Ranking 7Ms Effective Factors in Iranian Production Systems Using Fuzzy AHP

Amir Amini[1]*, Alireza Alinezhad[2]
[1]M.Sc. Graduate of Industrial Engineering, Alghadir Institute of Higher Education, Tabriz, Iran
[2]Associate Professor, Faculty of Industrial and Mechanical Engineering, Qazvin branch, Islamic Azad University, Qazvin, Iran
*Email of Corresponding Author: mr62.amini@gmail.com
Received: September 29, 2019; Accepted: February 12, 2020

Abstract
In order to survive in today's competitive world, organizations are looking to increase their efficiency and effectiveness. Therefore, they should focus on inputs that are more important than the rest of the inputs in their success. This paper aimed at ranking 7Ms (Management, Man power, Marketing, Material, Machinery, Methods and Money) and their sub-criteria of production in Iran. By improving manufacturing processes, manufacturing organizations create and establish their added value. The Analytic Hierarchy Process (AHP) is a very popular method in decision making process, and its inner dependence extension is used for cases in which criteria or alternatives are not independent enough. In FAHP, each option severity is displayed by fuzzy numbers in relation to criteria. Therefore, a fuzzy judgment matrix is obtained. In this study, Fuzzy AHP tool has been used to rank these inputs. The results are compared with the ideal ranking results and are examined that how different they are.

Keywords
Ranking, 7Ms Effective Factors, Production Systems, MCDM, Fuzzy AHP Method

1. Introduction
To be successful, organizations must identify the key factors of their success to strive towards them. They need to increase their efficiency and effectiveness so that they can remain in the competitive world. One of the most useful systems in this field can be reducing input and stabilizing or increasing output. In fact, the desirability of the product or service is not the only key factor of survival in the market. Without having a systematic approach and regardless of the input, managers cannot reach organizational goals. The organization inputs can be generally categorized in to seven groups which are called 7Ms [1]. In the production process, 7Ms includes the following (Table 1):

Table1. Organization's 7overall inputs

7Ms						
Management	Manpower	Marketing	Material	Machinery	Methods	Money

By improving manufacturing processes, manufacturing organizations create and establish their added value. To improve the production process, they also need to increase the efficiency of their inputs or 7Ms.But the efficiency of all 7Ms is not the same. A Change in some of them can cause a very large increase in the efficiency and some of them are less likely to cause an increase in the efficiency. Organizations first tend to concentrate and focus their efforts on those 7Ms that have the highest impact on their efficiency.

Multi-criteria decision-making (MCDM) methods are approaches to structure information and decision evaluation in formal problems with multiple, conflicting goals. MCDM can help users understand the results of integrated assessments, including tradeoffs among policy objectives, and can use those results in a systematic, defensible way to develop policy recommendations .

MCDM methods have been widely used in many research fields. Different approaches have been proposed by many researchers, including the Analytic Hierarchy Process (AHP) [2], Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) [3] and MCDM [3, 4].

In many situations experts prefer to state their opinions in qualitative and linguistic way. Fuzzy models allow us to translate these qualitative words into quantitative or numerical values.

7Ms Ranking was studied by Rostamzadeh and Sofian [5] generally. They used analytical Hierarchy Process (AHP) tool to rank 7Ms.First, linguistic values are used to assess the ratings and weights for 7Ms (These linguistic ratings can be expressed in trapezoidal or triangular fuzzy numbers) then, a hierarchy multiple criteria decision- making (MCDM) model based on fuzzy sets theory including FAHP and Fuzzy TOPSIS (FTOPSIS) are applied. The results obtained from AHP, FAHP; FTOPSIS were compared with each other.

The rank of 7Ms effective factors in Iranian production systems using Fuzzy AHP (FAHP) will be discussed in this paper.

2. Fuzzy Theory

With different daily decision making problems of diverse intensity, the results can be misleading if the fuzziness of human decision making is not taken into account [6]. Fuzzy sets theory providing a more widely frame than classic sets theory, has been contributing to capability of reflecting real world [7].

Fuzzy set theory was first introduced to deal with the uncertainty due to imprecision or vagueness. A fuzzy set is a class of objects with a continuum of grades of membership. Such a set is characterized by a membership (characteristic) function, which assigns to each object a grade of membership ranging between zero and one.

