

DIGITALES ARCHIV

ZBW – Leibniz-Informationszentrum Wirtschaft
ZBW – Leibniz Information Centre for Economics

Ebrahimi, Majid

Article

Applying new approach to develop a strategy in gold industry (case study: Isfahan urban economy)

Provided in Cooperation with:

Iran Urban Economics Scientific Association, Tehran

Reference: Ebrahimi, Majid Applying new approach to develop a strategy in gold industry (case study: Isfahan urban economy).

This Version is available at:

<http://hdl.handle.net/11159/315>

Kontakt/Contact

ZBW – Leibniz-Informationszentrum Wirtschaft/Leibniz Information Centre for Economics
Düsternbrooker Weg 120
24105 Kiel (Germany)
E-Mail: [rights\[at\]zbw.eu](mailto:rights[at]zbw.eu)
<https://www.zbw.eu/>

Standard-Nutzungsbedingungen:

Dieses Dokument darf zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden. Sie dürfen dieses Dokument nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, aufführen, vertreiben oder anderweitig nutzen. Sofern für das Dokument eine Open-Content-Lizenz verwendet wurde, so gelten abweichend von diesen Nutzungsbedingungen die in der Lizenz gewährten Nutzungsrechte.

<https://savearchive.zbw.eu/termsfuse>

Terms of use:

This document may be saved and copied for your personal and scholarly purposes. You are not to copy it for public or commercial purposes, to exhibit the document in public, to perform, distribute or otherwise use the document in public. If the document is made available under a Creative Commons Licence you may exercise further usage rights as specified in the licence.

Applying New Approach to Develop a Strategy in Gold Artifacts Industry (Case Study: Isfahan)

Majid Ebrahimi

Instructor of Statistics, Faculty of Sciences, Sadra Institute of Higher Education, Tehran, Iran

Mohammad Ali Fattahzadeh*

Ph.D. Candidate of Industrial Engineering- Planning and Production Management, Science and Research Branch, Islamic Azad University, Tehran, Iran

Javad Maali

M.Sc. in Industrial & Production Management, Department of Management, Central Tehran Branch, Islamic Azad University, Tehran, Iran

Received: 2015/07/22

Accepted: 2015/10/25

Abstract: The production of gold ornaments and artifacts is a local and national industry. Isfahan is one of the major metropolises which it has the first rank of gold industry, jewelry and silver in Iran. Obtained value added in this industry is not in a good position than other industries in Isfahan, however. Thus, more attention to this valuable industry will result in more development and growth and economic progress in Isfahan as well. Hence, the researcher tried to present an integrated framework in order to develop appropriate strategies in this metropolis which will help the growth and survival of the industry. For presenting a comprehensive framework strategy, SWOT has been used for determining the factors in this study. Major factors have been selected by using fuzzy linguistic variables and multi criteria decision making method. Using these factors, necessary conditions for enhancing value added obtained from this industry may be enhanced and more share of global markets will be gained.

Keywords: gold artifacts industry, SWOT, Isfahan, MCDM

JEL Classification: L25 .F14.O14 .O25 .O21.R11

The Scientific-Research
Quarterly Journal
ISSN: 2345-2870
Indexed in: ISC, SID,
Noormags, RICEST, Ensani,
Magiran
www.lueam.ir
Vol. 3, No.12
Fall 2015

*Corresponding Author: fattahzadeh@in.iut.ac.ir

1- Introduction

Gold has been one of the most expensive metals during the history. It has been always used for backing currency used in a system as gold standard in which a unit of currency was equal to a certain amount of gold (Faramarzi, 2005).

Many governments could gain huge incomes for their countries by using gold making industry. In addition to the revenue, employment in this industry was increased. Thus, making gold artifacts requires strategic planning in order to be in urban economy by taking advantage of available resources in our country.

According to the International Organization for jewelry in 2004, Iran was the sixth largest gold consumer in the

world. This shows the importance of domestic market of this product. Since gold is considered as one of the strategic goods in each country, investment in this industry can determine appropriate strategic situation among other countries in the region and the world. Iran has only 4 percent of global market despite having rich resources of gold. Table 1 adopted from Islamic Republic of Iran Customs website shows dollar volume of import and export of gold artifacts for Iran and Isfahan City. As it is shown in this table, Isfahan Customs is the main exporter of this product. Another important point is the volume of import which is very slight or it does not have any report even in most years.

Table1. Dollar volume of export and import of gold artifacts

Year	export		import
	Iran	Isfahan	
2009	119781646 \$	119781646 \$	4699 \$
2010	178606938 \$	178572358 \$	0
2011	667100072 \$	664349533 \$	903971 \$
2012	0	0	0
2013	0	0	0
2014	23977494 \$	23976952 \$	0

Source: (Islamic Republic of Iran Customs' website)

As it is shown in table 2, Iran's export of gold artifacts was accomplished by Tehran, Isfahan and Mashhad customs.

