test result indicates that there is significant difference between the mean rank of each variable related to the role of government in significance level of α=0.05.

Table 2: Friedman test results of government role variables

Number of replies	32
K- square test	35.055
Degree of freedom	21
Significance level	0.028

So the most important variables relating to government role, affecting exports in their priority order are described in the following table.

Table 3: prioritize variables relating to the government role in exporting

Priority	Studied variables	Rank mean
1	Stability of laws and regulations relating to exports	15.5
2	Coordination of laws and regulations relating to exports with each other	12.7
3	Availability of easy means for controlling and inspection, clearance, licensing, storage facilities and etc	12.55
4	Inclusiveness and exclusiveness of laws and regulations relating to exports	12.38
5	Flexibility of rules and regulations relating to exports	12.36
6	Government investment for the development of export culture	12.05
7	Exchange policies (stable exchange rate policy, the real exchange rate, exchange arrangements)	11.86
8	Supporting exporters considerably by information providing	11.69
9	Availability of facilities and incentives in country for export	11.55
10	Country accompaniment with regional and global developments	11.55
11	Tax policies (proper taxation system, justice of tax system, affordable rates, payment methods, tax cuts)	11.5
12	Development of market economy and free trade by the government	11.36
13	Customs and tariff policies (tariff system stability, tariff reinforcements system, administrative processes facilitation)	11.3
14	Using international standards in exporting	11.12
15	Availability of proper strategy and planning of country for export development	1.06
16	Simplicity and transparency of laws and regulations relating to exports	11.00
17	Credit policies (appropriate system of financing, crediting, ease access to credit, covering and guarantees mechanism, credits interest rate)	10.89
18	Holding fairs by government and facilitating participation in abroad fairs	10.80
19	Cooperation of embassies, consulates and commercial belonging of foreign countries with exporters	10.75
20	Availability of national centers for trade facilitation	10.38
21	Political- trade relations with most countries and reducing economic sanctions	9.77
22	Country adherence to global agreements and protocols	8.91

Analysis of differences of variables relating to market appropriate conditions with mean value

Results of analyses of differences of variable relating to market appropriate conditions affecting exports with mean value i.e. 3, using sign test are described below.

Table 4: results of analyses of differences of market appropriate conditions with mean value

Components /evaluated variables	Mean	SD	Sign test result					
			Negative	Positive	Equality	Sum	Test statistic	Significance level
23- availability of appropriate human resources in the country (relatively skilled and educated work force, investment in human resources)	3.52	1.15	6	18	16	40	-	0.023
24- availability of appropriate physical resources in country such as land, water, mineral resources, climate and easy access to them	3.27	1.46	11	22	7	40	-1.741	0.082
25- availability of appropriate technical knowledge in country (availability of high-quality universities, research centers, scientific and trade journals, and information centers and etc)	3.82	0.88	2	24	13	39	-4.118	0.000
26- availability of appropriate infrastructures in the country (information technology, roads, telecommunications, banking and financial systems and etc)	3.57	1.31	7	23	10	40	-2.739	0.006
27- availability of attractive domestic market for products (reasonable price, low number of competitors and high volume customers within the country)	3.20	0.97	8	12	19	39	-	0.503

28- availability of exclusive domestic market for company's products	2.97	1.07	15	10	13	38	-	0.424
29- availability of appropriate transmission systems in the country	3.72	1.01	4	20	13	37	-	0.002
30- availability of strong suppliers of raw materials and machinery in the country	3.63	1.44	10	25	3	38	-2.366	0.018
31- availability of strong related and complementary industries with high capacity in the country	3.43	1.27	9	21	9	39	-2.008	0.045
32- availability of appropriate marketing agencies in the country	3.56	1.37	18	12	12	42	-0.913	0.361

Above table data analysis indicates that variables no. 24, 27, 28 and 32 are significant at α=0.05 level and these variables have significant difference with mean value. As seen, in above variables, the positive sign of the variable no. 23, 24, 25, 26, 27, 29, 30 and 31 are more than of their negative signs. Thus, it could be stated that these variables status has evaluated more than mean value i.e. 3, by evaluators. While the effect of variables no. 28 and 32 in export in view of evaluators is lower than mean value (3), since their negative signs are more than positive signs. In order to prioritize the variables relating to market conditions, Friedman ANOVA test has been used. This test result indicates that there is significant difference between the mean rank of each variable relating market conditions in significance level of α=0.05.

Table 5: Friedman test results of market appropriate conditions variables

Number of replies	35
K- square test	25.213
Degree of freedom	9
Significance level	0.003

The table indicates the most important variables relating to market conditions in exporting in their priority order.

Table 6: prioritize variables related to market appropriate conditions in exporting

Priority	Studied variables	Rank mean
1	Availability of appropriate technical knowledge in country (availability of high-quality universities, research centers, scientific and trade journals, and information centers and etc)	6.26
2	Availability of appropriate transmission systems in the country	6.19
3	Availability of appropriate marketing agencies in the country	6.16
4	Availability of appropriate human resources in the country (relatively skilled and educated work force, investment in human resources)	5.71
5	Availability of strong suppliers of raw materials and machinery in the country	5.71
6	Availability of appropriate infrastructures in the country (information technology, roads, telecommunications, banking and financial systems and etc)	5.69
7	Availability of appropriate physical resources in country such as land, water, mineral resources, climate and easy access to them	5.34
8	Availability of strong related and complementary industries with high capacity in the country	5.33
9	Availability of exclusive domestic market for company's products	4.47
10	Availability of attractive domestic market for products (reasonable price, low number of competitors and high volume customers within the country)	4.14

Analyses of differences of strategies and operations variables of enterprises with mean value

This table indicates the results of sign test analyses of differences of strategies and operations variables of enterprises in exporting with mean value (3).

Table 7: results of analyses of differences of strategies and operations variables of enterprises with mean value

Components		Evaluated variable	Mean	SD	Sign test result					
					Negative	Positive	Equality	Sum	Test statistic	Significance level
Identification and analysis of foreign markets		1- studying economic characteristics such as trends relating to economic growth, inflation, interest rates and exchange, customs, finance and credit policies in foreign markets	3.80	1.25	18	12	12	42	-0.913	0.361
		2- studying legal and political characteristics such as laws and regulations relating to the administrative system, foreign trade, taxation systems and environmental, restrictions on foreign trade, nationalism, property rights, trade unions, international and regional organizations membership	3.09	1.05	12	16	14	42	-0.567	0.571
		3- studying social and cultural characteristics such as social values and attitudes, lifestyle, work, ethic, family patterns, population pyramid and foreign markets customs	3.21	1.11	10	16	16	42	-0.981	0.327
		4- identifying competitors and analyzing strengths and weaknesses of them in foreign markets	3.42	1.10	9	22	11	42	-2.155	0.031
		5- identifying direct customers such as buyers, sales representatives and business centers	3.52	1.06	6	25	11	42	-3.233	0.001
		6- identifying product final consumer in terms of demographic characteristics	3.33	1.07	9	22	11	42	-2.155	0.031
		7- identifying external market opportunities and threats	3.16	1.08	8	14	20	42	-	0.286
		8- identifying market size and its future trends in foreign markets	3.48	1.00	7	19	15	42	-2.157	0.031
		9- identifying distribution channels in foreign markets	3.16	0.96	10	17	15	42	-1.155	0.248
		10- identifying current marketing practices in foreign markets	3.33	1.05	6	20	16	42	-2.55	0.011
Foreign market entry strategies	Product strategy	11- providing such product to fix the problem and external customer needs	3.07	1.23	14	17	10	41	-0.359	0.719
		12- having a unique product specification (competitive advantage)	2.95	1.22	16	14	11	41	-0.183	0.855
		13- appropriateness of product design, shape and color	3.14	1.06	10	12	19	41	-	0.832
		14- complying with product health and safety standards	3.45	1.10	9	20	11	40	-1.857	0.063
		15- complying with product quality characteristics	3.63	8.16	13	21	7	41	-1.2	0.230
		16- providing product with appropriate packaging	3.43	1.30	12	22	7	41	-1.543	0.123
		17- brand appropriateness	3.46	0.92	6	22	13	41	-2.835	0.005
	Price strategy	18- right analyzing the costs of exporting and considering export additional costs such as communications, travelling, exchange fluctuations and foreign demands collection in product pricing	3.36	0.88	7	18	16	41	-	0.043
		19- complying with prices of similar products in foreign markets in price determining	3.95	0.94	3	31	7	41	-4.63	0.000
		20- complying with sensitivity and elasticity of price in foreign target markets	4.12	2.86	5	28	8	41	-3.83	0.000
		21- complying with price restrictions in foreign markets	3.56	0.8	4	26	11	41	-3.834	0.000
	Explanation strategy	22- appropriate method of product releasing to foreign markets (selling by agencies granting, foreign agent, taking order and etc)	3.19	0.95	7	16	18	41	-	0.93
		23- using appropriate promoting tools with cultural, economic and foreign customers' lifestyle considerations	3.36	0.99	7	23	11	41	-2.739	0.006

		24- complying with after-sales services (returns, repairs, warranty, maintenance, training, communications and etc)	3.07	0.92	9	15	15	39	-	0.307
		25- complying with guarantee and performance requirements	3.10	1.10	12	14	11	37	-0.196	0.845
		26- complying with legal requirements and restrictions on using advertisement in newspapers, magazines, radio, television, internet, posters and etc in foreign markets	2.8	0.99	15	10	15	40	-	0.424
	Distribution strategy	27- timely delivering products in accordance with contract	3.53	1.05	6	23	12	41	-2.971	0.003
		28- complying with storage requirements and using appropriate inventory control methods	3.4	0.95	5	16	19	40	-	0.027
		29- complying with insurance requirements of transportation	3.7	1.01	6	24	10	40	-3.104	0.002
		30- using appropriate methods of transporting according to specific product needs (heating, cooling, humidity and etc)	3.75	1.00	4	25	11	40	-3.714	0.000
		31- complying with documentation requirements (export, safety, shares, inspections and approval documentations)	3.14	0.93	10	17	14	41	-1.155	0.248
Awareness of internationa l laws		32- complying with settlement considerations such as payment ensuring, arbitration and mediation conditions, governing the law of importer or exporter country when dispute and the place of trial	3.09	1.09	10	17	14	41	-1.155	0.248
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Awareness of international laws		33- complying with the terms and conditions contained in the contract of sale such as incoterms, payment currency, its conversion rate, payment methods and etc	3.41	1.07	11	24	6	41	-2.028	0.043
		34- complying with product measuring methods and quality standards, insurance issues, after sales services and warranty in contract	3.42	0.87	6	22	12	40	-2.835	0.005
		35- complying with rules and regulations of the foreign country that are effective on product distribution or sales representative agencies	3.25	1.05	13	21	6	40	-1.2	0.23
		36- identifying usable documents in an international trade and incoterms laws	3.26	0.89	4	13	21	38	-	0.049
Financial and risk issues analysis		37- accurate estimate of the cost of export products and export finance requirements determination	3.51	1.07	8	25	8	41	-2.785	0.005
		38- accurate estimating of the export cash flow	3.39	1.13	9	22	10	41	-2.155	0.031
		39- estimating required equipment (capital expenditures) for export supporting	3.58	0.86	5	24	12	41	-3.343	0.001
		40- complying with exporting risks such as country risk, market risk, currency risk and foreign target country market risk	3.63	1.08	5	26	10	41	-3.592	0.000

Above table data analysis indicates that the significance level for all variables except variables no. 1, 12 and 26 is lower than α=5%. This indicates that they have significant differences with mean value. Since the positive signs of the variables except the variables no. 1, 12 and 26, are more than their negative signs, so it could be stated that that these variables status has evaluated more than mean value i.e. 3 from the view of evaluators. In other word from the view of evaluators, these factors have the most important role in affecting exports. Also, considering the significance level of all variables except variables no. 1, 12 and 26 is more than α=0.05, thus the value of this variable have not significant difference with mean value and it could be stated that these variables status has evaluated in mean value i.e. 3, by evaluators. Other variables relating to enterprises strategies and operations, due to the higher number of positive signs than negative signs, have less effects in enterprise exporting from the view of evaluators. In order to prioritize the variables relating to above index role, Friedman ANOVA test has been used. This test result indicates that there is significant difference between the mean rank of each variable relating strategies and operations variables of enterprises in significance level of α=0.05.

Table 8: friedman test results of strategies and operations variables of enterprises in impact on exports

Number of replies	32
K- square test	133.875
Degree of freedom	39
Significance level	0.000

So the most important variables relating to strategies and operations variables of enterprises in their priority order are described in the following table.

Table 9: prioritize strategies and operations variables of enterprises in impact on exports

Priority	Studied variables	Rank mean
1	complying with the prices of similar products in foreign markets in price determining	28.34
2	complying with insurance requirements of transportation	25.28
3	Using appropriate methods of transporting according to specific product needs (heating, cooling, humidity and etc)	25.11
4	complying with sensitivity and elasticity of price in foreign target markets	24.89
5	Identifying direct customers such as buyers, sales representatives and business centers	24.23
6	complying with exporting risks such as country risk, market risk, currency risk and foreign target country market risk	24.14
7	complying with price restrictions in foreign markets	23.53
8	Accurate estimate of the cost of export products and export finance requirements determination	23.19
9	Estimating required equipment (capital expenditures) for export supporting	23.19
10	Identifying market size and its future trends in foreign markets	23.11
11	Timely delivering products in accordance with contract	22.86
12	Identifying competitors and analyzing strengths and weaknesses of them in foreign markets	22.7
13	Brand appropriateness	22.55
14	complying with storage requirements and using appropriate inventory control methods	21.89
15	complying with product quality characteristics	21.64
16	Identifying product final consumer in terms of demographic characteristics	21.56
17	complying with product measuring methods and quality standards, insurance issues, after sales services and warranty in contract	21.36
18	Using appropriate promoting tools with cultural, economic and foreign customers' lifestyle considerations	21.27
19	complying with product health and safety standards	20.98
20	Identifying current marketing practices in foreign markets	20.89
21	Providing product with appropriate packaging	20.45
22	Right analyzing the costs of exporting and considering export additional costs such as communications, travelling, exchange fluctuations and foreign demands collection in product pricing	19.95
23	Identifying usable documents in an international trade and incoterms laws	19.95
24	complying with after-sales services (returns, repairs, warranty, maintenance, training, communications and etc)	19.86
25	Studying social and cultural characteristics such as social values and attitudes, lifestyle, work, ethic, family patterns, population pyramid and foreign markets customs	19.42
26	Accurate estimating of the export cash flow	19.28
27	Appropriate method of product releasing to foreign markets (selling by agencies granting, foreign agent, taking order and etc)	19.05

Based on the results of the data analysis, the major findings of the study are as follows:

important findings in enterprise dimension

Research findings indicate that from the three components of porter's model, i.e. Government, market and enterprise, the government's role in failure of exporters activities is more than others, from the view of exporters and the other two components role is at mean value. The major weak point of enterprise's internal factors, is relating to sales and promotion strategies, product strategy was at mean value, and pricing and distribution strategies have been had less important role in enterprises exporting failure. Legal and political characteristics appropriate studying is one of exports success factors that is weakness of enterprises from the respondents view. Exporters believe that exporting goods

don't have appropriate brand, as 47% of respondent have rated this factor in failure of export activities in high and 27% have rated in very high. Exporters products are lack of unique and innovative features, accordingly, 55% of respondent have rated this factor in poor performance of exporters in high and 22% have rated in very high. From view of evaluators, most enterprises in have major weaknesses at appropriate using of promotion tools that fits the cultural, economic and lifestyle considerations of external customers, as 37% of respondents have rated this factor in high and 26% have rated in very high. Respondents believe that the amount of enterprises consideration to requirements and limitations of advertising in foreign countries media tools is lower. Accordingly, 34% of respondents have rated this factor in exports declining in high and 25% have rated in very high. One of major weaknesses of enterprises is less attention to performance guarantee and warranty obligations, that most respondents had believe it. As 58% of respondents have rated its effect in high an very high and 25% have rated in nearly moderate. From the majority of respondents view, enterprises performance isn't appropriate in after-sale services. As 54% of respondents rated that in high and very high and 35% rated in moderate level. Evaluators believe that enterprises are weak at applying appropriate marketing strategies in foreign countries and their poor performance in this area, is one of the reasons for their failure in exporting. Customer and end-consumer identification are of basic and important principles of processes marketing that according to respondents, enterprises have not performed well in this regard and weaknesses of this factor has a negative impact on their export performance. Respondents believe identifying distribution channel in foreign countries that is one of most important distribution aspects of four marketing mix aspects, was higher than mean value and its weakness has caused some problems in enterprises exporting. Less attention to exporting risks has been another factor in constituting enterprises failure in exporting, these risks include country risk, market risk, currency risk and market risk of target country that exporters have evaluated that undesirable. Index score of "appropriateness of product design, shape and color" component indicates that enterprise didn't have successful performance in this context, and its weakness have been effective in enterprises exporting failure. Other factors affecting enterprises exporting failure, has been lack of attention to the social and cultural characteristics of foreign markets. This component has received a mean score of sample views. According to respondents, the lack of identifying foreign markets opportunities and threats have been other weaknesses of enterprises rating 3.7 was summarized result of their views in this regard. With a score of 3.3 in the packaging, evaluators believed, export products didn't have good packaging.

important findings in government dimension

From 75% of respondents view, government relating factors have rated in high in enterprises exporting failure and 20% rated in mean value. Respondents believe laws and regulations are not appropriate, as 48% of them rated this factor in exporting failure in high and 27% rated in very high. Developing export strategy that includes foreign exchange, credit, customs, tax policies, and export strategies, and according to 80% of respondents view had a high impact in the failure of exports and 20% considered it as mean value. Create appropriate conditions for trade is other government task that, according to sample view has affected export failure, as 52% rated this factor in mean value and 40% rated in high. Evaluators believe, the embassies, consulates and trade belongings cooperation is not appropriate with exporters in foreign countries and with getting mean score of 4.29, indicate its effect in exporting failure. Credit policies including score was 4.1, and this reflect its inappropriateness from the view of respondents. Adopting appropriate strategy and planning for export development are important factors in of foreign trade development and according to sample view, government has performed poorly in this regard, and score of 4.4 indicates the negative impact is high. Scores of (4.1) foreign exchange policies of government indicates that government's performance has not satisfied exporters in this regard and its weaknesses has created problems for them. Evaluators believed that existing laws and regulations relating to export are not straightforward and transparent (mean score of 4), as 36% of respondents rated this factor in high and 41% have rated in very high. Lack of international standards appropriate implementing is one of exporting failure factors, as 44% have rated this factor in high, 29% have rated in very high, and 30% have rated in low or mean value. Respondents comments indicates that government actions in export culture development have not very effective, and an appropriate investment has not been made in this area. Trade facilitating national centers have played an important role in export development in many countries however, according to respondents view(mean score of 3.5) ,in Iran these centers role have been negligible, and have not had much influence on the export development. Most evaluators believe that the level of diplomatic-trade relations of Iran with most countries have been unfavorable (with mean score of 3.71) and this factor has had an important role in the enterprises export failure. Despite the government efforts in providing facilities and incentives for export enterprises, from exporter's view, current government actions are inadequate and less effective. Sample views surveying indicate that government performance has been poor in enterprise information nurturing and this weakness has been very effective in failure of export activities. One of the government responsibilities in export strategy compiling, is determining credit policies. Government weakness in creating appropriate financing system, production and export crediting, guarantees and coverage (insurance) mechanisms, and facilitating access to these facilities have created numerous problems for exporters. Respondents statements indicated that government tariff policies and regulations have caused exporting problems for enterprises. Appropriate information acquiring about the market plays a key role in marketing, but in foreign markets due to the large distance to markets and access

problems, appropriate information acquiring to enterprises alone is very difficult and costly and government cooperation is strongly required in this regard. Respondents believed that the government weakness has been effective in exporting failure in this regard. One of most important tools to enterprises for marketing is product offerings in fairs. From the respondents view in the past few years due to lack of coordination between agencies involved in exporting, such as commerce ministry, export promotion center, institute of standards, customs, ports and shipping organization, chamber of commerce and banks, majority of exporters have faced with major problems in developing their exports. Because of lack of the real exchange rate, laws and regulations instability, lack of transparency of policies, government exchange policies have caused most exporters be affected from this aspect.

important findings in market dimension

Maximum score (3.88) in market related factors dedicated to technical knowledge. In other words, 44% of studied exporters have rated that in inappropriate, and 17% have rated in completely inappropriate. According to respondents, there aren't strong material and equipment suppliers in the country, and its weakness has created exporting problems for enterprises, as 59% have rated this factor in inappropriate and 10% have rated in completely inappropriate. Today, the role of marketing activities in trading development is completely clear, and studying leading countries in trading indicates that there are strong marketing institutions in these countries. Unfortunately, due to the neglect of the role of such institutions in Iran have caused the country and thus manufacturers be bereft of such strong institutions, and despite having appropriate products can't be successful in exporting. From the sample view, in terms of having adequate human resources, country is at moderate level, as 47% of them have rated this factor in inappropriate and completely inappropriate and 43% have rated in appropriate and completely appropriate. From respondents view the country situation in terms of physical resources is at desirable level, as 49% have rated this in appropriate and 42% have rated in completely appropriate. Respondents believe the country's transportation system in is appropriate, as 61% of sample have rated this in appropriate and 39% have rated in inappropriate and completely inappropriate.

Discussion and Conclusion

To identify factors affecting the export activities, porter's model of competitive advantage because of its comprehensive approach to international trade have been benefited. Based on this model, factors affecting the enterprises exports in three segment including, government, enterprise and market have been segmented and investigated. The results indicated that the most important factor affecting enterprises export activities is government, which is consistent with the results of the internal researches. Based on theoretical foundations, with rules and regulations codification, formulating appropriate strategies for export, creating conditions to facilitate trade, government plays a major role in the export development. Foreign researches studying indicate that most of the researchers believe countries exporting success in government actions. Their studies indicate that the governments of these countries by adopting appropriate approaches in foreign investment fields, foreign policies, tax policies, customs policies, organizational policies, incentive policies, educational policies, reducing exporters risks creating competitive market, creating free trade zones have played a major role in exports development. Comparing these actions with the results of research field studies indicate that despite government actions in the rules revising, exports strategy formulation, trade facilitation, and ..., according to exporters, are not enough, and there are still weaknesses in this components. In sum total of the results in the government section, the main weak points are as follows:

- lack of coordination between agencies involved in export and their weak cooperation with exporters
- lack of appropriate credit, foreign exchange and customs laws and policies
- lack of appropriate strategies for developing country exports
- lack of obligation to use international standards in export
- inadequate government investment in export culture development
- weak national centers of trade facilitating
- problems in diplomatic-trade relations with most countries
- weak alignment with regional and global developments
- inadequate exporters supporting in terms of information
- insufficient exporting incentives
- poor development of economy based on market and free trade

Market segment with using theoretical foundations in three factors i.e. Production supply factors appropriate conditions, demand conditions of domestic market, related and segmentation coordinating industries and in this sections human resources, physical resources, technical knowledge, infrastructures, domestic market attractions, market competitiveness, transportation systems, suppliers, supplement industries and marketing agencies have been studied. Research findings indicated that the main weaknesses of this sector are inadequate technical knowledge, lack of raw materials and equipment suppliers, skilled human resources shortage, especially in international trade and lack of appropriate marketing agencies in the country.

The enterprise section have analyzed based on four factors including foreign markets identification and analysis, market entry strategies, knowledge of international law and financial issues and export risk analysis. Based on theoretical foundations, the first step in the international trading, is foreign market identification. Without identifying aspects such as economic characteristics, social, political and technological characteristics, competitive position, the nature of the industry and major suppliers, buyers, wholesalers, and each of them, exports would not be very

successful. Research findings indicated that exporters have major weaknesses in this field which is also consistent with the results of the internal researches. The main weak points of this section, could be stated as follows:

- Weak environmental studies (political, economic, social, cultural, competitors)
- Brand inappropriateness
- Lack of identifying current marketing practices in foreign markets
- Lack of identifying the size of the market and its future trends in foreign markets
- Lack of identifying foreign markets opportunities and threats
- Poor after sales service and warranty and performance guarantee
- Weakness in using promotional tools and limitations considering
- Lack of a unique product characteristic (competitive advantage)
- Weakness in export risk analysis
- Lack of identification of foreign markets distribution channels and appropriate product offerings
- Poor customer identification
- inappropriate product packaging

According to the findings, and conclusion the following recommendations are offered to reduce the problems of exporting enterprises in Ardabil province:

Due to limited experience in applying promotion methods, enterprises should implement different and effective promotion approaches in their marketing activities by benefiting from information technology, skilled consultants and mining of other enterprises. Create after sales service centers in major export markets and carry out appropriate planning in this field. Since market identification is one of the basic and primary marketing steps, with appropriate funding for this case, using empowered workforce and information technology, enterprises develop their activities in this sector. It is recommended that enterprises, consider adopting appropriate strategies for entering new markets or expanding existing markets and benefiting from experienced consultants can be useful in this context. Complying with international standards should be enterprises prior plans and do effective measures in this regard, and by using information technology, establish appropriate customer relationship system, get feedbacks from customers and establish good relationship with them. In addition, with the advent of experienced institutions and consultants in this field, can utilize their abilities. Enterprises can expand their export knowledge and skills through various approaches, such as the recruitment of empowered workforce, benefiting from experienced consultants and using optimal mining of top enterprises, providing appropriate training and etc. Enterprises recommended to develop their collaboration with external resources such as universities, research centers and top enterprises in this field by the joint venture and .... Enterprises should provide special programs to upgrade their main processes i.e. Supplying, designing and production. Enterprises to allocate appropriate funding for export supporting activities such as market research, market juicing, market control, market navigation, market orientation, market assessment and etc to develop their exports. To establish appropriate relationship with organizations involved in exports such as ministry of commerce, banks, export promotion center, embassies and etc because these organizations are able to solve an important part of exporting problems of enterprises. Due to enterprises weakness in main processes i.e. Research and development, production, supply and marketing, these processes should be troubleshot and appropriate projects be defined and implemented for improving that. Enterprises, to put cost management strategy as their prior corporate strategies and to adopt appropriate approaches to managing cost and lowering their products price. Exporting enterprises to have an appropriate plan to apply their information technology. Enterprises that export development is their strategy, to plan and implement an appropriate reward system based on exports. Market research by leading related ministries and organizations, including the ministry of commerce, trade promotion organization of Iran and etc be well-done optimally and information should be readily available to exporters. Government with forming and supporting export management enterprises, commercial companies, export clusters and consortia, to develop enterprises exports. Government should reform current mismatches with the revision of the basic tasks of these organizations and lead to the synergy of their activities. The government is expected to do basic steps in improving export incentives and to consider exporters to comply these standards. It is also necessary, the laws and policies be improved by the government. To upgrade the technical knowledge it is recommended, firstly, basic review to be taken about offered training meeting with the needs of active industries in exporting, secondly, the university-industry relationship be closer and thirdly, appropriate funding for the production and transmission of knowledge is taken by the government and the private sector.

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Determination measure of efficiency using by undesirable inputs of DEA

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Abstract: In this paper, the possibility of suitable production is presented, and then a new method is suggested taking into account the existence of some undesirable components is the outputs and inputs of the Decision, Making Units (DMUs) in the set.

[Monzeli Abbasali and Saeid Ebadi. **Determination measure of efficiency using by undesirable inputs of DEA.** *Life Sci J* 2012;9(4):4714-4718] (ISSN:1097-8135). http://www.lifesciencesite.com. 708

Keywords: Data Envelopment Analysis, Undesirable Inputs and Outputs, Efficiency.

1. Introduction

When there are no undesirable input and output in the performance of DMUs, models of Data Envelopment Analysis (DEA) to increase efficiency are based on the output increase or input decrease. But many applied problems may consist of inputs whose increase and decrease results in efficiency increase and decrease, respectively, As Koopman (1951) represented. Such reclamation operation needs to increase undesirable inputs in order to increase efficiency or increase and decrease of undesirable outputs decrease and increase efficiency, respectively[7].

Suppose undesirable outputs be factory wastes that should decrease in order to increase efficiency (e.g. Allen, (1999), Smith, (1991))[1,11].

There are direct and indirect methods for consideration and using undesirable outputs in DEA. In indirect methods, undesirable inputs and outputs in every single DMU change into desirable inputs and outputs with a decreasing monotonous function. And then DMUs efficiency is evaluated using standard models of DEA. Koopmans (1951), Golany and Roll (1989) introduced [ADD] and [MLT] methods, respectively, for measuring efficiency with undesirable inputs and outputs[5-6]. In'direct methods, there are some suppositions to Production Possibility Set (PPS), so in evaluation will obtain suitable input and output [2-5].