By introducing fuzzy theory for the first time, Zadeh [8, 9] provided preliminaries for modeling and simulation of inaccurate information and approximate reasoning by mathematical equations which in turn have led to a renaissance in classical mathematics and logic. Fuzzy approximate reasoning approach- which is known as fuzzy system- is proposed for systems with high complexity and uncertainty that adequate and accurate information is not available. In recent decades, the fuzzy sets theory has been a useful tool in dealing with uncertain and ambiguous data and models and some researchers have developed and expanded a variety of useful fuzzy ways considering this ambiguity and uncertainty [10].

According to the definition, if $M_{ij} =(l_{ij}, m_{ij}, u_{ij})$ is considered as a triangular fuzzy number. The sum of two fuzzy numbers$M_1 = (l_1, m_1, u_1)$, $M_2 = (l_2, m_2, u_2)$and inverse is defined as follows [11]:

$(l_1, m_1, u_1)\ (\oplus l_2, m_2, u_2)(= l_1 + l_2\ ,\ m_1 + m_2\ \ , u_1 + u_2)$

$$(l_1, m_1, u_1)^{-1} = \left(1/_{u_1}, 1/_{m_1}, 1/_{l_1}\right) \quad (1)$$

3. FAHP methodology

The multi-criteria decision making (MCDM) is widely using method to evaluate criteria that are typically multiple. The method is used to compare, rank and order several alternatives with respect to criteria. Atypical MCDM problem involves a number of decision-makers (DMs) to provide qualitative and quantitative measurements for determining the performance of each alternative with respect to criteria and the relative importance of the evaluation criteria with respect to the overall judgments [12]. Many MCDM problems in the real world are judged or evaluated by a group of DMs. There are numerous MCDM approaches which have been proposed thus far. Analytic hierarchy process (AHP), analytic network process (ANP), decision making trial and evaluation laboratory (DEMATEL), technique for order preference by similarity to ideal solution (TOPSIS), just to name a few. One of the most outstanding MCDM approaches is the AHP where decision is made by DMs based on pair wise comparison among criteria and alternatives. In AHP, the linguistic scale of crisp value is used for defining pair-wise comparison.

Linguistic variables with fuzzy number preference scales are used to express the DMs' uncertainty. In addition, linguistic variables denote words or sentences of a natural language [13]. Thus, the AHP is extended by incorporating the basic concepts of fuzzy sets theory. This method is popularly known as fuzzy AHP. The fuzzy AHP has been developed, in which the pair-wise comparisons in the judgment matrix are fuzzy numbers. The decisions are evaluated in a systematic manner through subjective ratings such as between three and five times less important and approximately three times more important [14].The DMs are given the authority to select linguistic variable that reflects their confidence. The fuzzy AHP applies fuzzy arithmetic and fuzzy aggregation operators in order to solve the hierarchical structure of problems. The calculation of fuzzy AHP is done as per normal AHP method for weighting the criteria of decision problems [15].

FAHP methodology is obtained from the combination of Saaty's AHP and Lotfizadeh's fuzzy set theory [16, 17]. In FAHP, each option severity is displayed by fuzzy numbers in relation to criteria. Therefore, a fuzzy judgment matrix is obtained. Also, the final score of options is displayed by fuzzy numbers. Options Ranking is also obtained by certain mathematical relationships. FAHP application procedure can be summarized in the following three steps:

1-Creating a hierarchical structure for solving the problem

2- Establishing fuzzy judgment matrix and fuzzy weight vector

3. Ranking all options and choosing the best of them.

In this study, all the numbers of judgment matrix are presented by triangular fuzzy numbers. Fuzzy numbers are used to show the effect of each option on a criterion. As a result, fuzzy judgment weight vector is obtained for each criterion. Fuzzy judgment matrix is also made by all of these judgment weight vectors.