Major part of Iran's exports was done by customs located in Isfahan to the United Arab Emirates.

Table2. Export of gold artifacts from 2009 to 214

From	Destination customs	Dollar Value	Total value in Dollars
Turkey	commercial areas 2 of Imam Khomeini Airport	4699	4699
China	Khorramshahr	144/0	803971
	Bushehr Special Zone 1	803826.93	

Source: (Islamic Republic of Iran Customs' website)

Table3. Import of gold artifacts from 2009 to 214

Destination Country	From	Value in Dollars	Total
the United Arab Emirates	Isfahan	95285	989366867
	Commercial areas of Imam Khomeini airport	2550375	
	Isfahan airport	273293	
	Isfahan airport	813490	
	Isfahan airport	23976952	
	Isfahan airport	119686361	
	Isfahan airport	177485575	
	Isfahan airport	664349533	
	Mashhad	136003	
Canada	Commercial areas of Imam Khomeini airport	32732	52998
	commercial area 2 of Imam Khomeini Airport	20266	
Iraq	commercial area Imam Khomeini Airport	21429	21429
Lebanon	Commercial areas of Imam Khomeini airport	10000	20000
	Mashhad	10000	
Germany	Mashhad	4314	4314
Saudi Arabia	Mashhad	369	369
Qatar	Exhibition affairs of Tehran	175	175

Source: (Islamic Republic of Iran Customs' website)

Table 3 shows imports were mainly from Turkey and China. This amount of imports is impossible since existing foreign artifacts are more than this number. Large-scale of smuggled goods may be imported.

Isfahan is one of large metropolises in the country ranked first in gold, jewelry, and silver making industry. About 90 percent of used machineries in this industry are in Isfahan; about 40 per cent is industrial, about 40 other percent

is mechanized, and 20 percent is semi-mechanized. Since this metropolis has an influential role in producing gold artifacts, this industry can boom by developing appropriate strategies. According to the report presented in 2103 by Isfahan Municipality statistic (table4), unemployment rate in this metropolis,

where it can be exporter hub of gold artifacts in global markets, is higher than unemployment rate in the country. This shows that it is necessary and important to pay more attention to this industry for entering in the world market and reducing this rate in Isfahan.

Table4. Unemployment rate in Isfahan and Iran

Year	Country	Isfahan
1388	11.9	12
1389	13.50	15.30
1390	11.70	13.30
1391	12.1	13.7
1392	10.4	10.9

Source: (Isfahan Municipality statistic, 2013)

According to the last published statistic by Statistical Center of Iran from 2004 to 2013, added value obtained from the industry of gold artifacts in Isfahan is

less than 2 percent compared to existing industries in this metropolis that shows negligence to this industry (table5).

Table5. Added value obtained from gold artifacts in Isfahan economy

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Industry (Million Rials)	35195707	39849142	43688656	66552616	78591426	60266521	86818508	140554801	152924780	227419354
Gold Artifacts (Million Rials)	465351	598478	711572	623195	1026386	1025334	1329111	1829680	1540758	1708648
Percentage	1.32	1.50	1.63	1.24	1.31	1.70	1.53	1.3	1.01	0.75

Source: (Statistical Center of Iran's website)

Strategic management is the process of guaranteeing access to the organization benefits from applying appropriate organizational strategies as well as the art and the science of formulation, implementation, and assessment of multi-dimensional decisions emphasizing on integration of management, marketing, financial affairs, production, services and other factors (Pahlavaniyan, 2006). A strategy is not a plan but it is attitude way

based on the identification of key opportunities and realization of potential benefits (Ghafariyan & Kiyani, 2001).

If strategy is considered as a concept, it will be a coordinator between organization and external environment (Bamberger and Meshoulam, 2004).

Many techniques and approaches are used in the process of strategic management which SWOT is the most common (Dincer, 2004).

SWOT summarizes the most important external and internal factors of an organization. These factors are known as effective strategic factors on the organization's future (Kangas et al., 2003). Using this technique, it has been tried to assess and develop appropriate strategies for growth and improvement of gold industry in Isfahan.

2- Literature Review

a. Foreign researches

No systematically acceptable method has been presented for determining the importance of factors in available studies. The best techniques that can be used in SWOT are Multi-Criteria Decision Making (MCDM) techniques.

