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Prioritizing Fars Province Industrial Clusters by Copeland Aggregation of Qualiflex Hesitant Fuzzy and Topsis Hesitant Fuzzy

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Abstract
In recent years, industrial clusters have received considerable attention from economists and industry analysts because they are seen as the main reason for certain economic regions' economic growth and success. For many Industrial States Organization, the selection of industrial clusters has become a critical strategic consideration due to the Budget allocation priority. In this paper, an extended qualitative flexible multiple (QUALIFLEX) method is used to solve problems regarding the priority among this cluster using probability hesitant fuzzy information, which can lead to allocating the budget for industrial clusters more effectively. For more accuracy, we have applied a hesitant fuzzy Topsis for prioritizing. Both rankings have been aggregated by the Copeland method. From our research results, the Larestan Muscat is of great importance, and Abade Inlaid Wood, Citrus packaging, Shiraz Marquetry, and Niriz stone have ranked respectively.
Keywords: *Industrial cluster, Qualiflex Hesitant fuzzy, Prioritizing, Topsis Hesitant fuzzy, Copeland*

Introduction

Globalization of trade and rapid technological progress are among the challenges companies in the trade and business sector must face. Their survival through timely decision making depends on concepts such as competitiveness. Therefore, increased competition has led companies to offer their own resources and implement programs to differentiate themselves from their competitors. (Hajihassani, Rangriz & Hajikarimi, ۲۰۲۱). Nowadays, Small and Medium-sized Enterprises (SMEs) play vital roles in most countries involving various aspects of the economy, including manufacturing and services. Indeed, these enterprises are significant providers of employment, evolution, and innovation and pioneers in novel technology inventions (Alexander, Tatiana, & Svetlana, ۲۰۱۳). Accordingly, the development of SMEs facilitates the country's domestic development and accelerates industrial growth. Thus increasing competition has led companies to implement programs that provide them with unique assets and differentiate the programs from their competitors. Despite the significant presence of SMEs in Iran, such enterprises face numerous challenges due to the common approach applied in policymaking, regardless of the scale of production units. Therefore, SMEs fail to play the expected roles in developed countries (Iran Small Industries & Industrial Parks Organization, ISIPO, ۲۰۱۳). Industrial clusters are regarded as one of

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SMEs' most effective organizational designs. They strengthen many advantages of a small business, such as flexibility and diversification, by eliminating its limitations. In many nations today, planning for the growth of SMEs based on a clustering approach is seen as a way to achieve developmental objectives. (Shakib, ٢٠٢٠).

Industrial cluster development is still a significant difficulty even though they have a high potential for sustained economic growth. (Karaev, Koh & Szamosi, ٧٠٠٧). Usually, the evolution taking place within a cluster has an impact on the businesses. However, it is crucial to identify these aspects, or variables, because their influence on a cluster's evolution should be considered. (Danesh Shakib, Toloie & Alorzi, ٧٠١٧). As several appropriate scenarios can be launched and better practical plans can be executed, existing potential in the cluster can be harnessed effectively in favor of the stakeholders' interests, contributing to sustainable development.

The development of domestic and foreign trade based on an economic-industrial development planning can improve the financial and foreign exchange power of the region and the country for the development of investment and ultimately guarantee more economic growth and expand social welfare, considering the limitations of capital and resources. Moreover, creating industries with optimal efficiency and following the country's macro strategy seems necessary to carry out research in the field of prioritizing the development of economic-industrial clusters in Fars province. In addition, the productive investments of the private and public sectors are driven in the right direction to prevent the diversion of capital to non-productive activities.

The development of priority industrial clusters with high added value will cause the growth and prosperity of the economy and industry of Fars province. It can take a step towards removing the deprivation of this country. For this reason, the topic of industrial cluster planning is significant.

For this purpose, the document is organized as follows. Section ١ provides the introduction. Section ٢ presents the relevant literature review discussing industrial clusters, prioritizing industrial clusters, and the main drivers for implementing Prioritization in hesitancy. Section ٣ provides information on the methodology, data collection, and case study chosen in the present research paper. Data analysis and results of the research paper are presented in Section ٤. Section ٥ conclusions and managerial implications are given, followed by limitations and future work for the field of eco-design implementation.

Research Background

Chia-Li (٢٠٠٩), in his article entitled "A value-created system of science (technology) park by using DEMATEL," proposed development strategies and operating models for the authorities of science (technology) parks to advance the parks' value. The DEMATEL (Decision Making Trial and Evaluation Laboratory) technique is used in this study to assess different industrial clusters and develop industrial structures. Four factors are considered: market development, technological resources, investment environments, and human resources. These factors include ٢٨ evaluation criteria that help identify the cluster establishment qualities. To establish the relationships between the evaluation criteria and their value structures have been established by the DEMATEL technique. (C.-L. Lin & Tzeng, ٢٠٠٩)

Sun, Lin, & Tzeng (٢٠٠٩), in an article entitled "The evaluation of cluster policy by fuzzy MCDM: Empirical evidence from Hsinchu Science Park," discussed this problem's grasp of the factors influencing the development of industrial clusters and determined which cluster policies should take precedence. An excellent illustration of this paper's focus on innovative participants and connections is Taiwan Hsinchu Science Park. The Fuzzy Analytic Hierarchy Process is then used as the analytical tool in this study. The weightings for evaluation dimensions among decision-makers are determined using the Fuzzy Analytic Hierarchy Process approach. According to the study, the Factor Conditions are the main force behind improving the performance of an industrial cluster. Additionally, the first two aims for cluster policy are the promotion of global linkages policies and more comprehensive framework policies. The conclusion of this paper includes some simulations of several cluster policy options that the Taiwanese government and businesses must consider.

Andrea Giovannetti (٢٠١٢), in his article entitled "A Dynamical Analysis and Network Simulation. ٢٠١٢, Department of Economics, "attempts to establish an entire industrial area using a set of hypotheses that, in the event of a financial crisis, are crucial for systemic risk. The assumptions are gradually relaxed throughout the work to allow for more intricate representations. So, he creates three distinct models of industrial clusters using non-linear ordinary differential equations and percolation dynamics in graph theory, depending on two levels of complexity (structure of economic connections and level of industrial population heterogeneity). A financial contagion mechanism is presented to examine each model's resilience and create a threshold condition. (Giovannetti, ٢٠١٢)

Lin, Lee, & Ho (٢٠١٣), in an article entitled" Model Building to Evaluate Performance of Industrial Clusters with Hybrid DBA Approaches, " evaluated the industrial performance of three hybrid approaches of DEA, BSC, and AHP intended to obtain a better framework structure for analyzing industrial performance using the DBA approach, and this model they are also conducting empirical research using This result indicates that industrial clusters are not only classifying operational performance here but can also be applied to other field studies.