This paper is structured as fallows: section 2 gives definitions of proportionate PPS to undesirable inputs and outputs. The method for measuring efficiency with undesirable inputs and outputs is shown in section 3. Finally, an example with undesirable inputs and outputs, and then the conclusion will be given.

2. Production Possibility Set

Suppose we have n observations on n DMUs with input and output vectors (x_j, y_j) for j = 1, 2,..., n. Let $x_j = (x_1,...,x_{mj})^T$ and $y_j = (y_{1j},...,y_{sj})$. All $x_j \in R^m$ and $y_j \in R^s$ and $x_j > 0$, $y_j > 0$ *for j = 1, 2,... n.* The input matrix *X* and output matrix *Y* can be represented as

$$X = [x_1,...,x_j,...,x_n] \ , \ Y = [y_1,...,y_j,...,y_n]$$

Where *X* is an $(m \times n)$ matrix and *Y* an $(s \times n)$ matrix. The production possibility set T is generally defined as

T = {(x,y)1 x can produce y}. (1)

In DEA, the production possibility set under a Variable Return to Scale (VRS) technology is constructed form the observed data (x_j, y_j) *for j = 1, 2, ..., n* as follows:

$$T = \left\{ (x,y) \middle| x \geq \sum_{j=1}^{n} \lambda_j x_j \ , \ y \leq \sum_{j=1}^{n} \lambda_j y_j \ , \lambda_j \geq 0 \ , \ \sum_{j=1}^{n} \lambda_j = 1, j = 1,...,n \right\}. \qquad (2)$$

In the absence of undesirable factors when a DMU_O , $o \in \{1,2,...,n\}$, is under evaluation, we can use the following BCC model:

$$\begin{aligned} &\min\theta \\ &st \quad \theta x_o - X\lambda \geq 0 \\ &\quad Y\lambda \geq y_o, \\ &\quad 1^T\lambda = 1, \\ &\quad \lambda \geq 0. \end{aligned} \tag{3}$$

Corresponding to each output y, $L(y)$ is defined as the following:

$$L(y_j) = \{x \mid (x, y_j) \in T\}. \tag{4}$$

In fact, $L(y_j)$ is a function that y_j portrays to a subset of inputs so that inputs can produce y_j.

Now suppose that some inputs are undesirable so input matrix X can be represented as $X = (X^d, X^u)^T$, where $X^d = (x_{1j}^d, ..., x_{m_1 j}^d), j = 1, ..., n$ and $X^u = (x_{1j}^u, ..., x_{m_2 j}^u)$, $j = 1, ..., n$ are $(m_1 \times n)$ and $(m_2 \times n)$ matrixes that represent desirable (good) and undesirable (bad) inputs, respectively. And similarly, suppose that some outputs are undesirable so outputs. Matrix Y can be represented as $Y = (Y^g, Y^b)^T$, where $Y^g = (y_{1j}^g, ..., y_{s_1 j}^g), j = 1, ..., n$ and $Y^b = (y_{1j}^b, ..., y_{s_2 j}^b), j = 1, ..., n$ are $(s_1 \times n)$ and $(s_2 \times n)$ matrixes that represent. Desirable (good) and undesirable (bad) inputs, respectively.

Definition 1: Let DMU of $(x_1^d, x_1^u, y_1^g, y_1^b)$ is dominant to DMU of $(x_2^d, x_2^u, y_2^g, y_2^b)$ if $x_1^d \leq x_2^d, x_1^u \geq x_2^u, y_1^g \geq y_2^g$ and $y_1^b \leq y_2^b$ the unequal be strict at least in a component. So that,

$$\begin{pmatrix} -x_1^d \\ x_1^u \\ y_1^g \\ -y_1^b \end{pmatrix} \geq \begin{pmatrix} -x_2^d \\ x_2^u \\ y_2^g \\ -y_2^b \end{pmatrix}$$

Definition 2: DMU_O is efficient if in T there is no DMU to be dominant over it.

We consider the properties of the Production Possibility Set as the following:

(1) T is convex.

(2) T is closed.

(3) The monotony property of desirable inputs and outputs. So that,

$$\forall u \in R_+^{m_1}, v \in R_+^{s_1}, (x^d, x^u, y^g, y^b) \in T \Rightarrow (x^d + u, x^u, y^g - v, y^b) \in T$$

This is not necessarily established for undesirable factors, because in this case, T has no efficient DMU.

We can define the Production Possibility Set T satisfying (1) through (3) by

$$T = \left\{ (x^d, x^u, y^b, y^g) \middle| x^d \geq \sum_{j=1}^{n} \lambda_j x_j^d, x^u = \sum_{j=1}^{n} \lambda_j x_j^u, y^g \leq \sum_{j=}^{n} \lambda_j y_j^g, \right.$$
$$\left. y^b = \sum_{j=1}^{n} \lambda_j y_j^b, \quad \sum_{j=1}^{n} \lambda_j = 1, \lambda_j \geq 0, j = 1, ..., n \right\}. \tag{5}$$

3. Measures of Efficiency Using Undesirable Factors

In input oriented data, the efficiency of the DMU under evaluation is obtained by decreasing and increasing the desirable and undesirable input, respectively. And similarly, in output oriented data, we increase desirable output and decrease the undesirable output. Farell (1989) introduced a model to increase and decrease desirable and undesirable output, respectively [12-13]. But there is a problem with his model and it is its nonlinear form. $[TR\beta]$ Method introduced by Ali and Seiford (1990) simultaneously increase desirable

outputs and decrease undesirable outputs, but measures of efficiency are dependent on the β value[2].

There are some other methods such as [WD] and [MLT] that were introduced by Far (1989) and Galony and Roll (1989) respectively that decrease undesirable outputs only with decreasing desirable outputs[4-5].We, however, believe that in order to improve efficiency, desirable and undesirable outputs need to be increased and decreased respectively. Suppose DMUo=$(x_o^d, x_o^u, y_o^g, y_o^b)$ be unit under evaluation, corresponding to the output $y_o = (y_o^g, y_o^b)$ and using (2) $L(y_o^g, y_o^b)$ in defined as follows:

$$L(y_o^g, y_o^b) = \left\{(x^d, x^u) \middle| (x^d, x^u, y_o^g, y_o^b) \in T\right\} \qquad (6)$$

and we consider the subset of $L(y_o^g, y_o^b)$ as :

$$\partial^s L(y_o^g, y_o^b) = \left\{(x^d, x^u) \middle| \forall (u,v) \geq 0, (u,v) \neq 0 \quad \Rightarrow \quad (x^d - u, x^u + v) \notin L(y_o^g, y_o^b)\right\} \quad (7)$$

That $\partial^s L(y_o^g, y_o^b)$ includes all inputs of the efficient DMUs which can produce (y_o^g, y_o^b).

The model to evaluate the efficiency of DMUo with the most decrease of x_o^d and the most increase of x_o^u is as follows:

$$d_o^d = x_o^d$$

And :

$$d_o^u = x_o^u - x_{\max}^u$$

So that :

$$(x_{\max}^u)_i = Max_j \left\{x_{ij}^u\right\}$$

Therefor in defined unefficiency as follows:

$$\theta_o^* = Max \quad \theta_o$$

$$st.$$

$$\sum_{j=1}^{n} \lambda_j x_j^d + s^- = x_o^d - \theta_o d_o^d$$

$$\sum_{j=1}^{n} \lambda_J x_j^u = x_o^u - \theta d_o^u$$

$$\sum_{j=1}^{n} \lambda_j y_j^g - s^+ = y_o^g \qquad (8)$$

$$\sum_{j=1}^{n} \lambda_j y_j^b = y_o^b$$

$$\sum_{j=1}^{n} \lambda_j = 1$$

$$\lambda_j \geq 0 \qquad for \quad all \quad j = 1,\ldots,n$$

Theorem 1: The DMUo ill model (8) is efficient if and only if

1) $\theta_o^* = 1$

2) All slacks are zero for all optimal solutions.

Theorem 2: If all optimal solution of model (8) be (θ^*, s^{-^*}), then

$$(x^d - \theta^* d^d - s^{-^*}, x^u - \theta^* d^u) \in \partial^s L(y_o^b, y_o^g)$$

4. Numerical example

As an example, consider seven DMUs with one desirable input, one undesirable input and one desirable output.

Regarding Table 1 and Figure 1, it can be seen that DMUs D, E, and F are efficient and they are on the $\partial^s L(y_G^g)$. On the other hand, efficiency of other DMUs have been examined through their image on $\partial^s L(y_G^g)$. (Efficient Frontiers)

Table 1. The inputs and outputs data for 7 DMUs.

$DMU's$	x^d	x^u	y^g	$1-\theta^*$
A	3	1	1	0.33
B	2	2	1	0.5
C	1	3	1	1
D	1	5	1	1
E	2	6	1	1
F	3	7	1	1
G	4	4	1	0.43.

Similar discussion can be presented for the output oriented.

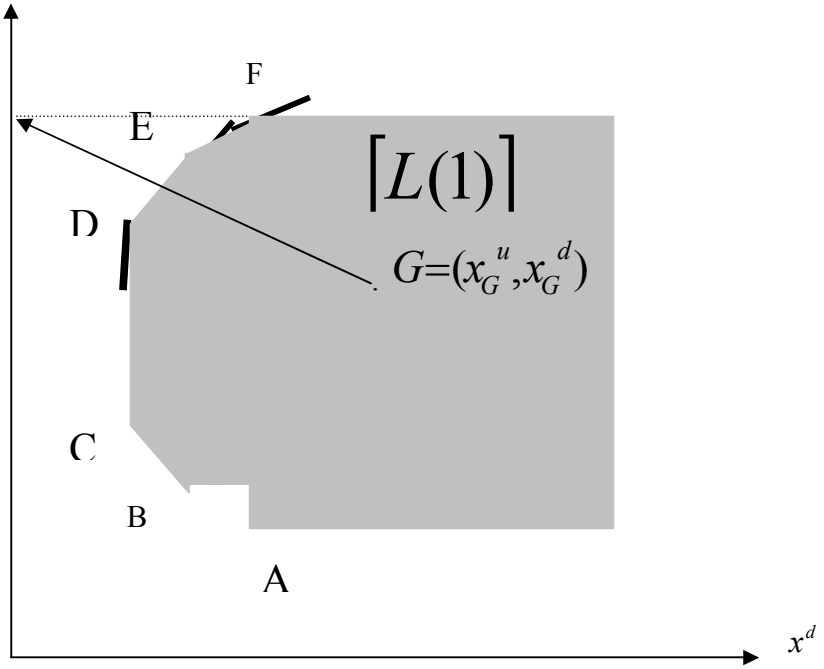

Figure 1: The graph of the $L(y_G)$

5. Conclusion

Throughout this paper, a new model is defined for the evaluation of efficiency where some inputs and outputs may be undesirable. Also, this model assures that the DMUs under evaluation will be compared with a corresponding unit of $\partial^s L(y_G^g)$. (Efficient Frontiers)

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Soybean qualities parameters, seed yield and its components response to planting dates and density in the north of Iran

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Abstract: In order to evaluation of soybean (*Glycin max* L.), qualities parameters, seed yield and its dependents components response to planting dates and plant density, an experiment was carried out at the Islamic Azad University of Qaemshahr Agronomy farm, Mazandaran, Iran in 2012. This experiment was done as split plot in randomized complete blocks design based three replications. Planting dates were chosen as main plots including: May 14, July 5 and August 15, and plant density as sub plots including: 20, 40, 60 and 80 plant per m^2. The results showed that planting date on May 14 had the most number of days from planting to flowering, number of days from flowering to filling pod, first pod height from ground surface, number of pod per plant, number of seed per plant, due to highest seed yield (420.3 g/m^2) was produced for this planting date, but the maximum oil percentage was observed on August 15 and the most 100-seed weight and protein percentage were obtained on July 5. The maximum number of pod per plant had observed with 20 plants per square, but highest seed yield was produced with 80 plants per square. As the most oil and protein percentage were observed with 20 and 80 plants per square. The maximum seed yield (581.1 g/m^2) was conducted for interaction planting date on May 14 with 80 plants per square, because of increase number of seed per pod.
[Taghavi H, Mobasser H.R, Rahimi Petroudi E, Dastan S. **Soybean qualities parameters, seed yield and its components response to planting dates and density in the north of Iran**. *Life Sci J* 2012;9(4):4719-4726] (ISSN:1097-8135). http://www.lifesciencesite.com. 709

Keywords: Density; oil percentage; planting date; seed yield; soybean

1. Introduction

Soybean is one of the important oilseed crops and major source of high quality protein for human daily diet and livestock feed in the world (Lei et al., 2006). Soybean is grown on an area of 84.084 ha with an annual production of 207.476 tones given an average yield of 2467 kg/ha in Iran (FAOSTAT, 2009). The optimum soybean (*Glycine max*) planting date is determined by a combination of calendar date and climatic conditions. Soybean seed can germinate in soil temperatures as low as 45°F, but temperatures near 50°F provide better and more consistent germination. Optimum soil temperatures for rapid germination and emergence are above 60°F. Sowing date is the variable with the largest effect on crop yield (Calvino et al., 2003a, b). Fine-tune management of soybean by sowing date is a good approach to enhance both crop yield and economic benefit. Effects of planting date on soybean yield and other traits varied at locations (Hoeft et al., 2000; Naeve et al., 2004). Environmental conditions associated with late sowing affect crop features related to the capture of radiation and portioning of crop resources. In spring-sown single crops of soybean, yield is most susceptible to nutritional and water deficits during late flowering and grain filling, and grain number is the main yield component involved in this response (Calvino and Sadras, 1999). Delayed sowing generally shifts reproductive growth into less favorable conditions with shorter days and lower radiation and temperature (Egli and Bruening, 2000). Unlike grain soybean, the taste of the grain and the pod traits of vegetable soybean at harvest are extremely important (Takao, 2004). The yielding ability of green soybean may be affected by its sowing time due to adverse weather conditions and the number of pods set; the green soybean yield decreased with delay in the sowing time (Nishioka and Okumura, 2008; Zhang et al., 2008).

Adjusting planting density is an important tool to optimize crop growth and the time required for canopy closure, and to achieve maximum biomass and grain yield (Ball et al., 2000; Turgut et al., 2005; Svecnjak et al., 2006; Haddadchi and Gerivani, 2009). High populations provide a way to optimize grain yields in short-season production systems (Liu et al., 2007). Bilal Ahmad et al., (2009) stated that the optimum plant density with proper geometry of planting is dependent on variety, its growth habit and agro-climatic conditions. Ismail and Hall, (2002) stated a decrease in grain yield of cowpea with increased spacing. Bing et al, (2010) reported grain yield and numbers pod per plant were declined with increasing density. Yield potential of soybean is affected by the number of pod per plant, number of seed per pod, and seed weight (Desclaux et al., 2000;

Ohashi and Nakayama, 2009). Liu et al., (2008) stated that Adjusting planting density is an important tool to optimize crop growth and the time required for canopy closure, and to achieve maximum biomass and grain yield. Ball et al, (2000) reported that increasing plants population reduced yield of individual plants but increased yield per unit of area. Plant population can be used as a tool to manage crop growth, maximize biomass, the time required for canopy closure and yield (Akunda, 2001). Information on the effects of component densities of maize and sorghum on the yield of soybean are available (Muoneke et al., 2007). The objective of our study was evaluation of soybean qualities parameters, seed yield and its dependents components response to planting dates and plant density.

2. Material and Methods

In order to evaluation of soybean (*Glycin max* L.), qualities parameters, seed yield and its dependents components response to planting dates and plant density, an experiment was carried out at the Islamic Azad University of Qaemshahr Agronomy farm, Mazandaran, Iran in 2012. The experimental farm is geographically situated at 28°, 56' N latitude and 28°, 36' E longitude at an altitude of 14.5 m above mean sea level. The soil was analyzed and the soil of field was clay-loam (Table 1), weather conditions were also measured in vegetation period (Table 2). This experiment was conducted as split plot in randomized complete blocks design based three replications. Planting dates were chosen as main plots including: May 14 (spring planting date), July 5 (summer planting date) and August 15 (summer delay planting date), and plant density as sub plots including: 20, 40, 60 and 80 plant per m^2, with planting arrangement in order 50 × 10 cm^2, 50 × 5 cm^2, 40 × 4.16 cm^2 and 30 × 4.16 cm^2, respectively. Plots were planted with a grain drill. According to soil results Urea and potassium (K_2O) were applied 200 and 150 kg/h sequentially, all operations like weeds control, plant illnesses controlling, pests controlling were done during the growth process with chemical components, as manual weeding was applied during the growing season. The number of days from sowing to flowering, number of days from flowering to initial pod filling and number of days from sowing to maturity was recorded. During the growth time, following characteristics was measured randomly from each plot (Plant height, first pod height from ground surface, number of pod per plant, number of grain per pod, 1000-seed weight and seed yield). Oil and protein percentage was measured in lab. Data analyzed by SAS statistical software and Averages comparison were calculated by Duncan's multiple range tests in a 5% probability level.

3. Results and Discussion

Number of days from planting to flowering had significant effect under planting date in 1% probability level (Table 3). Planting date on May 14 (55.17 days) had more flowering duration compare to planting date on July 5 March (45.75 days) and August 15 (33.92 days) (Figure 1). The maximum number days from planting to flowering was obtained at interaction of spring planting date under 20, 40, 60 and 80 plant per square equivalent to 55.33, 55.33, 54.67 and 55.33 days, respectively. The minimum number days from planting to flowering had observed at interaction of summer delay planting date with 20, 40, 60 and 80 plant per square equivalent to 33.67, 34, 34.33 and 33.67 days, respectively (Table 4). All physiological process is under effect of day length, temperature degree and other environmental factors (planting date) and consequently it affects on yield and yield components (Rameeh, 2006). Pedersen and Lauer (2003, 2004a, 2004b) conducted one of the few detailed studies on the effects of early (3–6 May) vs. late (23–27 May) planting dates by examining soybean growth, development, and yield in a 4-yr experiment located in Wisconsin. They observed that the start of each reproductive stage from R_1 (begin flower) to R_5 (begin seed) was delayed by the 3-wk delay in planting date.

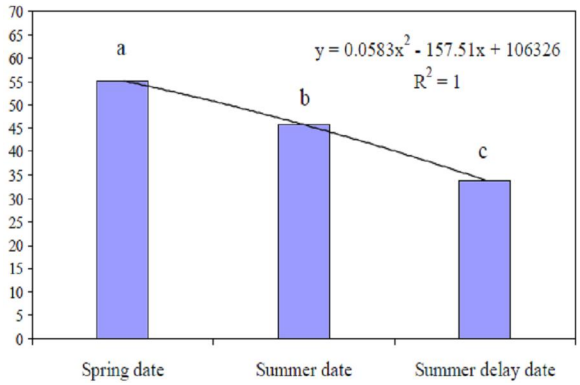

Figure 1. Effect of planting dates on number of days from planting to flowering.

Number of days from flowering to pod filling had significant effect under planting date in 5 % and 1% probability level sequentially (Table 3). Planting date on May 14 (12.67 days) had more pod filling duration compare to planting date on July 5 (9.33 days) and August 15 (9.25 days) (Figure 2). The most number of days from flowering to pod filling was observed at interaction of 14 May with 20, 60 and 80 plant per square (12.67, 12.67 and 13 days), and the least number of day from flowering to pod filling was obtained at interaction of July 5 with 40 and 80 plant per square (8 and 9.33 days) and interaction of August 15 with 20, 60 and 80 plant per square

equivalent to 9.33, 8.67 and 9.33 days (Table 4). Late planting date caused to decrease flowering duration and plant maturity. Pedersen and Lauer (2003, 2004a, 2004b) conducted one of the few detailed studies on the effects of early (3–6 May) vs. late (23–27 May) planting dates by examining soybean growth, development, and yield in a 4-yr experiment located in Wisconsin. They observed that the start of each reproductive stage from R_1 (begin flower) to R_5 (begin seed) was delayed by the 3-wk delay in planting date.

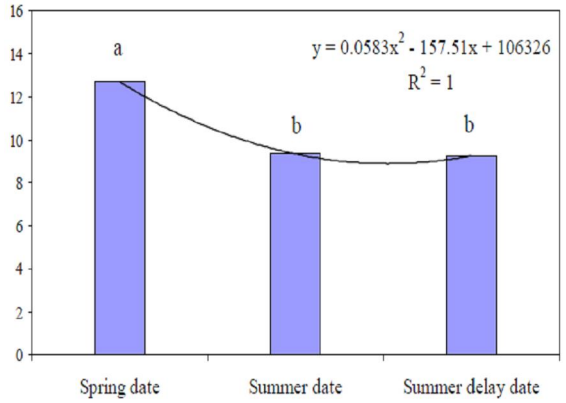

Figure 2. Effect of planting dates on number of days from flowering to filling pod.

Number of days from planting to maturity had significant effect under planting date in 1% probability level (Table 3). Planting date on July 5 (151 days) had more growth duration compared to planting date on May 14 (111.6 days) and August 15 (130 days) (Figure 3). The maximum growth duration had observed at interaction of July 5 with 20, 40, 60 and 80 plant per square equivalent to 150.7, 151.7, 150.7 and 151 days, respectively and the minimum number of days from planting to maturity had obtained at interaction of May 14 with 20, 40, 60 and 80 plant per square equivalent to 111.7, 111.7, 111.3 and 111.7 (Table 4). Late planting date caused to decrease growth duration because growth degree day is low in last planting dates. Pedersen and Lauer (2003, 2004a, 2004b) conducted one of the few detailed studies on the effects of early (3–6 May) vs. late (23–27 May) planting dates by examining soybean growth, development, and yield in a 4-yr experiment located in Wisconsin. They observed that the start of each reproductive stage from R_1 (begin flower) to R_5 (begin seed) was delayed by the 3-wk delay in planting date.

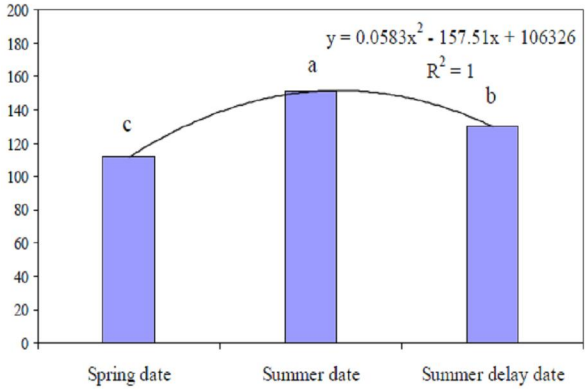

Figure 3. Effect of planting dates on number of days from planting to maturity.

Plant height had significant effect under plant density in 1% probability level (Table 3). The least plant height (62.09 cm) was observed for 20 plants per square and minimum of that was observed for other plant density that equivalent to 70.81, 71.46 and 74.94 cm for 40, 60 and 80 plant per square, respectively (Figure 4). The maximum plant height (84.50 cm) was obtained for interaction of summer planting date with 80 plants per square and the minimum plant height (56.77 cm) had obtained at interaction of summer delay planting date with 20 plants per square (Table 4). Early planting date caused to increase plant height because it has more time to growth that can increase flower and pod. Taller stems can increase photosynthesis if they don't have lodging problem. Pedersen and Lauer (2004a) also used data they collected at 20-d intervals to examine seasonal patterns in plant height and node appearance. At 64 d after emergence, plants in the late May planting were 35 cm shorter than plants in the early May planting, but at R6, plants in both planting dates were nearly equal in height.

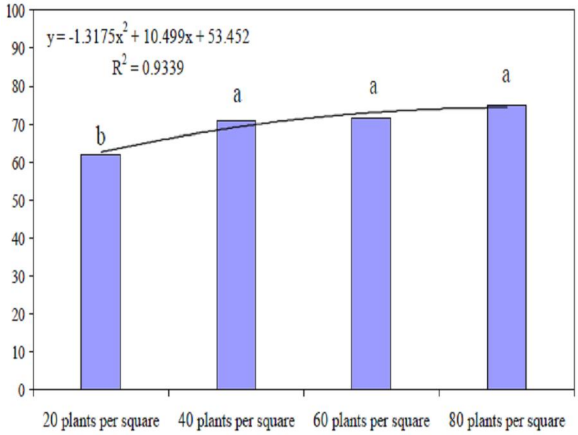

Figure 4. Effect of plant density on plant height.

First pod height from ground surface had significant effect under planting date in 5% and plant density in 1% probability level (Table 3). The most pod height from ground surface (26.01 cm) was produced for planting date on May 14 and minimum of that (17.68 cm) was obtained for planting date on July 5 (Figure 5). The lowest pod height from ground surface (17 cm) was observed for 20 plants per square and the highest of this trait was obtained for 40, 60 and 80 plants per square equivalent to 22.62, 22.52 and 23.79 cm, respectively (Figure 6). The most pod height from ground surface (30.97 cm) was produced at interaction of May 14 with 80 plants per square and the least of that (14.23 cm) had observed at interaction of July 5 with 5 plants per square (Table 3). In late planting dates, plant faced to low temperature in early growth stage, so it has low growth and has not suitable growth before entering in reproductive stage, therefore it often faced with high temperature compare to early planting dates in flowering time, hence first pod couldn't have evolution consequently they are less than early planting dates.

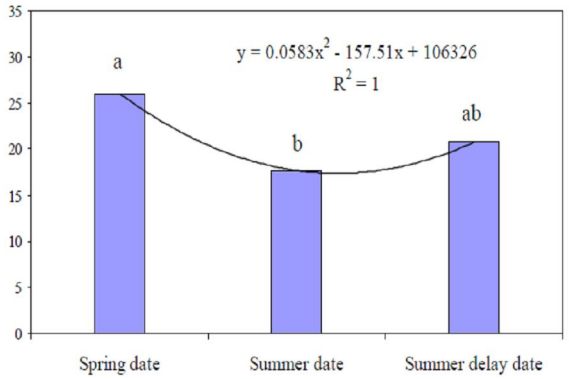

Figure 5. Effect of planting dates on first pod height from ground surface.

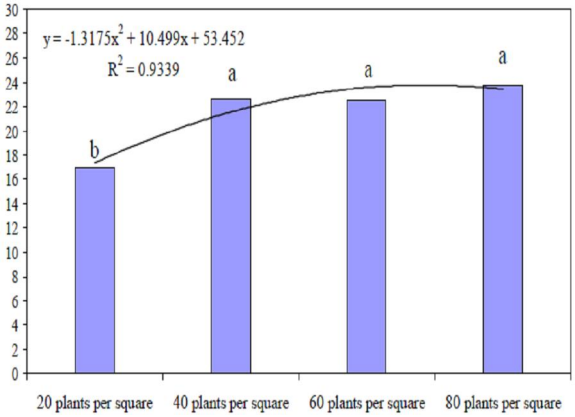

Figure 6. Effect of plant density on first pod height from ground surface.

Number of pod per plant had significant effect under planting date in 5% and plant density in 1% probability level (Table 5). The maximum number of pod per plant (66.75 pods) was produced for planting date on May 14 and minimum of that (48.42 and 37.85 pods) was obtained for planting date on July 5 and August 15. The most number of pods per plant (69.97 pods) was observed in 20 plants per square and least of that had produced for 40, 60 and 80 plants per square equivalent to 51.82, 42.06 and 40.20 pods, respectively (Table 6). The maximum number of pods per plant (93.30 pods) was observed at interaction of spring planting date with 20 plants per square and the minimum of that was obtained at interaction of summer delay planting date with 60 and 80 plants per square equivalent to 28.43 and 30.10 pods (Table 7). Results showed that early planting dates had suitable environmental factors so plant produce more pod. Late planting dates decreased to produce pod because of high temperature in flowering time and beginning of pod produce, so decrease in pod cause to reduce of grain yield. Plant with strong seed dormancy and enough leaf in winter before entering to reproductive stage can have more photosynthesis material for re-growth that it can to keep more flowers and turn to pod. Ozer, (2003) reported that differences in product yield in different planting dates caused to change in pod number in plant. Pedersen and Lauer (2003, 2004a, 2004b) conducted seed number and pod number were greater, but seed per pod was lower, in the early May planting date. However, these yield component differences were small, offering little explanation for the difference in 4-yr seed yield means between 4.23 Mg ha^{-1} recorded in the early May plantings and 3.85 Mg ha^{-1} in the late May plantings.