Kurttila et.al., (2000) developed a combined method from MCDM to remove the weaknesses in measuring and assessing steps of SWOT analysis. Their approach was based on Analytical Hierarchy Process (AHP) in analyzing SWOT; known as A'WOT in subsequent studies. Many researchers used this approach after this study. The most important of them were the studies of Stewart et.al. (2000), Kajanus et.al. (2004), Masozera et.al. (2006). It is important to note that this approach has been used only in order to prioritize and rank SWOT factor in all studies and it has not been developed into strategy selection stage.

Yüksel & Dagdeviren (2007) applied Analytical Network Process (ANP) technique instead of AHP in a study and they developed it into strategy selection stage in addition to prioritization of factors and sub-factors of SWOT. SWOT-

ANP approach was used to develop biomass energy in Kentucky (Catron et al., 2013).

b. Iranian researches

MCDM techniques were applied in several strategic studies.

In 2009, a case study in Auto Tabriz Sahand Company was done aiming to develop a strategy using a comprehensive framework strategy. SWOT, internal and external matrixes were used in this study and quantitative strategic planning matrix was used for decision-making (Amini & Khabbaz Babil, 2009).

In 2012, a case study in Hyperlink Company was done to develop a strategy. SWOT, internal and external matrixes were used in this study and quantitative strategic planning matrix was used for decision-making (Amini & Samavatiyan, 2012).

Another study was done in the same year and Analysis Technique Network in SWOT was used for Iran Insurance Company. Analysis Technique Network was used because of shortcomings in the field of evaluation, measurement, and SWOT factors and AHP inability to solve problems (Sehat and Parizadi, 2009). SWOT-ANP approach was used Iran's iron industry in 2014 (Shakoor Shahabi et al., 2014). TOPSIS approach in SWOT was used for selecting supplier (Arabzad, 2015).

3- Theoretical Principles

Analytical Hierarchy Process (AHP)

Process has great compatibility with human thinking and mental processes and its algorithm is based on a mathematical logic which has extremely high efficiency

and using it, many decision-making problems have been solved (Saaty & Takizawa, 1986). Decision making in AHP is done in several simple steps which is summarized below:

- Breaking the complex and unstructured into constructive components and elements (criteria and options)
- Sorting these criteria and options in hierarchical form
- Assigning numerical values to decision-makers' judges regarding the importance of standards at each level of the hierarchy

To choose which option has the most priority and should be considered as the goal to achieve appropriate output of the issue, judgments must be aggregated.

Analytical Network Process (ANP)

AHP has a fundamental limitation for optimize SWOT; possible dependencies among factors are not considered in AHP and this is the underlying assumption of AHP. The assumption is not logical in the world of strategic planning since SWOT factors are independent of each other. As devoted weights of AHP to factors are assumed as independent, they may be different from calculated weights with dependency assumption. Thus, it is necessary to apply an approach that consider possible dependencies among factors and involve them in measurement (Shrestha, 2004).

Due to the limitations listed for AHP and inability of this approach in terms of the dependencies between criteria and factors, Saati (2004) developed another approach known as ANP. The key advantage over AHP is considering dependencies among criteria.

Preference Based on Similarity to Ideal TOPSIS

TOPSIS model was proposed by Hwang and Yoon (1981). An option (m) is assessed by (n) as index in this method. The underlying logic of this model defines ideal solution (positive) and negative ideal solution. Positive ideal is a solution that increases profit criterion and decreases cost criterion. Optimal option is an option in which it has the minimum distance from the ideal solution and at the same time the farthest from the negative ideal solution. In other words, the options that are more similar to ideal solution obtain higher ranks in TOPSIS method (Asgharpour, 2010).

Linguistic Variables

Linguistic variables are those that their variables are not numbers, but they are words or sentences in natural or artificial language. Although fuzzy sets theory deals only with mathematical models, it enables modeling words and phrases of a natural language with the help of linguistic variables (Lee, 2005).

If $(V, T(V), U, G, M)$ is a linguistic variable, V is a linguistic variable, $T(V)$ a set of linguistic variables defined for V . U is a reference collection that linguistic values are defined on it. G is defined as membership function on reference collection that specifies linguistic values in the phrase and M is a sub-set of U .

Fuzzy Sets and Fuzzy Numbers

The theory of fuzzy sets was proposed by Lotfizadeh for the first time in 1965. He stated uncertainty caused by the ambiguity of human thinking in this theory. The main advantage of this theory is the ability to present uncertain

data. This method is able to apply mathematical operators in fuzzy data. The use of fuzzy sets in decision-making issues is one of the most important and efficient application of this theory compared to classical sets theory.