Jiang et al. (٢٠١٤), in their research "Prioritization of strategies to achieve world-class manufacturing using a hybrid approach of fuzzy multiple criteria technique: Case study from Quanzhou industrial clusters," the enterprises in the Quanzhou textile and garment industry clusters to prioritize strategies to attain world-class production using a combination of FAHP, BSC, and FVIKOR approaches. The study results show that "design products according to consumer needs" should be essential to attain world-class manufacturing. (Jiang, Rees, Yu, & Chen, ٢٠١٤)

Jote et al. (٢٠١٤), in an article entitled "Fuzzy AHP-Based Micro and Small Enterprises Cluster Identification," Develop an AHP-based model to identify SME clusters. As a result, quantitative and qualitative factors, including geographical proximity, sectorial concentration, market potential, support services, resource potential, and potential entrepreneurs, are found to be critical factors in cluster identification. In this paper, linguistic values are used to determine how significant the ratings and weights of the factors are. AHP will be a helpful tool for selecting clusters in problems such as cluster selection. Finally, a case study was taken to prove and validate the procedure of the proposed method. A sensitivity analysis is also performed to justify the results. (Jote, Beshah, Kitaw, & Abraham, ٢٠١٤)

In another study, Tong and Tao (٧٠١٧). Worked on fuzzy Quality Function Deployment (QFD), an evaluating method of the effectiveness of hi-tech industry cluster policies, is proposed in this paper. The evaluation base of hi-tech industry cluster policies is based on linguistic variables and fuzzy triangular numbers (TFNs). Secondly, the expert authority degree is obtained by the expert's judgment and familiarity with the cluster policies. Then by introducing an expert authority degree with a fuzzy expected value operator, the fuzzy weighted average technique is suggested to determine and rank the weights of evaluation indexes of cluster policies by including expert authority degree with a fuzzy expected value operator. The total evaluation value is then determined using the evaluation index weights. The empirical study of Jiangxi Software Outsourcing (SO) industry cluster policies is given to demonstrate the feasibility and practicability of the proposed method.

Sulistiandi, Marpaung, & Sunardi (٢٠٢٠), in their research " Clustering on Small-scale Food Manufacturing Industry in West Jakarta: A Fuzzy Analytical Hierarchy Process Approach," focused on the West Jakarta area as a pilot project. Five factors were taken into account throughout the assessment using the Fuzzy Analytical Hierarchy Process (Fuzzy AHP): the availability of land, suppliers, facilities and infrastructure, labor, and markets. As a result, an area clustering map was proposed.

Jafari, & Akhavan, ٢٠٢١are interested in the relationship between the competitive advantage criteria of the science and technology parks and the incubator to identify the most influential factors, target and develop them further at these centers. The main factors affecting competitive advantage prepared by our old study were carried out in the form of a DEMATEL questionnaire and written by experts. Finally, the obtained model was discussed and analyzed. In this study, the effectiveness and influence of each factor of competitive advantage in incubators and science and technology zones were studied on other factors, and the results are presented in the form of charts and graphs.(Khanmirzaee, Jafari, & Akhavan, ٢٠٢١)

Another research was done in ٢٠٢٢ by Sirirat Sae Lim, Nguyen, & Lin. which leads to summarize four evaluation aspects for constructing the driving factors for developing the science park through a literature review and interviews with experts. They examined stakeholders' satisfaction with the four components of the driving reasons for the development of the scientific parks using the hybrid multiple-criteria decision-making (MCDM) approach and proposed suitable strategy recommendations. They discovered that enhancing public infrastructure (PI) can boost the business environment (BE) and the working environment in addition to enhancing environmental quality (EQ) (WE). This upgrade might entice domestic and international industries, provide jobs, increase the park's size, and encourage industrial development. This research improves the method of collecting empirical data to establish the driving forces for developing science parks through suitable development strategies.

He & Zhu (٢٠٢٢) built a decision model for the selection of strategic emerging industries in the region, applied ARCGIS to study the spatial distribution of strategic emerging industries in Sichuan province, and used the fuzzy comprehensive evaluation method (FCEM) and analytic hierarchy process (AHP) to address the priority of the development of emerging strategic industries. Conclusions: Firstly, Sichuan province should prioritize the development of the new generation of the information technology industry and new energy vehicle industry, then the high-end equipment manufacturing industry, energy-saving, environmental protection industry and new energy industry, and finally, the biological industry and new material industry. The larger the coefficient of influence is, the higher the total score is, while the more prominent the coefficient of sensitivity is, the lower the total score is. Secondly, the number of enterprises in the new-generation information technology and the new energy vehicle industry still needs to be dominant in Sichuan province. Finally, the study shows that the current development of strategic emerging industries in Sichuan province is unbalanced in different regions, and the phenomenon of competition and reconstruction is evident. (He & Zhu, ٢٠٢٢)

According to the research conducted in this field, the following table ١ compares these researches. In addition to introducing the author's name, year of publication, and research title, this table is divided into two parts. In the "Fuzzy type" column, if the studies have examined the fuzzy approach, the type of fuzzy approach is mentioned. In the method column of this part, the method of determining in studies is given. The third part is related to the application of multi-methodology. It is marked with a tick.

Table ١.

Comparison between research conducted

Author's name, year of publication	Research title	Case study	subject	Fuzzy type	methodology	Applying multi method
Giovannetti et al.,٢٠١٢	Financial Contagion in Industrial Clusters: A Dynamical Analysis and Network Simulation	-	resilience of industrial cluster	-	graph theory	-
Lin et al., ٢٠٠٩	A value-created system of science (technology) park by using DEMATEL	The Neihu technology park	industrial structures	-	DEMATEL	-
Lim et al., ٢٠٢٢	Exploring the Development Strategies of Science Parks Using the Hybrid MCDM Approach	Park science in Taiwan	strategy for sustainable development of industrial cluster	-	hybrid mcdm vikor Dematel	✓
Tong and Tao, ٢٠١٧	A quantitative evaluating method of the effectiveness of hi-tech industrial cluster policies based on the fuzzy QFD	Jiangxi Software Outsourcing (SO) industry cluster policies is	effectiveness of hi-tech industry cluster policies	triangular fuzzy	fuzzy QFD	-
Sun et al., ٢٠٠٩	The evaluation of cluster policy by fuzzy MCDM: Empirical evidence from HsinChu Science Park	Taiwan HsinChu Science Park	prioritizing the growth of industrial cluster policies	triangular fuzzy	FAHP	-
Sulistiandi et al., ٢٠٢٠	Clustering on Small-scale Food Manufacturing Industry in West Jakarta: A Fuzzy Analytical Hierarchy Process Approach	West Jakarta area	cluster the small-scale food manufacturing industry	triangular fuzzy	FAHP	-
Jiang et al., ٢٠١٤	Prioritization of strategies to achieve world-class manufacturing using a hybrid approach of fuzzy multiple criteria technique: Case study from Quanzhou industrial clusters	Quanzhou textile	prioritize strategies	triangular fuzzy	BSC FVIKOR FAHP	✓
Lin et al., ٢٠١٣	Model Building to Evaluate Performance of Industrial Clusters with Hybrid D.B.A. Approaches		evaluated industrial performance	-	DEA BSC AHP, DBA	✓
He and Zhu, ٢٠٢٢	Strategic emerging industry layout based on analytic hierarchy process and fuzzy comprehensive evaluation: A case study of Sichuan province	Sichuan province	study the spatial distribution of strategic emerging industries cluster identificatio	triangular fuzzy	entropy-weighted fuzzy FAHP	
Khanmirzaee et al, ٢٠٢١	Analyzing the Competitive	-	Relationship between		DEMATEL	

	Advantage's Criteria of Science and Technology Parks and Incubators Using DEMATEL Approach		competitive advantage's criterion of science and technology parks			
Current study	Prioritizing Fars province industrial clusters by Topsis Hesitant fuzzy and Qualiflex hesitant fuzzy	Fars province industrial clusters	Prioritizing industrial clusters for practical developing actions	Hesitant Fuzzy	Fuzzy Topsis Fuzzy Qualiflex Coepland	✓

Studying the related literature and According to the table۱ and the results of the studies shows that two main drawbacks can be deduced: (۱) more attention needs to be paid to the multi-approaches. (۲) Nevertheless, there is no study in hesitant fuzzy approaches to reduce the hesitancy of the real-life world when there are many MCDM problems with imperfect, vague, and imprecise information. (۳) There needs to be more focus on how to priories industrial clusters, especially in developing countries, is carried out. Another feature of the current study is implementing this method by using hesitant fuzzy with a combination of MCDM Approaches for prioritizing industrial clusters.