A fuzzy number $\tilde{x}$ means "about x". Each fuzzy number is displayed by three parameters (l, m, r) which represents the triangular fuzzy number; l is the left base point of triangle, m the midpoint of triangle and r is the right base point of triangle. The Triangular fuzzy number $\tilde{x}$ and its membership function are as Figure 1:

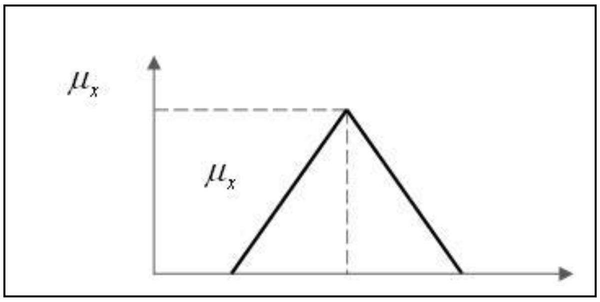

Figure1. The membership function of Triangular fuzzy number

$$\mu_x = \begin{cases} 1 & x = m \\ \dfrac{x-l}{m-l} & l \le x \le m \\ \dfrac{n-x}{n-m} & m \le x \le n \\ 0 & Otherwise \end{cases} \tag{2}$$

Fuzzy AHP has been successfully applied in diverse applications. Büyüközkan, et al. [18] used FAHP and FTOPSIS for selection of the strategic alliance partner in logistics value chain. Tuysuz and Kahraman [19] provided an analytic tool to evaluate the project risks under incomplete and vague information. Other works can be considered in Chang et al. [20], Ertugrul and Karakasoglu [21], Kang and Lee [22], Lee et al. [23], Murtaza [24], Tang and Beynon [25].

Many authors have developed many variations of fuzzy AHP for evaluating fuzziness of decision making problems [26- 34].

Rezaei et al. [35] developed a novel two-phased funnel methodology to select the suppliers. For the first step, they proposed a conjunctive screening method, and for the second phase, a fuzzy AHP is used.

Ohnishi and Yamanoi [36] proposed fuzzy weights and two kinds of compositions. The compositions of weights depend if there are inconsistency in one level or not. Their results show the fuzziness of double inner dependence structure AHP in different way.

Chena et al. [37] presented a novel framework for teaching performance evaluation based on the combination of fuzzy AHP and fuzzy comprehensive evaluation method.

When the decision-maker (FM) is faced with an uncertain problem, performing his or her comparative judgments based on uncertain ratios. For example, says "…is about twice as important as…".In standard AHP, these uncertainties and the word "about" cannot be entered in the calculations. Thus, to do paired comparisons, fuzzy numbers are required. A comparison matrix may not, however, have enough consistency when AHP or inner dependence is used because, for instance, a problem may contain too many criteria or alternatives for decision making, meaning that answers from decision-makers, i.e., comparison matrix components, do not have enough reliability and they are too ambiguous or too fuzzy.

In this study the [38] and [39] operators are used. Let us consider the two A and B fuzzy number

with following fuzzy parameters:
$\tilde{A}=(a_1, a_2, a_3)$
$\tilde{B}=(b_1, b_2, b_3)$
The multiplication of two fuzzy numbers is defined as follows:

$$\tilde{A}*\tilde{B}=(a_1*b_1, a_2*b_2, a_3*b_3) \tag{3}$$

The division of two fuzzy numbers is defined as follows:

$$\tilde{A}/\tilde{B}=(a_1/b_3, a_2/b_2, a_3/b_1) \tag{4}$$

The reverse of fuzzy number (a, b, c) is as follows:

$$(a,b,c)^{-1}=\left(\frac{1}{c},\frac{1}{b},\frac{1}{a}\right) \tag{5}$$

And the nth power is as:

$$(a,b,c)^n=(a^n,b^n,c^n) \tag{6}$$

As can be seen in Figure 2, the relative importance of a fuzzy number will be in the form of a range if it is expressed in fuzzy. Assume ($\tilde{w}_i$) as a series of a decision maker (DM)'s opinions on the importance of an option in comparison to other options, the concept of these fuzzy numbers ($\tilde{w}_i$) is shown in Table 2.

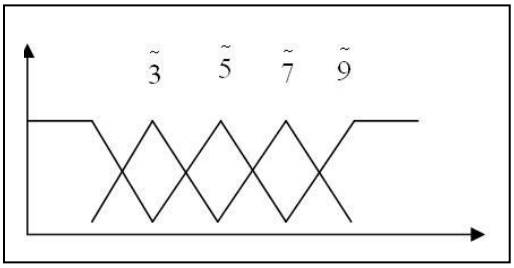

Figure2. Saaty's measurement scale in the form of fuzzy set

Table2. Saaty's measurement scale in the form of fuzzy set

Relative importance	Concept
$\tilde{1}$	Very low
$\tilde{3}$	Low
$\tilde{5}$	Average
$\tilde{7}$	Very
$\tilde{9}$	Very much