Belonging or membership is quite definite and precise in a classic set. Therefore, it is either a member of a set or is not. The membership function can only have two values of zero and one. In order to describe a gradual and slight change, Lotfizadeh introduced zero and one degrees and a scaled concept of rated membership. For this purpose, the membership function of μ was defined which has the values from the interval of $[0, 1]$ (Lotfizadeh, 1965). A fuzzy number has been identified by an interval of real numbers each of which have a degree of membership between 0 and 1.

Trapezoidal Fuzzy Number

A fuzzy set of $A^* = (a_1, a_2, a_3, a_4)$ will be a trapezoidal fuzzy number if the function of its membership is shown as equation 1.

$$\mu_A(x) = \begin{cases} \frac{x-a_1}{a_2-a_1} & a_1 \leq x \leq a_2 \\ 1 & a_2 \leq x \leq a_3 \\ \frac{x-a_4}{a_3-a_4} & a_3 \leq x \leq a_4 \\ 0 & \text{otherwise} \end{cases} \quad (1)$$

a_1, a_2, a_3, a_4 are real numbers in this equation (Chou et al., 2008).

Fuzzy Number and Scalar Multiplication

To multiply a fuzzy number of $\bar{A} = (a_1, a_2, a_3, a_4)$ with scalar number $k \geq 0$, we do according to equation (2)

Normalization of Fuzzy Number

If $\bar{A}_i = (a_{i1}, a_{i2}, a_{i3}, a_{i4})$ is a trapezoidal fuzzy number for: $i \in I$ and if

our criterion is profit for normalization of each fuzzy number of \bar{A}_i , we will have:

$$\bar{R}_i = \left(\frac{\min_{i \in I}\{a_{i1}\}}{a_{i4}}, \frac{\min_{i \in I}\{a_{i2}\}}{a_{i3}}, \frac{\min_{i \in I}\{a_{i3}\}}{a_{i2}}, \frac{\min_{i \in I}\{a_{i4}\}}{a_{i1}} \right) \quad (2)$$

If our criterion is cost, we will have:

(Chen, 2000)

$$\bar{R}_i = \left(\frac{\min_{i \in I}\{a_{i1}\}}{a_{i4}}, \frac{\min_{i \in I}\{a_{i2}\}}{a_{i3}}, \frac{\min_{i \in I}\{a_{i3}\}}{a_{i2}}, \frac{\min_{i \in I}\{a_{i4}\}}{a_{i1}} \right) \quad (2)$$

The Distance between two Trapezoidal Fuzzy Numbers

We have two trapezoidal fuzzy numbers of $\bar{A} = (a_1, a_2, a_3, a_4)$ and $\bar{B} = (b_1, b_2, b_3, b_4)$, we use equation 3 for calculating the distance between two fuzzy numbers:

$$(\bar{A}, \bar{B}) = (a_1 - b_1)^2 + \dots + (a_4 - b_4)^2 + \left[\frac{1}{6} ((a_1 - b_1)(a_2 - b_2) + \dots + (a_3 - b_3)(a_4 - b_4)) \right]^{0.5} \quad (3)$$

The subject domain of this research is market and industry of gold artifacts that investigates influential factors in gold artifacts industry in Isfahan using newly introduced approach by multi-criteria decision making. Spatial domain is gold artifacts industry in Isfahan and time interval is from 2009 to 2014.

4- Research Method

SWOT- Fuzzy TOPSIS Approach Combined with ANP

SWOT- Fuzzy TOPSIS approach combined with ANP has been used in this research adopted from (Bas, 2013) and (Chen, 2000).

Dependency among SWOT factors has been considered in this approach.

ANP method has been used for calculating weights. The algorithm steps are as follows:

Step1; determining SWOT factors: strengths, weaknesses, threat, and

opportunity of necessary factors are specified for each group

Step2; applying AHP for each SWOT group: pairwise comparison matrix to be used for comparison of factors in each SWOT groups considering the industry of gold artifacts in Isfahan. Weight matrix for each SWOT group is obtained and shown as W_S, W_W, W_O, W_T .

Step3; applying ANP among SWOT group: considering the existence of dependency among SWOT groups, ANP method is used for calculating weights regarding "the industry of gold artifacts in Isfahan". Vector of weights W_G to be prepared consisting w_S, w_W, w_O, w_T

Step4; calculating final weights of SWOT factors: The final vector of weights consisting $W_{SF}, W_{WF}, W_{OF}, W_{TF}$ is prepared. To calculate the weights: $W_{SF}=W_S W_S; W_{WF}=W_W W_W; W_{OF}=W_O W_O; W_{TF}=W_T W_T$

Step5; calculating vector of evaluation: the vector of evaluation of \bar{E} is calculated using the evaluation of SWOT factors for the industry of gold artifacts in Isfahan by linguistic variable $\bar{e} = (e_{i1}, e_{i2}, e_{i3}, e_{i4})$.