Data Collection Tools

This applied quantitative research was performed among academic experts active in sustainable development and experts in industrial clusters. The members of this community are people who have executive or research expertise related to the dimensions of industrial clusters in the field of economic development in the industrial park. The data collection tool included a questionnaire designed based on structured interviews. The validity of this study was confirmed through interviews with several experts.

Method Fuzzy

Consequently, this execution assessment issue can be considered a multiple-criteria decision-making (MCDM) issue. Aggregating both quantitative and qualitative criteria within the assessment handle, analyzing complex issues, and participating in decision producers effectively within the decision-making handle are the most points of interest of MCDM. The use of certain numbers has always affected the accuracy of the results obtained from expert opinion and based on it; consequently a fuzzy logic it is increasingly used to improve the performance of mathematical techniques and the correctness of export opinions in various ways (Bastami, Ehtesham & Abedi, ۲۰۲۱). Fuzzy Set Theory (FST) may explore vague ideas and intervene to speak to unclearness (Ecer, ۲۰۱۸).

In recent years, HFSs have received much attention from researchers due to their widespread applications in many fields, such as subtraction and division operations over HFSs (Hussain & Yang, ۲۰۱۸). This article will focus on one of the characteristics of human emotions: uncertainty. Under the assumption that people's uncertainty is like a pendulum that oscillates typically in a range based on a single value, they try to find valuable information hidden in the HFS provided by the DM during their decision-making process. (Ren, Xu, & Wang, ۲۰۱۸) .

The membership value of a Hesitant Fuzzy Sets (HFS) element for a given set allows it to have multiple values. This feature allows decision-makers to move hesitation into decision-making problems to get good results. (Kahraman, Onar, & Öztayşi, ۲۰۱۸). Chen et al., In the group decision-making process, introduced interval-valued hesitant preference relation to the account for uncertain evaluation information. (N. Chen, Xu, & Xia, ۲۰۱۳). Kaya focused on evaluating the quality of e-business sites using the MADM method. The authors define a decision-making model consisting of four main criteria and nine sub-criteria and use an integrated AHP-TOPSIS method using general fuzzy numbers. (Kaya, ۲۰۱۰). Xia and Xu developed a set of aggregation operators for ambiguous fuzzy information. (Xia & Xu, ٢٠١١).

Hesitant fuzzy

In decision-making, preference relations are one of the most common preference structures used to express the rank information of a DM. Hesitant fuzzy preference relation (HFPR) is an effective tool to express DM hesitation and fuzziness. HFPR is also widely used in decision-making events. In HFPR, the DM's evaluation information consists of hesitant fuzzy elements (HFEs) representing all possible preferred values . It can be used to effectively express the DM's hesitant and fuzzy information about the problem. (Liu, Xu, Montes, Ding, & Herrera, ٢٠١٨)

Fuzzy set theory is specifically designed to address the uncertainty, ambiguity, and imprecision inherent in many real-world problems. However, it is challenging for some multi-criteria decision problems to handle considerable uncertainty, even with traditional fuzzy sets. So, to find a better definition of the function of a value or a membership parameter in a decision-making problem, the general fuzzy set has recently been extended to the intuitive and hesitant fuzzy set (HFS). HFS (Torra & Narukawa, ٢٠٠٩) can solve problems where experts need a clear idea of choosing alternatives. As Sun et al. (G. Sun, Guan, Yi, & Zhou, ٢٠١٨) pointed out, HFS helps deal with the uncertainty that occurs when professionals need a clearer idea about choosing a membership grade. There can be several possible values for this membership level. It is handy for group decisions when a compromise solution is preferred over an integrated solution (Camci, Temur, & Beskese, ٢٠١٨). The QUALIFLEX method also predicts the concordance/discordance of rankings and ratings by constructing specific concordance/discordance indices that are calculated first at a single reference level and then at a composite level for all possible ratings. Decision matrix or ranking order. (T.-Y. Chen & Wang, ٢٠٠٩) .

In short, the QUALIFLEX ranking method aims to find substitutes that best represent preorders by criteria in terms of meeting the criteria. (Wang, Tsao, & Chen, ٢٠١٥).

In this paper, we develop a new superior method for solving the MCDM problem where the evaluation of the alternatives and the weight of the criterion is expressed by HFEs (Zhang & Xu, ٢٠١٥), using the QUALIFLEX method, where the criterion evaluates both alternatives. . Base weights are denoted as HFEs

Problem formulation

The MCDM is to identify the desired compromise solution from the set of viable alternatives evaluated against a set of conflicting criteria. In the importance of decision making, it should be stated that decision making includes the correct expression of goals, evaluating the consequences and results of implementing each solution and finally selecting and implementing it(Roghani, Modiri, Fathi Hafshjani& Alirezaie,٢٠٢١) .The quality of management is essentially a function of the quality of decision making. We consider the MCDM problem in a hesitant fuzzy environment here. Let A = {A١, A٢, . . ., A_m} ($m \geq$ ٢) be a discrete set of m feasible alternatives, C = {C١,C٢, . . ., C_n} be a finite set of criteria. Each alternative is assessed on each criterion, and an HFE expresses the assessment. More significantly, we assume that a DM (or a decision organization) provides an HFE assessment $h_{ij} = \left\{\gamma^{١}_{h_{ij}}, \gamma^{٢}_{h_{ij}}, \dots, \gamma^{\#h_{ij}}_{h_{ij}}\right\}$ for the alternative $A_i \in A$ with respect to the criterion $C_i \in C$. For the alternative with respect to the criterion. In a real-life decision-making process, the weights of criteria should be taken into account. Here we denote the criteria weighting vector by W= (W١, W٢,…, W_n)T, where W_j is the relative weight of the criterion C_j. Similarly, the HFEs can be used to express the importance of weights for various decision criteria during the DM’s evaluation process. That is to say, each of W_j(j = ١،٢, . . ., n) is a HFE, denoted by $W_j =$

$\{\gamma_{w_j}^{١}, \gamma_{w_j}^{٢}, \ldots, \gamma_{w_j}^{\#w_j}\}$ Therefore, the MCDM problem with hesitant fuzzy information can be concisely expressed in the matrix format as:

$$H = (h_{ij})_{m\times n} = \begin{matrix} & C_١ & C_٢ & C_٣ & C_٤ \\ A_١ \\ A_٢ \\ A_٣ \\ A_٤ \end{matrix} \begin{pmatrix} h_{١١} & h_{١٢} & \cdots & h_{١n} \\ h_{٢١} & h_{٢٢} & \cdots & h_{٢n} \\ \vdots & \vdots & & \vdots \\ h_{m١} & h_{m٢} & \cdots & h_{mn} \end{pmatrix}$$

Concepts of Hesitant Fuzzy Elements

Step١. Formulate the hesitant fuzzy MCDM problem and identify the hesitant fuzzy weighted values of criteria.