Number of seed per pod had significant effect under planting date in 1% probability level (Table 5). The maximum number of seed per pod (2.7 seeds) was obtained for planting date on May 14 and the minimum of that (2.45 and 2.50 seeds) was obtained for planting date on July 5 and August 15 (Figure 7). The most number of seed per pod (2.77 seeds) was observed at interaction of spring planting date with 80 plants per square and the least number of seed per pod (2.28 seeds) had produced at interaction of summer planting date with 80 plants per square (Table 7). Angadi *et al.* (2000) have shown that high temperature can caused to decrease grain number per pod. Pedersen and Lauer (2003, 2004a, 2004b) conducted seed number and pod number were greater, but seed per pod was lower, in the early May planting date. However, these yield component differences were small, offering little explanation for the difference in 4-yr seed yield

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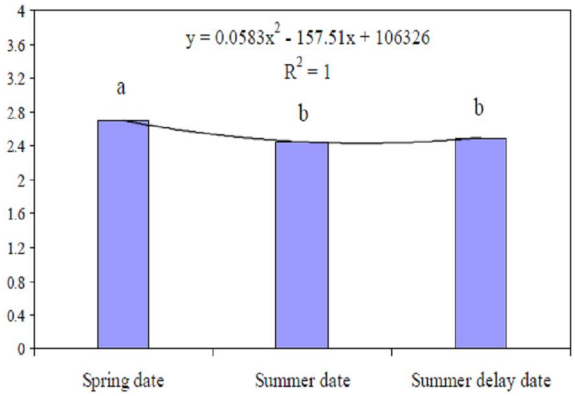

Figure 7. Effect of planting dates on number of seed per pod.

1000-seed weight had significant effect under planting date in 1% probability level (Table 5). The maximum 1000-seed weight (23.47 g) was produced for planting date on July 5 and the minimum of that (19.05 g) was obtained for planting date on August 15 (Figure 8). The most 1000-seed weight had observed at interaction of July 5 with 20, 40, 60 and 80 plants per square equivalent to 23.27, 23.97, 23.70 and 22.93 g and the least 1000-seed weight (17.83 g) was produced at interaction of summer delay planting date with 40 plants per square (Table 7). The plant can't use environmental conditions for photosynthesis and sap production in late planting date, so grain filling reduced because of high temperature consequently stored metabolic material reduced with more respiration, therefore plant produced pods with small grains and less 1000-seed weight (Abadian *et al.,* 2008). Angadi *et al.* (2000) reported that 1000-seed weight decreased with high temperature and unsuitable planting date.

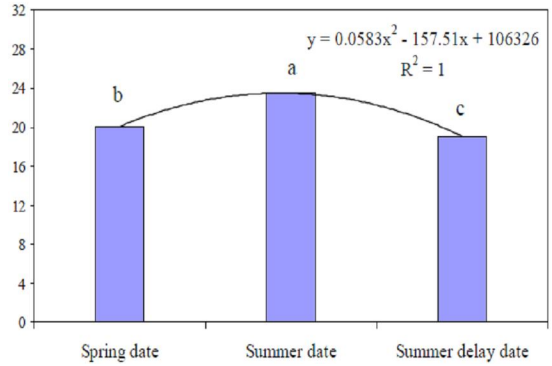

Figure 8. Effect of planting dates on 1000-seed weight.

Seed yield had significant effect under planting date in 5% and plant density in 1% probability level (Table 5). The maximum seed yield was produced for planting date on May 14 and July 5 (420.3 and 382.8 g/m^2) and the minimum of that (279.6 g/m^2) was obtained for planting date on August 15. The most seed yield (508.1 g/m^2) was observed for 80 plants per square and the least seed yield had produced for 20 and 40 plants per square equivalent to 282.4 and 264.6 g/m^2 (Table 6). The maximum seed yield (581.1 g/m^2) was conducted for interaction planting date on spring with 80 plants per square, because of increase number of seed per pod and the minimum of that was produced at interaction of summer delay planting date with 20 and 40 plants per square equivalent to 164.9 and 190.13 g/m^2 (Table 7). Main reason of increase seed yield in early planting dates was favorable temperature degree in growth season, so the plant had more time for growth consequently rapeseed could have use environmental conditions to increase yield with more yield components compare to other planting dates. Duration of Plant vegetative growth was short in planting date on August and plant rapidly went to reproductive stage under environmental conditions and temperature degree, so it caused to intense drop in yield. Morrison and Stewart, (2002) have shown high temperature in end of the season decrease yield and flowering limited with temperature more than 27 °c. Delayed sowing generally shifts reproductive growth into less favorable conditions with shorter days and lower radiation and temperature (Egli and Bruening, 2000). In a simulation study, Egli and Bruening (1992) found that reduced radiation and temperature accounted for most of the reduction in yield associated with late sowing in well watered soybean crops reaching maturity in late October or early November. Unlike grain soybean, the taste of the grain and the pod traits of vegetable soybean at harvest are extremely important (Takao, 2004). The yielding ability of green soybean may be affected by its sowing time due to adverse weather conditions and the number of pods set; the green soybean yield decreased with delay in the sowing time (Nishioka and Okumura, 2008; Zhang et al., 2008).

Oil percentage had significant effect under planting date and plant density in 1% probability level (Table 5). The maximum oil percentage (24.04 %) was obtained for planting date on August 15 and the minimum of that (22.67 and 22.63 %) was produced for planting date on May 14 and July 5. The most oil percentage (37.75 and 37.74 %) was produced for 20 and 80 plants per square and minimum of that (37 %) was obtained for 60 plants per square (Table 6). The maximum oil percentage (24.75 %) was obtained at interaction planting date

on summer delay planting date with 80 plants per square and the minimum of that was observed at interaction of planting date on May 14 with 60 plants per square and July 5 with 60 plants per square (Table 7). Rameeh (2006) and Omidi (2006) have shown in different varieties late planting date caused to decrease oil percentage in rapeseed. Early planting date caused to face pod filling period with moderate temperature and it increases lipids metabolism, fatty acids and oil percentage (Hamrouni *et al.,* 2001).

Table 1. Selected soil properties for composite samples at experimental site.

Soil texture	K (ppm)	P (ppm)	N (%)	OM (%)	pH	EC (µmohs/cm)	Depth (cm)
Clay loamy	228	12	0.22	1.8	7.1	0.26	0-30

Table 2. Weather condition in experiment site in rice growth stages.

Variable	January	February	March	April	May	June	July	August	September	October	November
Minimum tem.	8	6	10	12	14	19	22	25	18	15	14
Maximum tem.	12	8	18	20	24	30	34	34	28	18	16
Evaporation (mm)	45	42	52	58	75	110	128	156	121	85	82
Precipitation (mm)	53	45	36	85	32	28	9.2	12.2	48	82	95

Table 3. Mean square of planting dates and plant density on phonological and morphological traits.

S.O.V.	DF	Number of days from planting to flowering	Number of days from flowering to pod filling	Number of days from planting to maturity	Plant height	First pod height from ground surface
Replication	2	1.86	1.58	0.19	185.06	30.23
Planting dates (A)	2	1360.52**	45.58**	4667.69**	298.73	212.99*
Error	4	5.78	1.67	0.44	137.81	28.53
Plant density (B)	3	0.63	0.99	1.07	268.04**	83.35**
A×B	6	0.82	1.32	0.18	39.71	7.37
Error	18	0.83	2.49	0.86	19.15	7.28
C.V. (%)	-	2.54	15.15	0.69	6.27	12.56

** and * respectively significant in 1% and 5% level.

Table 4. Interaction of planting dates and plant density on phonological and morphological traits.

Interaction	Number of days from planting to flowering	Number of days from flowering to pod filling	Number of days from planting to maturity	Plant height (cm)	First pod height from ground surface (cm)
S_1P_1	55.33 a	12.67 a	111.7 c	66.37 cde	20.40 cd
S_1P_2	55.33 a	12.33 ab	111.7 c	71.30 b-e	26.40 ab
S_1P_3	54.67 a	12.67 a	111.3 c	74.47 bc	26.29 ab
S_1P_4	55.33 a	13.00 a	111.7 c	73.00 bcd	30.97 a
S_2P_1	44.67 b	10.33 abc	150.7 a	63.13 ef	14.23 e
S_2P_2	46.00 b	8.00 c	151.7 a	75.57 b	19.00 cde
S_2P_3	46.00 b	9.67 bc	150.7 a	72.43 bcd	18.93 cde
S_2P_4	46.33 b	9.33 c	151.0 a	84.50 a	18.57 cde
S_3P_1	33.67 c	9.33 c	129.7 b	56.77 f	16.37 de
S_3P_2	34.00 c	9.67 bc	130.7 b	65.57 de	22.47 bc
S_3P_3	34.33 c	8.67 c	129.7 b	67.47 b-e	22.33 bc
S_3P_4	33.67 c	9.33 c	130.0 b	67.23 b-e	21.83 bc

Values within a column followed by same letter are not significantly different at Duncan ($P \leq 0.05$).
S_1, S_2 and S_3: Sowing dates May 14, July 5 and August 15, respectively.
P_1, P_2, P_3 and P_4: Plant density 20, 40, 60 and 80 plant per m^2, respectively.

Table 5. Mean square of planting dates and plant density on qualities parameters, seed yield and its dependents components.

S.O.V.	DF	Number of pod per plant	Number of seed per pod	1000-seed weight	Seed yield	Oil percentage	Protein percentage
Replication	2	485.44	0.02	0.72	2816.57	0.38	0.09
Planting dates (A)	2	2566.48*	0.21**	64.28**	63705.96*	7.72**	20.2599
Error	4	245.21	0.02	0.41	7954.10	0.16	0.22
Plant density (B)	3	1671.13**	0.02	0.44	113622.85**	1.34**	1.31*
A×B	6	113.54	0.03	1.58	6114.10	0.42	0.22
Error	18	136.31	0.02	0.81	6032.09	0.30	0.35
C.V. (%)	-	22.89	5.17	4.32	21.52	2.37	1.58

** and * respectively significant in 1% and 5% level.

Table 6. Mean comparison of planting dates and plant density on qualities parameters, seed yield and its dependents components.

Treatments	Number of pod per plant	Seed yield ($g.m^{-2}$)	Oil percentage	Protein percentage
Planting dates				
May 14	66.75 a	420.3 a	22.67 b	36.55 b
July 5	48.42 b	382.8 a	22.63 b	38.99 a
August 15	37.85 b	279.6 b	24.04 a	37.05 b
Plant density				
20 plants per m^2	69.97 a	282.4 c	23.46 a	37.75 a
40 plants per m^2	51.82 b	264.6 c	22.92 ab	37.56 ab
60 plants per m^2	42.06 b	388.5 b	22.67 b	37.00 b
80 plants per m^2	40.20 b	508.1 a	22.41 a	37.74 a

Values within a column followed by same letter are not significantly different at Duncan ($P \leq 0.05$).

Table 7. Interaction of planting dates and plant density on qualities parameters, seed yield and its dependents components.

Interaction	Number of pod per plant	Number of seed per pod	1000-seed weight (g)	Seed yield ($g.m^{-2}$)	Oil percentage	Protein percentage
S_1P_1	93.30 a	2.73 ab	19.90 b	391.14 bc	23.13 cde	36.66 bcd
S_1P_2	68.52 b	2.65 abc	20.13 b	304.9 cd	22.93 cde	36.58 bcd
S_1P_3	58.57 bcd	2.65 abc	19.97 b	403.9 bc	22.19 e	36.19 cd
S_1P_4	46.63 b-e	2.77 a	20.23 b	581.1 a	22.46 de	36.77 bcd
S_2P_1	62.40 bc	2.50 bcd	23.27 a	291.0 cd	22.89 cde	39.20 a
S_2P_2	48.27 b-e	2.55 abc	23.97 a	298.5 cd	22.41 de	39.05 a
S_2P_3	39.17 de	2.48 bcd	23.70 a	458.4 ab	22.21 e	38.70 a
S_2P_4	43.87 cde	2.28 d	22.93 a	483.3 ab	22.03 cde	38.91 a
S_3P_1	54.20 bcd	2.60 abc	19.00 bc	164.9 d	24.38 ab	37.30 bc
S_3P_2	38.67 de	2.42 cd	17.83 c	190.13 d	23.42 bcd	37.04 bcd
S_3P_3	28.43 e	2.55 abc	19.13 bc	303.3 cd	22.62 bc	36.10 d
S_3P_4	30.10 e	2.43 cd	20.23 b	460.0 ab	24.75 a	37.55 b

Values within a column followed by same letter are not significantly different at Duncan ($P \leq 0.05$).
S_1, S_2 and S_3: Sowing dates May 14, July 5 and August 15, respectively.
P_1, P_2, P_3 and P_4: Plant density 20, 40, 60 and 80 plant per m^2, respectively.

Protein percentage had significant effect under plant density in 5% probability level (Table 5). The maximum protein percentage had obtained for July 5 (38.99 %) and the minimum of that had observed for May 14 and August 15 (36.55 and 37.05 %). The most protein percentage had observed for 20 and 80 plants per square equivalent to 37.75 and 37.74 %) and the least protein percentage was obtained in 60 plants per square (37 %) (Table 6). The maximum protein percentage was produced at interaction of July 5 with 20, 40, 60 and 80 plants per square equivalent to 39.20, 39.05, 38.70 and 38.91 %, and the minimum of that (36.10 %) had obtained at interaction of summer delay planting date with 60 plants per square (Table 7).

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9/14/2012

Field Study of the 2008-2009 Red Tide in the Northern Strait of Hormuz

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Abstract: The catastrophic event of red tide has happened in the Strait of Hormuz, the Persian Gulf and Gulf of Oman from late summer 2008 to spring 2009. With its devastating effects, the phenomenon shocked all the countries located in the margin of the Persian Gulf and the Gulf of Oman and caused considerable losses to fishery industries, tourism, and tourist and trade economy of the region. In the maritime cruise carried out by the Persian Gulf and Gulf of Oman Ecological Research Institute, field data, including temperature, salinity, chlorophyll-a, dissolved oxygen and algal density were obtained for this research. Satellite information was received from MODIS sensor. Temperature and surface chlorophyll images were obtained and compared with the field data. The results obtained from the present research indicated that with the occurrence of harmful algal blooms (HAB), the Chlorophyll-a and the dissolved oxygen contents increased in the surface water. Maximum algal density was seen in the northern coasts of the Strait of Hormuz. Less concentration of algal density was detected in deep and surface offshore water. Temperature and chlorophyll satellite images were proportionate to the measured values obtained by the field method. This indicates that satellite measurements have acceptable precisions and they can be used in sea monitoring.

S. Hamzehei, A. A. Bidokhti, M. S. Mortazavi, A. Gheiby, M. Ebrahimi, F. Saraji. **Field Study of the 2008-2009 Red Tide in the Northern Strait of Hormuz.** *Life Sci J* 2012;9(4):4727-4733] (ISSN:1097-8135). http://www.lifesciencesite.com. 710

Keywords: Red Tide, Strait of Hormuz; Persian Gulf; Iran

1. Introduction

Harmful Algal Blooms (HABs), commonly known as Red Tide, is a sea phenomenon in which unicellular algae or cyanobacteria change the color of oceans and seas during a rapid and considerable growth. Such a phenomenon is generally harmless; however, some species endanger sea environment and human health under certain conditions. The phenomenon often broadly threatens vast areas of seas and oceans in the world.

During the last decades, an increasing number of HABs have been reported worldwide, and received a lot of attention due to their negative impact on the marine environment in which they occur (Hallegraeff et al. 2003). Over the last few decades, the coastal regions throughout the world have experienced incidences of HAB with potential threat to humans as well as marine organisms, owing to accelerated eutrophication from human activities and certain oceanic processes (Chu and Kuo, 2010).

HAB events are characterized by two main features; they are caused by microalgae and they have a negative impact on human health and/or activities such as fisheries, aquaculture, and tourism. Despite these common features, HABs are very diverse in terms of harmfulness, causative organisms, dynamics of blooms and types of impact. Other dinoflagellates can cause direct harm to or even kill marine animals, such as fish, although the precise modes of impairment to the animals are diverse and sometimes not known. One dinoflagellate which is well known for causing fish kills in Southeast Asian waters is Cochlodinium polykrikoides. Cochlodinium has been implicated in kills of wild and impounded fish around the globe (Onoue et al., 1985; Yuki, and Yoshimatsu, 1989; Guzmán et al., 1990; Qi et al., 1993; Gárrate-Lizárraga et al., 2004; Whyte et al., 2001) and has been the cause of fisheries losses exceeding $100 million in Korea (Kim, 1998; Kim et al., 1999).

Studies have also indicated that metamorphosis of oyster (Crassostrea gigas) larvae was slowed during Cochlodinium blooms (Matsuyama et al. 2001) and that mortality of larvae of the American oyster, Crassostrea virginica, was elevated by exposure to Cochlodinium (Ho and Zubkoff, 1979). The most common Cochlodinium species, C. polykrikoides, grows optimally at temperatures between 21 and 26 °C and at salinities between 30 and 36 (Kim et al 2004; Yamatogi et al., 2006). Cochlodinium is a mixotrophic alga (Larsen and Sournia, 1991; Jeong et al., 2004) and thus likely

employs flexible nutrient acquisition strategies during blooms. Moreover, since this alga is noxious to some planktonic grazers (Ho and Zubkoff, 1979; Shin et al., 2003), it may escape top-down control by zooplankton which most phytoplankton experience (e.g. Gobler et al., 2002).

The phenomenon occurs through the two different methods in the Persian Gulf, the Gulf of Oman and the Strait of Hormuz in both summer and winter. Generally, native species of Nuctolica family grow in summer and native species of Dinoflagiate family grow in winter.

The phenomenon does not usually lead to loss of aquatic animals in the Persian Gulf and the Gulf of Oman; yet, it has caused the deaths of aquatic animals and wild fish in this area during recent years.

Harmful algal Blooms caused by Cochlodinium polykrikoides algae started in September 2008 from south of the Gulf of Oman, stretched to other areas of the Gulf of Oman, the Strait of Hormuz and the Persian Gulf, and lasted more than nine months. This phenomenon caused the death of so many marine species, wild fish and brood aquatic animals in this area and left catastrophic effects on the domestic economy in these regions. Red tide killed hundred tons of fish, limited fishing, damaged the coral reefs seriously, left unfavorable effects on tourism in this area, and caused disorders in marine ecosystems.

2. Method of research

Data of the present research includes the data collected from the maritime patrol performed in the Persian Gulf and Oman Sea Ecological Research Institute from 24 to 29 February 2009 at the time the red tide occurred, CTD field data preformed in the south of Gheshm Island in November 2008, and field measurements carried out before and after this phenomenon.

In this research, data of each station, including temperature, chlorophyll-a, dissolved oxygen, salinity and algal density collected in each station has been used. The data obtained from MODIS sensor satellite was used to compare with the field data of the temperature and chlorophyll.

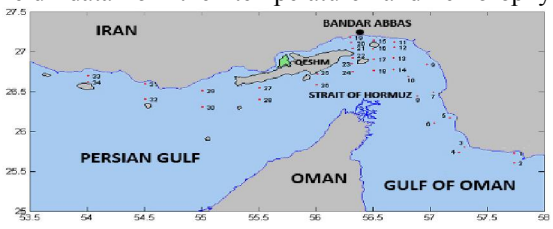


Figure 1: The Strait of Hormuz area and the stations studied in this research

Figure 1 shows the stations of the maritime patrol in the Persian Gulf, the Strait of Hormuz and the Gulf of Oman performed from 24 to 29 February 2009, considering L1, L2, L3 transects used in this research, marine parameters measurement stations in south of Gheshm Island in November 2008 and marine parameters measurement stations in Bandar Abbas coasts during HAB period. The chlorophyll and dissolved oxygen contents were obtained from the sensors installed on the CTD. Chlorophyll content and algal density were obtained experimentally in mg/m^3 and cell/l, respectively.

Finally, the field data of the stations and the satellite data were processed using Excel, Surfer and SeaDAS software. The results of the research were obtained using the assessment of diagrams and output forms of the software.

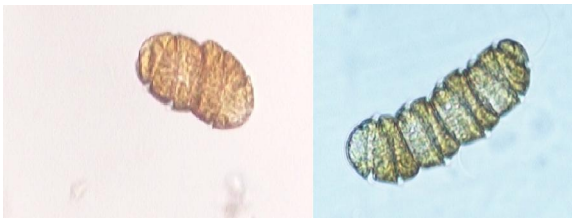


Figure 2: 2–cell and 4-cell chains of coclodinium polykorikodes caused red tide in the
Persian Gulf, the Strait of Hormuz and the Gulf of Oman in 2008-2009

Scope of study

Scope of study of the present research includes the north regions of the Strait of Hormuz. The Strait of Hormuz is where water of the Persian Gulf and water of the Gulf of Oman are exchanged.

Currents of the Strait of Hormuz are affected by the exchange of water between the Persian Gulf and the Gulf of Oman. Due to the counterclockwise movement of the current in the Persian Gulf that is generally caused by the density gradient, the current makes a reverse estuary in this area, similar to the Mediterranean Sea (Reynolds, 1993). The incoming current to the Persian Gulf runs from the north of the Strait of Hormuz and along the Iranian coasts toward the north of the Persian Gulf. There, due to the current movement of the Arvand River and the Coriolis force, the flow redirects to the south coasts of the Persian Gulf. It then moves along the Arabian coasts and toward the south of the Strait of Hormuz. During the course, due to high evaporation, its salinity increases and reaches 42psu. The high salinity of water increases water density. Consequently, the outflow of the Persian Gulf flows toward the depth and settles beneath the incoming current.

3. Results

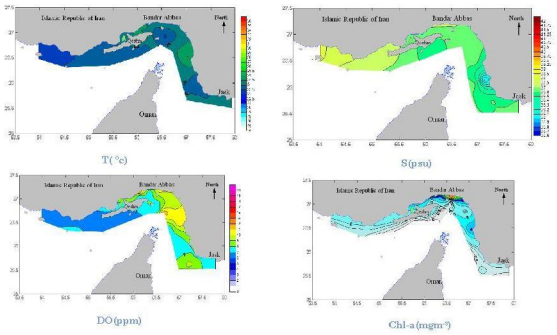


Figure 3: Surface distribution of temperature, chlorophyll, dissolved oxygen and salinity using the data obtained from the maritime patrol performed from 24 - 29 February in the north of the Strait of Hormuz

Figure 3 shows the surface temperature of the seawater measured in the maritime patrol performed 24 - 29 February. According to the Figure, the surface steady temperature is between 24°C to 25°C. Flowing toward the Persian Gulf, the surface temperature decreases. The surface chlorophyll of the seawater at the north coasts of the Strait of Hormuz is high. Flowing toward the Persian Gulf, The Gulf of Oman and central areas of the Strait of Hormuz, the temperature decreases. The dissolved oxygen in the north of the Strait of Hormuz is more than 10 ppm, which decreases in the surface water of the Persian Gulf and north water of the Gulf of Oman to 7ppm and 8ppm, respectively. Within the area under study, salinity of the Gulf of Oman is less than the one of the Strait of Hormuz and the Persian Gulf.

Density of Cochlodinium polykrikoides algae, the agent responsible for creating the red tide, has the most algal density in the north of the Strait of Hormuz. The density decreases in the north of the Persian Gulf and the Gulf of Oman.

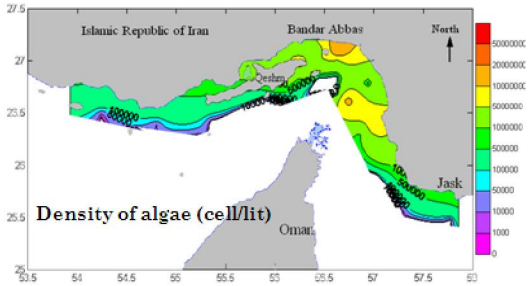


Figure 4: Surface distribution of the algal density of Cochlodinium polykrikoides using the data obtained from the maritime patrol of 24 - 29 February in the north of the Strait of Hormuz

The most algal density of the surface of water measured in the southeast of Bandar Abbas coast and east of the Hormuz Island is 20 * 10^6 cell/l. In these surface images, one is able to see the conformity of the surface chlorophyll distribution with the surface algal density distribution and surface oxygen.

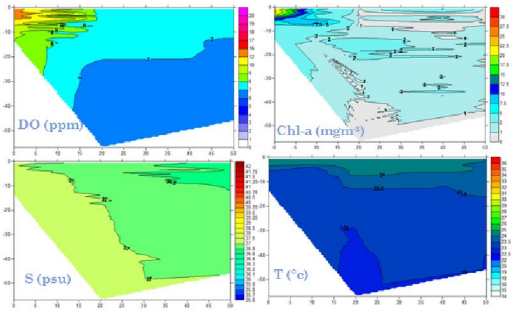


Figure 5: L1 transect, section of temperature, chlorophyll, dissolved oxygen and salinity using the data obtained from the maritime patrol of 24 - 29 February in the north of the Strait of Hormuz, Stations 19 to 24

Figure 5 shows the vertical section from the north of the Strait of Hormuz to the center of the Strait of Hormuz. In Figure 5, the vertical section, is shown by L1 transect. The Figure shows the steady distribution of water temperature with little thermocline gradient toward the bed in which the temperature varies from 23°C to 24°C. By moving from the north of the Strait of Hormuz to the depth of water and moving toward the center of the Strait of Hormuz, chlorophyll content decreases. It indicates that HAB density is extremely high in the north of the Strait of Hormuz. Water chlorophyll decreases in deep areas, which indicates that Cochlodinium polykrikoides algae content in deep water is more than the one in the surface water. Nevertheless, the differences in different regions of this transect indicates that distribution of HAB agent algae in different surface and deep regions is different. In addition, the chlorophyll content in water with the depth of 20 to 30 meters is more than the one in the surface water.

Oxygen distribution in this transect is similar to the one of chlorophyll. The only difference is that oxygen distribution is steadier. The oxygen content in the north of the Strait of Hormuz is high; however, its content in the center of the Strait of Hormuz is normal. The high concentration of oxygen in the north of the Strait of Hormuz can be attributed to the production of oxygen due to the photosynthesis of the red tide algae during the day. Such measurements have already been carried out during the day.

Distribution of salinity shows that water of north of the Strait of Hormuz is a little saltier than the

one of the central parts of the strait. The amount of salinity increases in deeper areas. The incoming current flowing into the Persian Gulf has made water of the central area of the Strait of Hormuz less salty.

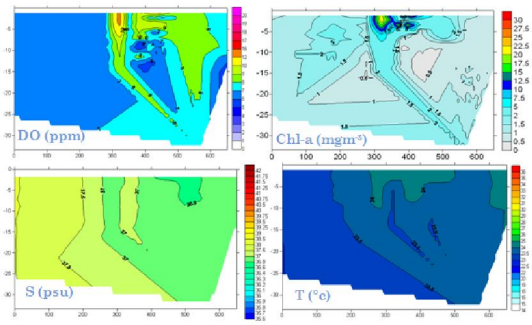


Figure 6: L2 transect, a vertical section of temperature, chlorophyll, dissolved oxygen and salinity using the data obtained from the maritime patrol of 24 - 29 February in the Persian Gulf toward the Gulf of Oman in stations close to the coastal regions of the north of the Strait of Hormuz

Figure 6 shows L2 transect which is a vertical section of the Persian Gulf toward the Gulf of Oman in stations close to the coastal regions of the north of the Strait of Hormuz. In this transect, temperature distribution shows that temperature of the coastal regions of the Persian Gulf close to the north of the Strait of Hormuz is less than the other regions. A gentle gradient of thermocline with little temperature changes is seen in some areas of the Strait of Hormuz.

Chlorophyll content in the regions close to the north coasts of the Strait of Hormuz exceeds 20 mg/m^3 whereas in the other regions of this transect in the Persian Gulf and the Gulf of Oman, the content of chlorophyll decreases. Chlorophyll content decreases in deep regions.

The dissolved oxygen content in the north surface regions of the Strait of Hormuz exceeds 12 ppm, which is the most amount of the dissolved oxygen. The dissolved oxygen content in the Persian Gulf, the Gulf of Oman, and deep waters decreases to 7 ppm, 8 ppm, and 5 ppm, respectively. In the center of the Strait of Hormuz, at the depth of 10m to 20m, there is a region in which the oxygen content reaches less than 6ppm. The region is located in an area where the oxygen content is high; the reason may be lack of photosynthesis of algae, as the algae of the upper layers prevent sunlight to reach the beneath layers. As oxygen is consumed during the day, the phenomenon requires the least amount of oxygen early morning.

L3 transect shows the vertical section of the Persian Gulf to the Gulf of Oman in the offshore stations of the north of the Strait of Hormuz.