Step6; normalization of linguistic variables: if the criterion is profit, linguistic variables will be obtained:

$$\tilde{n}_i = \left(\frac{e_{i1}}{\max_i\{e_{i4}\}}, \frac{e_{i2}}{\max_i\{e_{i4}\}}, \frac{e_{i3}}{\max_i\{e_{i4}\}}, \frac{e_{i4}}{\max_i\{e_{i4}\}} \right)$$

If the criterion is cost, we will have:

$$\tilde{n}_i = \left(\frac{\min_i\{e_{i1}\}}{e_{i4}}, \frac{\min_i\{e_{i2}\}}{e_{i3}}, \frac{\min_i\{e_{i3}\}}{e_{i2}}, \frac{\min_i\{e_{i4}\}}{e_{i1}} \right)$$

Step7; normal and weighted linguistic variable: to weight normal

linguistic variable for SWOT matrix factors, we should calculate $\tilde{n}_i^w = \tilde{n}_i \otimes w_i$.

Step8; Distance to the positive ideals of normal weighted linguistic variable: the distance from \tilde{n}_i^w to ideal positive of $\tilde{n}_i^P = (1,1,1,1)$ is calculated by equation 3 for each SWOT group and shown by d_i^+ .

Step9; distance to the negative ideal of normal weighted linguistic variable: the distance from \tilde{n}_i^w to negative ideal of $(0,0,0,0)$ is obtained by equation 3 for each of four SWOT group and shown by d_i^- .

Step10; close-ratio: calculate close-ratio index for all factors according to the equation 4.

$$CC_i = \frac{d_i^-}{d_i^- + d_i^+} \quad (4)$$

Step11; developing a strategy: Factors with high priority should be selected for developing a strategy. Pareto law is used for this purpose. Choosing these factors, it should be tried to increase strengths, minimize or remove weaknesses, take advantage of opportunities, and prepare against threats.

Algorithm Implementation

Step1: SWOT factors are shown in tables 6 and 7 for the industry of gold artifacts in Isfahan (with scientific cooperation with MA expert in Metal Industry in Ministry of Industry, Trade and Mines of the Islamic Republic of Iran).

Step2: AHP approach has been shown for calculating internal weights factors of each SWOT elements in tables 8 to 11.

Table6. Internal factors affecting the production of gold artifacts in the economy of Isfahan

Row	Strengths
S1	Good consumer market in the city due to be tourist city
S2	Artist and gifted the people of Isfahan
S3	Cheap labor force in Isfahan
S4	Creating high added value in the industry
	Weaknesses
W1	Lack of support from the government and city authorities
W2	Traditional production
W3	Inattention to customer taste, design and fashion in the industry
W4	The weakness in exports to the cities or even other countries.

Source: (researchers' findings)

Table7. External factors affecting the production of gold artifacts in the economy of Isfahan

Row	Opportunities
O1	Increase in demand for gold artifacts in metropolises such as Tehran, Isfahan, Tabriz and Mashhad, due to cultural, economic and social reasons
O2	High demand from neighboring Arabic countries for cultural reasons
O3	Attractiveness for foreign investors in the industry and especially well-known city like Isfahan
O4	Rapid transfer of technology in the industry
	Threats
T1	Public attitudes to foreign gold artifacts
T2	Cities with high growth potential such as Tehran
T3	Rapid technological changes in the industry

Source: (researchers' findings)

Step3: There is a dependency among SWOT groups, so ANP approach should be used to calculate dependency among SWOT groups to show existing dependencies. Obtained results are shown in Table 12.

Step4: The final weighting factors for SWOT matrix are shown in the second column of Table 13.

Step5: Vector of evaluation is shown in Table 15. (Values are derived from proposed table 14 for the linguistic variables). A linguistic variable has been defined for each factor in this vector.

Step6 to 10: These steps deal with implementation of TOPSIS methodology. Obtained proximity vector is shown in the fourth column of the table 13. The ranking of obtained values are shown in the fifth column as well.

Step11: Factors with higher importance should be chosen based on the Pareto principle to in this step (chart1). More attention should be paid to these factors in developing this strategy (chart1) and the criterion for this diagnosis criterion is obtained close-ratio to the TOPSIS methodology.