Step٢. List all of the possible m! Permutation of the m alternatives that should be tested in the next steps. Let P_ρ denote the ρth permutation of the m alternatives that should be tasted in the next steps. Let P_ρ denote the ρth permutation using Eq. (٤,٢).

Step ٣. Calculate the concordance/ discordance index ϕ_j^ρ (Aξ, Aζ) using Eq. (٤,٣).

Step ٤. Compute the weighted concordance/ discordance indices ϕ^ρ (Aξ, Aζ) using Eq. (٤,٥)

Step ٥. Calculate the comprehensive concordance/ discordance index ϕ^ρ for the permutation P_ρ by using Eq. (٤٦٦)

Step ٦. Determine the optimal ranking order of all alternatives, which is the permutation with the maximal comprehensive concordance/ discordance index by using Eq.(٤,٧)

$$P_\rho = (\ldots.A\xi.\ldots.A\zeta.\ldots), \qquad \rho = ١.٢.\ldots.m! \quad (٤,٢)$$

Where Aξ, Aζ∈ A and the alternative Aξ is ranked higher than or equal to Aζ.

$$\phi_j^\rho\ (A\xi,\ A\zeta) = d_s(h_\xi.\tilde{١}) - d_s(h_\zeta.\tilde{١}) \quad (٤,٣)$$

$$\phi^\rho\ (A\xi,\ A\zeta) = \sum_{j=1}^{n} \phi_j^\rho(\ A\xi,\ A\zeta) * (1 - d_s(W_j.\tilde{١}) = \sum_{j=1}^{n}(1 - d_s(W_j.\tilde{١})) * (d_s(h_\xi.\tilde{١}) - d_s(h_\zeta.\tilde{١})) \quad (٤,٥)$$

At length, the comprehensive concordance/ discordance index ϕ^ρ for the ρth permutation can be defined as follows:

$$\phi^\rho(A\xi,A\zeta) = \sum_{A\xi.A\zeta\in A}\sum_{j=1}^{n}(1 - d_s(W_j.\tilde{١})) * (d_s(h_\xi.\tilde{١}) - d_s(h_\zeta.\tilde{١})) \quad (٤٦٦)$$

According to the signed distance-based comparison method of HFEs (i.e., Definition ٣,٧), it is easily seen that the bigger the comprehensive concordance/discordance index value is, the better the final ranking result of alternative is. Therefore, the optimal ranking order of alternatives can be determined by comparing the values ϕ^ρ of each permutationP_ρ, which is the permutation with the maximal comprehensive concordance/discordance index ϕ^ρnamely.

$$P^* = max_{\rho=١}^{m!}\{\phi^\rho\} \quad (٤,٧)$$

Definition ٣,٧. Let $h_i(i = ١.٢)$ be tow HFEs and $\tilde{١}$ be an ideal HFE, $d_s(h_١.\tilde{١})$ and $d_s(h_٢.\tilde{١})$ be the signed distances, and then the ranking of HFEs can be defined as:

(D٣,٧,١) If $d_s(h_١.\tilde{١})>d_s(h_٢.\tilde{١})$, then $h_١$ is worse than or less preferred to $h_٢$, denoted by $h_١ < s^{h_٢}$;

(D٣,٧,٢) If $d_s(h_١.\tilde{١})<d_s(h_٢.\tilde{١})$, then $h_١$ is bettere than or preferred to $h_٢$, denoted by $h_١ > s^{h_٢}$;

(D٣,٧,٣) If $d_s(h_١.\tilde{١})=d_s(h_٢.\tilde{١})$, then $h_١$ is indifferent to$h_٢$, denoted by$h_١ \sim s^{h_٢}$;

We here consider that is how industrial states organization to select a suitable industrial cluster from several potential industrial clusters. At first, the list of potential clusters of the province was determined by using the opinions of experts in this field. There are the most popular potential clusters which are (A١, A٢, A٣, A٤, A٥) to be selected, Niriz stone, Larestan Muscat, Shiraz Marquetry, Citrus packaging, Abade Inlaid Wood.which are listed in Table ٢.

Table ٢.
Alternative Description

	Description
A١	Niriz stone
A٢	Larestan Muscat
A٣	Shiraz Marquetry

	Description
A٤	Citrus fruit packaging in the south of Fars province
A٥	Abade Inlaid Wood

According to the industrial clusters Guideline of the Fars province industrial clusters, the primary six criteria, including Generalizability of experiences in other clusters, Cluster extensibility, The employment generation capacity of the cluster, Cluster age, Cluster export, the Production capacity of the cluster, are determined to evaluate these five possible clusters, which are listed in Table ٣.

Table ٣.
Criteria description

	criteria	Description
C١	Generalizability of experiences in other clusters	The number of similar clusters in the country
C٢	Cluster extensibility	The level of access to the market and raw materials, technology and human resources
C٣	The employment generation capacity of the cluster	The proportion of cluster employment to the total employment of the province and The average amount of investment needed to create a job in the cluster
C٤	Cluster age	The number of years of operation of the units
C٥	Cluster export	The proportion of the export share of the cluster product compare to the total sales of the cluster, province and country
C٦	Production capacity of the cluster	The ratio of added value or cluster production to the total added value or production of the province And the country

The collective opinions of the original assessments of industrial clusters concerning criteria provided by the decision organization are taken as HFEs, listed in Table ٤.

Table ٤.
Ratings of the industrial clusters by DMs under various criteria

	A١			A٢			A٣			A٤			A٥		
	DM١	DM٢	DM٣	DM١	DM٢	DM٣	DM١	DM٢	DM٣	DM١	DM٢	DM٣	DM١	DM٢	DM٣
C١	٠,٣٣	٠,٥٠٠٠	٠,٦٧	٠,٨٣	١	١	٠,٦٧	٠,٨٣	١	٠,٣٣	٠,٥	٠,٦٧	٠,٣٣	٠,٥	٠,٦٧
C٢	٠,٣٣	٠,٥	٠,٦٧	٠,٨٣	١	١	٠,٣٣	٠,٦	٠,٨٣	٠,٦٧	٠,٨٣	١	٠,٦٧	٠,٨٣	١
C٣	٠,١٧	٠,٥	٠,٦٧	٠,٥	٠,٦٧	٠,٨٣	٠,٥	٠,٦٧	٠,٨٣	٠,١٧	٠,٥	٠,٦٧	٠,٦٧	٠,٨٣	١
C٤	٠,١٧٠٠	٠,٥	٠,٦٧	٠,٥٠٠٠	٠,٦٧	٠,٨٣	٠,١٧٠٠	٠,٥	٠,٦٧	٠,١٧٠٠	٠,٥	٠,٦٧	٠,٣٣	٠,٥	٠,٨٣
C٥	٠,٣٣	٠,٥	٠,٦٧	٠,٨٣	١	١	٠,١٧	٠,٥	٠,٦٧	٠,٣٣	٠,٥	٠,٦٧	٠,١٧	٠,٥	٠,٦٧
C٦	٠,٣٣	٠,٥	٠,٦٧	٠,٨٣	١	١	٠,٣٣	٠,٥	٠,٦٧	٠,١٧	٠,٥	٠,٦٧	٠,٣٣	٠,٥	٠,٦٧

The weights of criteria provided by the decision organization listed in Table ٥.