With this Measurement scale, fuzzy comparison matrix $\tilde{A}$ is obtained which a_{ij} gives the value of $\frac{w_i}{w_j}$:

$$\tilde{A} = \begin{Bmatrix} \tilde{w}_1/\tilde{w}_1 & \tilde{w}_2/\tilde{w}_1 & \cdots & \tilde{w}_n/\tilde{w}_1 \\ \tilde{w}_1/\tilde{w}_2 & \tilde{w}_2/\tilde{w}_2 & \cdots & \tilde{w}_n/\tilde{w}_2 \\ \vdots & \vdots & \cdots & \vdots \\ \tilde{w}_1/\tilde{w}_n & \tilde{w}_2/\tilde{w}_n & \cdots & \tilde{w}_n/\tilde{w}_n \end{Bmatrix} \tag{7}$$

Matrix Ã is a real and positive matrix. If $a_{ij}=1/a_{ji}$ (in case $i \neq j$), then Ã is a reversed matrix.
After calculating matrix Ã, special vector, eigen values and IR criterion should be calculated where here these parameters are in the form of fuzzy numbers.
To calculate fuzzy special vector of matrix Ã, the following equation is used (which is the geometric mean of fuzzy numbers):

$$V_i = \left(\prod_{j=1}^{n} \tilde{a}_{ij} \right)^{\frac{1}{n}} \qquad i = 1, \ldots, n \tag{8}$$

So we have:

$$\begin{gathered} V_1 = \left(\tilde{a}_{11} * \tilde{a}_{12} * \tilde{a}_{13} * \cdots * \tilde{a}_{1n} \right)^{\frac{1}{n}} \\ \cdots \\ V_n = \left(\tilde{a}_{n1} * \tilde{a}_{n2} * \tilde{a}_{n3} * \cdots * \tilde{a}_{nn} \right)^{\frac{1}{n}} \end{gathered} \tag{9}$$

Special vector $V_i$of the combination of n fuzzy numbers is as follows:

$$V = (V_1, V_2, \ldots, V_n) \tag{10}$$

Where V_i a is fuzzy triangular number in the form of (V_i, V_m, V_u).
As in traditional AHP that special vector should be normalized, here the special vector is normalized too, as follows:

$$T = \left(w_1 / \sum w_i, w_2 / \sum w_i, w_3 / \sum w_i, \ldots, w_n / \sum w_i \right) \tag{11}$$

T is a normalized vector. From this normalized vector, the priority and importance of the under study criteria is obtained. In order to check the results of the method, the rate of inconsistency should be calculated. Deviation from consistency (or inconsistency criterion) is calculated by the following formula:

$$\text{II} = \frac{\lambda_{\max} - n}{n - 1} \tag{12}$$

Inconsistency rate (IR) can directly be used to calculate the inconsistency of paired comparisons.IR is calculated by dividing II by IRR (The number obtained from Saaty's inconsistency criterion Table (Table 4) [40]).

$$IR=II/IIR \tag{13}$$

If the IR is less than 10%, therefore comparisons are acceptable otherwise DMs should reconsider their comparisons.IIR has been created for different values of n by random matrices and calculating the mean of II from those matrices.

Since λ_{max} is a triangular fuzzy number, for CI calculations it should be converted in an absolute number. In this study, we propose the use of middle or central value of λ_{max} because our fuzzy numbers are symmetric.

4. FAHP application in ranking 7Ms

To solve the problem of Ranking 7Ms for improving the performance of production systems in Iran, first the hierarchical structure of the problem should be prepared (step 1).7Ms hierarchical structure and its sub-criteria can be found in Figure 3 which is the developed diagram of Rostamzadeh and Sofian [5].