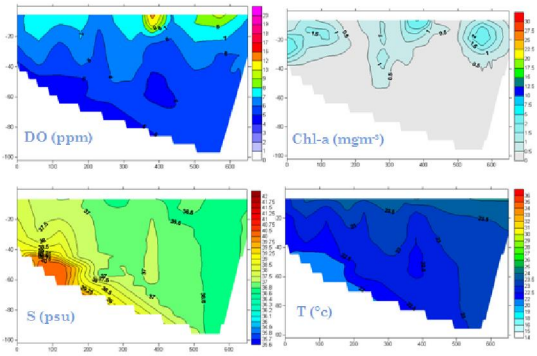


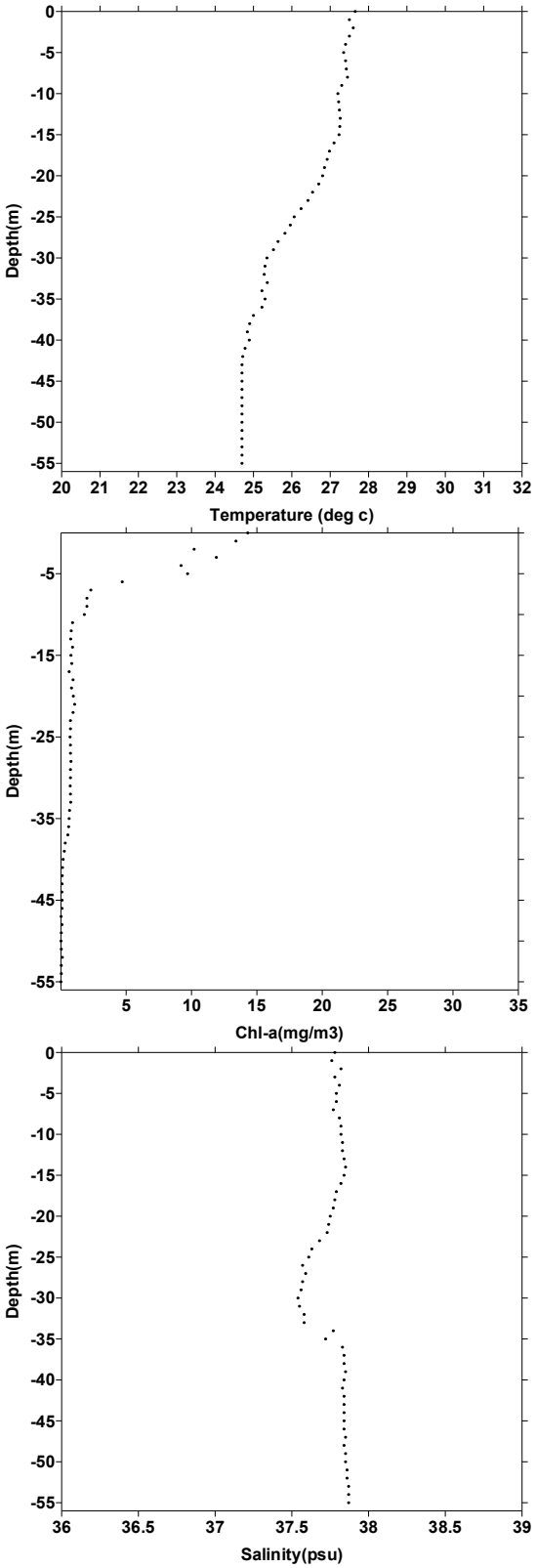
Figure 7: L3 transect, a vertical section of temperature, chlorophyll, dissolved oxygen and salinity using the data obtained from the maritime patrol of 24 - 29 February in the Persian Gulf toward the Gulf of Oman in the offshore stations of the north of the Strait of Hormuz

Temperature distribution in this region is in a way that the steady stratification is seen in the temperature. With the increase of depth, the compressed temperature stratification in the Persian Gulf is stretched to the extended stratification in the Gulf of Oman and thermocline becomes weaker and deeper.

The chlorophyll content in this transect is less than the one in L2. Regions with high amount of chlorophyll are only seen in a scattered way in the Persian Gulf, Strait of Hormuz and the Gulf of Oman which is consistent with the satellite images in Figure 8.

The dissolved oxygen content is higher in the surface water; however, it is lower in deep water of this transect. The most concentration of the dissolved oxygen is in the center of the Strait of Hormuz, which exceeds 12ppm. The oxygen and chlorophyll contents are consistent. In this vertical section, by moving from the Persian Gulf to the Gulf of Oman, the amount of salinity decreases. By moving from the depth of the Persian Gulf to the depth of the Gulf of Oman, salinity decreases severely; it decreases from 40 psu at the depth of the Persian Gulf to 36.8 psu at the depth of the Oman Sea.

Figure 8 shows the data measured in south of the Gheshm Island in November 2008. The Figure 8 shows the decrease of temperature from 27.5°C at the surface to 25.5°C at the depth of 40 meters. Chlorophyll content is 14 mg/m^3 at the surface; it reaches 2 mg/m^3 at the depth of 10 meters and closes to zero at more depths. Water salinity is 37.8 psu at the surface of water. Due to the incoming current into the Persian Gulf, salinity decreases to 37.5 psu. At the depth of 40m, it increases again and reaches 38 psu.



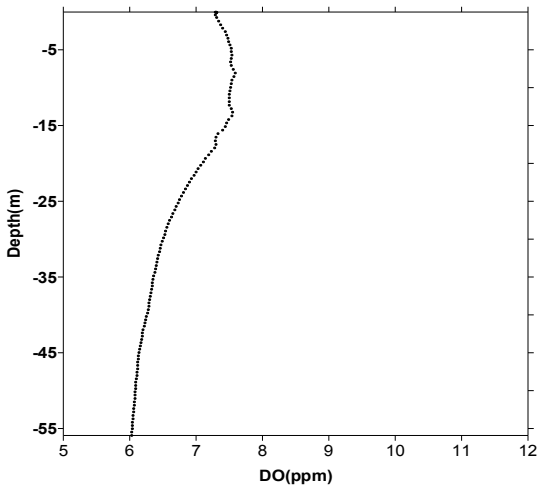
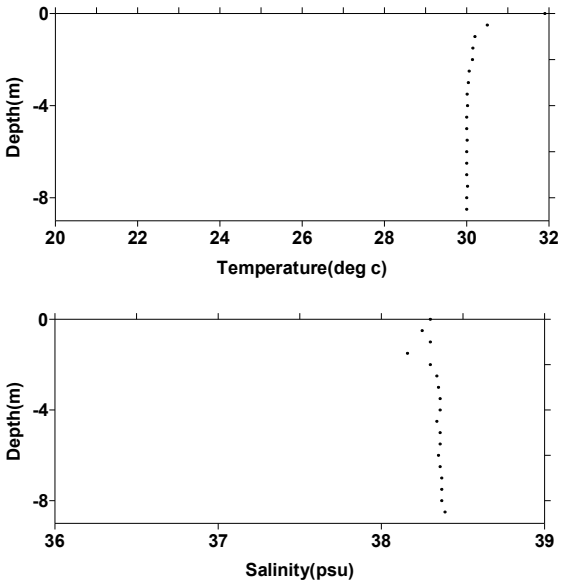


Figure 8: Measured CTD data in south of the Qeshm Island in November 2008

Parameters measured in an area close to the Bandar Abbas coasts show that water temperature at the surface of water decreases from 31.5°C to 30°C at the depth of 2m. The same temperature (30°C) is maintained to the bed.

Chlorophyll contents of the seawater decrease to 34 mg/m^3, 2 mg/m^3, and 6 mg/m^3, respectively. The dissolved oxygen at the surface of water, at the depth of 2m and 4m are 10.8 ppt, 8 ppt, and 6 ppt, respectively; this trend is proportion to chlorophyll. Salinity of the seawater slowly increases from the surface to the depth.



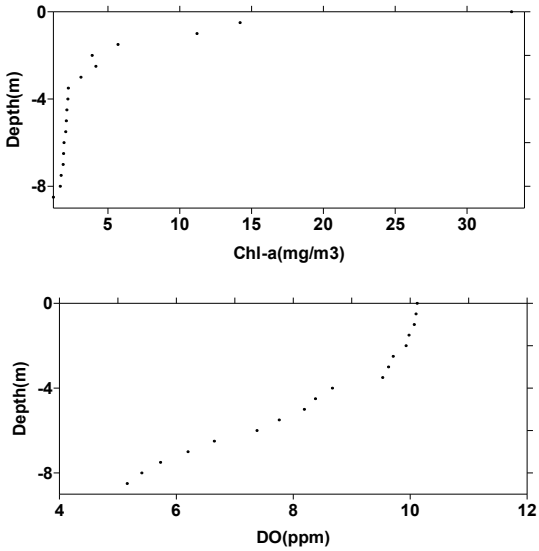


Figure 9: Measured CTD data in south of the Bandar Abbas coast in November 2008

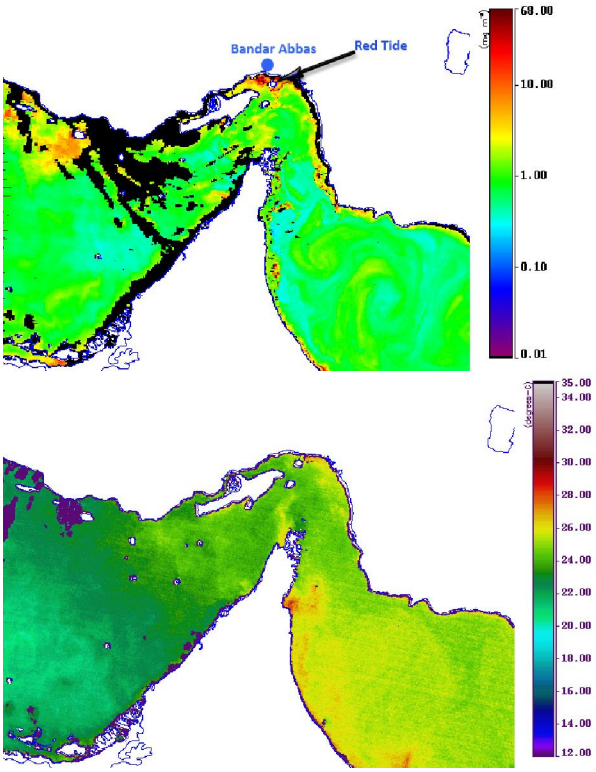


Figure 10: Satellite images of temperature, and surface water chlorophyll, on 29 February 2009 using MODIS sensor data

In addition, satellite images drawn by SeaDAS software shows that the highest temperature of the surface water in the north water of the Strait of Hormuz belongs to the east of Badar Abbas coasts where the chlorophyll content is high. By moving toward the Persian Gulf, temperature drops and chlorophyll content decreases. In the eastern regions of the Strait of Hormuz, the temperature is lower than the one of the center of the Strait of Hormuz. However, high chlorophyll content in the eastern coasts located in the north of the Strait of Hormuz can be seen as a narrow strip on the coastline. This issue shows that the algae concentration in the eastern coast of the Strait of Hormuz is more than the other regions, which may be due to more nutrients in this region and entering such materials through the industrial and urban sewage.

4. Conclusion

With respect to the results obtained in this study, one is able to conclude that consistency of the chlorophyll-a distribution, dissolved oxygen and algae (the agent responsible for creating the red tide) in the studied stations and satellite sensor chlorophyll images can be studied. The achieved consistency can be attributed to the availability of chlorophyll in algae, photosynthesis action, and oxygen generation.

The most distribution of algae and chlorophyll-a can be seen in the surface water of the north of the Strait of Hormuz and south and east of Bandar Abbas. This indicates that nutrients are abundant to feed algae and there are appropriate physical and biological conditions for them to grow in this area.

Chlorophyll content and algae distribution were measured by the stations. Satellite images confirm that algae density in nearshore area is more than the one in offshore areas, which indicates that the growth conditions of the algae in the water close to the coastline is more appropriate, as nutrients and oxygen contents are more.

Chlorophyll distribution in the vertical section and surface to depth diagram indicates that HAB density decreases from surface to depth. Because light, nutrients and oxygen contents in deeper waters are far less than the surface water. These conditions limit the growth and living of the algae.

The oxygen content in the north of the Strait of Hormuz and in areas with high concentration of HAB is high. This can be attributed to the generation of oxygen due to the photosynthesis of algae, which is responsible to create red tide during the day. However, the similar measurements carried out during night and early morning prove the opposite and indicate that the algae consume oxygen during the night. Consequently, the oxygen content is reduced.

In the central areas of the Strait of Hormuz, the chlorophyll content at the depth of 20 to 30 meters is a little more than the surface of water. This indicates that there is a limited area, which is

appropriate for the algae to grow and there are some constraints for their growth.

Acknowledgments

We would like to thank all the technical and scientific staff of Persian Gulf and Oman Sea Ecological Institute. The satellite data is from the ocean color website.

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9/6/2012

The effect of wave parameters on the current patterns and sediment transport in the Inlets

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Abstract: Hydrodynamic factors such as waves and currents play significant role in the inlets morphology changes. Therefore, recognizing their roles, as the transference processes, plays an effective role in detecting the geometry, as well as, the forms of shores and inlets. Wave is a hydrodynamic factor and wave break in shallow water of inlet portal causes the transfer of some shore currents and sediment to this zone. This research focuses on, the performance of relevant parameters such as, wave height, direction, wave period and its effect on the sedimentation pattern, and erosion in the inlet. For this purpose, a basin is simulated with irregular meshing and the dimension of 10 to 50 m using the Mike software. Regarding the height effect, first, the waves are reflected by various heights and constant period as cross- shore. Then, for studying the role of wave ray angle the waves sent to the inlet with constant height and period under various angles. Finally, to investigate the effect of wave period, the wave appears to be reflected to the inlet with constant height under various periods as cross-shore. The results obtained from the simulation show that the change of wave height has a significant effect on the current pattern and sedimentation. The speed of current as well as the volume of transfer sedimentation in the channel increase with increasing in the wave height. In addition, by changing the wave reflection angle against shore line, the current pattern and sedimentation are changed in the inlet and its sides. However, the period of wave has no significant effect on the pattern and current rate and sedimentation.

[M. Sadatkiaee, A. Karami-Khaniki, A. Aliakbari-Bidokhti. **The effect of wave parameters on the current patterns and sediment transport in the Inlets.** *Life Sci J* 2012;9(4):4734-4739] (ISSN:1097-8135). http://www.lifesciencesite.com. 711

Keywords: Estuary; wave height; ray angle; wave period; wave break down; sedimentation; erosion

1. Introduction

Inlets play an important role in marine transportation, as the connection between free water and channels and gulfs of which a wide, deep and permanent channel is of great importance. These marine channels are complex due to various factors of hydrodynamic and sedimentation. Ebb and flood, from one hand, and the energy of the waves, on the other hand create an active sedimentation environment in the inlet. Therefore, inlets play significant role in controlling the sediment movement of and its distribution in the local and regional areas. Hydrodynamic parameters of inlets such as waves and marine currents are important factors in determining the geometry and form of shore in the inlet. Seasonal changes of waves

And marine currents and their permanent interference in the inlets have significant effect on the morphology of inlets. Sediment accumulation in the portal and channel of inlets, causes shallowness and difficulties in the floats passage, and should be periodically removed. Exact recognition of alluvial process in the inlets not only helps their optimum use but also reduces the cost of their maintenance as well as that of protective projects. Several researchers have studied the hydrodynamic behavior of inlets and some of which are referred in the following.

Leeuwen et al. (2002) studied a rectangle basin connected to the ocean through a shallow inlet using a physical model. They investigated the effect of Coriolis force in two statues: cross shore current and long shore current. (Leeuwen et. al., 2002). A result of this study is the formation of vortex currents in two sides of mouth of the inlet that is due to the tide and ebb currents and their frictions with the walls of two sides of inlets. He concluded that Coriolis force has no significant effect on the vortices from.

Militello et al. Modeled an ideal inlet with 5 m depth. The pond's dimensions were 5km×1.5km. The dimensions of inlet and gulf as well as the assumed channel were almost as those of Shinnecock inlet in New York. This study showed that the waves flow caused sedimentation in the jetties up drift. The breaking down of waves on the ebb delta will cause its erosion. The morphology of inlet and up drift sides of ebb delta are changed by changing the

direction of ebb currents. Therefore, wave, ebb and tide current and sedimentation transfer, all together, make an ideal inlet (Militello et al., 2003).

In another research, Karami Khaniki et al. (2011) studied the current model and sedimentation due to cross-current in the inlet portal. For this purpose, they simulated a shore basin, connected to the open sea, in Mike 21 software. They applied an unstructured flexible mesh with the dimensions of 10 to 50 m in a finite difference model with 1 s time step. In this simulation, the wave with 1.5m height and 8 s period was of as cross shore current and the current velocity and sediment transfer are calculated in various parts of inlet. The results of simulation showed the current field in the portal as four vortices in the up drift and down drift of the inlet. These vortex currents cause corrosion and sedimentation in different parts of inlet.

Fachin et al. (2002) investigated the effects of wave angle, height, undertow current load location and wave energy on the shore. The results showed that the bed changes depend severely on the wave angle. The cross-shore currents produce reverse loads and the waves that are directed obliquely conduct the shore currents to the coast and cause partial changes in the form of bed.

The above vortices are observed by Kennedy in two sides of return current as well (Kennedy, 2003). He believed that the high velocity of return current in the portal of return channel was due to a pair of strong vortex existed in the two sides of portal.

Plecha et al. (2011) studied the effect of wave on inlet morphology through numerical simulation. They analyzed the bed changes, sediment flow and bed changes rhythm for 8 waves in the bed. According to the obtained results the effect of simulated waves is shown only in the inlet and near shore. The bed changes and sediment transfer depend on the wave height rather than the wave frequency. These results can be achieved by analysis of each wave separately as well.

2. Materials and methods:

The used model

To achieve the purposes of the study, Mike 21 modeling software is used which has been established and improved by Danish Hydraulic Institute in cooperation with Water Quality Institute. This software has high calculative and graphical capabilities in modeling shore complex processes in shallow regions, gulfs and seas.

The module used in this study is Coupled Mike 21/3 of software box that is a dynamic modeling system for shore applications in the estuaries and river area and inlet. Couple Model FM sub sets – including hydrodynamic module or hydrodynamic (HD), sand transport (ST) and spectral wave (SW) are used for modeling sediment transfer the wave which is the main module based on calculation components. Hydrodynamic (HD) concludes ebb and flood, river, wind, currents due to wave, storm transposition and tidal currents. The changes in water level as well as currents can be studied by this module. It should be mentioned that this modules can simulate the currents in a one- layer liquid. The currents are of tidal and those due to the wave or a composition of both. In this study, 2-D model of current is used in HD module based on shallow water equations and momentum in which the averaged equations of Navier Stock are integrated in a non-compacted form. ST model is used to investigate the transfer of non-cohesive sediments under the effect of flow and wave. This model is used to calculate the changes of non-cohesive ST under the effects of wave and current. Wave module or SW can simulate growth rate, reduction and transfer of waves from far or near distance of the shore, Dura waves concerning shallowness, reflection and differentiation.

Design and implementation of the model basin:

Here, the effects of height, period and wave reflection are studied on the pattern of the current due to wave and their influences on the sedimentation and erosion in the inlet. In this regard, a basin with 3500 m length, 2200 m width 0.0023 bed gradients and 300 m inlet width are used. The dimensions of bed are shown in Fig.1 and its topography and mesh, to be used in the numerical simulation, in Fig 2. The mesh of basin is irregular with the triangular element of the dimension of 100m in the basin and 25m in the channel. The time step and total time for performing the model are 1s and 12 h, respectably. The sediment is non-cohesive with the diameter of 0.2mm.

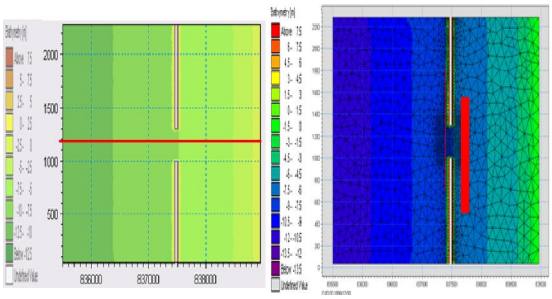


Fig1: The studied inlet (section 1) Fig 2: mesh Model (section 2)

The effects of wave parameters, height, direction and period have been studied on the flow

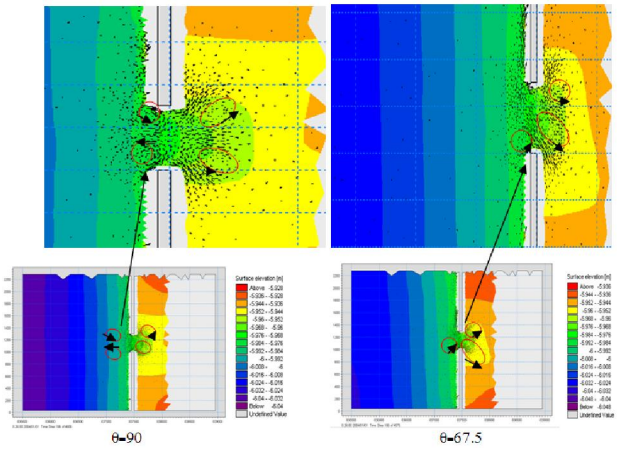
models and sedimentation in inlet in, 3 stages. Regarding the height, first, the wave is reflected as cross-shore current with various heights and constant period. Then, the direction effect of the wave is above mentioned evaluated it in various directions. Finally, the wave with is reflected as cross-shore to investigate the effect of wave period on the flow model and sedimentation. The variables are shown in the below table (table1).

Table 1: The properties of the wave entering to the inlet

angle of wave (degree)	Wave period (s)	Wave height (m)
90	8	0.75
90	8	1.5
90	8	2.2
0	8	2.2
22.5	8	2.2
45	8	2.2
67.5	8	2.2
90	8	2.2
90	6	2.2
90	8	2.2
90	10	2.2

3. The results of simulations

Fig.3 shows the velocity distribution of the flow due to the angle change of the wave with 2.2m height and Fig. 4 shows the distribution of resulted bed changes. Fig. 5 shows the speed components due to the changing of wave reflection angle along the section 1 and Fig 6 shows the in section 2. Figs. 7 show Bed level change due to changing the wave angle in section 1, 2. Figs. 8 show Velocity changes of wave current and bed level changes with various heights in section 1. Fig.10. A show the distribution of bed changes and Fig.10. B show time series of the changes rate of the flow velocity for various periods in section 1.



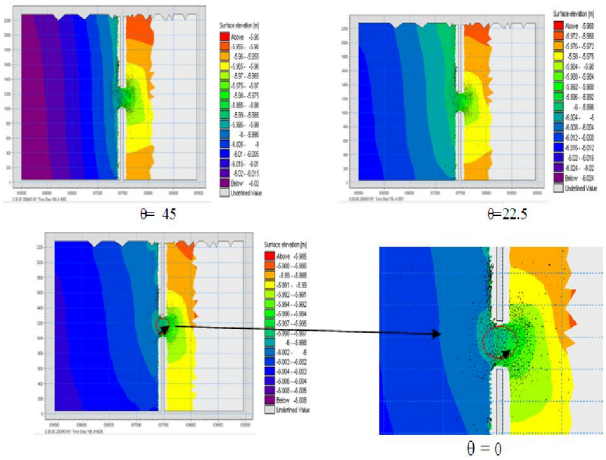


Fig. 3: The changes of water level distribution with velocity vectors cross shore under various wave ray angles

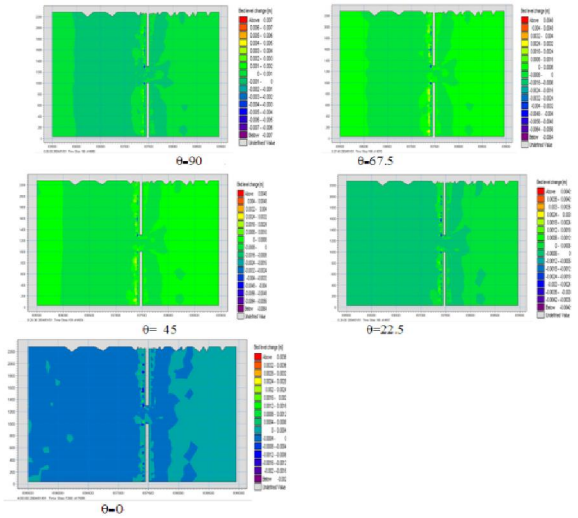


Fig. 4: The rate of bed changes under various reflection angles

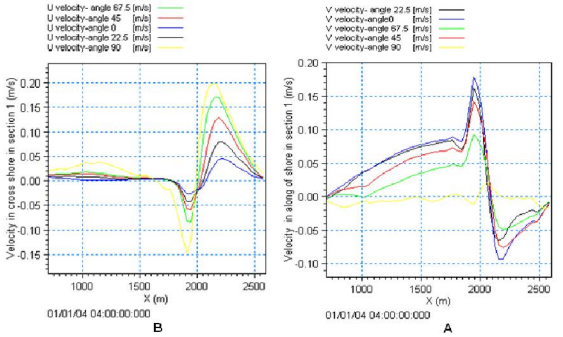


Fig. 5: The velocity components due to changing the wave reflection angle along section 1 A. Velocity components in long shore and B. Velocity component in cross shore current

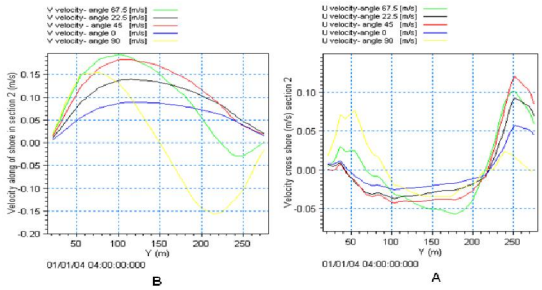


Fig. 6: Velocity change due to changing the wave angle in section 2
A. Cross shore current and B. Long shore current

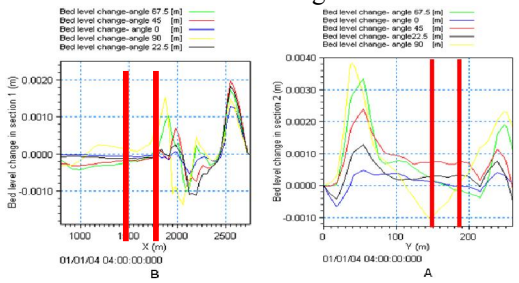


Fig. 7: Bed level change due to changing the wave angle (channel is shown in red lines)
A. Bed level changes in section 2 B. Bed level changes in section 1

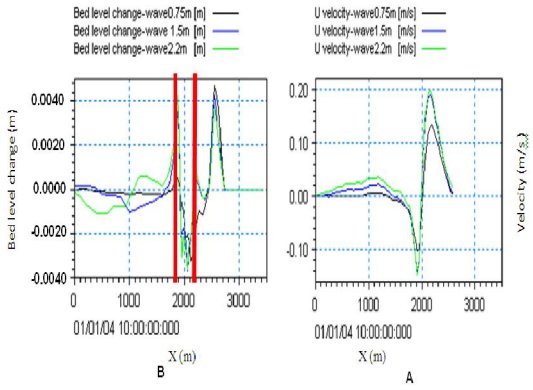


Fig. 8: Velocity changes of wave current and bed level changes with various heights in section 1 (Channel is shown in red lines)

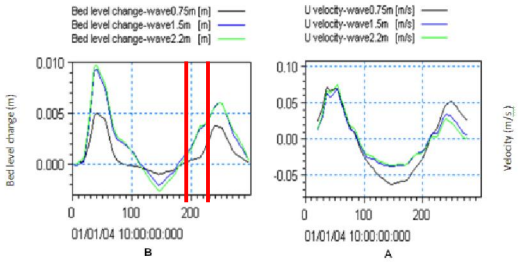


Fig. 9: Velocity changes of wave current and bed level changes with various heights in section 2 (Channel is shown in red lines)

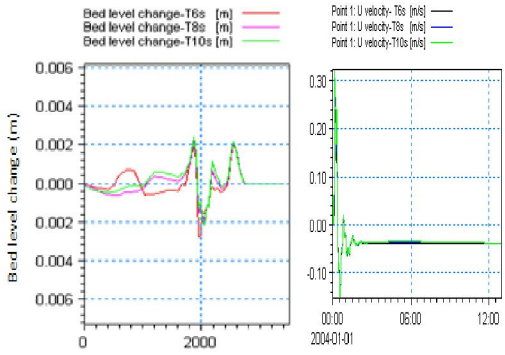


Fig.10. A: The distribution of bed level changes for various periods Fig.10.B: Time series of the changes rate of the flow velocity in section 1

Calibration:

Fig.11 shows the changes H_0/L_0, a symbol of dimension less height of the wave flow to the parameter without H0/WT. In this figure, the results of the model (Fig. 11 A) are compared with those of field studies (Fig. B).

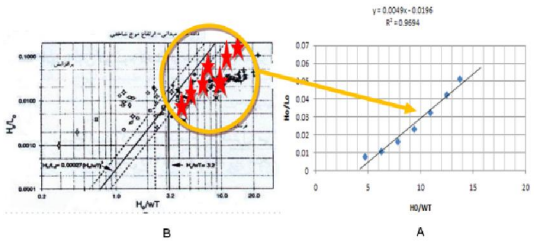


Fig. 11: A. Pre- erosion searcher in the channel by using the results obtained by the model B. Pre- searchers of erosion and accretion using field data (Kraus, 1992).