Table ٥.
Weights of the criteria provided by three DMs

	C١	C٢	C٣	C٤	C٥	C٦
DM١	٠,٦٧	٠,٥	١	٠,١٧	٠,٨٣	٠,٨٣
DM٢	٠,٥	٠,٨٣	٠,٨٣	٠,٥	١	٠,٨٣
DM٣	٠,٣٣	٠,٦٧	١	٠,٣٣	٠,٨٣	٠,٦٧

In Step ٢, there are ١٢٠(=٥!) permutations of the rankings for all alternatives that must be tested according to Equation (٤,٢):

Table ٦.
Permutations of the rankings

P١=(٥،٤،٣،٢،١)	P٣١=(٤،٣،٥،٢،١)	P٦١=(٣،٢،٥،٤،١)	P٩١=(٢،١،٥،٤،٣)
P٢=(٥،٤،٣،١،٢)	P٣٢=(٤،٣،٥،١،٢)	P٦٢=(٣،٢،٥،١،٤)	P٩٢=(٢،١،٥،٣،٤)
P٣=(٥،٤،٢،٣،١)	P٣٣=(٤،٣،٢،٥،١)	P٦٣=(٣،٢،٤،٥،١)	P٩٣=(٢،١،٤،٥،٣)
P٤=(٥،٤،٢،١،٣)	P٣٤=(٤،٣،٢،١،٥)	P٦٤=(٣،٢،٤،١،٥)	P٩٤=(٢،١،٤،٣،٥)
P٥=(٥،٤،١،٣،٢)	P٣٥=(٤،٣،١،٥،٢)	P٦٥=(٣،٢،١،٥،٤)	P٩٥=(٢،١،٣،٥،٤)
P٦=(٥،٤،١،٢،٣)	P٣٦=(٤،٣،١،٢،٥)	P٦٦=(٣،٢،١،٤،٥)	P٩٦=(٢،١،٣،٤،٥)
P٧=(٥،٣،٤،٢،١)	P٣٧=(٤،٢،٥،٣،١)	P٦٧=(٣،١،٥،٤،٢)	P٩٧=(١،٥،٤،٣،٢)
P٨=(٥،٣،٤،١،٢)	P٣٨=(٤،٢،٥،١،٣)	P٦٨=(٣،١،٥،٢،٤)	P٩٨=(١،٥،٤،٢،٣)
P٩=(٥،٣،٢،٤،١)	P٣٩=(٤،٢،٣،٥،١)	P٦٩=(٣،١،٤،٥،٢)	P٩٩=(١،٥،٣،٤،٢)
P١٠=(٥،٣،٢،١،٤)	P٤٠=(٤،٢،٣،١،٥)	P٧٠=(٣،١،٤،٢،٥)	P١٠٠=(١،٥،٣،٢،٤)
P١١=(٥،٣،١،٤،٢)	P٤١=(٤،٢،١،٥،٣)	P٧١=(٣،١،٢،٥،٤)	P١٠١=(١،٥،٢،٤،٣)
P١٢=(٥،٣،١،٢،٤)	P٤٢=(٤،٢،١،٣،٥)	P٢٢=(٣،١،٢،٤،٥)	P١٠٢=(١،٥،٢،٣،٤)
P١٣=(٥،٢،٤،٣،١)	P٤٣=(٤،١،٥،٣،٢)	P٧٣=(٢،٥،٤،٣،١)	P١٠٣=(١،٤،٥،٣،٢)
P١٤=(٥،٢،٤،١،٣)	P٤٤=(٤،١،٥،٢،٣)	P٧٤=(٢،٥،٤،١،٣)	P١٠٤=(١،٤،٥،٢،٣)
P١٥=(٥،٢،٣،٤،١)	P٤٥=(٤،١،٣،٥،٢)	P٧٥=(٢،٥،٣،٤،١)	P١٠٥=(١،٤،٣،٥،٢)
P١٦=(٥،٢،٣،١،٤)	P٤٦=(٤،١،٣،٢،٥)	P٧٦=(٢،٥،٣،١،٤)	P١٠٦=(١،٤،٣،٢،٥)
P١٧=(٥،٢،١،٤،٣)	P٤٧=(٤،١،٢،٥،٣)	P٧٧=(٢،٥،١،٤،٣)	P١٠٧=(١،٤،٢،٥،٣)
P١٨=(٥،٢،١،٣،٤)	P٤٨=(٤،١،٢،٣،٥)	P٧٨=(٢،٥،١،٣،٤)	P١٠٨=(١،٤،٢،٣،٥)
P١٩=(٥،١،٤،٣،٢)	P٤٩=(٣،٥،٤،٢،١)	P٧٩=(٢،٤،٥،٣،١)	P١٠٩=(١،٣،٥،٤،٢)
P٢٠=(٥،١،٤،٢،٣)	P٥٠=(٣،٥،٤،١،٢)	P٨٠=(٢،٤،٥،١،٣)	P١١٠=(١،٣،٥،٢،٤)
P٢١=(٥،١،٣،٤،٢)	P٥١=(٣،٥،٢،٤،١)	P٨١=(٢،٤،٣،٥،١)	P١١١=(١،٣،٤،٥،٢)
P٢٢=(٥،١،٣،٢،٤)	P٥٢=(٣،٥،٢،١،٤)	P٨٢=(٢،٤،٣،١،٥)	P١١٢=(١،٣،٤،٢،٥)
P٢٣=(٥،١،٢،٤،٣)	P٥٣=(٣،٥،١،٤،٢)	P٨٣=(٢،٤،١،٥،٣)	P١١٣=(١،٣،٢،٥،٤)
P٢٤=(٥،١،٢،٣،٤)	P٥٤=(٣،٥،١،٢،٤)	P٨٤=(٢،٤،١،٣،٥)	P١١٤=(١،٣،٢،٤،٥)
P٢٥=(٤،٥،٣،٢،١)	P٥٥=(٣،٤،٥،٢،١)	P٥٥=(٢،٣،٥،٤،١)	P١١٥=(١،٢،٥،٤،٣)
P٢٦=(٤،٥،٣،١،٢)	P٥٦=(٣،٤،٥،١،٢)	P٨٦=(٢،٣،٥،١،٤)	P١١٦=(١،٢،٥،٣،٤)
P٧٧=(٤،٥،٢،٣،١)	P٥٧=(٣،٤،٢،٥،١)	P٨٧=(٢،٣،٤،٥،١)	P١١٧=(١،٢،٤،٥،٣)
P٢٨=(٤،٥،٢،١،٣)	P٨٨=(٣،٤،٢،١،٥)	P٨٨=(٢،٣،٤،١،٥)	P١١٨=(١،٢،٤،٣،٥)
P٢٩=(٤،٥،١،٣،٢)	P٥٩=(٣،٤،١،٥،٢)	P٨٩=(٢،٣،١،٥،٤)	P١١٩=(١،٢،٣،٥،٤)
P٣٠=(٤،٥،١،٢،٣)	P٦٠=(٣،٤،١،٢،٥)	P٩٠=(٢،٣،١،٤،٥)	P١٢٠=(١،٢،٣،٤،٥)

In step ٣, for each pair of alternatives (Aξ,Aζ) in the permutation P_ρ with respect to each criterion C_j, the concordance/discordance index ϕ_j^ρ (Aξ,Aζ) can be calculated by employing Eq.(٤,٣), and the results are presented in Table٧.