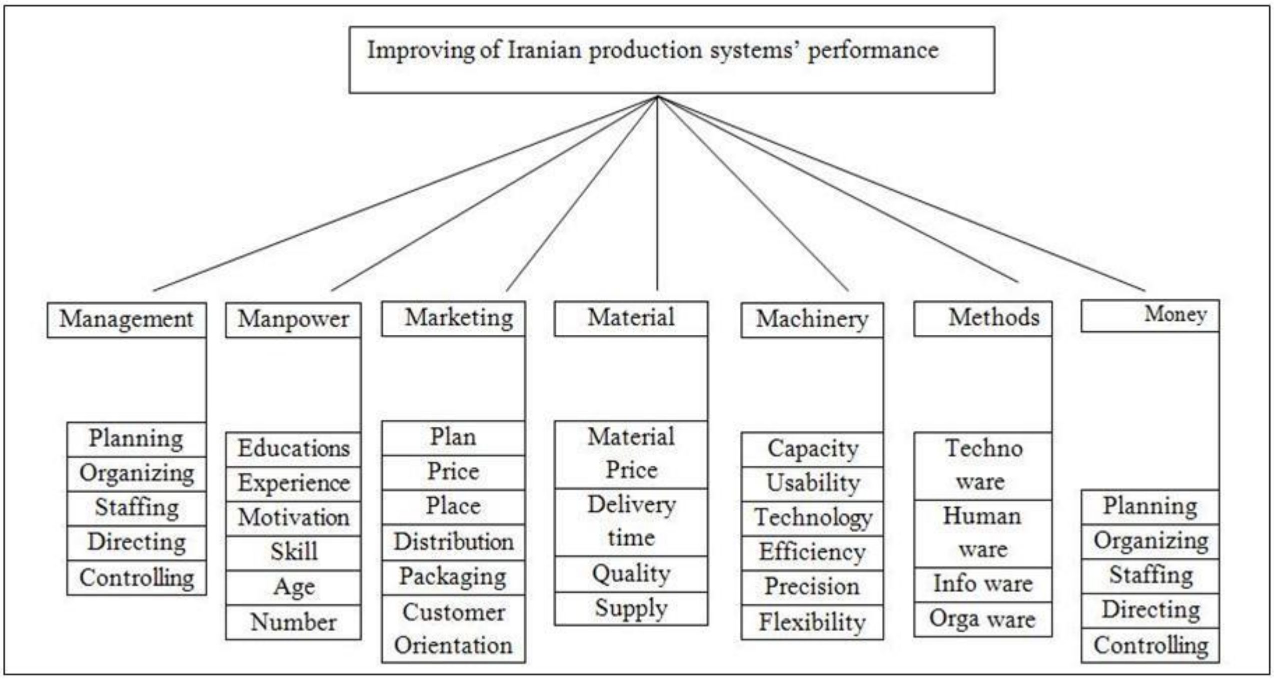

Figure3. 7Ms hierarchical structure and its sub-criteria

To do paired comparisons between 7Ms and the sub-criteria, the experts were asked to fill out researcher made questionnaire. Experts were included university professors and manufacturing companies' experts with expertise in industrial engineering and management in Iran.73 university professors and 139 experts were asked to respond to the questionnaires. Out of them, 143 people

(46 professors and 97 experts) responded to the questionnaires. By applying the mathematical relationship of geometric mean of fuzzy numbers (equation 8), experts' opinions were converted into a fuzzy number. As a result of using the geometric mean of fuzzy numbers for averaging the opinions of experts, paired comparisons matrix of 7Ms is obtained as Table 3.This matrix is obtained by Saaty's scale with triangular fuzzy numbers.

Table3. Paired comparisons matrix of 7Ms

3	Management	Manpower	Marketing	Material	Machinery	Methods	Money
Management	(1,1,3)	(2,24,2.65)	(3.87,5.9,7.94)	(3,5,7)	(3,5,7)	(3.87,5.9,7.9)	(1.7,3.87,5.9)
Manpower	(0.19,0.38,0.45)	(1,1,3)	(5.91,7.93,9)	(2.7,3.89,5.91)	(2.64,5.19,6.7)	(4.48,6.7,7.93)	(3.87,5.92,5.94)
Marketing	(0.13,0.17,0.26)	(0.11,0.13,0.17)	(1,1,3)	(1.1,3.4,5.11)	(1.73,3.87,5.9)	(1.7,3.87,5.9)	(1.1,3.4,5.11)
Materials	(0.14,0.2,0.33)	(0.17,0.26,0.37)	(0.2,0.3,0.9)	(1,1,3)	(3.87,5.91,7.94)	(5,7.1,7.83)	(1.73,3.87,5.9)
Machinery	(14,0.2,0.3)	(0.15,0.19,0.38)	(0.17,0.26,0.58)	(0.12,0.17,0.26)	(1,1,3)	(3,5,6.47)	(1.7,3.79,0.59)
Methods	(0.13,0.17,0.26	(0.13,0.15,0.22)	(0.0,17.26,0.58)	(0.13,0.14,0.2)	(0.15,0.2,0.3)	(1,1,3)	(1.7,2.24,4.58)
Money	(0.17,0.26,0.59)	(0.17,0.17,0.26)	(0.2,0.3,0.91)	(0.17,0.26,0.17)	(0.17,0.26,0.59)	(0.22,0.45,0.58)	(1,1,3)