Table8. Paired comparison matrix among strengths

W _s	S4	S3	S2	S1	
0.2676	0.33	4	3	1	S1
0.1137	0.2	2	1	0.33	S2
0.0815	0.25	1	0.2	0.25	S3
0.5369	1	4	5	3	S4
0.0602					CR

Source: (researchers' findings)

Table9. Paired comparison matrix among weaknesses

W _w	W4	W3	W2	W1	
0.1261	2	0.25	0.33	1	W1
0.2611	3	0.33	1	3	W2
0.5233	4	1	3	4	W3
0.0893	1	0.25	0.33	0.5	W4
0.0533					CR

Source: (researchers' findings)

Table10. Paired comparison matrix among opportunities

W _o	O4	O3	O2	O1	
0.4600	5	3	2	1	O1
0.3248	5	3	1	0.5	O2
0.1485	3	1	0.33	0.33	O3
0.665	1	0.33	0.2	0.2	O4
0.0385					CR

Source: (researchers' findings)

Table11. Paired comparison matrix among threats

W _t	T3	T2	T1	
0.3325	0.5	3	1	T1
0.1396	0.33	1	0.33	T2
0.5278	1	3	2	T3
0.0297				CR

Source: (researchers' findings)

Table12. Weights of SWOT groups

W _G	
0.8953	S
0.7004	W
0.1876	O
0.2165	T

Source: (researchers' findings)

Table13. The final weights, close ratio and ranking factors

Factor	W_F	W_F Ranking	Close-Ratio	Ranking the Close-Ratio
S1	0.2396	3	0.2046	3
S2	0.1018	6	0.0668	7
S3	0.7030	9	0.0479	11
S4	0.4807	1	0.4094	1
W1	0.0883	7	0.0667	8
W2	0.1829	4	0.1562	4
W3	0.3665	2	0.3126	2
W4	0.0625	11	0.0349	12
O1	0.0863	8	0.0737	6
O2	0.0609	12	0.0521	10
O3	0.0609	14	0.0183	14
O4	0.0124	15	0.0106	15
T1	0.0719	10	0.0615	9
T2	0.0302	13	0.0228	13
T3	0.1142	5	0.0976	5

Source: (researchers' findings)

Table14. The proposed set of linguistic variable

Trapezoidal Fuzzy Number	Linguistic Variable
(0,0,1,2)	Extremely weak
(1,2,3,4)	Very weak
(2,3,4,5)	Weak
(3,4,5,6)	Extremely weak
(4,5,6,7)	Normal
(5,6,7,8)	Fair
(6,7,8,9)	Good
(7,8,9,10)	Very good
(8,9,10,10)	Excellent

Source: (researchers' findings)

Table15. Vector of evaluation

Factors	\bar{E}	Factors	\bar{E}
S1	(7,8,9,10)	O1	(7,8,9,10)
S2	(5,6,7,8)	O2	(7,8,9,10)
S3	(5,6,7,8)	O3	(5,6,7,8)
O3	(5,6,7,8)	O4	(7,8,9,10)
W1	(6,7,8,9)	T1	(7,8,9,10)
W2	(7,8,9,10)	T2	(6,7,8,9)
W3	(7,8,9,10)	T3	(7,8,9,10)
W4	(4,5,6,7)		

Source: (researchers' findings)

5- Research Findings

According to the chart1, six factors out of 14 available ones devoted the most degree of importance to themselves and the factor of high added value of this industry is known as the most important factor among other existing factors. As it is shown in Table 5, although added value of this industry is very high, it does not have appropriate position among other industries in this metropolis and it has obtained a figure less than 2 per cent about recent 10 years. If this factor is considered more accurately in developing this strategy, the position of this industry can be enhanced and economically significant revenues can be obtained in this industry as well.

The factor of inattention to customer's tastes and views on the design and manufacture of gold products is of secondary importance. The major manufacturers pay more attention to customer's taste than anything in this industry and they spend a lot to attract customers.

Isfahan is one of the tourism hub in Iran and a well-known touristic city in the world that millions of tourists visit it. This factor is counted as a great privilege for Isfahan that it should be considered in gold artifacts since it allows them to be seen to introduce their products to merchants in other countries, increase their export volume, and supply their products without intermediaries. Most manufacturers of gold artifacts in Isfahan produce their goods traditionally. It is a major problem in this regard. Generally, production in the traditional way is slow. Order, uniformity and elegance in advanced machinery products are not

seen in traditional productions. Mostly, there is not available information on traditional manufacturers in the Ministry of Industry, Trade and Mines. For this reason, the possibility of important plans is difficult in this case, so organizing the producers should also be a priority in the development of strategic planning.

One of the serious threats posed in this industry is rapid changes in technology that is an important factor in developing strategy for this industry. Those countries that pay special attention to gold artifacts always try to create modern methods in their products since more elegant products can attract customers' attention and increase sales.