Table ٧.
The results of the concordance/discordance index

Ø(C١)	A١	A٢	A٣	A٤	A٥	Ø(C٢)	A١	A٢	A٣	A٤	A٥
A١	-	-٠,٢٨	-٠,١٧	٠,٠٠	٠,٠٠	A١	-	-٠,٢٨	٠,٠١	-٠,١٧	-٠,١٧
A٢	٠,٢٨	-	٠,١١	٠,٢٨	٠,٢٨	A٢	٠,٢٨	-	٠,٢٩	٠,١١	٠,١١
A٣	٠,١٧	-٠,١١	-	٠,١٧	٠,١٧	A٣	-٠,٠١	-٠,٢٩	-	-٠,١٨	-٠,١٨
A٤	٠,٠٠	-٠,٢٨	-٠,١٧	-	٠,٠٠	A٤	٠,١٧	-٠,١١	٠,١٨٠٠	-	٠,٠٠
A٥	٠,٠٠	-٠,٢٨	-٠,١٧	٠,٠٠	-	A٥	٠,١٧	-٠,١١	٠,١٨٠٠	٠,٠٠	-
Ø(C٣)	A١	A٢	A٣	A٤	A٥	Ø(C٤)	A١	A٢	A٣	A٤	A٥
A١	-	-٠,١٧	-٠,١٧	٠,٠٠	-٠,٢٥	A١	-	-٠,١٧	٠,٠٠	٠,٠٠	-٠,٠٥
A٢	٠,١٧	-	٠,٠٠	٠,١٧	-٠,٠٨	A٢	٠,١٧	-	٠,١٧	٠,١٧	٠,١١

A۳	۰,۱۷	۰,۰۰	-	۰,۱۷	-۰,۰۸	A۳	۰,۰۰	-۰,۱۷	-	۰,۰۰	-۰,۰۵
A٤	۰,۰۰	-۰,۱۷	-۰,۱۷	-	-۰,۲۵	A٤	۰,۰۰	-۰,۱۷	۰,۰۰	-	-۰,۰۵
A٥	۰,۲۵	۰,۰۸	۰,۰۸	۰,۲۵	-	A٥	۰,۰۵	-۰,۱۱	۰,۰۵	۰,۰۵	-
Ø(C٥)	A۱	A۲	A۳	A٤	A٥	Ø(C٦)	A۱	A۲	A۳	A٤	A٥
A۱	-	-۰,۲۸	۰,۰۸	۰,۰۰	۰,۰۸	A۱	-	-۰,۲۸	-۰,۱۷	۰,۰۰	۰,۰۰
A۲	۰,۲۸	-	۰,۳٦	۰,۲۸	۰,۳٦	A۲	۰,۲۸	-	۰,۱۱	۰,۲۸	۰,۲۸
A۳	-۰,۰۸	-۰,۳٦	-	۰,۱۷	۰,۲۵	A۳	۰,۰۰	-۰,۲۸	-	۰,۰۰	۰,۰۰
A٤	۰,۰۰	-۰,۲۸	-۰,۱۷	-	۰,۰۸	A٤	-۰,۰۸	-۰,۳٦	-۰,۲۵	-	-۰,۰۸
A٥	-۰,۰۸	-۰,۳٦	-۰,۲۵	-۰,۰۸	-	A٥	۰,۰۰	-۰,۲۸	-۰,۱۷	۰,۰۰	-

In step ٤, we utilize Eq. (٤,٥) to calculate the weighted concordance/discordance index $\phi^{\rho}(A_{\xi},A_{\zeta})$, listed in Table ۸.

Table ۸.
The results of the weighted concordance/discordance index.

Ø*(۱-Ds(w,۱))	۱	۲	۳	٤	٥
۱	-	-۰,۲٤۳۱۸	-۰,۰۳٦۰٤	-۰,۰٦٥٥٤	-۰,۰۲۰۳۸
۲	۰,۲٤۳۱۸	-	۰,۱۷۱۹۳	۰,۱۷۷٦٤	۰,۱۸۷٥۹
۳	۰,۰۳٦۰٤	-۰,۱۷۱۹۳	-	۰,۰٥۸٦٤	۰,۰۱٥۷٦
٤	۰,۰٦٥٥٤	-۰,۱۷۷٦٤	-۰,۰٥۸٦٤	-	-۰,۰٥۷۲۹
٥	۰,۰۲۰۳۸	-۰,۱۸۷٥۹	-۰,۰۱٥۷٦	۰,۰٥۷۲۹	-

In step ٥, we compute the comprehensive concordance/discordance index $\phi^{\rho}(\rho = ۱.۲.۳.٤.٥)$ by using Eq. (٤٦٦), which is listed in Table ۹:

Table ۹.
Determine the ranking of alternative

P۱=(٥،٤،۳،۲،۱)	۰,۰٦۹۹	P۳۱=(٤،۳،٥،۲،۱)	۰,۰۱۲۷	P٦۱=(۳،۲،٥،٤،۱)	۰,۱۳۸٥	P۹۱=(۲،۱،٥،٤،۳)	۰,۲۲۱٥
P۲=(٥،٤،۳،۱،۲)	-۰,۲۰۸٥	P۳۲=(٤،۳،٥،۱،۲)	-۰,۲٦٥۷	P٦۲=(۳،۲،٥،۱،٤)	-۰,۰۲۹٥	P۹۲=(۲،۱،٥،۳،٤)	۰,۲٦٥۷
P۳=(٥،٤،۲،۳،۱)	۰,۰۸۷٦	P۳۳=(٤،۳،۲،٥،۱)	-۰,۰۲۲٦	P٦۳=(۳،۲،٤،٥،۱)	-۰,۰۳۱۲	P۹۳=(۲،۱،٤،٥،۳)	۰,۱۰٤٦
P٤=(٥،٤،۲،۱،۳)	۰,۰۸٦۸	P۳٤=(٤،۳،۲،۱،٥)	-۰,۰۰۷۸	P٦٤=(۳،۲،٤،۱،٥)	۰,۰٥۰۹	P۹٤=(۲،۱،٤،۳،٥)	۰,۱۳٤۸
P٥=(٥،٤،۱،۳،۲)	-۰,۰۸٥۱	P۳٥=(٤،۳،۱،٥،۲)	-۰,۲۳۰٦	P٦٥=(۳،۲،۱،٥،٤)	۰,۱۰۸۲	P۹٥=(۲،۱،۳،٥،٤)	۰,۲۸۰۲
P٦=(٥،٤،۱،۲،۳)	۰,۰٥۱٦	P۳٦=(٤،۳،۱،۲،٥)	-۰,۰۷۸۲	P٦٦=(۳،۲،۱،٤،٥)	-۰,۰٥۱٦	P۹٦=(۲،۱،۳،٤،٥)	۰,۲۰۸٥
P۷=(٥،۳،٤،۲،۱)	۰,۱۰۸٤	P۳۷=(٤،۲،٥،۳،۱)	۰,۰۳۰۲	P٦۷=(۳،۱،٥،٤،۲)	-۰,۱۰٤۷	P۹۷=(۱،٥،٤،۳،۲)	-۰,۱۹۳۷
P۸=(٥،۳،٤،۱،۲)	-۰,۱۳٤۸	P۳۸=(٤،۲،٥،۱،۳)	-۰,۰۰٥۷	P٦۸=(۳،۱،٥،۲،٤)	۰,۰۰٥۷	P۹۸=(۱،٥،٤،۲،۳)	۰,۰۳۱۲
P۹=(٥،۳،۲،٤،۱)	۰,۰٥٥٥	P۳۹=(٤،۲،۳،٥،۱)	۰,۰۳۰٤	P٦۹=(۳،۱،٤،٥،۲)	-۰,۲۷٤٤	P۹۹=(۱،٥،۳،٤،۲)	-۰,۱٥٥۱
P۱۰=(٥،۳،۲،۱،٤)	-۰,۰۱۰۰	P٤۰=(٤،۲،۳،۱،٥)	۰,۰۰۹۹	P۷۰=(۳،۱،٤،۲،٥)	-۰,۰۱۹٥	P۱۰۰=(۱،٥،۳،۲،٤)	-۰,۰۳۰٤
P۱۱=(٥،۳،۱،٤،۲)	-۰,۲۲۲۹	P٤۱=(٤،۲،۱،٥،۳)	۰,۰۲۹٤	P۷۱=(۳،۱،۲،٥،٤)	۰,۰۳۷۷	P۱۰۱=(۱،٥،۲،٤،۳)	-۰,۰۸۹۰
P۱۲=(٥،۳،۱،۲،٤)	-۰,۰٤٥۳	P٤۲=(٤،۲،۱،۳،٥)	۰,۰٤٥۳	P۲۲=(۳،۱،۲،٤،٥)	-۰,۰۸٦۸	P۱۰۲=(۱،٥،۲،۳،٤)	۰,۰۲۲٦
P۱۳=(٥،۲،٤،۳،۱)	-۰,۰۳۲٥	P٤۳=(٤،۱،٥،۳،۲)	-۰,۱٤۲٥	P۷۳=(۲،٥،٤،۳،۱)	۰,۲۲۲۳	P۱۰۳=(۱،٤،٥،۳،۲)	-۰,۳۱۰٥
P۱٤=(٥،۲،٤،۱،۳)	۰,۰۱۹٥	P٤٤=(٤،۱،٥،۲،۳)	۰,۰۲۹٥	P۷٤=(۲،٥،٤،۱،۳)	۰,۲۷٤٤	P۱۰٤=(۱،٤،٥،۲،۳)	-۰,۱۳۸٥
P۱٥=(٥،۲،۳،٤،۱)	۰,۱۰۸٥	P٤٥=(٤،۱،۳،٥،۲)	-۰,۱٤۲۳	P۷٥=(۲،٥،۳،٤،۱)	۰,۲۹٦۰	P۱۰٥=(۱،٤،۳،٥،۲)	-۰,۲۹٦۰
P۱٦=(٥،۲،۳،۱،٤)	-۰,۰٤٥۲	P٤٦=(٤،۱،۳،۲،٥)	۰,۰٤٥۲	P۷٦=(۲،٥،۳،۱،٤)	۰,۱٤۲۳	P۱۰٦=(۱،٤،۳،۲،٥)	-۰,۱۰۸٥
P۱۷=(٥،۲،۱،٤،۳)	-۰,۰٦۸٦	P٤۷=(٤،۱،۲،٥،۳)	-۰,۰۰٥۸	P۷۷=(۲،٥،۱،٤،۳)	۰,۰۸۳۸	P۱۰۷=(۱،٤،۲،٥،۳)	-۰,۰۷۱٤
P۱۸=(٥،۲،۱،۳،٤)	۰,۰۷۸۲	P٤۸=(٤،۱،۲،۳،٥)	۰,۰۱۰۰	P۷۸=(۲،٥،۱،۳،٤)	۰,۲۳۰٦	P۱۰۸=(۱،٤،۲،۳،٥)	-۰,۰٥٥٥
P۱۹=(٥،۱،٤،۳،۲)	-۰,۲۷٥۷	P٤۹=(۳،٥،٤،۲،۱)	۰,۱۳۸٦	P۷۹=(۲،٤،٥،۳،۱)	۰,۱٤۰٦	P۱۰۹=(۱،۳،٥،٤،۲)	-۰,۱٤۰٦
P۲۰=(٥،۱،٤،۲،۳)	-۰,۰٥۰۹	P٥۰=(۳،٥،٤،۱،۲)	-۰,۱۰٤٦	P۸۰=(۲،٤،٥،۱،۳)	۰,۱۰٤۷	P۱۱۰=(۱،۳،٥،۲،٤)	-۰,۰۳۰۲
P۲۱=(٥،۱،۳،٤،۲)	-۰,۱۳٤۷	P٥۱=(۳،٥،۲،٤،۱)	۰,۰۷۱٤	P۸۱=(۲،٤،۳،٥،۱)	۰,۱٥٥۱	P۱۱۱=(۱،۳،٤،٥،۲)	-۰,۲۲۲۳
P۲۲=(٥،۱،۳،۲،٤)	-۰,۰۰۹۹	P٥۲=(۳،٥،۲،۱،٤)	۰,۰۰٥۸	P۸۲=(۲،٤،۳،۱،٥)	۰,۱۳٤۷	P۱۱۲=(۱،۳،٤،۲،٥)	۰,۰۳۲٥
P۲۳=(٥،۱،۲،٤،۳)	-۰,۱۰۳۸	P٥۳=(۳،٥،۱،٤،۲)	-۰,۲۰۷۰	P۸۳=(۲،٤،۱،٥،۳)	۰,۲۰۷۰	P۱۱۳=(۱،۳،۲،٥،٤)	۰,۰۳٦۹
P۲٤=(٥،۱،۲،۳،٤)	۰,۰۰۷۸	P٥٤=(۳،٥،۱،۲،٤)	-۰,۰۲۹٤	P۸٤=(۲،٤،۱،۳،٥)	۰,۲۲۲۹	P۱۱٤=(۱،۳،۲،٤،٥)	-۰,۰۸۷٦