Using equations 8, 9, 10, 11 and 12 the normalized special vector is:
V=(0.15,0.33,0.88)(0.12,0.26,0.61)(0.039,0.11,0.29) (0.046,0.1,0.29)(0.02,0.05,0.16) (0.01,0.031,0.08) (0.01,0.03,0.08))

A new relationship needs to be introduced to rank these six obtained fuzzy numbers. There are many methods for ranking fuzzy numbers; among them we used the following method due to its simplicity and short computation [38, 39].

$$\hat{A} = \frac{a_1 + 2a_2 + a_3}{4} \tag{14}$$

Table4. Ranks of 7Ms in Iran

7Ms	Management	Manpower	Marketing	Material	Machinery	Methods	Money
$\hat{A}$	0.42	0.31	0.137	0.134	0.07	0.038	0.037
Rank	1	2	3	4	5	6	7

It was earlier said that for each paired comparisons matrix, the rate of inconsistency should be calculated. Therefore, inconsistency rate of 7Ms matrix should be calculated. To calculate II using equation (13) λ_{max} is required. As Saaty [2, 32, 40] proposed, the following equation can be used to calculate λ_{max}:

$$\lambda_{max} = V * W \tag{15}$$

W is obtained from the sum of columns of paired comparisons matrix:
W=((1.89,2.36,5.22),(3.96,4.51,9.59),(11.5,15.88,22.9),(8.22,13.77,21.65),(12.57,21.41,31.43),(19.6,29.9,39.62) (5.57,24.04,36.3))
So λ_{max} is equal to:

$$\lambda_{\max} = (2.09, 7.79, 34.44)$$

As mentioned in the previous section to calculate II, we need definitive numbers. So we consider the middle or central value of $\lambda_{\max}$:

$$\text{II}=\frac{7.79-7}{6} \cong 0.13$$

To calculate IR, IRR is needed which according to Saaty's Table 5 it will be equal to 1.32.

Table5. Saaty's random inconsistency rate table

n	1	2	3	4	5	6	7	8	9	10	11	12	13	14
IIR	0.0	0.0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.49	1.51	1.48	1.56	1.57

Since the inconsistency rate is less than 0.1, the resulting paired comparisons matrix and rankings are acceptable. By doing all the above calculations for each sub-criterion of 7Ms, the following rankings are obtained (Tables 6 to 12):

Table6. Ranking of management sub-criteria

Management	Planning	Organizing	Staffing	Directing	Controlling
$\hat{A}$	0.31	0.17	0.111	0.112	0.23
Rank	1	3	5	4	2

Table7. Ranking of Manpower sub-criteria

Manpower	Educations	Experience	Motivation	Skill	Age	Number
$\hat{A}$	0.1	0.36	0.17	0.24	0.31	0.39
Rank	4	1	3	2	6	5

Table8. Ranking of marketing sub-criteria

Marketing	Plan	Price	Place	Promotion	Distribution	Packaging	Customer Orientation
$\hat{A}$	0.1	0.33	0.09	0.21	0.11	0.15	0.07
Rank	5	1	6	2	4	3	7

Table9. Ranking of material sub-criteria

Material	Material Price	Delivery time	Quality	Supply
$\hat{A}$	0.37	0.24	0.41	0.11
Rank	2	3	1	4

Table10. Ranking of Machinery sub-criteria

Machinery	Capacity	Usability	Technology	Efficiency	Precision	Flexibility
$\hat{A}$	0.39	0.08	0.28	0.17	0.05	0.086
Rank	1	5	2	3	6	4

Table11. Ranking of Methods sub-criteria

Methods	Techno ware	Human ware	Info ware	Orga ware
$\hat{A}$	0.13	0.31	0.42	0.16

Rank	4	2	1	3

Table12. Ranking of Money sub-criteria

Money	Current assets	Product technology	Fix assets	Reputation
$\hat{A}$	0.22	0.12	0.9	0.54
Rank	2	3	4	1

5. Conclusion

According to the research conducted by Rostamzadeh and Sofian [5], in today's world to have a successful production system the need to comply with 7Ms rankings and its sub-criteria is felt in organization. It is worth mentioning that in relation to 7Ms rankings in Iran, many of the criteria are wrong and are not suitable for today's competitive environment.