Fig. 11: B shows the results of field investigation. The assumed plotted lines; attributing 10% transformability in the wave height is depth index (Hs) wave current period index (T_s) and grains settlement velocity (w_s) (H_0,T and w in the figure).

First, the following simple predictions are proposed:

$\frac{H_{0,s}}{w_s T_s} < 3.2$ (Accrétion)

$\frac{H_{0,s}}{w_s T_s} \geq 3.2$ (Erosion)

Then, the diagonal line was replaced by this criterion in Fig 11.

The points shown in Fig. 11 A are obtained based on regression coefficient of 0.96 which have proper consistency with the field studies (Kraus, 1992). They indicate the reciprocal relationship between channel erosion and the reflection wave height, and good fitness with the field data in Fig. 11 B.

4. Discussion and conclusion

A. The effect of wave attack angle

According to Fig.3 the wave moves as cross shore current towards channel. As the water is swallowed, the wave is broken and enters the portal with high velocity. The direction of wave is changed when it exits from the portal. The velocity component is dominated in the cross direction and causes two vertices in two sides of the channel. Also the torsion radius of the vortices and therefore the flow velocity in the shore side is higher than sea side (Fig. 4B).

Sedimentation model acts according to flow model. As is shown in figure 9 A, the current takes out the sediments from the mouth during the breaking of wave, and accumulates them in two sides of the portal. Then they are vertically conducted toward sea and inside the basin by vortices to from tidal and ebb deltas. By shifting the reflection angle of the wave toward inlet portal, the current velocity is divided into two components: cross shore current (U) and long shore current (V).

According to Fig. 5 A, B. by reducing reflection angle to 67.5, the side flow becomes stronger and flow to the mouth increases. This will result in the reducing the velocity, weakening the sea vortices and strengthening the shore vortcies. According to the sedimentation model, the ebb delta is stronger than tidal delta. If wave angle is 45 degree, the velocity and shore current will increase which takes more water and sediment to the shore. In this case, the length of erosion and the height of ebb delta have their maximum values (CEM- part 3-chapter 2). By reducing the reflection angle to 22.5, sea vortices and shore current will have the same direction the sedimentation model acts as current model. If the reflection angle is zero, shore current plays an effective role in water transport, sedimentation and ebb delta forming. Strong by passing currents are formed in front of it and a single vortical current in the east of the inlet. The sedimentations are formed in the sea side. However, in section 2 by increasing the angle, the velocity and shore current (cross current component) increase and the sediments are formed in the down drift (Figs. 12, 13).

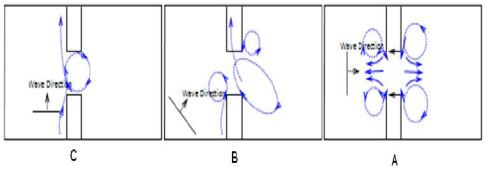


Fig. 12: The effect of wave direction on the current model in the inlet

A. Cross shore current; B. the wave with 45 degree angle to the shore line; C. long shore current

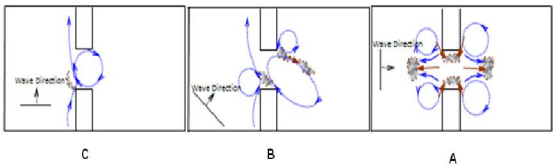


Fig. 13: The effect of wave direction on the sedimentation model in inlet

A. Cross shore current; B. Wave with 45 degree angle to the shore line; C. Long shore current

The effect of wave height

The simulation results showed the current pattern in the mouth under the effect of cross shore current in the form of four vortices in the up drift and down drift of the inlet. These vertical currents cause erosion and sedimentation in various parts of inlet and its model is shown in Fig.3.A.

According to this figures, increase of the height has no effect on current pattern. However the velocity and radius of vortex increase by increasing the wave length and the breakdown point of the wave is shifted toward the channel portal (sea side). Also, the vortices penetrate further into the mouth inside their radii. However the vertical velocity towards the sea is less than that of the shore. In other words, while shore eddy vortices become stronger, the main sea vortices are weakened and move towards the shore.

The sedimentation performance of the inlet is similar to Fig 4A. Based on this figure, the vortices formed in four corners of the inlet cause transportation of water and sediment from four sides to the portal center. The sediments are settled in the center of the portal due to the low velocity of flow there, resulting in swallowing. It should be mentioned that current are towards the sea and inside the basin as cross-current after settling the sediments in the portal. The wave breakdown causes the shallowness in the portal and the sediments transported by the vortices are delivered towards the two sides of the inlet channel creating ebb and tidal deltas. In addition, sedimentation is formed in the latitudinal sides of the channel. By increasing the wave height, the sedimentation and erosion height are increased in both longitudinal and latitudinal sections. The changing in the wave height will cause the change of current pattern in vertical cells of the region near the shore.

The effect of wave height change on the erosion and sedimentation in the longitudinal section of channel (in section 1) is shown in Fig. 14. According to this figure, by increasing in the wave height, the heights of up drift and down drift deltas of the inlet increase and their peaks proceeds toward deep water. However, the hole created in the center

of portal becomes deeper and it tends towards the deep water. It should be mentioned that the velocity of inflow is higher than that of outflow. This shows that the volume up drift delta is more than that of down drift (Fig. 14).

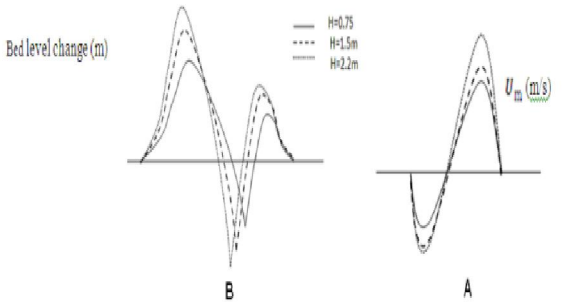


Fig. 14: The effect of wave height on current model and sedimentation

A. Velocity changes of wave flow. B. The changes of bed for the wave with various heights

The relationship are obtained between sediment problems wave properties (Period and height) by numerical modeling results and shown in Table 2.

Table 2: Length, width and height equations of sedimentation and erosion before and after the mouth obtained through simulation results

equations	before of the mouth	In the mouth	after of the mouth
Eq. Length	$L_1 = 6.4881H_W^{0.656}$	$L_2 = 1.01H_W^{-0.183}T_W^{0.61}$	$L_3 = 14.31H_W^{0.51}$
Eq. Width	$Y_1 = 6.488H_W^{0.656}T_W$	$Y_2 = 5.186H_W^{-0.384}T_W^{1.1}$	$14.012H_W^{0.605}T_W^{0.6}$ Y_3
Eq. Height	$51H_W^{0.267}T_W^{0.103}$ $D_1 =$	$D_2 = 0.251H_W^{0.872}T_W^{-0.}$	$1.108H_W^{0.294}T_W^{0.294}$ D_3

Where, L_1, Y_1, D_1 are the length, width and height of sedimentation, respectively, before the portal; L_2, Y_2, D_2 are length, width and erosion, respectively, in the mouth; L_3, Y_3, D_3 sedimentation height after the portal in m; Hw is wave length in m; and T_w is wave period in seconds. According to these equations by attacking long waves to mouth, the vortex velocity increases. Moreover by improving the vortexes, the sedimentation volume increases in the up drift and down drift of the channel. The erosion also increases inside the channel causing the improvement of shallowness in inlet, namely in up drift.

C. The effect of wave period

According to Fig. 10, changing in wave period has no significant effect on the, current pattern and sedimentation. Although the velocity and bed level increase.

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9/6/2012

The survey of design, implementation process and evaluation of educational animation

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Abstract: Animation is one of the most interesting visual phenomena educating scientific realities as descriptive and in the form of imaginary stories to the learner. Providing the scenario and selecting effective characters in an educational animation can facilitate the education of complex and abstract concepts. Today, there is some software to provide 2-D, 3-D and probe-based animations facilitating the complex operation of providing animation. Animation affects sight and hearing senses for better and rapid learning of the concepts. The researchers by being inspired of learning theories can present suitable theoretical basics to increase the abilities of animations in learning and teaching process. To provide and produce effective animation in education, we should consider design, execution and evaluation of educational animations. Thus, the main purpose of this study is to determine a good structure to provide an effective educational animation. This study was done by quality method and Delphi method was used for data collection. In this method, the comments of specialists were collected for three stages and after the conclusion was presented in a checklist with 23 items in general stage of design, 59 items in special stage of design, 6 items in production and execution stage and four items in evaluation of the animation. The review of literature of the previous studies on key points was determined in this study to consider in design, execution and educational animation evaluation process. In this study, the concept of educational animation and its characteristics, learning-teaching theories and the studies are determined and the conclusion and discussion are presented in this regard.
[Zahra Jamebozorg, Mohammad Salimi. **The survey of design, implementation process and evaluation of educational animation.** *Life Sci J* 2012;9(4):4740-4749] (ISSN:1097-8135). http://www.lifesciencesite.com. 712

Keywords: Animation; educational animation; design process; execution; evaluation

1. Introduction

In traditional systems, "education" was considered only the basis of the growth of talents and only the teachers were used who considered the book as the main information source. Today, by replacing the word" Learning", learning is with the methods, tools and new communication environments. The recent progresses in computer industry and ICT, the emergence of multi-media facilities and communicative technologies presented new methods for the designers, planners, managers and executers (Afzalnia, 2005). These changes had considerable influence on learning-teaching process by changing the role of learners, the change of the role of teachers, more participation of students with their peers, the increase of using extracurricular resources, the improvement of design skills and presenting the items. What makes computer-based educational programs different from other programs and media are their abilities in creating animated displays and symbols facilitating learning and it increased the use of printing, graphic, type and access to information resources and this increased the fame of this media in learning. Today, producing computer –based interactive educational programs by receiving response from the learner and providing comparative and descriptive feedback of it, improved the attractiveness of these programs. In this environment, the perception and receiving the scientific complex concepts as deeper and easier by the combination of voice, image, animation, and graphic are provide (Roblyer, Edwards, 1997). Animation as a dynamic multi-medium by involving more than one sense, had great influence on learning. The studies showed that multi-media spaces provide the information in the form of animation, voice, photo, picture, graphic and text for the user, by increasing the productivity, create quality and fundamental change in learning process. Explosive growth of compact disk systems and multi-media software in all educational level showed this claim. It seems that in our country, compared to other social life aspects, the education is less affected by new technology changes. Although during the recent years, the education is not ignored by these changes and these changes are not consistent with the up-to-date changes and its high capacity. It should be considered that using technology in education can have some disadvantages. There are some studies to reduce these disadvantages and effective use of this technology in various countries. Based on the results of this studies and attempts, some standards are formulated helping the effective use of abilities in education. In this paper, animation is investigated as a technology-based education

method and a media. Then, design, execution and evaluation of animation stages are discussed for effective use of its abilities and capabilities.

Educational animation and its characteristics

One of the most important applications of animation is using it in education. When learning and teaching are raised, animation can has effective help in this process. When data are transferred orally or are written on the board, only the speech transfers the contents in one dimension and as its images and charts are used, in two-dimensions, the required data are observed. By using design and information in three dimensions and even four dimensions, we can observe a complex and abstract scientific-empirical process. Animated images not only are attractive for the children but also help considerably the adults in receiving the items. Animation can display scientific realities of basic sciences as physics, chemistry and math as real or present these realities in the form of imagination and storytelling. This method is more attractive for children and adolescents. The definite example of these works is magic bus soap opera in which the children get smaller with their teacher and enter with a bus into the human being body and observed its various parts. Thus, animations can display the items that can not be observed. Thus, education with animation is a new science and needs considerable studies and investigation. The negative and positive effects are used in the studies (Alamdari, 2010).

According to the views of Schnutz Volv (2003) the concept of educational animation is defined by three various levels as technical, semiotic and psychological.

Technical level is any technical tool being used to produce or transfer animated symbols. With the change in computer graphic industry, various tools were given to the designers by which we can use for the production and display of various and interactional educational messages.

Semiotic level is any animated symbol being transferred in the animation and psychological level is the conceptual and cognitive processes of the learner being used during the observation or understanding animation (Rahimidust, 2011).

Animation, namely computer animation is used for its easy application for educational aims including educational applications of animation as:

- The display of phenomena, rules and principles
- Attraction
- Using symbols to directing the consideration of the learner to important educational items

Learning practice via practice

Attractive animations can make the abstract concepts as educating the electromagnetic waves more meaningful in the mind of the learners (Unal, 2010). Via the animations, we can help the learners to describe the real world conditions. According to Shaker (2002) these technological tools help the students to measure some of the quantities and design some models in their mind. This causes that they reduce their negative views to complex concepts learning. Their excitation is increased for learning. In addition, by animation we can improve the understanding of the students and focus-based skills. The animations target most of the senses of the students including sight, hearing, and reading. Thus, the achieved knowledge is more permanent by this way (Azadmir, 2006).

According to Najar (1996), the animations give 3-D thinking skill to the students. Thus, they understand the concept rapidly and focus more on key data. Educational animations by giving the items can be classified as interactive or non-interactive. In the first type, the learner via the mechanisms being designed can communicate with animation, can change the size, value, display speed and reviewing the difficult parts. In non-interactive animations, the images are shown by similar speed and definite time and the learner can not change it. The main characteristic of this kind of animation is the instability of images. In this kind of animation, the learner is passive. In terms of animation functions, the interactive one is related mostly with practice function and non-interaction one is related with displaying the phenomena (Rahimidust, 2011).

Learning theories and review of literature

Theoretical and strategic basics based on the studies provide good conditions for rapid and easy learning. The research evidences show that working memory has important role in doing complex cognitive consignments. Working memory is a mental system storing and processing the data temporarily for a series of complex cognitive assignments as understanding, reasoning and learning (Kriz, S., & Hegarty, M., 2007). The people with more efficient working memory had high academic achievement compared to the people with low efficient working memory (DeKoning, B., 2011). Based on working memory models, visional information is encoded and processed in active visual memory and speech data are encoded in speech working memory. Most of technology-based educations don't have adequate efficiency. These educations instead of facilitating leaning for the learner, namely for his working memory as learning

bottle neck, create cognitive load and make the learning slowly (Seviler, 1988). Cognitive load is the sum of mental activities being imposed on active memory (Cooper, 1990). Some of the theorists believe that learning difficulty of an issue is aroused of its internal and external cognitive load. Internal cognitive load is related with the nature of materials and learning content. When the learning content is simple, its internal cognitive load is low. In this case, adequate mental resources exist for learning in a person. Even if considerable external cognitive load is imposed via learning on him. When the learning content is complex, its internal cognitive load is high, because learning complex items requires more mental energy. If external cognitive load is high, the sum of cognitive load of mental learning and capacity are more than limited capacity of working memory. Thus, learning leads into the failure. A study titled "The effect of directed focus of the learner and cognitive load in animation perception" was done by Amadeo et al in Tolus University of France in 2010 and the results are as following: This study was about the effect of Cueing on cognitive load and the perception of the animations that the displayer of the dynamic process were in neurobiology. Cueing in this study was including zooming important information in each stage of the process by a purple square. 36 BA psychology students were exposed three times to animation display. In three sessions, the animation was repeated for them. Half of the participants received animation without cueing while the others observed the same animation with cueing. Cognitive load evaluation and perception performance were done. In the above analysis, two major results were achieved. First, the external cognitive load after three times contact with animation was reduced by cueing. Second, the maintenance of separate elements of animation was improved in both groups while the reasons of the relations between the elements were understood only in cueing condition. In addition, in problem solving, it was defined that cueing helped the development of wide mental model. Cueing method helped the learner to select both important elements and ignore side elements of animation. At the beginning of each stage of long time pottentiation, a purple square was appeared on the related region to attract the attention of the learner to that region. Then, zooming was done. The current study based on cognitive load theory investigates that consideration-based guidance by some symbols as cueing in animation helped an individual to focus their consideration on important issues. This consideration deviated a person attention from focusing on marginal issues increasing the cognitive load. Finally, a better understanding is created in a person (Amadio, 2010). Another study titled "The effect of prevalent control in education animation" was carried out by celer, kresten and Seviler in 2010. In this study, it was reported that comparative studies about animation and non-animated imagination arts brought contradictory results. It seems that in some conditions, animation instead of improving learning is a barrier. Animation requires processing attempts compared to non-animated imaginative arts. Because it is possible to create high cognitive load, cognitive load theory emphasizes on the importance of controlling working memory requires simplifying learning process and providing a theoretical framework for studying the processing method and learning of education animation. The current study aimed to investigate the design of animation to optimize the educational efficiency. Of three animation versions with concurrent tradition and a tradition version was used only for day and night consecutive education for elementary students. 72 boy students of the elementary school of a boy college in Sydney Australia, to which the education subject was not given, were classified randomly in one of three experimental groups. Three animations were displayed: The first animation was continual, the second one had separate sections, and the third had play-stop buttons on continual version. First animation didn't have any relation with user and animation and students without any pause observe the total animation. Second animation: It was divided into eleven sections and after each part, the animation was stopped automatically. The continuance of the display dependent upon the decision of the students. Third animation: In this version, play-stop button existed and allowing the students to see animation with good speed. They can stop animation at any time. In the first version, the students only listened the report interpretation and didn't deal with the animation. This version is necessary by which we can determine the report is understood separately or there is extra data in animation? The scores of efficiency, cognitive load were calculated by mental difficulty scoring, performance evaluation. In second and third animation, the learning performance was high and cognitive load was low in comparison with the first version and validity was observed. Above all, play-stop group despite the students had pressed the button rarely, had better performance than the first group. This result showed that only play-stop button besides the instruction about using it increased the related cognitive load. Finally, the learning performance of the students was high in this version. Better

performance of second and third versions compared with the first version showed that user control on his learning is an effective issue in learning and comprehension. In a study titled" The effect of using animations in scientific success of the new sciences teachers by Unal et al. in 2010 in Inono University of Turkey. The results were achieved as: In the current study, the effect of animation technique on learning the features of electromagnetic waves for new sciences teachers was investigated. This study was done by the aid of experiment and control group. The success evaluation test before and after testing each group had considerable difference between control and experiment group. The results of this study showed that the animations applied in this education environment were one of the strongest tools because they reduced the negative views of the learners to learning the complex issues (Demir, 2006). False misinterpretation of electromagnetic waves and its features provided some problems in teaching by new teachers and difficulty in learning these waves due to their abstract nature. Some animations were provided in accordance with educational goals. The success of the teachers in presenting the content by animation in control group showed that learners want to achieve knowledge in short term and they want to face with attractive things in learning process. For example, attractive animations can make abstract concepts meaningful in the mind of the learner. In a study titled "The role of animation on 3-D concepts education" carried out by Leila Roshangar et al. In Tabriz medical sciences University in 2009. The results showed that using animation in 3-D concepts learning was effective and had considerable influence in learning imaginative theory text books. In this study, 100 students of medical sciences who passed fetus textbook were selected. The average learning and comprehension of the students in the chapters using animation had significant difference compared to the items not using them. In another theory titled double channel theory, it is shown that human being for data processing by audio-visual materials had separate channels (Clark, 2001). Thus, this theory can be used for important points in providing educational animation. Cognitive multi-media theory is another process theory describing active cognitive processes in learning via multi-media materials. According to this theory, learners at first select the visual and speech data from the stimulus. Then organize them as visual and speech revisions and finally integrate these mental reviews with each other and the previous knowledge (Mayer, 2005). Meta-cognitive skills are necessary skills for learning. Meta cognitive strategies are the strategies being applied to supervise cognitive strategies and their control. Meta cognitive strategies are classified into three groups:Planning strategies

a. Supervision and evaluation strategies

b. Organizing strategies

These three strategies are used to produce interactive animations.

2. Study method

This study was applied and the study method was quality one in which Delphi method was used for data collection. In this method, to use the required standards in producing an educational animation, the comments of experts were used. In the first stage, the key points and standards of the previous study were defined and were sent for validity for ten education technology experts. After the summary of the comments in the second stage, the comments were collected for the same people and in the third stage, after the summary and correcting the problems, the corrective comments were sent again for the experts and after the final approval were compared with the previous studies and a standardized checklist was designed, its reliability was proved by test-retest method in some examples of educational animations with convenient sampling by educational technology experts. In the appendix of this paper, the required checklist was presented.

3. Findings

In this part, all the points by the experts about the design process and educational animation evaluation were classified for effective use.

a. Animation design stage: The design stage is divided into general and specific stages. The general stage is related to the educational media and methods and specific stage is related to the design of each media and education method that is used and designed by its specific features (Jame Bozorg, 2007).

(a-1) General stage in animation design: In this stage, the underlying design is provided. The goals, effective solutions, subject, addressee, current condition and what should be investigated (Jame Bozorg, 2007).

• The investigation of the current situation: To investigate the existing situation, the followings are considered:

- The significance of education subject
- The severity of learning-teaching problem of the learners
- The necessity of using animation related to education subject
- Defining previous educational activities
- Defining the media being used in this regard
- The deficits and barriers

- It should be determined using animation is good for removing the problems of learning-teaching or not?

• Determining the audiences: The features of audiences should be considered in terms of culture (language, religion, education and life method), demographic features including age, gender, school, etc and behavioral and psychology features (comments attitude, habits and behavior). The learning, abilities and visual perception, audio-visual, abstract nature should be considered. The selected education media should be consistent with the abilities, interests and needs of the learners. For example, animation content should be presented with the understanding language of the audiences. In selecting the words, images, music, tone, speed, items, the interests of audiences should be considered (Aqazadeh, 2006).

• Determining the goals based on the need of the learners: Each communication process including education communication processes are formed following special goals. In educational situations, the aims are achieved and the final result of the work is learning and teaching. These aims are determining factors in total communication and in selecting the media and good education method. The suitable media is consistent with the education aims, content and education activities. For example, if the educational aim is to achieve a definite practical skill. Some media as real objects are the best media.

• Defining the best educational items: Objects, headlines and education content in accordance with the behavioral goals in learning-teaching process.

• The selection of the type of media and education method: For correct selection of the media and education method, we should consider the following: (Amir Teimuri, 2006).

a. Learners features
b. Educational goals
c. Education content
d. Inclination of the learners to the media and specific education method
e. Availability
f. Place condition
g. Social, economical and cultural issues
h. Type of activity and the participation of learner in learning teaching process

a-2) The specific stage in animation design: In this stage based on the specific features of animation designed it and the following points are designed:

1- Animation type

- The animation we want to design is 2-D, 3-D or web-based?

2- Animation content

• Accuracy

- Is animation content presented a scientific reality in the form of imagination and storytelling?
- Is the story and animation is consistent with the content and subject.
- Is an animation content present a scientific reality as continual.
- Is the content of animation discontinued and in the form of separated sequences and automatically.
- Is animation content and its display speed is controlled by stop-play by learner.
- Is an animation content present a scientific reality as valid.
- Is animation content is designed consistent with special education model.
- Is composition of giving the content is consistent with the introduced model?

*Note: Formulating animation educational content is suitable by Meril, Ragloth and Ganieh method.

-How animation content is valid scientifically.

-How much accuracy is observed in writing scenario term?

-Is the selected character consistent with its educational content?

- How much is the animation content gives up-date information for the audience.
- Is the consistency of animation content observed with educational goals?
- is web-based animation content consistent for loading in the web

-Is animation content consistent with its type (2-D,3-D).

• The lack of consistency

- Are speech, animated image, text, vector, chart and voice are used consistent with education content.
- Is there any consistency between animated images and voice
- Is there any consistency between voice and text for presenting content

*Note: The studies show that the animations with speech have high effectiveness compared to the animations presenting the same speech as written on the image. If the animation is presented with speech, as learner senses (sight and hearing) are involved both, animation message is divided between two senses and the learning output is increased (Seviler, 2005).

- is animation time consistent with the difficulty and easy learning of education subject?

*Note: complex and difficult education issues need longer time for display to the learner.

- is cueing in animation consistent with the educational content and subject.

• Clarity:

- How is animation content understandable.

- When referring to the new specialized terms, how much good examples and explanations are presented for easy understanding?
- Relevancy
- How much animation content is applied for the audience and is relevant with the need of the audience.
- How much animation content is consistent with behavioral and psychological properties of the audience?
- How much the animation content is consistent with the demographic and cultural attributes of the audience?

• Appealing
- How much is the animation content attractive
- In animation content, how much favorite image and graphic special features are used.
- How much animation content is presented as real?

• Credibility
- To present the animation content, how much acceptable resources and characters are used.

• Creativity
- How much this animation is different with the simialr samples?
- How much creativity and innovation is used in animation content

3- Animation structure

• Animation ID
- Are the date, production place and the institution of animation defined?
- Is the profile of animation authors and order givers with their specialization are given to the audience?
- Are required data to be connected with the ordering organization are given to the audience.
- Is the required guidance to use animation is given to the audience
- Is the minimum software and hardware are introduced to display animation to the audience.
- Animation multi-media elements
- How much are readable the fonts being used in animation text
- How much is beautiful the fonts being used in animation text
- Are the size of fonts good for the audience
- How is the quality of voices and music
- How much is attractive the music being applied in animation
- How is the quality of animated images (3-D or 2-D)
- How is the graphic quality?

• Animation resources
- Is animation introduces the resources being used in providing the content
- Based on the subject of animation, how much up-to-date resources are used

• The design of animation pages
- The order of displaying education animation pages are consistent with the special education model
- Is the combination of giving the pages consistent with the introduced model
- How much the pages design use consistent color combination

• Animation capabilities
- Can interact with the audience
- Can be developed
- Can help the audience
- How you evaluate its publication
- How you evaluate guiding the audience in animation
- How you evaluate its installation

b. Execution and production of animation: After the animation design, we can execute it. For suitable use of the animation, the following points are considered:

1- Animation test and test performance before using in learning-teaching process: before using animation in wide level, it is required that some audiences see the animation and their comments should be applied in correcting the weaknesses and strengths of animation.

2- Providing instruction to give to the audience: After removing the problems of animation it is better to prove an instruction for the use of audiences of animation.

3- Animation package: The animation is packed in a good package and can be given to the audience.

4- The method of audience access to animation: Marketing and defining the audience access to animation is done in this stage.

5- Determining the price and sale place of animation: The price is determined consistent with the animation abilities. The selling place is accessible for the audiences.

c. Animation evaluation stage: Finally the animation should be evaluated by main audiences. The evaluation is a method to test the success of a definite activity by the aim of improving the activity. In the designed animation, some conditions should be fulfilled that the audiences evaluate the animation and give their corrective comments for the animation providers.

• In the designed animation, a program is considered for its evaluation?
• In evaluation program, how much the effect on audiences is considered
• In evaluation program, how much the effect of its problems is defined?