The last important and influential factor in the formulation of strategies for the industry gold artifacts is good demand of this product in Iran since social, cultural, and economic conditions in the country is in such a way that people buy gold artifacts not only as a decorative product but also as investment and a product with high liquidity. Geographical conditions are suitable for Isfahan because of neighboring with a big metropolis like Tehran and it can have a very good market in Tehran and even in cities like Shiraz, Tabriz and Mashhad. The factors that are most important ones in the SWOT matrix should be considered to develop a strategic and macro plan of the industry. Isfahan can prepare the ground by presenting a suitable strategic plan and more attention to this industry. The share of obtained added value, that is less than 1.7 per cent (table5), can be increased in this industry than other existing ones and it can be a ground for economic growth in the Isfahan.

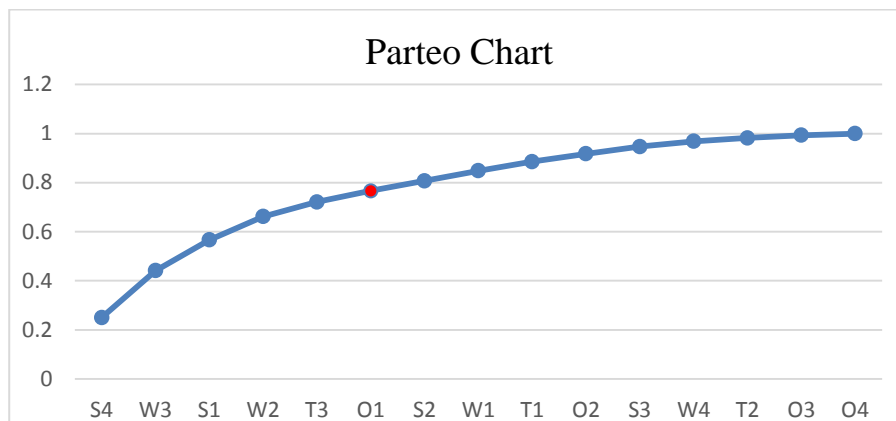


Chart1. Parteo Chart

Source: (Researchers' findings)

6- Conclusion and Suggestion

The industry of gold artifacts has high added value. Isfahan is counted as a hub for gold artifacts. 986680489 dollars were obtained from total volume of exports of gold artifacts by Isfahan customs from 2009 to 2014. Most of the exports were related to 2009 to 2011 and it decreased from 2011 to 2014 significantly so that only about 24 million dollars was related to 2014 and no export was reported in 2011 and 2012. All of them exported to U.A.E. by Isfahan customs. According to table1, more than 90 per cent of exported gold artifacts to other countries were accomplished by Isfahan customs, but it is about 4 per cent of global markets. The share of added value of the gold artifacts is less than 1.7 than other industries in Isfahan. This is a sign of inattention to this value-creating industry. Since Isfahan has a high potential for growth in this industry because of its geographical and environmental situation, an appropriate strategic planning can be developed for this industry by using obtained factors. It is possible to export 5 billion dollars in

the country. Due to existing capacities in Isfahan, it is possible for this metropolis to export these products for economic growth and higher added value as well as decline in unemployment rate of 11 per cent in the metropolis and obtaining more suitable position at global markets level.

A new approach has been presented for developing a strategy in the industry of gold artifacts in this research aiming to identify the most influential factors to develop it. SWOT matrix was used to determine factors and fuzzy methods and MCDM were used to prioritize and select the most important factors. It is recommended that Isfahan's experts use the factors for developing strategy after identifying the most important factors in order to prepare the ground for the growth of this industry to obtain more shares of global markets as well as higher added value of this industry than other ones in Isfahan. Among six chosen items as the most influential ones, the first four of them refer to weaknesses and strengths as internal factors and two others are external ones. Therefore, it is evident that internal factors have more influential role.

According to the results, it is suggested that the reasons of proposed weaknesses to be investigated in future researches since only effective and influential factors were considered in this study. Attention to the feasibility study for the modernization of gold artifacts and the measurement of customers' satisfaction from gold artifacts in Isfahan can be very helpful as well.