Table13. Comparing 7Ms rankings in Iran with Rostamzadeh and Sofian [5]

7MS	Management	Manpower	Marketing	Material	Machinery	Methods	Money
Ranking in Iran	1	2	3	4	5	6	7
Rostamzadeh and Sofian Ranking [5]	1	3	4	6	5	7	2

Regarding money criteria, a big difference can be seen (Table 13).Iranian organizations need to do more concerning efficient use of money in their organizations.

Table14. Comparing ranking of management sub- criteria in Iran with Rostamzadeh and Sofian [5]

Management	Planning	Organizing	Staffing	Directing	Controlling
Ranking in Iran	1	3	5	4	2
Rostamzadeh and Sofian Ranking [5]	1	3	5	2	4

In Iran, due to traditional production systems, control sub-criterion is of high importance (Table 14). To improve this sub-criterion self-control and modern methods should be used.

Table15. Comparing ranking of Manpower sub- criteria in Iran with Rostamzadeh and Sofian (2011)

Manpower	Educations	Experience	Motivation	Skill	Age	Number
Ranking in Iran	4	1	3	2	6	5
Rostamzadeh and Sofian Ranking [5]	1	2	4	3	5	-

A significant difference is seen in education sub-criterion (Table 15). This difference stems from Iran's traditional production system.

Table16. Comparing ranking of marketing sub- criteria in Iran with Rostamzadeh and Sofian [5]

Marketing	Plan	Price	Place	Promotion	Distribution	Packaging	Customer Orientation

Ranking in Iran	5	1	6	2	4	3	7
Rostamzadeh and Sofian Ranking [5]	2	3	4	1	-	5	-

In relation to plan sub-criterion, the same issue exists due to Iran's traditional production system. This sub-criterion has a big difference compared with Rostamzadeh and Sofian [5] (Table 16).This is despite the fact that in today's competitive world of marketing plans and initiatives are very important.

Table17. Comparing ranking of material sub- criteria in Iran with Rostamzadeh and Sofian [5]

Marketing	Material Price	Delivery time	Quality	Supply
Ranking in Iran	2	1	4	3
Rostamzadeh and Sofian Ranking [5]	2	3	1	4

The quality sub-criterion of Iranian Production Systems is very different from Rostamzadeh and Sofian [5] (Table 17).Lack of attention to quality in Iran is one of the main causes of dropping behind the global competition market. Moreover, Iran pays many costs for low quality.

Table18. Comparing ranking of Machinery sub- criteria in Iran with Rostamzadeh and Sofian [5]

Machinery	Capacity	Usability	Technology	Efficiency	Precision	Flexibility
Ranking in Iran	1	5	2	3	6	4
Rostamzadeh and Sofian Ranking [5]	4	5	1	2	3	-

In capacity and precision sub- criteria a significant difference is seen (Table 18).Iran's production system is still mass production and this is why production capacity is very important in relation to machines.

Table19. Comparing ranking of Methods sub- criteria in Iran with Rostamzadeh and Sofian [5]

Methods	Techno ware	Human ware	Info ware	Orga ware
Ranking in Iran	4	2	1	3
Rostamzadeh and Sofian Ranking [5]	4	2	3	1

Recently, fair attention is paid to the issue of data and information sharing in Iran is and still does not have a clear role in organizational success (Table 19).Compared to Info ware, the importance of Orga ware is due to the issue of Iranian traditional organizations.

Table20. Comparing ranking of money sub- criteria in Iran with Rostamzadeh and Sofian [5]

Money	Current assets	Product technology	Fix assets	Reputation
Ranking in Iran	2	3	4	1
Rostamzadeh and Sofian Ranking [5]	2	3	4	1

In money sub- criteria Iran is close to Rostamzadeh and Sofian [5].

From the above comparisons, it is concluded that the main problem with Iran is its traditional production system. For this reason Iran should try to use new methods and technology to increase its efficiency and effectiveness.

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