The checklist of design, execution, evaluation process of educational animation	
General stage of animation design	
	Score of each question
a. The investigation of the existing condition (need assessment)	
1- Are the documents of existing condition (need assessment) available? No □ Yes□	
2-How much the problem of learning and teaching is investigated?	12345
3-How much is the importance of problem is investigated?	12345
4-Are the audiences being investigated?	12345
B:Formulating educational aims	
1- Are the documents of educational aims available? No □ Yes□ if yes, score the following questions.	
6-How much are the goals available?	12345
7-How much the goals are separated into partial goals including the determination of the type of change, required time to create it and target population?	12345
8-To what extent the goals are measured?	12345
9-Are the goals being classified based on learning-teaching problems?	12345
c. Identification of audiences	
1- Are the documents of defining the audiences available? No □ Yes□	
11-How much are the demographic attributes of audiences as age, gender, job, literacy are investigated.	12345
12-How much are the cultural attributes of the audiences as language, religion and ethnicity are investigated.	12345
13-How much are the behavioral- psychological attributes of audiences as behavior and habits, attitude and knowledge are investigated.	12345
14-How much are the educational needs of the audiences are investigated?	12345
15-The visual, hearing, abstract understanding are investigated consistent with the age of the audience?	12345
d. The selection of media and education method	
16- Are the documents of selecting new media available? No □ Yes□	
17-In case of good previous media, the production of the new media is necessary to what extent?	12345
18-How much the type of media is consistent with the demographic attributes of the audiences including age, gender, language, and education?	12345
19-How much the type of media is consistent with the goals of educational message?	12345
20-How much the type of media is consistent with existing budget and resources?	12345
21-How much the type of media is consistent with the participation and type of activity of the audience?	12345
22-How much the type of media is consistent with the interest of the audience?	12345
23-How much is the type of media consistent with educational content?	12345
II. The design of special stage of animation:	
1- Type of animation	
2-D □3-D □Web-based □	12345
Animation content	
a (Accuracy)	
2-Is the animation content presented a scientific reality in the form of imagination and storytelling.	12345
3-Is the story and imagination is consistent with content and subject.	12345
4-Is the animation content presents a scientific reality as continual.	12345
5-Is discontinued animation content in the form of separated sequences are presented as automatically.	12345
6-Is animation content and its display speed controlled by stop-play by the learner.	12345
7-Is the animation content presenting a scientific reality as valid	12345
8-Is animation content consistent with special education model.	12345
9-Is composition of presenting content is consistent with the introduced model.	12345
10-How much is the animation content valid in terms of scientific.	12345
11-How much accuracy is observed in writing scenario terms	12345
12-Is the selected character in animation is consistent with its education content.	12345
13-The animation content how much presents the new information	12345
14-Is the consistency of animation content is observed with education goals	12345
15- Is the content of web-based animation consistent for loading in the web?	12345
a. The lack of consistency	
16-Are speech, animated image, text, vector, chart and voice are used consistent with the education content.	12345
17-Is there any consistency between animated voice and images for presenting content	12345
18-Is there any consistency between animated images and text to give content.	12345

19-Is there any consistency between form and text to give the content.	12345
20- Is animation display time consistent with difficulty and learning easiness of education subject?	12345
21-Is cueing in animation consistent with the education content.	12345
c Clarity	
22- How much is the content of animation simple and understandable?	12345
23-During referring to the new terms, to what extent the suitable examples are presented easily?	12345
d (Relevancy)	
24-How much animation content is applicable for the audience	12345
25-How much the animation content is consistent with the behavioral and psychological attributes of the audiences?	12345
26-Animation content is consistent to what extent with the behavioral and psychological attributes?	12345
e (Appealing)	
27-To what extent the animation content is attractive?	12345
28-How much visual and graphic special features are used in animation content?	12345
29-To what extent animation content is displayed really.	12345
f .(Creativity)	
30-How different is animation in terms of content with the similar samples?	12345
31- How much innovation and creativity is used in animation content?	12345
g (credibility)	
32-The organization or animation organization to what extent are trusted by the audiences?	12345
33-How many resources and valid characters are used for the audiences	12345
b. Animation structure	
a- ID	
34-Are the date, production place and animation institution is defined?	12345
35-Are the profile of animation authors are presented with their specialization?	12345
36-Are the required data given to the audience to communicate with the ordering organization?	12345
37- Is the required hardware for animation (CPU, required memory, voice card type, image card type) is given to the audience?	12345
38-Is the minimum software for animation (including the type of navigating system and side graphical programs) is given to the audience?	12345
b. The applied media in animation	
39-How much are read the applied fonts in animation text?	12345
40-How beautiful are the fonts used in animation text?	12345
41-Are the animation text fonts good for the audience?	12345
42-How is the quality of music applied in animation?	12345
43-How consistent is the music applied in animation?	12345
44-How is the quality of the images used in animation?	12345
45-How is the quality of the graphic used in animation?	12345
46-How is the quality of the applied tables and charts in animation?	12345
C Animation resources	
47-Is the animation presenting the sources being used in content providing?	12345
48- Based on the animation subject, how much the update resources are used?	12345
c. Animation pages design	
49-The order of animation pages is designed in accordance with special model.	12345
50-How much the design of animation is with consistent color with the content?	12345
51-How suitable is the composition of animation?	12345
c.Animation capabilities	
52- How you evaluate the interactivity of animation with the audience?	12345
53-How you evaluate the search ability of the animation?	12345
54-Is animation be upgraded?	12345
55-How you evaluate the helping ability of animation?	12345
56-How you evaluate print ability of animation?	12345
57-How you evaluate navigation ability of animation?	12345
58-How you evaluate install and uninstall ability of the animation?	12345
59-How is using ability of animation for disabled people?	12345
III Animation performance	
1-Pretest was used before animation performance	12345
1-Is instruction of giving information to audience is provided for animation?	12345
2-How is the quality of animation packing?	12345

3-To what extent the animation is available for the audience?	12345
4-How consistent is the animation price with its abilities?	12345
5-The price of animation to what extent is consistent with audience shopping ability	12345
IV Evaluation/ animation evaluation	
1- Is there any plan for evaluation/animation evaluation is considered? No□ Yes□	
2-The animation evaluation to what extent evaluated achieving the education goals?	12345
3-The evaluation of animation to what extent evaluated the effect on audiences (knowledge, attitude and behavior change)	12345
4-The evaluation of animation to what extent evaluated its deficits?	12345

Based on design stages, the animation performance and evaluation of checklist are designed by the researcher by which an animation is evaluated. Finally, a checklist was presented in the form of artificial intelligence fuzzy logic to be a model to use this method in the evaluation of the educational media and methods.

4. Discussion and conclusion

In the past, educational design and planning were widely based on concepts-transfer method. In this method, the educational objectives were vague and based on case judgments and personal comments. Now the development of knowledge and scientific findings had many questions including “how human beings learn? What is the best method of providing and producing the educational media and materials? What are the potential and flexible factors for more development and benefit of learning-teaching methods?

These questions improved the interest of teachers and educational authorities about the detection of new methods and attitudes. Using animation in learning-teaching process is very famous. But the studies showed that the animation capabilities are not used completely in education and some of them are not successful in transferring message. The results of the studies showed that applying learning theories increased the consideration to visual data processing and using animated images design in providing educational animation and increased the efficiency of animation in learning-teaching process. Also, observing the principles and standards in design, execution and evaluation of animation make the aim of producing good educational animation as easy. This study was done by qualitative method and the comments of the experts were asked regarding design process, execution and evaluation of education animation and besides comparing the results with the previous studies results, a framework was designed and it is proposed that the educational planners, experts and educational managers use this framework as general principles in providing educational animation and besides producing an effective animation, we can avoid the loss of resources and energy.

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10/6/2012

Testing Separability between Iranian Import and Domestic Agricultural Commodities (Application to Iran Grains Demand in a Dynamic Model)

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Abstract: In this study the demand relations for two main grains, wheat and rice in Iran are estimated and interpreted. Two main aims of this study are the separability between import and domestic grains and performance of static versus dynamic models of consumer behavior. A dynamic system of demand functions beside a static LA/AIDS model used to test the separability restrictions in Iran grains consumption data. The results indicate that a dynamic specification of the AIDS model is better than the static model. The separability test showed imported wheat and rice are separable from the domestic wheat and rice so Iran import grains demand must analysis separable from Iran domestic grain demand.

[Mohammad Reza Hosseini Pour, Reza Moghaddasi, Saeed Yazdani. **Testing Separability between Iranian Import and Domestic Agricultural Commodities (Application to Iran Grains Demand in a Dynamic Model).** *Life Sci J* 2012;9(4):4750-4756] (ISSN:1097-8135). http://www.lifesciencesite.com. 713

Keywords: Separability; Dynamic AIDS model; wheat; rice; import demand

1. Introduction

The concept of separability, originally introduced by Leontief (1945) and Sono (1961), can be extremely useful for economic modeling because of its wide ranging implications for the existence of consistent aggregates and the decentralization of optimization decisions (Moschini et al. 1994). This concept has been used effectively to analyze the structure of consumer preferences and its implications have been widely used in the empirical study of demand analysis for agricultural commodities in order to limit the number of estimated parameter (Boonsaeng and Wohlgenant, 2006). Separability conditions require the marginal rates of substitution between certain pairs of commodities to be functionally independent of the quantities of certain other commodities. Such conditions reduce the number of parameters that enter the family of demand functions and make estimation of the parameter space more feasible. In practice, however, it is next to impossible to look upon marginal utilities to determine the nature of separability. If separability restrictions are inconsistent with the true preference ordering of the representative consumer, empirical estimates of structural demand parameters are invalid. Thus, it is worthy to consider tests of separability (Nayga and Capps, 1994).

Why is it theoretically consistent to express demand as a function of aggregate commodities instead of the individual commodities that households actually purchase? And why can demand for a category of commodities such as food be expressed as a function of the expenditure on food, instead of total household expenditure? The conditions that make both of these specifications theoretically consistent are two stage budgeting, or weak separability.

For years, weak separability has been used as justification for aggregation demand data, though it has been assumed more often than tested. If separability conditions were not satisfied, it was considered inappropriate to aggregate. If separebility was violated, empirical research had to rely upon disaggregated demand systems which lead to many difficulties in estimation including multicollinearity, degrees of freedom constrains and computational limitations (Schulz et al. 2011).

In this paper, we employ a dynamic almost ideal demand system (AIDS). The dynamic specification proposed in this study is similar to the specification proposed by Assarsson (1991).

To our best knowledge, there is no study has explored the relationship between the Iranian demand for domestic and imported foods. Our study will fill the void.

Data

The data used to estimate the static and dynamic models are yearly time series data from 1975 to 2007. The grains considered are wheat, and rice. The quantity data are kilogram per capita consumption.

Iran per capita consumption of domestic commodities was obtained by dividing Iran domestic total disappearance to the Iran population. Iran domestic total disappearance in every period was calculated by adding Iran production to beginning stocks and subtracting exports, and ending stocks. Total Iran production, stocks variation, imports, and exports data are from FAO website . Also wholesale

price indices and exchange rates were obtained from central bank of Iran.

Consumption per capita of imported commodities can be obtained by dividing total commodity imports by the Iran population. The import prices for individual items are not publicly available so unit values are used as proxy for prices. Unit import values (import prices) were obtained by dividing import values by import quantities.

2. Methods

The Static AIDS Model

Since Deaton and Muellbauer (1980) published their famous "Almost Ideal Demand System", AIDS had quickly become one of the most widely used demand models because of its theoretical consistency and functional flexibility. It satisfies the axioms of choice and allows aggregation over consumers (Liao and Chern, 2007). The basic AIDS model is written as:

$$w_i = \alpha_i + \sum_j \gamma_{ij} \ln(p_j) + \beta_i \ln(E/P^*) \quad i = 1, 2, \ldots, n. \tag{1}$$

Where α_i is a constant, w_i is the budgetary share allocated to the i^{th} item, p_j is the price of item j, E is the total expenditures on all items and P^* is aggregate price deflator defined by:

$$\ln P^* = \alpha_0 + \sum_{i=1}^{n} \alpha_i \ln p_i + \frac{1}{2} \sum_{i=1}^{n} \sum_{j=1}^{n} \gamma_{ij} \ln p_i \ln p_j$$

Deaton and Muellbauer also proposed to convert the nonlinear AIDS model into simplified linear AIDS (LA/AIDS) model by using so called "Stone index" ($\ln P^* = \sum_{i=1}^{n} w_i \ln p_i$) to replace the nonlinear price index. Because of its simplicity and less computation burden, LA/AIDS model was very popular for empirical demand analysis (Green and Alston, 1990).

To be consistent with economic theory, the system of share equations in (4) must satisfy several restrictions. First, the shares w_i have to sum up to unity. Second, adding up implies the following restrictions in the parameters: ($\sum_{i=1}^{n} \alpha_i = 1, \sum_{i=1}^{n} \gamma_{ij} = 0$, and $\sum_{i=1}^{n} \beta_i = 0$); homogeneity implies ($\sum_{j=1}^{n} \gamma_{ij} = 0$); and symmetry implies ($\gamma_{ij} = \gamma_{ji}$).

The Dynamics AIDS Model

There are several ways to specify a dynamic AIDS model. Some economists include lagged budget share or lagged consumption into the AIDS model to account for the habit effects. Various dynamic almost ideal demand systems (Anderson and Blundell 1983 and 1984, Ray 1984, Blanciforti et al. 1986, Shukur 2002, and Eakins and Gallagher 2003) have been applied to demand analysis after Deaton and Muellbauer published their AIDS model and have found improvement in elasticity estimation and functional form specification.

In this study based on the Assarsson (1991), we defined dynamic effects as below:

$$\alpha_i = \alpha_{i0} + \sum \theta_{ij} W_{j(t-1)}$$

Where $W_{j(t-1)}$ is the lagged budgetary share allocated to the j^{th} item .

Elasticities

Based on the Green and Alston (1991), Price elasticities were calculated by using these equations:

Unconditional price elasticities:

$$\varepsilon_{ij} = \delta_{ij} + \frac{\gamma_{ij}}{w_i} - \beta_i \frac{w_j}{w_i}$$

Conditional price elasticities:

$$\varepsilon^*_{ij} = \delta_{ij} + \frac{\gamma_{ij}}{w_i} + w_j$$

Expenditure elasticities:

$$\eta_i = 1 + \frac{\beta_i}{w_i}$$

Morishima elasticities:

$$M_{ij} = \varepsilon^*_{ij} - \varepsilon^*_{ii}$$

Where δ is the Kroncker delta Which is equal to -1 when i = j for the own price elasticity and $i \neq j$ for the cross price elasticities. The coefficient β_i determines the characteristic of the goods. For luxury goods it is positive and for necessary goods it is negative.

Morishima elasticities determine substitutability between goods. If these elasticities are positive, the goods are considered to be substitutes and if they are negative, they are considered to be complement.

Diagnostic Tests

Following shukur (2002) and Boonsaeng and Wohlgenent (2006), The Breusch- Godfrey (BG) test is used to test for autocorrelation; The Breusch-Pagan (BP) test is used for heteroscedasticity; and the RESET test is utilized for functional misspecification. Also we used Jarque- Bera (JB) statistic for testing residual normality.

Separability

The separability assumption is often invoked by researchers doing empirical demand analysis. This assumption allows specifying conditional (second stage) demand systems of equations, thus the system of equations is only conformed by the group of goods that is the focus of the research. However, there are undesirable features associated with the empirical use of conditional demand systems. For example, the

resulting estimated elasticities are of limited value because group expenditures in conditional demand systems are endogenous. For these reasons, unconditional demands are more appropriate to obtain elasticities for policy and welfare analysis. The systems in the first stage are also suitable for testing separability (Boonsaeng and Wohlgenant, 2006).

In this paper to test for separability we consider separable structure that proposed by Blackorby, Primont, and Russell (1978). Let **q** = (q_1, …, q_n) denote the vector of consumer goods, **p** = (p_1, …, p_n) denote the corresponding nominal price vector, and y denote total expenditures on the n goods (income, for short).

The set of indices of the n goods is **I** = {1, …, n}, and these goods can be ordered in S separable groups defined by the mutually exclusive and exhaustive partition $\hat{I}$ = { I_1, …, I_S} of the set **I** . To allow for asymmetric separability, some of the groups include only one good. Assume that 1, 2, …, r are the groups in I that include only one good. Thus, the utility function can be written as:

$U(q)=[q_1, \ldots, q_r, U^{r+1}(q^{r+1}), \ldots, U^s(q^s)]$ (6)

where, $q_1, \ldots, q_r$ are the one commodity groups of goods, U^{r+1} (.) is subutility function that contains a subset q^{r+1} of goods, and U^s (.) is a subutility functions that contain a subset q^s of goods. These utility functions satisfy strong monotonicity, strict quasi-concavity, and differentiability (Boonsaeng and Wohlgenant, 2006).

Consider the elements I_d and I_m from the partition I. Based on the results of Blackorby, Davidson, and Schworm (1991), the separable utility in (6) implies that, for all i ∈ I_d and k ∈ I_m and for all d ≠ m: s defined by Moschini et al. (1994, p. 63) If we take any two goods (i, j) ∈ I_g, and any two goods (m, k) ∈ I_s, (i =j or m = k is possible), for any two groups g f s, it follows that the substitution terms between goods belonging to different groups are proportional to the respective income terms a set of restrictions that can be maintained in any of the commonly used demand systems, or subjected to a statistical test can be written as:

$$\frac{\sigma_{ik}}{\sigma_{jm}} = \frac{\epsilon_i \epsilon_k}{\epsilon_j \epsilon_m}$$

In the LA/AIDS model, the restrictions are:

$$\frac{\gamma_{ik} + w_i w_k}{\gamma_{jm} + w_j w_m} = \frac{(w_i + \beta_i)(w_k + \beta_k)}{(w_j + \beta_j)(w_m + \beta_m)}$$

The number of non redundant weak separability restrictions for any utility tree can be determined by

$$\left(\frac{1}{2}\right)[N^2 + N - S^2 + S - \sum_s n_s(n_s + 1)]$$

Where N is the number of products in the utility tree, S is the number of separable groups in the utility tree and n_s is the number of products in group s (Moschini et al. 1994). All of the separability restrictions are applied to both static and dynamic AIDS.

To test restrictions in demand systems, it is common to use either the Wald test or the likelihood ratio test. The likelihood ratio test requires the estimation of both the unrestricted and restricted models, whereas the Wald test requires the estimation only of the unrestricted model. Estimation of the restricted model, although not a problem with linear restrictions, can be difficult and cumbersome when dealing with nonlinear restrictions, especially when combined with linear restrictions (homogeneity and symmetry) in a demand systems context (Nayga and Capps, 1994).

Table 1: Misspecification tests for the static and dynamic models

Test	Results for the static demand model			
	Domestic Wheat	Domestic Rice	Imported Wheat	Imported Rice
BG	0.012	0.052	0.14	0.04
BP	0.002	0.011	0.006	0.025
JB	0.52	0.34	0.67	0.029
RESET	0.35	0.42	0.31	0.37
	Results for the dynamic demand model			
BG	0.48	0.37	0.59	0.61
BP	0.76	0.65	0.12	0.45
JB	0.82	0.74	0.23	0.58
RESET	0.54	0.75	0.84	0.69

Note: Numbers represent P-values

3. Results

Misspecification Test Results

Table 1 shows results of misspecification tests for static and dynamic LA/AIDS models. This table divides into two sections. Results of misspecification tests for static LA/AIDS are given in the upper section and results of misspecification tests for dynamic LA/AIDS model are given in the lower section of this table. Based on the results for static LA/AIDS model, BG tests indicate the presence of autocorrelation. Because BG tests reject the null hypothesis that there is no autocorrelation in the individual demand equations except in imported Wheat equation. But for dynamic LA/AIDS model BG autocorrelation tests fail to reject the null hypothesis that there is no autocorrelation in the demand equations. With regard to the BP tests for homoscedasticity, all of the tests in static model provide evidence of the presence of homoscedasticity. But in the dynamic model these tests reject the null hypothesis of the presence of homoscedasticity. JB test identify normality of residuals in all equations in both models except imported rice in static model. The RESET tests

indicate that there is no functional form misspecification in all equations in both models.

Results from the Static Demand Model

The results from the restricted static LA/AIDS demand model are presented in Table2. The highest R^2 belong to domestic rice equation and the lowest R^2 belong to imported rice equation. The estimated parameters are mostly significant. It is expected that if the Iran currency appreciates, then wheat or rice import from foreign countries will increase, therefore the parameter estimates corresponding to the exchange rate variable in the demand equations for domestic rice, imported wheat and, and imported rice have the correct sign. The exchange rate parameter in the domestic wheat has the incorrect sign but it is insignificant. The variable D_1 is used to include the effects of war between Iran and Iraq on demand. All the coefficients of this variable are significant.

Table 2: Parameter estimates for the restricted Static LA/AIDS demand model

Variables	Domestic Wheat	Domestic Rice	Imported Wheat	Imported Rice
Constant	0.1226*	0.0435*	-0.001	0.0032*
	(0.0662)	(0.0207)	(0.002)	(0.0016)
ln(D. Wheat Price)	-0.00083*	0.00034*	0.00014*	-0.00043
	(0.00036)	(0.00017)	(0.00005)	(0.00107)
ln(D. Rice Price)	0.00034*	-0.00056*	0.00034*	-0.00094
	(0.00017)	(0.00023)	(0.00014)	(0.00153)
ln(Im. Wheat Price)	0.00014*	0.00034*	-0.00073*	0.00088
	(0.00005)	(0.00014)	(0.00031)	(0.00795)
ln(Im. Rice Price)	-0.00043	-0.00094	0.00088	-0.0017*
	(0.00107)	(0.00153)	(0.00795)	(0.0005)
ln(Non Grains Price)	-0.0079*	-0.0063*	-0.0005	-0.0012**
	(0.0035)	(0.0034)	(0.0006)	(0.0003)
Exchange Rate	-0.0029	0.0005	-0.0004*	-0.0081*
	(0.0048)	(0.0048)	(0.0002)	(0.0038)
Real Income	-0.0003*	0.002**	0.0007*	-0.0001
	(0.0001)	(0.0001)	(0.0003)	(0.0015)
Time Trend	0.00002*	-0.0003	0.0008*	0.0004*
	(0.00001)	(0.0004)	(0.0004)	(0.0003)
D_1	-0.0045*	-0.0052**	0.0009*	0.0005*
	(0.0023)	(0.0012)	(0.0004)	(0.0002)
R^2	0.7343	0.8923	0.6522	0.5815
Adjusted R^2	0.7321	0.8851	0.6501	0.5372

*Note: * and ** are 10 and 5 significance levels, Standard errors in parenthesis*

Table 3: Elasticities for static LA/AIDS demand model

	D. Wheat	D. Rice	Im. Wheat	Im. Rice
Income Elasticity	0.993	1.4	1.05	-0.2
Marshallian Elasticity Matrix				
D. Wheat	-1.017	0.0073	0.0031	-0.009
D. Rice	0.062	-1.099	0.061	-0.174
Im. Wheat	0.008	0.027	-1.061	0.0726
Im. Rice	-0.327	-0.722	0.677	0.7
Hicksian Elasticity Matrix				
D. Wheat	-0.971	0.012	0.015	-0.008
D. Rice	0.106	-1.094	0.072	-0.166
Im. Wheat	0.057	0.033	-1.048	0.074
Im. Rice	-0.284	-0.717	0.689	0.701
Morishima Elasticity Matrix				
D. Wheat	-	1.077	1.028	0.687
D. Rice	1.106	-	1.127	0.377
Im. Wheat	1.063	1.12	-	1.737
Im. Rice	-0.709	-0.867	-0.627	-

The price, income and Morishima elasticities for this model are presented in Table3. Some of the elasticities have incorrect signs. For example, own price uncompensated elasticities should be negative but the imported rice shows a positive own price elasticity. The Morishima elasticities are also shown some problems. For example according to imported rice equation, imported rice and domestic rice are complements; however, according to the domestic rice equation, they are substitutes. This problem exists between imported rice and domestic wheat or between imported rice and imported wheat too.

Results of the Dynamic Demand Model

Unit root tests show that all time series contain unit root (non stationary), but first difference of all series of the variables turn out to be stationary[1]. Therefore all the variables are I (1) and usable in regression analysis. The results of the ADF tests for the residuals of the static and dynamic LA/AIDS models show these residuals are stationary.

The results from restricted dynamic LA/AIDS demand model are presented in Table4. All equations in dynamic demand model have higher R^2 than the static demand model. In this model the highest R^2 belong to domestic rice equation and the lowest R^2 belong to imported rice equation too. The parameter estimates corresponding to the exchange rate variable in the demand equations for all equations have the correct sign. Results of coefficients θ_{ij} are not shown in this table and they are available upon request. The variable D_1 has both positive and negative signs but all the coefficients of this variable are significant. Time trend parameter has correct sign and all of the time trend coefficients are significant. Domestic and imported wheat and rice demand are increase during the time.

[1] - Results are not shown, but available upon request

Table 4: Parameter estimates for the restricted dynamic LA/AIDS demand model

Variables	Domestic Wheat	Domestic Rice	Imported Wheat	Imported Rice
Constant	0.0132*	0.0733*	0.0072	0.0625*
	(0.0055)	(0.0367)	(0.0087)	(0.0315)
ln(D. Wheat Price)	0.00045*	0.00114*	-0.00028*	-0.00063*
	(0.00017)	(0.00056)	(0.00012)	(0.00025)
ln(D. Rice Price)	0.00114*	-0.00203**	-0.00078*	0.00094
	(0.00056)	(0.00046)	(0.00032)	(0.00082)
ln(Im. Wheat Price)	-0.00028*	-0.00078*	-0.00026*	-0.00073*
	(0.00012)	(0.00032)	(0.00013)	(0.00028)
ln(Im. Rice Price)	-0.00063*	0.00094	-0.00073*	-0.00023*
	(0.00025)	(0.00082)	(0.00028)	(0.0001)
ln(Non Grains Price)	-0.0071*	-0.0039*	-0.0028	-0.0076
	(0.0035)	(0.0016)	(0.0032)	(0.0092)
Exchange Rate	0.0007	0.0045*	-0.0006**	-0.0003*
	(0.0008)	(0.0026)	(0.0002)	(0.0002)
Real Income	-0.0046	0.004*	0.0038	-0.0016
	(0.0053)	(0.0021)	(0.0093)	(0.0103)
Time Trend	0.0002	0.0005*	0.0003	0.0007
	(0.0007)	(0.0002)	(0.0008)	(0.0008)
D_1	0.0067**	-0.0034**	-0.0046**	0.0039*
	(0.0007)	(0.0005)	(0.0009)	(0.002)
R^2	0.6873	0.9214	0.6652	0.5971
Adjusted R^2	0.6552	0.8916	0.6224	0.5372

*Note: * and ** are 10 and 5 significance levels, Standard errors in parenthesis*

The price, income, and Morishima elasticities for this model are presented in Table5. The income elasticities for all commodities are positive except the income elasticity for imported rice. The income elasticity for imported rice is negative and less than one in absolute value. This negative sign could be explained by the fact that most of the rice imported to Iran has low quality and the imported rice is an inferior commodity. The income elasticities for domestic rice and imported wheat are greater than one, which indicate that these commodities are luxury goods. But the income elasticity for domestic wheat is between one and zero which indicates that domestic wheat is a necessary good. The Morishima elasticities indicate domestic rice is substitute for imported rice and domestic wheat is substitute for imported wheat. With regard to all the results the dynamic model is preferred to static model, but for testing separability both models are used.

Table 5: Elasticities for the dynamic LA/AIDS model

	D. Wheat	D. Rice	Im. Wheat	Im. Rice
Income Elasticity	0.9004	1.8	1.314	-0.6
Marshallian Elasticity Matrix				
D. Wheat	-0.985	0.025	-0.0048	-0.0135
D. Rice	0.207	-1.362	-0.138	0.167
Im. Wheat	-0.037	-0.006	-1.025	-0.06
Im. Rice	-0.463	0.725	-0.555	-1.229
Hicksian Elasticity Matrix				
D. Wheat	-0.944	0.0806	0.006	-0.012
D. Rice	0.249	-1.356	-0.127	0.169
Im. Wheat	0.023	-0.058	-1.009	-0.059
Im. Rice	-0.438	0.728	-0.549	-1.229
Morishima Elasticity Matrix				
D. Wheat	-	1.193	0.967	0.506
D. Rice	1.436	-	1.298	2.08
Im. Wheat	1.015	0.882	-	0.46
Im. Rice	1.217	1.396	1.169	-

Separability Tests

Based on Boonsaeng and Wohlgenant (2006), In this study separability tests were carried out with the homogeneity and separability restrictions imposed and without these restrictions imposed in both the static and dynamic models. Likelihood ratio tests were used to test the restrictions and two considered. In the first case in the unrestricted model none of the restrictions (homogeneity and separability) were imposed whereas than in the restricted model these two restrictions were imposed.

In the second case, unrestricted model was similar to the first case; however the restricted model only imposed the separability restrictions.

Separability test results are presented in Table6. In static model and in the first case the separability restriction is rejected but in the second case in this model and in both cases in dynamic model the separability restrictions are not rejected. These results imply that imported rice and wheat are separable from these domestic goods.

Table 6: P-value of the separability tests

	L.R. statistic	P-value
The static LA/AIDS model		
Separability test in case 1	16.66	0.003
Separability test in case 2	7.43	0.12
The dynamic LA/AIDS model		
Separability test in case 1	6.34	0.18
Separability test in case 2	5.83	0.25

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11/6/2012

The effect of Qade Al-Saman "Arab contemporary writer" in Arab and Iran literature

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Abstract: In the current era, transferring human heritages from one nation to another and from one language to another is one of the most important development tools of civilization and the study of literature works of Iran and Arab is of great importance. These two are closely related with Islamic common culture during many centuries and the effect of these common cultural relations reflected them in various fields especially in their literature and one of the complexes one is story. In the current study, we investigated about the importance of literature, different kinds and life history of women of Arab world literature including Qade Al-Saman. In addition, we deal with the literature of Iran.

[Entesar Bek Khoshnevis, Amir Esmaeel Azar, Abdolhoseyn Farzad. **The effect of Qade Al-Saman "Arab contemporary writer" in Arab and Iran literature.** *Life Sci J* 2012;9(4):4757-4762] (ISSN:1097-8135). http://www.lifesciencesite.com. 714

Keywords: Story literature; Feminism; Qade Al-Saman

1. Introduction

The literature of each country is a mirror in which the culture of the same country is reflected. The mirror in which the traditions on the society, the values, anti-values, norms, as new or old are formed.

The political, social and cultural condition of Iran and Arab society based on mutual historical influence in each time was similar and the underlying environment on these two societies and global changes had their effects in all the phenomena namely literature.

One of the manifestations of west literature interaction creating fundamental changes in Iran and Arab literature is the emergence of new kinds of literature in these two societies as some of common literature methods were old and the new methods were common. Story and story writing are one of the new types that can be discussed from various views in the literature of both societies.