P٢٥=(٤،٥،٣،٢،١)	-٠,٠٠١٨	P٥٥=(٣،٤،٥،٢،١)	٠,٠٥٦٩	P٥٥=(٢،٣،٥،٤،١)	٠,٣١٠٥	P١١٥=(١،٢،٥،٤،٣)	-٠,٠٥٦٩
P٢٦=(٤،٥،٣،١،٢)	-٠,٢٨٠٢	P٥٦=(٣،٤،٥،١،٢)	-٠,٢٢١٥	P٨٦=(٢،٣،٥،١،٤)	٠,١٤٢٥	P١١٦=(١،٢،٥،٣،٤)	-٠,٠١٢٧
P٧٧=(٤،٥،٢،٣،١)	-٠,٠٣٦٩	P٥٧=(٣،٤،٢،٥،١)	٠,٠٨٩٠	P٨٧=(٢،٣،٤،٥،١)	٠,١٩٣٧	P١١٧=(١،٢،٤،٥،٣)	-٠,١٣٨٦
P٢٨=(٤،٥،٢،١،٣)	-٠,٠٣٧٧	P٨٨=(٣،٤،٢،١،٥)	٠,١٠٣٨	P٨٨=(٢،٣،٤،١،٥)	٠,٢٧٥٧	P١١٨=(١،٢،٤،٣،٥)	-٠,١٠٨٤
P٢٩=(٤،٥،١،٣،٢)	-٠,٢٤٤٩	P٥٩=(٣،٤،١،٥،٢)	-٠,٠٨٣٨	P٨٩=(٢،٣،١،٥،٤)	٠,٢٤٤٩	P١١٩=(١،٢،٣،٥،٤)	٠,٠٠١٨
P٣٠=(٤،٥،١،٢،٣)	-٠,١٠٨٢	P٦٠=(٣،٤،١،٢،٥)	٠,٠٦٨٦	P٩٠=(٢،٣،١،٤،٥)	٠,٠٨٥١	P١٢٠=(١،٢،٣،٤،٥)	-٠,٠٦٩٩

Step: determine the ranking of alternative
The bigger the comprehensive concordance index/discordance index, the better the final ranking result of the alternatives will be:
$P^{*} = max\{\varphi_{\tau} | \tau = ١.٢ \dots .n!\}$

Table ١٠.
The results of hesitant on QUALIFLEX fuzzy

	ci	rank
A١	٠,٦١١٦٢٧	٥
A٢	٠,٨١١٥٢٩	١
A٣	٠,٦٧٦٧٢٩	٣
A٤	٠,٦٤١٠١٥	٤
A٥	٠,٦٩٩٤٩٢	٢

Table ١١.
The results of hesitant on Topsis fuzzy

	di+	di-		rank
A١	٠,٢٩١٤٦٥	٠,١٥٥٧٩٥	٠,٣٤٨٣٣١	٥
A٢	٠,١٥٥٧٩٥	٠,٢٩١٤٦٥	٠,٦٥١٦٦٩	١
A٣	٠,٢٢٢١٣٥	٠,١٥٠٩٠٥	٠,٤٠٤٥٢٩	٤
A٤	٠,١٥٠٥٥٦	٠,٢٢٦٧٦٣	٠,٦٠٠٩٨٥	٢
A٥	٠,١٨١٨٨٧	٠,١٧٨١٢٨	٠,٤٩٤٧٨	٣

Due to variability in the outcomes of various MCDM methods when applied to solve the same real-life problem, using an aggregation strategy such as the Copeland method based on sound mathematical footings is essential.
The Copeland method
The Borda count method is thought to be modified by the Copeland method (Dortaj, Maghsoudy, Ardejani, & Eskandari, ٢٠٢٠). Three steps can be used to summarize the methods for applying the Copeland method.

Table ١٢.
Final rankings of prime movers based on Borda count rule and Copeland method

	A١	A٢	A٣	A٤	A٥	$\sum C$	
A١	-	X	X	X	X	٠	٠-٤=-٤
A٢	M	-	M	M	M	٤	٤-٠=٤
A٣	M	X	-	X	X	١	١-٢=-١
A٤	M	X	X	-	X	١	١-١=٠
A٥	M	X	M	X	-	٢	٢-١=١

٤,٢ Comparative Analysis
To demonstrate the superiority of the hesitant trapezoidal fuzzy QUALIFLEX approach, we make a comparative analysis with the TOPSIS method.

The first stage is determining the winning score, the total of an alternative's ranking orders about numerous approaches. The difference between the win scores of each alternative and the majority wins score is then used to determine the losses scores. The difference between the winning and losses scores is then used to calculate the final scores. According to the size of the overall score, the options are sorted in decreasing order(Alao, Popoola, & Ayodele, ٢٠٢٢).

$\sum R$	٤	٠	٢	١	١

Discussion

Ranking the potential clusters problem is one of the most critical issues in the organization of the industrial states. It directly affects the organization's performance regarding how Fars industrial states organization allocates its budget. This perspective makes developing and extending a new industrial cluster selection decision-making method of substantial significance. Although industrial cluster selection problems have been extensively extended to the fuzzy sets theory, and from fuzzy environment to multi-valued neutrosophic fuzzy environment, little attention has been paid to probability hesitant fuzzy environment. However, in this paper, we have focused on group decision-making under a probability hesitant fuzzy environment.

Moreover, an extended QUALIFLEX method was applied for the industrial clusters selection problem. We used the proposed method to solve the problem of prioritizing industrial clusters in Fars province for budget allocation. A real industrial cluster selection example was then used to illustrate the proposed method. Then, we proposed a new approach based on TOPSIS to solve the MADM problem with uncertain fuzzy data. This approach avoids information overload in the information-gathering process because it relies on the relative proximity of each option to rank all options. Finally, the proposed method's effectiveness and applicability were demonstrated through the selection of industrial clusters. The approach is convenient, has low information loss, and can be easily applied to control decision-making problems in fuzzy uncertain domains. Finally, the Copeland method combined these two methods to ensure which clusters are of great importance.

The results showed that the Larestan Muscat is of great importance in both single methods and Copeland aggregation methods; however, for other alternatives, the ranking in each method is different, so the ranking of Copeland can be the best reference for our prioritizing. Due to the fact that these potential clusters are ranked by criteria that show which kind of these clusters can have a more significant impact on the economic growth of the region, with the help of this ranking, the industrial states organization can experience a faster SMEs development rate in the region by allocating their budget in Larestan Muscat, Abade Inlaid Wood, Citrus packaging, Shiraz Marquetry, Niriz stone respectively .

Past studies have yet to use the hesitant fuzzy method in prioritizing industrial clusters. Considering that in this fuzzy, the decision makers' hesitation in scoring is included in the calculations, it can give us a more accurate result than the crisp data. Also, two simultaneous methods were used to ensure the prioritization of the clusters, two simultaneous methods were used, and finally, the Copeland method was used to aggregate the results. Such a combination of methods is rarely seen in other research. More importantly, this ranking with high accuracy can provide a reliable solution for prioritizing the budget allocation for industrial clusters of Fars Industrial Estates Organization, making it more effective.

Limitation

This study also has limitations. First, in this paper, other MCDM methods, such as BWM and COPRAS or fuzzy methods, are not used in the comparative studies. Second, the evaluation index system constructed in this paper assigns weights and scores using Qualiflex and Topics. However, these two methods rely to some extent on experts' opinions and have a certain degree of subjectivity, so that the results may differ. Finally, due to the limited data available, the research scope of this paper is limited to the cluster industry in Fars province.

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