7- References

- Alavalapati, R.K., Kalmbacher, J.R.R. (2004). Exploring the potential for silvopasture adoption in South-central Florida: An application of SWOT-AHP method. *Agricultural Systems*, 81, 185–199.
- Amini, M.T., Khabbaz Babil, S. (2009). Developing strategy using a comprehensive framework strategy formulation (case study: Auto Tabriz Sahand Company), *Journal of Commercial Management*, 1(2), 17-32
- Amini, M.T., Samavatiyan, Akram. (2010). Developing a strategy using SWOT matrix (case study: Hyperlink Company), the *Quarterly Journal of Management and Development Process*, 23(2)
- Arabi, S.M. (2003). *Strategic planning of customs*, Tehran, Cultural Research Bureau.
- Arabzad, S., Ghorbani, M., Razmi, J., Hadi Shirouyehzad, H. (2015). Employing fuzzy TOPSIS and SWOT for supplier selection and order allocation problem, *international journal advanced manufacturing technology*, 76, 803–818.
- Asgharpour, M.J. (2010). *Decision-making with multiple criteria*, Tehran: Tehran University Press.
- Bamberger, P., Meshoulam, I. (2004). *Human resource strategy*, translated by: Parsayian, A; Arabi, S.M, Tehran, Cultural Research Bureau.
- Catron, G., Stainback, A., Dwivedi, p., John M. (2013). Bioenergy development in Kentucky: A SWOT-ANP analysis, *Forest Policy and Economics*, 28, 38–43.
- Chen, C.T. (2000). Extensions of the TOPSIS for group decision-making under fuzzy environment. *Fuzzy Sets System*, 114, 1–9.
- Chou, S.Y., Chang, Y.H., Shen, C.Y. (2008). A fuzzy simple additive weighting system under group decision-making for facility location selection with objective/subjective attributes. *European Journal of Operational Research*, 189, 132–45.
- Dincer, O. (2004). *Strategy Management and Organization Policy*. Istanbul: Beta Publication.
- Faramarzi, M., (2005). Gold engineering, theory and practice. Tarrah Publication
- Ghafariyan, V., Kiyani, Gh., (2001). *Effective strategy*, Tehran: Farda Publication.
- Hassanqolipour, T., Aqazadeh, H. (2005). Strategic Planning for small and medium enterprises, *Journal of Commerce*, 9(35)
- Kajanus, M., Kangas, J., Kurttila, M. (2004). The use of value focused thinking and the A'WOT hybrid method in tourism management. *Totisum Management*, 25, 499-506.
- Kangas, J., Kurttila, M., Kajanus, M., Kangas, A. (2003). Evaluating the management strategies of a forestland estate-the S-O-S approach. *Journal of Environmental Management*, 69, 349–358.
- Khalili Shourini, S., (2004). *Strategic planning and management*, Tehran: Yadvareh Ketab Publication.
- Kurttila, M., Pesonen, M., Kangas, J. and Kajani, M. (2000). Utilizing the Analytic Hierarchy Process in SWOT Analysis: A Hybrid Model and its Application to a Forest Certification

- Case, *Forest Policy and Economics*, 1, 41-52.
- Lee, K.H. (2005). *First course on fuzzy theory and applications*. Berlin Heidelberg: Springer.
- Li, D.F. (2007). Compromise ratio method for fuzzy multi-attribute group decision making, *Applied Soft Computing*, 7(3), 807–17.
- Masozera, M.K., Alavalapati, J.R.R., Jacobson, S. K., Shresta, R. K. (2006). Assessing the suitability of community-based management for the Nyungwe Forest Reserve. *Forest Policy and Economics*, 8, 206–216.
- McDonald, M. H. B. (1993). *The marketing planner*. Oxford: Butter-worth.
- Pahlavaniyan, H. (2006). *Successful experience of using strategic management*, Yazd: Nikou Ravesb
- Saaty, T.L., Takizawa, M. (1986). Dependence and Independence: From Linear Hierarchy to Nonlinear Networks. *European Journal Of Operational Reaserch*, 26(3), 105-118.
- Sehat, S., Parizadi, I., (2009). Applying the process of network analysis in SWOT, *Industrial Management* 1(2), 105-120
- Shakoor Shahabi, R., Basiri, M.H., Rashidi Kahag, M., Zonouzi, S. (2014). An ANP–SWOT approach for interdependency analysis and prioritizing the Iran's steel scrap industry strategies. *Resources Policy*, 42, 18–26
- Shrestha, R.K., Alavalapati, J.R.R., Kalmbacher, R.S. (2004). Exploring the potential for silvopasture adoption in South-central Florida: An application of SWOT-AHP method. *Agricultural Systems*, 81, 185–199.
- Stewart, R., Moamed, S., Daet, R. (2002). Strategic implementation of IT/IS projects in construction: A case study. *Automation in Construction*, 11, 681–694.
- Yu`ksel, I., Dagdeviren, M. (2007). Using the analytic network process (ANP) in a SWOT analysis-A case study for a textile firm. *Information Sciences, Vol. 20*, 47-62.
- Zadeh, L. A. (1965). Fuzzy sets and systems. Proc. Syrup. System Theory, *Polytechnic Institute of Brooklyn*, 29-37.
- Zadeh, L.A. (1975). “The concept of a linguistic variable and its application to approximate reasoning-I, *Information Sciences*, 8(3), 199–249.