Among all the affairs related to human being and human aspects, woman issue, this delicate and human educator creature was faced with some problems. Iran and Arab literature have male dominance and woman is considered the second gender. Unfortunately, the literature of both societies did not take adequate consideration to the position of woman.

This study is an exploration to find the traditions, views of Iran and Arab to woman based on their historical and cultural relations.

The aims of the current study are: a. increasing the knowledge and information of the audiences of story literature in Iran to Arab story literature.

b. making them familiar with the story writing of " Qade Al-Saman", Arab writer.

c. making familiar with the Arabs world knowledge in modern story

d. being familiar with the deep pains of a woman in Arab community and the common points with Iranian society.

In this study, sociology methods are used.

Being familiar with "Qade Al-Saman", Arab contemporary story writer

Qade was one of the elite contemporary women in Arab world and writing and poem. With her delicate feeling, special sensitivity, pure emotions, deep attitude, special beliefs and the experiences of the west life is famous as an Arab female writer and could achieve many prizes in this regard and most of his works are translated into many languages in the world.

"In the early 19th century, Arab nation was in a new period and inclined to the old literature and was inspired by it, then this nation had relationship with the west and used many cultures, education, learning and translation, etc story had the maximum benefit.

The researchers in Egypt, Lebenon, Syria and other countries considered the translation of foreign stories and after than story writing continued that Arab literature took proud in it. We have some stories that by Arabic interpretation, eastern style and

human inclination the special morale and eastern experience are manifested (Bensharif, 2004, 82).

Story writing art in the new era was changed by some specialists as Mahmood Teimoor, Najib Mahfooz and Abdolmajid and Abdolmajid Sahar. If in the old China, wooden shoes were given to the women that cannot go out of the houses besides that, his feet are small, the condition of Arab land from Aljazayer, Egypt and Sudan to Kuwait, Libia, Arabia, Hijaz and Yemen was worst.

"Mary Ziadeh" was one of the women that despite public opinion, established the first literature institution in Cairo and each week a great number of Egypt and Arab elites participated in this session.

Qade Al-Saman the writer that his disobedience against women retarding and fighting with ignorance was dealt with ancestors' traditions, discrimination is one of the most public themes. To be away of women problems to make himself free among the stories that showed the depth of their sorrow. Although he is wealthy without any problem but the sorrow of women and understanding of the sorrows of eastern women was in his mind. "Qade Al-Saman" was born in 1942. Her mother "was Salmi Royhe" and his father "Ahmad Al-Salman". His father had PhD of law from Sorbonne of France (Al-Saman, 2002, 99). He taught French to his daughter. Her mother was the lecturer of Arabic and French in national school. One day, Dr. Nourhatam, father of "Qade Al-Saman" was hugging his daughter and teaching French to her. He was surprised and warned the father of "Qade Al-Saman" that if his daughter don't learn Arabic language, she can not speak by this language. After the death of her mother, she had a good relationship with his father. She was everything for him and he was everything for her. She said about her relationship with the father in childhood: "My only friend when I was 10 was the chief of Syria University and the ministry of high education of Syria, my father. I should play with him. The friends of my games were my father friends all professors of University. I grew up in this environment. Although I escaped from their world to play boy games as catching snake, swimming in "Bordi" river, climbing the tallest tree, the most important characteristics of my childhood was my surprising relationship with my father and his world. After he finished guidance school, was faced with a big challenge. She should choose between humanistic and science one them. This meant that she should define his life path and her father tried to make her study medicine. However, Qadeh was surprisingly inclined to literature and what was dealing with literature and felt that she should obtain natural diploma. He passed this field with high scores and when she admitted in University, could not resist with his wants and chose English literature and her brother chose medicine.

"Qade Al-Saman" in the first days of admitting in University engaged to a person and married. She insisted on continuing her schooling, her marriage lasted only two years. Some weeks after BA exams got divorced. The father was her only friend. "Qade Al-Saman" got his BA in 1960 and got divorced. She got the highest scores in American literature. Most people wondered how "Qade Al-Saman" with marriage, work in Dameshq University was working and she faced life freely. In 1960, in presidential palace, was the secretary of newspaper office. She remained in this job to 1961. "Among the items that were written by Qadeh and published them in "Alvahdeh" newspaper, there were some columns that made people angry. In a paper titled " we should pray for the female slave) being whipped and was angry with the girls of Hemah city who didn'« فلنصل من اجل الجاريه التى تجلد»

Accept the selection right. This paper made many people angry. She was attacked and one of the religious associations published a statement against her. These reactions added the self-belief of "Qadeh Al-Saman". Instead being silent, she wrote another paper titled "we should make men free . . . This paper made many problems. As she wanted the freedom of women «فلنطالب بتحرير الرجل أيضا»)

Moreover, despite what was in the society, the mistakes of women should be equal to the mistakes of men.

Literature University of Dameshq University appreciated Qadeh in the early academic year 1961-62 and selected her as the professor of English literature in this school. She was the youngest professor in this university.

In the early months of 1964, "Qadeh Al-Saman" went to Beirut to follow MA in English literature. In the early residence in Beirut, she was teacher in "Sharl Saad" school in "Al-Shavifat" and was writing paper in a newspaper (Isa, 2002, p. 147-155).

In 1966, the father of Qadeh passed away. In this event, she cut her relationship with her family in Dameshq. She was searching for total independence and freedom. Due to this fact, financial helps were cut from the family. At the same time, Qadeh Al-Saman was sentence for three months while she was not in Syria and was searching for work in various European countries (Shokri, 1980, 63). She was married to a Lebanese man called "Dr. Al- Aoq", the chief of Daroltalie publication and chose Beirut for

living. She had a child called "Hazem". She was comfortable by returning to Lebanon and wrote book and journalism. Her considerable interest to freedom and independence caused that establish a publication besides the publications of her husband called "Qadeh Al-Saman publications". The publication that published more than 30 books in various literature types such as short story, novel and poem. She gathered the article of her speech in various newspapers and published with the name of "incomplete works". Of the important critics about his stories are the following books:

غاده السمان بلا أجنحه» اثر دکتر «غالی شکری»، « «تحرر المرأه عبر أعمال سیمون دوبوفوار و غاده السمان» نوشته ی «نجلاء نسیب الاختیار»، «غاده السمان: الحب والحرب» از دکتر «الهام غالی»، «قضایا عربیه فی أدب غاده السمان» اثر «حنان عواد»، «التمرد و الالتزام فی أدب غاده السمان» نوشته ی «پاولادی کاپوا»، «الجنس فی أدب غاده السمان» از «وفیق عزیزی».

The works of "Qade Al-Saman" are criticized in many books about the criticism of Arabic novel. As Moheydin Sobhi said: "Qade Al-Saman" had many disobedience and modernism in the first words and this puts her among the poets that you think they have something to say. She writes as she wants to say something (Sobhi, 2004, 206).

"Qade Al-Saman" lives now In Paris. This city was the inspiration place and a station of short life trip. She is living in this city with her friends. She is sad now living without her husband (Ansarian, 2009).

2. Literature position of "Qade Al-Saman"

According to one of the critics, "Qade Al-Saman" was one of the people her works was equal to high art level and faced with wide welcome of people. The explanation of this critic is that "Qade Al-Saman" did not reduce the literature level and did not use any political wave and fulfilled his literature ability with her attempts (Capva, 1992, 34). "Ernat" said: "The development of the works of "Qade Al-Saman" among people was due to delicacy, speech power and his courage in the realities (Ernat, 1993, 104)." Qade Al-Saman" raised the realities courageously, explicitly. She did not know hypocrites and by freedom and bravery wrote and made the wisdom dominant with all her feeling (Capva, 1992, 12). The success of Qade Al-Saman was due to her artistic originality and this originality considered her distinguishing aspect of the female writers (Shokri, 1980, 28). Qade Al-Saman in Arab novel change had the best position because she was true about her sorrows and she insisted to touch life realities and she should be in the events to have true views. Due to this fact with interior war and death danger remained in Lebanon to follow the events really (Shabil, 1987, 222).

The words of critics about "Qade Al-Saman"

Adores

Mohammad Mehdi Javaheri, the great classic poet: I love "Qade Al-Saman" works…when I read them, I get surprised and took proud that Arab nation has such writer (As-Saman, 1992, 130).

Abdollatif Ernaut: The stories of "Qade Al-Saman" in new Arabic story writing is a progress (Ernaut, 1993, 13).

Abdolrazaq Basir, the Kuwaitian journalist: "Qade Al-Saman means a different pen in contemporary Arab literature (Al-Saman, 1992, 130).

During the publication of "Aynak Qadri", Nezar Qabani, the famous Syrian poet, considered "Qade Al-Saman", story field poet.

Yasin Refayi: "Qade Al-Saman" is a writer who started from the high and is valuable.

According to Yusuf Edris, "Qade Al-Saman" was considered the women literature revolution and has considerable Arabic rhetoric (Capva, 1992, 38).

Qali Shokri in his book "غاده السمان بلا أجنحه»" adored her with these words: if we consider "نجیب محفوظ" for all Arabic readers as classic writers, "Qade Al-Saman" is the writer of new Arab generations.

Salmi Al-Khazra Al-Jedis, the Arabic and English writer said: "Qade Al-Saman" is a surprising example of courageous fighting in the challenge that Arabic home in this part of 20th century is dealing with it.

Raja Al-Naqas, the Egyptian critic said: " in the literature of Qade Al-Saman is a soul that by bravery, resistance and insist wants to open a place in the world… (Frzad, 1989, 9). Nabil Soleiman: Qade Al-Saman in her writing, at first gave importance in the culture and bourgeoisie and considered the problems from their view not from the views of normal people (Soleiman, 1974, p. 90-91).

Qamar Kilani: Qade Al-Saman was innovator and loved the culture. Although she was a shining star in the sky of literature, rapidly went away and chose another sky to be the star.

Critics

There are some critics on "Qade Al-Saman" and some of them are referred:

"Qade Al-Saman" was emotional and passive in the first stories (Al-Saman, 2002, 273).

The novels of "Qade Al-Saman" had a kind of repetition and poetic language (Hamud, 2005, 136).

"Qade Al-Saman" expressed the concept of his secrets explicitly and damaged the aesthetic aspects of language showing the aesthetic receive and understanding (Hamud, 2005, 142).

"Qade Al-Saman" showed the personalities showing his views, namely women as perfect as any woman at any age had stable, knowledgeable personality (Hamud, 2005, 128). Sometimes the voice of writer is

dominant on the voice of novel personalities (Hamud, 2005, 43).
"Qade Al-Saman" in her works exceeded the familiar rules and exceeded novel writing principles (Al-Saman, 2002, p. 260).
"Qade Al-Saman" in writing the current realities of Arab world was negative and his descriptions were not consistent with eastern Arabic communities.

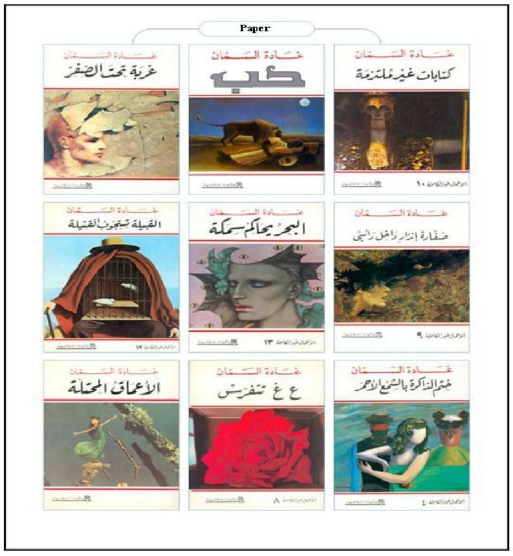

Fig. 1: The works of "Qade Al-Saman": paper

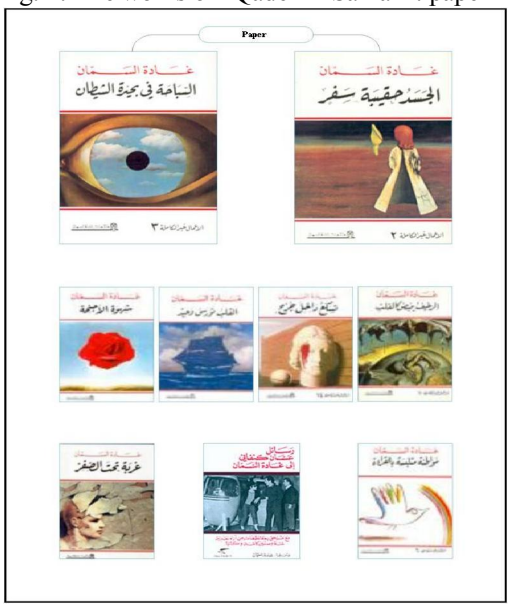

Fig. 2: The continuance of Qade Al-Saman works: paper

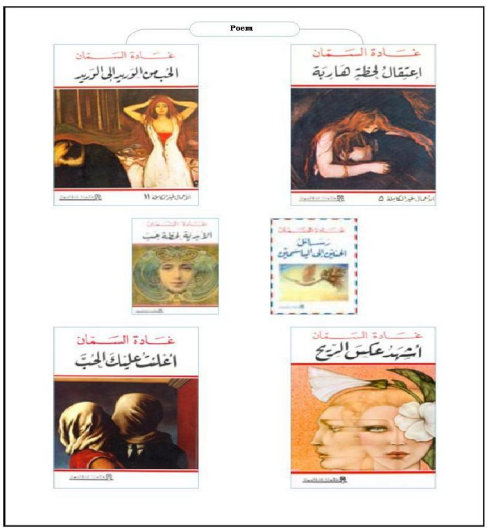

Fig. 3: The works of "Qade Al-Saman": poem

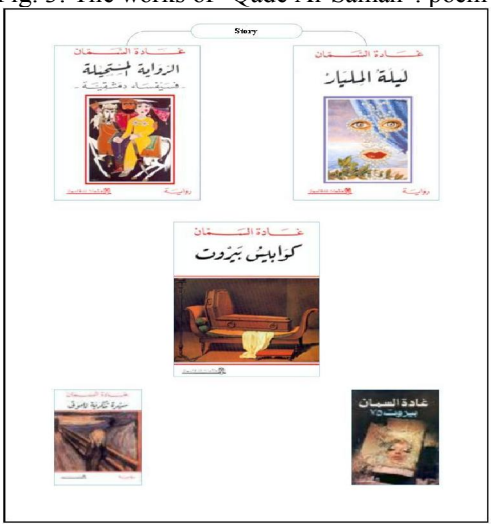

Fig. 4: The works of "Qade Al-Saman": novel

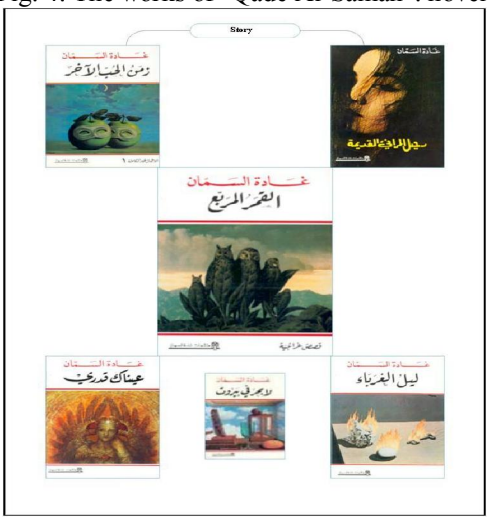

Fig. 5: The works of "Qade Al-Saman": story

3. The works of "Qade Al-Saman"

The works of "Qade Al-Saman" in terms of paper, poem, novel and story are:

Paper

«الجسد حقیبه سفر», «السِّباحه فی بحیره حب», «ختم الذّاکره بالشمع الأحمر», «مواطنه متلبّسه بالقراءه», «الرغیف ینبض کالقلب», «ع. غ. تتفرّس», «صفّاره انذار داخل رأسی», «الاعماق المحتلّه», «غربه تحت الصِّفر», «کتابات غیر ملتزمه», «القبیله تستجوب القتیله», «البحر یحاکم سمکه», «تسکّع داخل جرح», «محاکمه حب», «شهوه الاجنحه», «القلب نورس وحید», «رعشه الأجنحه», «امرأه عربیه وحرّه», «رسائل غسّان کنفانی الی «غاده السمان».

Poem

«اعتقال لحظه هاربه», «الحب من الورید الی الورید», «اعلنت علیك الحب», «الحبیب الافتراضی», «عاشقه فی مِحبره», «أشهد عکس الرّیح», «الأبدیه لحظه حب», «رسائل الحنین الی الیاسمین», «الرقص مع البوم».

Novel

«بیروت ۷۵», «کوابیس بیروت», «لیله المیلیار», «الروایه المستحیله-فسیفساء دمشقیه», «سهره تنکّریه للموتی»».

Story

«عیناك قدری», «زمن الحب الآخر», «لا بحر فی بیروت», «لیل الغرباء», «رحیل المرافیء القدیمه», «زمن الحبّ الآخر», (القمر المربّع» قصص غرائبیه»).

Female Iranian storywriters

Indeed, Islamic Revolution of Iran had great role in active presence of women in various social and cultural fields. One of the manifestations of this presence was wide presence of female writers in story and its considerable effects and some of them are very valuable. "After Islamic Revolution of Iran, female writers were added and one of the explicit characteristics of revolution in literature is the inclination of women to writing story. It can be predicted that the future of Iran story writing is for female writers and in future decade, we will have female storywriters. The priority of female writers is the exact description of life, feelings of female characters in their works (Kaviri, 2003, p. 3-4).

The start of female story writing was "Atash-E Khamush" written by Simin Daneshvar being published in 1327, some people considered the books "Afsaneh and Afsare-man written by Maryam Firouz before "Atashe Khamush" but this book is a kind of biography because story aspects are not strong in it and the writer talked about the previous memories. Generally, female storywriters are divided into three groups:

The first group who was active to the revolution and they did not publish any works.

The group that before and after revolution wrote stories and some of them were talented and are considered as the most famous storytellers. Regarding a few story writers that mostly wrote before the revolution and after the revolution, some works are published to Hassan Abedini, we can say that the writing of storywriters reflected some of their experiences. The social and political aspects of the society are considered. The most famous one is Simin Daneshvar. Some people as Goli Taraqi, Shahrnoosh Parsipoor, qazaleh Alizadeh, Mahshid Amirshahi and Mahin Bahrami are in this group.

The writers who started their writing after Islamic Revolution of Iran. They are called "revolution generation writers". Some issues as the events of the early days of revolution and some months before Islamic Revolution, social religion wars guided the thoughts of people from routine line to the protection of values and created special literature works.

The topic of women writers in Iran

Female writers dealt with various topics in their story works as:

The stories about the sorrow and sad life of Iranian women such as short story of "a city as heaven", 1340, written by Simin Daneshvar and short story" Sargozasht", "Bibishahrbanoo", "zayeman", "model", yek zan ba mardha", "dar bazaar Vakil", " Mardi ke barnagasht" from this set. The novel " Hosele Qam, 1369, written by Shirin Bermer, the stories " Istgah Zard, " Zourkhane Piran, " Table Nimeshab, " Kushmar", " Yekshanbeha", 1370 written by Fereshte Molavi.

The short story of " Zakhmkhordegan Taqdir", 1371, written by Fahime Rahimi, short story " Alam o Adam", 1367, written by Maryma Jamshidi, the stories " Be ki salam konam", 1359, written by Simin Daneshvar, the stories " Sanghay Sheitan, 1369 by Moniro Ravanipour and story of " Shokuh Sokut", 1369 written by Roya Bordbarkhu.

Geographical and local stories

The stories occurred in special geographical regions and environments and the world and words, terms and local cultures are:

The stories " Shahri Chon Behesht", 1340 and "Souvashun", 1348 for the culture of Fars people and the story of "Sanghay Sheitan", namely short stories "Herus", "se tasvir" written by Moniro Ravanipour.

The stories of imposed war of Iraq against Iran (1359-1367) written by female story writers such as "Sorud Arvandrood" , 1368 written by Manijeh Armin, the story " Gahvare Chubi", 1367 written by Maryam Jamshidi, " Madar Shahadat-e Farzandat Mobarak", 1362 written by Fahime Khoda dust, the story "Alam o Adam" namely stories " Alaj Dard", " Tabkhir Ruh", " Tadbir Khata" and "Rangparideh" written by Maryam Jamshidi.

The stories of delivery and labor such as a part of " Shahri chon Behesht" and short story "delivery" in the story " Shahri Chon Behesht", 1340, the story " Dokhtar Haji Aqa" published of story "

Dokhtar Haji Aqa", 1370, written by Zahra Kadkhodayan, short story "Mar o Mard" and " Kolbe Tile Shekasteh" of story "Be ki salam konam", 1359.

Love stories such as the story "Shahri chon Behesht", short story " Zayeman", "Model" of the story " Shahri Chon Behesht", 1340 and the story " Dar Bazar Vakil", " Mardi ke barnagasht", "Suratkhaneh", " Tabl Nimeshab", 1370 written by Fereshteh Molavi, short story " Qese Qam Angize Eshq" of story " Sanghaye Sheitan", 1369 written by Moniro Ravanipour and short story "Mar O mard" of the tory "Be ki salam Konam?, 1359.

Women stories about men or for men such as the drama "Man be Baqe Erfan", 1369 written by Pari Saberi. " Mardi Ke Barnagasht, " Shahri Chon Behesht" of " shahri chon Behesht", 1340 and the "Iid Iraniha, " Suratkhaneh" and novel "Suvashun", 1348, "do Adam Kutuleh", 1370 of Fereshte Molavi, "Istgah Khakestari, Morq Daryayi, Zan Shishehi and Baq but Viran from the story " Zan Shishei" written by Razieh Tojar.

The characteristics of women stories in Iran

The characteristics of women stories are:

The women in adolescent and children literature are more than other parts. As consisting of about 80% of women writers and most of them are related to Islamic Republic of Iran. Men and boys in story writing works had less presence of women and daughters in their opposite gender.

The emotions are the main spice in women writers. Violence, anger, bad behavior have less application.

Most of the books published by Iran women writers are published in Tehran and a few of them were published in Arak, Tabriz, Mashhad, Qom, Shiraz, etc. The schooling of women writers before revolution is a few and there are a few people as Dr. Simin Daneshvar but after Islamic Revolution of Iran, most of the women writers had BA, MA and Phd.

Dealing with social and family issues are considered mostly by Iranian storywriters. More than 90% of women story works show the sorrow, experiences and their observations (Najafzadeh, 1375, p. 6-18).

The story is one of the most important tools of propagating culture, social change, reflecting them and showing artistic innovations. This art is used in various communities.

"Qadeh Al-Saman" attempted that by giving various images of previous and present conditions of women, motivated them to review in common gender definitions and created some gaps in idealogy cover of patriarchy.

He is not pessimistic and depicts bad behavior to achieve the dynamics and delicacy and speak of the women who were suffering from the discrimination and ruthlessness. Arab women inhibited their creativity and did not develop it.

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11/6/2012

A view of meritocracy in Ferdowsi the book of kings

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Abstract: The book of kings of Tus is not only the history of storytelling of old Iran but it is a treasure of valuable source of wisdom and knowledge and sociology and social issues were valuable things of this rich source. Meritocracy is considered a social item in this work with good position. Some examples are referred in this paper.
[Taghi Amini Mofrad, Kobra Nodehi, Zohreh Arab. **A view of meritocracy in Ferdowsi the book of kings.** *Life Sci J* 2012;9(4):4763-4767] (ISSN:1097-8135). http://www.lifesciencesite.com. 715

Keywords: Ferdowsi the book of kings; meritocracy; qualification; testing and selection

1. Introduction

Ferdowsi book is neither the dull history, nor legend or story, it is full of human world view of Ferdowsi. Ferdowsi was higher than a great poet, Hakim and great teacher of Iran and depiction of a great Ideal Iranian. Any story of this book has a deep knowledge and from the beginning and end of the story, the valuable wise thoughts are expressed effectively (Riahi, 1994:17). The book of kings is important as it is valuable full of knowledge and wisdom, living method in this world and guides us to salvation (Alavi Moqadam, 1995:178). The entire book of kings is admiring the virtues and hating the wrong doing. Reading this book is the document of qualification of Persian language and the treasury of Iran culture to Ferdowsi era. Any Iranian person should read the book of kings and model it (Dabir Siaqi, 1991: 7).

The manifestation of some issues as justice, good doing, charity, loving the country, meritocracy, dealing with welfare affairs of people, considering defensive issues of the country, behavior methods in internal and international relations, behavior and thinking of the enemy in this book showed the best generality of Ferdowsi in social and sociology aspect. Based on the importance of qualification and meritocracy on all the affairs, we briefly discuss about this important issue in Ferdoosi book.

Meritocracy in Islam religion teaching

Indeed, giving the responsibilities to qualified people is not a valid issue but it is considered as main and real affairs. As the Holy Quran said: اِنَّ اللهَ یأمُرُکم اَنْ تُؤَدُّوالأماناتِ الی اَهْلِها (Al-Nisa, 58). Ignoring the qualification of people in selecting and delegating the affairs to them is a problem endangering the foundation and health of the society and implicit unavoidable damages on the society.

As human being reached Khalifato Allah, after taking the tests and based on meritocracy, Nezami said:

The knowledge of a person is his good nature and his dignity (Nezami, 1993, 288)

Appointing Ebrahim (pbuh) as the leader of people was done after achieving qualification, in verse 124 Baqareh, it is said:

« وَ اِذِا بْتَلی اِبراهیمَ رَبُّهُ بِکَلِماتٍ فَاَتَمَّهُنَّ، قالَ اِنّی جاعِلُکَ لِلنّاسِ اِماماً».

The importance of qualification is considerable in other religious learning. Imam Ali (pbuh) presented some recommendations in considering meritocracy and qualification of the agents, he said in letter 53 of Nahjolbalaqeh: consider your agents and appoint them by testing and don't give any responsibility to them without the consultation of others! This work is a set of cruelty and treason and selects them among the experienced people from the pioneer family in Islam! They are more respectable for their behavior and correct dignity and they are less greedy and more thoughtful about their works.

Imam Ali (pbuh) in another part of the letter said: "Consider the people you appoint and select the best one and give the letter in which your secrets are written to a person who is more virtuous (Khatami, 2002:1315).

Considering the important characteristic of meritocracy in other valuable texts of this book has special position. Saadi Shirazi believed that:

A poor person no fear of the king
Appoint a good person for people
Nothing more than cry is heard
As ashamed as a poor person
Fearing you, don't trust him
Be a god fearing person
Not the punishment
Trust person should fear God

(Saadi, 2002:44)

In Kelileh and Demneh of Nasrollah Monshi, considering meritocracy is reflected. He wrote: the right of people on the king is such that each of them should be reached based on dignity and don't delay in it and we should prefer the artists and wise people to ignorant and artless people. Two things are not expected of kings: decoration of head, putting the decoration of foot on the head and putting ruby and pearl in lead and tin is not insulting to the gold, the wisdom is for the people of wisdom is blamed and the works are done easily with wise people (Nasrollah Monshi, 1991: 68).

2. Meritocracy in the book of kings

The book of kings has special position in art and qualification and meritocracy.

Ferdowsi tried to put ideals and human basics in the body and soul of positive personalities in his book and tried that these personalities have valuable human history and they should be more thoughtful in their personal and social affairs to have a good result. In this stage, one of the conditions that is important in achieving satisfactory result in planning is considering qualification and respecting the concept of meritocracy in all fields. This valuable thing in all letter of this wise man is considered and we will have a brief report.

The story of Fereidoon is one of the meritocracy issues in the book of king. By the brief view of this story, we can find that in testing the capabilities, qualification is the main criterion. In this story, after the sons of Fereidoon arrived, Fereidoon appointed Jandal to help him in important plan of selecting spouse for the sons and attempted with wide attempt in selecting qualified brides:

One of the most respectful
Fereidoon invited of the brave people

Being kind with the king
Jandal full of art

Appoint three girls of noble family
All over the world
Beautiful, noble
Three sisters of one mother and one father

Suitable for marriage Suitable for my children

(Ferdowsi, 1994:96).

The result of this study is the daughters of Shah Yemen, Sarv Sayefekan as fiancée. The king of Yemen loved the girls more and tried to accept the request of Jandal on condition and asked the agent of Fereidoon to see the princess and evaluate them. The request of Yemen king showed respecting qualification and virtues and the people of wisdom should take it as an example:

Obeying is necessary
As the order of the king

Go out of my house
With the order of the king, the three daughters
The valuable things
How can I see their kings

To lit the dark city
They should come to me

To see their conscious mind
To be happy of their visit

To take their hands
To see their justice

To give may tradition
Then, three kings

(Ferdoosi, 2001:153).

In the continuance of this story, after the sons were married, Fereidoon tried to divide the wide kingdom scope among the sons. He decided to test the sons for just division and for the qualification of any person, gave some of them. Thus, when the sons reached Iran after returning Yemen, the father appeared as a dragon and attacked them and three sons were tested:

Came to see
Being informed of returning the three kings

To reduce the suspects
To know about them

As brave as lion
One of the bravest came

(Ferdoosi, 1994:104)

At first attacked the older son, the son said that fighting with the dragon is not for the people of wisdom and escapes from the dragon:

As precious
Went to the older son

Not out of wisdom
To fight with the dragon

Father came to the brother
To escape

(ibid)

Fereidoon attacked the second son; he decided to fight with the dragon:
Put the arrow in the bow
As the middle son saw

A lion should fight
In the battle field
(ibid)

The younger son attacked dragon and from wisdom tried to approach the dragon and expressed his abilities and his brothers to create disorder:
Shouted when seen the dragon
As the older son came to them

Don't go to the way of lions
Go out of here

Don't do it
Being heard of the name of Afaridon king

All fighting
Three sons of the king

I call you a bad person
If you go from this way

(ibid)

Fereidoon in this test and evaluating the arts and qualifications of each of the sons were achieved, younger son, Iraj was more qualified for mild nature and after consultation with experts, divided the wide country based on the qualifications of each of the sons, He gave Rome and Khavar to Selm, China and Turan to Tur and Iran and Nizevaran plain to the best son, Iraj.

In the story of Manuchehr, the reflection of meritocracy is revealed. In this story, Sam with the order of Manuchehr is prepared to attack Mazandaran. Zal was a gift in Kabol and gave the kingdom of the land to him and selecting and appointing the elites in kingdom are the orders of brave Sam to the son:
to be calm
Zal went to Sam

The men of knowledge and brave people
Gather the army

You get a lot of any knowledge
Hear of any knowledge

Gather all for justice and knowledge
Don't be get rid of forgiving
(ferdoosi, 2000:153)

Poursam after seeing off the father- moving to Mazandaran applied the constructive guides of the father and by using the attitudes of elites and scientists and experts and cultural and military experts were invited and by consultation, the constructive knowledge of the people of wisdom were applied:
Good name should be for ever
Sam was thoughtful

Searched and did everything
Sitting on the throne

The army
Astrologists and religion people

Consulting with each other
Nights and days they were together

Like a star
Zal learnt a lot

Not seen any one stronger than him
Of decision and knowledge, reached a position

(ibid, 154)

Other important examples were the fact that Manuchehr asked Sam that the corps attacks India and Kabul:
Go with the selected people
The king of the world said to Sam

Set on fire the place of Mehrab and Kabul
Set India on fire

(ibid, 197)
In the first reaction, Sam accepted the order of Shahriar:
I make the king happy
I will do it
(ibid, 198)

As Zal Sam heard this, he fell in love with Rudabeh- daughter of Mehrab Kaboli by going to father tried to prevent Shah and Sam and by recalling the memories of childhood with a magnificent tone tries to prevent them. Sam invited the writer and wrote a letter for his braveries and services and request of Zal to Manuchehr. Zal took the letter and went to the king, after PorSam reached; the court accepted him and was guided to the king. Manuchehr took the letter from him and after knowing the content said:
If your destiny is such
I will to as you like
(ibid)

The king heard about the braveries of Zal and after the letter of Sam found about the

constructive role of the young Pahlevan and took the opportunity and Zal was the potential qualified person who can take power after the father.

Based on the important mission, multi-dimensional evaluation, an exact result is achieved and it is useful in selecting and appointing qualifier agents and propagating the culture of meritocracy in all levels as a valuable model and experience.

Thus, Manuchehr at first asked the people of wisdom, experts and magicians to research about the future and result of marriage of Zal and Rudabeh because the future planning and strategic long-term thinking required that the result of this marriage followed the improvement of the foundation of the country:

Astrologists and men of wisdom
Order the Mubadan

Search about the sky
Gather them

(ibid, 217)
The researchers after searching the first part of the test, reported the result to the king, Manuchehr:
The clear water is flowing
It was clear

A good natured child is born
The daughter of Mehrab and son of Sam

Strong, polite, noble
With a good life

Strong for fighting
Wing, branches

Obeying the kings
The shelter of the army in Iran

(ibid,218)

In another part of the test, the wisdom and intelligence of Pour Sam are evaluated. The king asked the experts to have an interview with Zal and raise some questions in various fields and evaluate his knowledge and qualification. Each of them asked a question, then they asked him to think about the questions well and present the answer clearly and por sam answered them clearly. The king found about the qualification, wisdom and intelligence of Zal after this difficult test, was happy with him and admitted him and they set up a celebration. Then, Zal went to Manuchehr to let him return, the king asked him to stay one more day. Then, " the test for selecting a qualified person), practical test and evaluating the physical force is prepared and the final approval of the qualification of Zal depends upon the positive and successful result in this stage. Zal took the test and started the work symbolically:
Very old
A bad tree

Prepared the horse
Sam rubbing the bow

The arrow of kingdom
Released it

(ibid,224)
The test continues until the brave people all confess about the qualification of pour sam in physical and mental aspect:
His mother will cry more
Any one fighting with you

He is whale
Such person is not born of the lions

(ibid, 225)
After the final stage of the big test for important selection, Manuchehr and other experts admired Zal Zar and prepared some valuable gifts for the famous Pahlevan. At the end, the king appointed the famous Zal and delegated the affairs to him:
All on that time
Everything was given to Zal
(ibid, 226)

The importance of qualification and meritocracy to achieve the responsibilities obliged the people of wisdom to evaluate all the agents. In the kingdom of Keikavus story, when he was informed of the characteristics of the daughter of Hamavaran king, Sudabeh, fell in love with her. He tries to take her hand for marriage, Kavus decides to appoint a good messenger:
A man of knowledge
Selected among the group
Ordered to go to Hamavaran
Brave, intelligent
(ibid, 131)

The messenger of Kavus did his mission as qualified:
To the king of Hamavaran
The intelligent man went
With sweet words
Spoke calmly
Then the messageGave hello of Kavus
(ibid, 132)
The valuable characteristics of Keikavus messenger are well as the king of Hamavaran in discussion with his daughter said:
The letter as Zand and skillful in his hand

The kind messenger came
(ibid, 133)

This accuracy in appointing the shrewd messenger is considered in this story (the fight of Kavus with the king of Hamavaran). After the king of Hamavaran invites Kavus with deceiving, and imprisons him, Rostam hears about it and invited the army to be prepared for attack and then Pour Dastan sent an intelligent messenger to the court of Hamavaran and this decision showed considering meritocracy in this cultural work:

Was sent to Kavus Shah
An intelligent person
Became famous
Beside the king of Hamavaran
(ibid, 129)

In the kingdom story of Kavus, selecting Rostam as the messenger to go to the court of the king of Mazandaran is another manifestation of meritocracy in the book of kings. In this selection, Rostam tried to use this mission and find about the army of the enemy and ups and downs of the court:

Receiving the letter took the way
Took down the heavy club approaching Mazandaran
King was informed of the letter sent by Kavus
Salar Mazandaran heard selected among the brave men
As Tahamtan saw them saw a branch of the tree
Took it in his hand all the army surprised
Ordered them to bring Put it down approaching
One of them took the hand and pressed to upset him
Rostam laughed all were watching
Cut his vein and fell as laughing pressed his hands
Came down from the horse he was unconscious
(Reza, 1991:148)

In the story of the kingdom of Khosroparviz, when the letter of China Khaghan in response to the letter of the King of Iran is reached to Khosroparviz. After being informed of the content of the letter, invites the counselors. They recall the necessity of selecting an intelligent and wise messenger to Khaqan and sending an experienced, wise and brave person show observing meritocracy and observing qualification in delegating the works to the agents:

From magnificence and kingdom
The response from Iranians
Wise, brave and intelligent
Select among Iranians one of them
Speak and hear his manner
As going to Khaqan from this door
(ibid, 153)

3. Conclusion

Considering meritocracy is an important issue in determining the constructive elements of human communities. The suitable approach to this culture and its establishment in planning and activities caused the permanent growth of the society.

The importance of meritocracy caused that Ferdoosi in his book consider this issue and is reflected in the thought, speech and method of the people of wisdom and Ahura and some of the examples were presented in the current study.

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11/6/2012

Eulogy in Persian Literature

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Abstract: A great part of Persian literature is consisting of eulogy and elegy. Elegy is a mournful, melancholic or plaintive poem, especially a funeral song or a lament for the dead and eulogy is a poem that is said in the compliment and adore of a special person, live or dead. By the review of the history of Persian literature we can find that from the beginning of Persian poem, adoring the power owners was in eulogy poems.
[Abbas soltany gerdfaramarzy. **Eulogy in Persian Literature.** *Life Sci J* 2012;9(4):4768-4773] (ISSN:1097-8135). http://www.lifesciencesite.com. 716

Keywords: Poem; Iran; Eulogy; Persian literature

1. Introduction

A great part of Persian literature is consisting of eulogies. Eulogy means to praise and commend of someone's good attributes and traits.(dehkhoda dictionary). and eulogy poem is a praise that poet says for own person eulogized and uses from it, for expressing of his moral attributes and exalts from his behavior and achievements and opens language to his Respect(Razmjou, Hussein, 1374) According to Saying of author of the "History of Sistan" The first usage of versified speech in persian verse, Has been eulogy a king , about twelve centuries ago. citing this book , can be found Mohamed bin Vasyf Segzi, is the first one that has composed eulogy poem to Farsi, by Eulogy Saffarid yaacob

ای امیری که امیران جهان خاصه و عام/بنده و چاکر و مولای و سگ بندو غلام
ازلـی خطـی در لوح کـه ملکی بدهی/ به ابیيوسف یعقوبـبن - اللیث همـام(Author unknown, History of Sistan, 1314)

Eulogy was inclined to the men of religion, kings and powerful men of court and the poets, namely from Samanid and Qaznavid tried it to approach them or make the living.. "nizami aroozi," in Articles the poet book "Four Articles" Requisite of survival of the names of kings, Depends to such eulogies:" So the king from good poets, is not the solution That thay prepare survival of his name and record his mention in the volumes and books , When king becomes an envoy to an inevitable work Did not hold effects from Corps and treasure and treasury and, his name Will remain eternal because of poetry of poets. (Razmjoo, Hussein,1374)

The form of eulogy was Qasideh and the greatest eulogy tellers of Persian literature were living in Qaznavid era as Onsori, Asjadi, Farokhisistani, Manuchehri Damqani and Masood Sad Salman. There were some poets before them as Rudaki in Samanian court. In other periods of iran literary, too, many poets , such as Hafez, Saif Frghany, Khajoo Kermani, Ferdowsi, Nizami Ganjavi and Fakhruddin As'ad Gorgani, wrote verses in praise of great men and gave him , in poetic forms of qazal and masnavi,.The poets who were active after Qaznavid era in eulogy literature were Anvari, Khaqani, Moezi Neishaburi and Kamalodin Ismail.

eulogy in Khosro and Shirin

The ethical investigation of eulogy in Khosro and Shirin can be evaluated in two parts ofcomplimenting the qualified people and powerful men.

1- Adoring the qualified people

Adoring the wise men was respecting the ethical virtues and human behavior is good. These compliments cause the propagation of spiritual values and stability of knowledge and morality sovereignty in human society and educate high attempts and motivate the talents of right doers to achieve good behavior and doing good deeds.

Among the history of honors of human being, the divine Prophets and the people who guided others to be released of the deviance of the children and Adam are more evident.

From the view of Islam, the adorable people are prophets, right doers and the messengers as in the Holy Quran in verses 82 to 86 of Anam verse, adored 17 messengers as Ibrahim, Eshaq, Yaqub, Nuh, Davood, Soleiman, Ayub, Yusef, Musa, Zakaria, Yahya, Isa, Elias, Ismail, Yese, Yunes, Lut and consider them as the right doers.

Muslim poets based on this method adored, the Prophet (pbuh) and His family and Kholafay Rashedin after the beginning verses of his poems and had wise analyses of ethical virtues of religion and

knowledge men showing the friendship and their perfection inclination.

In old Persian poem, The Prophet is shining and he was considered as the best person to be adored. The following poems:

Sanayi said:

تا به حشر ای دل ارثنا گفتی همه گفتی چو مصطفی گفتی

(Sanayi Qaznavi, Hakim Majdud Ibn Adam, Hadiqe Al-Hadiqe, p. 206)

Atar said:

خواجه دنیا و دین گنج وفا/ صدروبدرهر دوعالم مصطفا

آفتاب شرع و دریای یقین / نـور عالـم رحمــه للــعالمین

(Atar Neishaburi, Manteq Al-Teir, corrected by Dr. Mashkur, Tehran. Tehran library publications. 1353. P. 17)

Mulavi:

جامه سیه کردکفر نور محمد رسید/ طبل بقا کوفتند،ملک مخلدرسید

(Molana, Koliat Shams, Corrected by Badiolzaman Foruzanfar, vol. 2, p. 192).

Saadi:

ماه فرو ماند از جمال محمد / سرو نباشد به اعتدال محمد

(Saadi, Qasaid, corrected by Mohammad Ali Forughi, Tehran. Eqbal publications, 1984, p. 17).

In old Persian poem works, after The Prophet (pbuh), the family of Prophet and Kholafaye Rashedin are considered as the best morality and ethical issue s and adored them with some poems as Ferdosi said:

همی دان علی بود جفت بتول/که او را به خوبی ستاید رسول

که من شهرعلم علیم دراست/ درست این سخن قول پیغمبراست

(Ferdosi, Abolqasem, The book of Kings, jul mole publication, Tehran. Pocket books organization publications, 1345, vol. 1, p. 8).

Hakim Ganjeh was a Muslim that adored the Prophet in all his books.

In his Khosro and Shirin book considered all the world as the soil of the Prophet and according to the order of God in verse 56 of Ahzab in the Holy Quran said: " Allah and angels say hello to the Prophet, o, believers, say hello to him, a good hello" say hello to the pure soul. He shines the eyes of wise men.

محمد کافرینش هست خاکش/هزاران آفرین بر جان پاکش

چـراغ افــروز چشم بینش/طـــراز کارگـاه آفرینـــش

(Khosroroshan, p. 115).

Nezami considered The Prophet (pbuh) in this eulogy as the commander of loyalty battle, the commander of the army of Messengers, Shafi of The needy people, the treasure of the needy people, the key of divine treasure, sheltering wisdom had some miracles that made the unbelievers embarrassed, kind person, the owner of the secret of Meraj and asked him to pray for Nezami:

کالهی بر نظامی کار بگشای زنفس کافرش زنار بگشای

دلش در مخزن آسایش آور برآن بخشودنی بخشایش آور

اگرچه جرم او کوهی گرانست تو را دریای رحمت بیکرانست

بیامرزش ،روان آمرزی آخـر خدای رایگان آمرزی آخـــر (ibid, p. 116)

2. Eulogy of powerful men

Compliment and adoring the powerful men is one of the important issues of Divans and offices of old Persian poets that deviated others including the compatibility with the oppressors. These eulogies include the attributes despite the existing attributes in people and most of the poets said the poems to make more money. If these greedy poets didn't achieve their goals, tried to blame that person, as Anvari Abiverdy said:

سه شعر رسم بود شاعران طامع را/ یکی مدیح و دوم قطعه تقاضائی

اگر بداد سوم شکر ور نداد هجا/ ازاین سه شعر دوگفتم دگرچه فرمائی

(Anvari Abiverdi, Divan, attempted by Mohammad Taqi Modares Razavi, Tehran, Book publication, 1340, vol. 2, p. 140).

In the eulogy poem , poet usually started his ghaside by lyricism and then intered in the eulogy of person and finally , finished by prayer of the same person(taabid). in this verses ,sometime , is seen also a description of wars of Praised person , that mentioned Enemy castle and how to open them and battlefields and difficult and hard campaigns and battle equipment and such as those and in this kind of poetry spoke from Banquet and happiness meetings of Kings, Gardens, palaces of kings and official meetings of them…(Vazin Poor, nader, AH, 1374.)

Sometimes this exaggeration is disgusting and other poets protest. Qazaeri Razi (death, 426) complimented Sultan Mahmood Qaznavi and said:

صواب کرد که پیدا نکرد هر دو جهان یگانه ایزد دادار بی نظیر و همال

و هرگونه هر دو جهان را کف تو بخشیدی امید بنده نماندی به ایزد متعال

Onsori protested to exaggerate in the eulogy as:

نگاه دار تو در خدمت ملوک ادب به جد بکوش و مده عقل را به هزل و هزال

زیادتی چه کنی کان به نقص باز شود کز این سبیل نکوهیده گشت مذهب غال

(Mahjub, Dr. Mohammad Jafar, Khorasani style in Persian poem, Tehran: Tarbiat Moalem publications, 1345, p. 468, 469).

Although hypocrite poets sold their arts to achieve money and position in the court, but these

poets were killed, imprisoned with a change by the king who honored them. Some poets as Masood Saed Salman, Falaki Shervani, Abolala Ganjavi and Mojir Bilqani were the miserable poets. Such degradations caused that some poets blame others as the poem of Ohad Al-Din Mohammad Anvari:

ای برادربشنواین رمزی زشعروشاعری تازمامشتی گداکس رابه مردم نشمری

آدمی راچون معونت شرط کارشرکت است نان زما کناسی خورد بهتر بود از شاعری (Ohadin Anvari Abiverdi, poems Divan, attempted by Saeed Nafisi, Tehran, Pirooz press publication, 1337, p. 297).

As it was said, the major aim of the eulogy poets in complimenting the envious court men loved money and wealth and degraded themselves as it is shown in the poems:

صاحبا بنده تو قاآنی که خداوند دانش و هنر است

گله ها دارد از تغافل تو لیک دلش از زبانش بی خبر است) Qani, Poems, corrected by Mohammad Jafar Mahjub, Tehran: Amirkabir publication, 1336, p. 48).

The men of courts had some aims of educating the poets such as ,first , The justification of not defeating of the government in the wars ,second , Justification of ruthlessness of the kings against the opposed people ,third , Political advertisements of the kings to justify their kingdom on people , fourth ,Loving the false fames and kingdom , fifth ,Creating fear and panic for the governors and people of other regions to occupy their land or avoiding the attack of the regions ,sixth Registering a good name for themselves in the history of their country

These poems are not poem and they are advertising poems propagating the comments of kings and more than being read in their presence are produced to be published in all over the country or beyond the boundaries.

Is Nezami a poet of eulogy poets of kings:

To answer this question we should say that although he is not court poet, by the investigation in his poem papers we are faced with the name of the kings adoring them. In Khosro Shirin of Nezami, three kings of Azerbaijan were adored as Toqrol Arsalan, Atabak Abojafar Mohammad ibn Ildagz, Jahan Pahlevan and Qezel Arsalan.

Atabakan of Azerbaijan

"Atabak was the title that was given in the early government of Saljukian dynasty on Iran (the end of 5th century) to people who were responsible for educating the prince's affairs.. Atabakan of Azarbayijan since 531 hijri Ghamari took power by Shams Oldin Ildgaz, his son Mohammad Jahan Pahlavan, Nosrat Odin Abubakr and Mozafar Ozbak were governing that were in the hand of Kharazmshahian in 622 h.gh.Nezami gave Khosro Shirin to Mohammad Jahan Pahlevan (Safa, Dr. Zabihollah, The history of Literature in Iran, vol. 2, p.26).

The true reason of eulogy

Nezami was one of the great men and due to his benefit of common sciences of poem, astronomy, medicine, philosophy, Islamic Phigh, Morality, etc and the evidences are shown in the works and he was called Hakim. Indeed we can not say that a person with this magnificence blindly adored the unqualified people who took power due to taking opportunity. In the following we try to reveal the final goals of Nezami in the eulogy.

1- Historical issues

The poets by expressing the name of kings and their governments in eulogy or non-eulogy poems help a lot in transferring most of the historical data to the next generation. Some of the historical advantages of Nezami eulogy in Khosro Shirin:

1-1 The definition of the time and place of Nezami life

As place and time characteristics have considerable effects in the content of the works of people, Nezami by expressing the name of the kings of Azerbaijan indirectly say all the life period and life climate characteristics to all and introduced exactly the kings at the same era.

2-1 expressing historical events

Nezami in his eulogy poems in his love book (Khosro and Shirin) said some of the historical events as the storm of Nuha and his ship on Jodi Mountain, in the adore of Jahan Pahlavan

چوطوفی سوی جود آرد وجودش زجودی بگذرد توفان جودش (Khosro Shirin, p. 124).

In other place simulated Qezel Arsalan in eulogy to Mehdi

چو مهدی گرچه مغرب شد وثاقش گذشت از سر حد مشرق یناقش(ibid, p. 131).

Mehdi: He was the founder of Fatemian in west country in 296 h.gh in Seljemaseh of African land that tool all the regions from the occupancy of Abasid kings and took power in 297.

2.2. Advising in the form of eulogy

Nezami was a powerful poet and the speech was very easy for him and whenever he wants he shakes the heart of the reader and sometimes uses the words, as the reader cries. This poet sees the oppression of kings and makes the silence forbidden for him. He tries to resist with his arm, poem. Nezami despite many poets as Naser Khosro didn't show his language to powerful kings to escape and he advised the kings in the form of eulogy.

The poet in his poems with some attributes as virtue, religiosity, mercy, forgiveness to the king starts the poem but it doesn't mean that these attributes are in that person and he advises the king

with these words such as this poem inviting to the forgiveness and justice:

چو دریا در دهد بی‌تلخ رویی گهر بخشد چوکان، بی‌تنگ خویی

خرد چون مادران گشته مطیعش به بام عدل زاده چون ربیعش (ibid,p. 124)

Nezami at the beginning of his book with some 10-beiti guided the kings to the advising poems in the main content of the book.

For example, the poet to show the problematic condition addressed the sky and Tin and said:

که داند که این دیر کهنسال چه مدت دارد و چون بودش اموال

نماند کس ببیند دور او را بدان تا درنیابد نمور او را

زجور و عدل او در هر دو سازی‌ست در آن داننده را بوسیله، رازی‌ست

نمی‌خواهی که بینی جور بر جور نیابد گفت راز دور با دور

به صد فن گر نمایی ذوفنونی نشاید برد ازین ابلق حرونی (ibid, p.33)

All these showed the real words of the poet that explicitly couldn't say them.

The poet of Gangeh when advising the kings tries to tell it by the language of a hero of the story and advise them:

جهان را کرده‌ای از نعمت آباد خرابش چون توان کرد ز بیداد

چنان گاوی که از وی شیر خیزد لگد در شیر بندد تا بریزد

( )..حذر کن ز آنکه ناگه در کمین دعای بد کند خلوت نشینی ibid, p.458)

3- The publication of the work and guarantee to keep it

Nezami knows the value of this work. He is wise and simulates his works to a treasure:

وز آن خرمن نجستم که چندین گنج بخشیدم به شاهی برگ کاهی (ibid, p.281)

In another place considers himself Mansubeh and he knows he will be immortal with his poems and works:

حضورش در سخن نظامی نیز کاین منصوبه خوانی یابی نهانی

که در هر بیت گوید با نهان کی باشد از تو جلوه‌سازی تو رازی

ز هر بیتی ندا آید که پس از صد سال اگر گویی کجا او ها او (ibid, p.501)

Nezami knows that in the period in which the publication of the works is on the responsibility of the court and only the powerful people can do it and should guarantee his works by adoring some kings and giving his valuable works to the name of one of the kings as in Makhzanolasrar requires the help of the king.

بسا کارا که بشه روشنتر از ماه

به همت، خاصه همت همت شاه (, ibid)

4- Make a living

Indeed, due to the difference of creation that is the main center of the creation of the creatures, each person has some special talents and by using it can achieve his good ideas besides making a living. Here, the poets that most of them didn't know anything except poem, for making a living should make a speech and create a treasure of prose or poem.

But these poets are divided into two groups in making a living.

4-1 The poet of poet

The poet of poet is a person who is only a poet and his speech is consisting of a message for a person addressing to be adored or blamed and this type of poem is not good except for the person who is adored. They made words by their talents. Who is the buyer and it is not the problem and he adorns the words that by money seems shining (Saedi, Abdolazim, With Hafez to mythology and morality, Tehran: Nour Fatemieh publications, 1359, p. 72,73.

4-2 The wise poet and the Aref poet

These poets due to their high talents, using mythology and common sciences not only need to attract kings by their adoring, the kings due to the lack of the talent, to meet their demands and ignoring the government problems required these two types of people. This need caused that wise and Arif poets as Khajeh Nezam Al-Molk and Khajeh Nasir Al-Din Tusi had the position of ministry of the court of kings (ibid, p.75).

Nezami, the wise poet:

Nezami is the second type of poets. He had the title of achieving ethical virtues and common sciences as Hakim, presented his works namely the two first works as Makhzan Al-Asrar and Khosroshirin in wisdom period (cited in Behrooz Servatian in the introduction of Khosro Shirin book, p. 44). Saeed Nafisi, contemporary Nesami search of Iran said it is evident of all the works of Nezami that he didn't deal with the kings and only once visited Atabak Qezel Arsalan and in his Masnavi, some poems were said in the adore of kings and commanders and sent the versions to them and he was famous and the kings asked him to send something,…" (Nezami Ganjavi, p.19).

The story of inviting Qezel Arsalan, the king of Azerbaijan from Nezami at the end of Masnavi of Khosro Shirin was one of the honors of this poet and showed that he was not interested to go to the kings and one time was due to the invitation of Qezel Arsalan king and it was one of his honors as he said that when the king heard of my visit, to respect me, he put aside wine and other recreations and he didn't allow him to bow.

فزودش شادی در چو دادندش خبر کامد نظامی شادکامی

نه زان پشمی که زاهد شکوه زهد من بر من نگه داشت
در کله داشت
مدارای مرا پی بفرمود از میان می برگرفتن
برگرفتن...((Khosroshirin, p.524)

Nezami said that in this meeting, Qezelshah and his brother as his Khosro Shirin was given to the king, gave a village to Nezami:

)... شدم نزدیک شه با بخت مسعود وزو باز آمدم با تخت محمود
(ibid, p.517)

According to these verses, although Nezami received some presents to create his works and more than he required these gifts, the kings needed him more and the gifts for the treasure of his speech were nothing. He said that hardly I achieve some words such as shining and the kings give a reward equal to barley (something invaluable):

کسی کاو بر نظامی می برد رشک نفس بی آه بیند دیده بی
اشک
بیا گو شب ببین کان کندنم را نه کان کندن بلی جان کندنم را
به دلت آرم به شبها به صد گرمی بسوزانم دماغی ..
شبچراغی
جو چندم فرستد فرستم تا ترازودار شاهان
عذر خواهان
جفا بر به بی وزنی به بی وزنان و هر گنج
گاو، گردون نالد از رنج (ibid, p.507)

Conclusion

After study Khosrow and Shirin poem , These results were obtained, first, parts of of this poem is dedicated to the eulogy and is divided to two kinds of eulogy of the qualified people and eulogy of powerful men, second , eulogy of the Prophet Muhammad is type of the qualified people eulogy That conforms Islamic law and the most important figures of islamic science and literature have done, third ,Nezami blamed eulogy of the kings as in his poems criticized the poets adoring the kings and considered them as the beggars that only love money:

(Makhzanolasrar, 43)

سکه این سیم کشانی که به زر مرده‌اند
سیم به زر برده‌اند

Complained of these beggars who were the slave of kings.

ای فلک از دست تو چون رسته‌اند
این گره‌هایی که کمر بسته‌اند(ibid, 42)

It doesn't mean that Nezami didn't adore anyone or didn't give his works to any king or didn't receive any money. It is evident that he gave panjganj to the kings of that region and received some gifts from them.

Despite the need of kings to Nezami, the great position of Nezami didn't allow that Nezami was changed to a poet who only adores the kings and in his poems he advised the kings skillfully. These poems on one hand reminded the existing utopia in the mind of the society to the kings and on the other hand, expressed the social movements of the depth of history to the next generation.

Fourth , as the poet in his words refer to some points and doesn't believe them doesn't believe in eulogy but sometimes based on the necessity, he adored a king. For example, in Khosro and Shirin more is said about wine (Mey):

قدح پر باده کرد و طبع پرجوش
به خسرو داد کاین را نوش کن نوش
(Khosro Shirin, p.237)

But The poet himself proudly said when describes his entrance to the court of Qezel Arsalan, when Qezel Arsalan found about my visit, put aside wine for my respect.This shows that as Nezami avoided to drink wine and described it only in his poem, was informed of the bad aspect of eulogy and Did not believe also such eulogies

Fifth, As deceased Saeed Nafisi, the contemporary Expert of nizami works, also believes "in his Masnavi there are some poems for adoring the kings and sent the versions to them and it was due to the fact that he was famous and the kings asked him to say something and he did the same (The works of Nezami,p.19).

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11/6/2012