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Selection of factors affecting the supply chain and green suppliers by the TODIM method in the dairy industry

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Abstract

Sustainable development has made significant progress in establishing environmental and social sustainability over operations and supply chain management. Adopting an investment strategy to improve the environmental performance of the supply chain has many benefits, such as saving energy resources, reducing pollutants, eliminating or reducing waste, creating value for customers, and ultimately improving productivity for the company. And organizations will bring. Manufacturers in the late 1980s went beyond what was required by law and moved to a greener approach to operating their system. The purpose of this article is to select the appropriate criteria for the green supply chain in dairy companies that have been measured and ranked by FDEMATEL, TODIM, and DALALA techniques. Also, based on these criteria, suppliers have been examined and the top supplier has been selected. Based on the results of this study, paying attention to waste and recycling it in the company environment is one of the most important criteria that should be considered.

1- Introduction

The advent of new, fast, and precise means of production, along with humanity's insatiable craving for up-to-date items and the simplification of life, has been and continues to be strongly felt away from environmental protection. Most caring people and most consumers today, willingly or unwillingly, focus their attention on their environment and the impact of how and use and waste of their items on their environment. Many have gone a step further and have a green and environmentally friendly view of how raw materials are provided and how goods and their means of production are produced. This view has led to the emergence of a new method of management with an environmental protection mechanism alongside clean production with an environmentally friendly supply cycle. In the meantime, the supply cycle is one of the most important and basic production cycles. In the meantime, a small part of this chain is the choice of suppliers. Environmental and managerial risks regarding the selection of this small but very important sector have caused managers to take a fresh look at this small [1-6].

The term supply chain management was first used by two researchers, Oliver and Weber, in 1982, and then became widely used in the 1990s. Previously, the term logistics and operations management was used instead.

According to Oliver and Weber, the supply chain includes logistics and the issue at the senior management level of the organization [7].

Green supply chain management from the perspective of product life cycle includes all stages of the supply chain including raw material supply, product design and manufacturing, product sales, product transportation, product use and recycling of depleted goods. Relying on green supply chain management methods, we will be able to minimize the damage to the environment and use the least resources in the production of goods as much as possible [8].

Doshe Amol Dairy Products Company with the name and brand of Haraz has started its production activity since August 2007 in Amol Industrial Town. The type of communication with suppliers will be very critical due to the existence of a separation system in the company's operating process. Focus on environmental considerations given the current competitive environment and the legal requirements and conditions that have arisen and the environmental pressures of the government and the countless demands of consumers and the pressure of nature lovers in the dairy industry is increasing significantly. Doshe Amol Dairy Company will inevitably face these competitive considerations. According to the above, the problem of the present study is to identify effective criteria by considering the green supply chain in the dairy industry and ranking the company's suppliers according to these considerations.

2-Literature Review

Supply chain management involves the integration of supply chain activities as well as related information flows through improved chain relationships to achieve competitive advantage. Therefore, supply chain management is the process of integrating supply chain activities and related information flows, through the improvement and coordination of activities in the supply chain of production and supply of the product. Elsewhere, the green supply chain is defined as the coordination of production activities, inventory, positioning and transportation among supply chain actors with the aim of achieving greater efficiency and meeting customer expectations. Supply chain management includes planning and management of all sourcing and procurement activities, conversion of goods from the raw material stage (extraction) to delivery to the final consumer, logistics activities and all coordination and cooperation activities between suppliers, Intermediaries, retailers and customers [9].

Structurally, the most important problem facing the supply chain is the problem of multiple decision centers for the production, conversion and flow of goods. This intensifies demand fluctuations throughout the chain. As we move from the end of the chain to the beginning of the chain (the first supplier), demand fluctuations intensify. This phenomenon is known as the effect of leather whipping. As a result of the leather whipping blow, retailers and distributors are ordering more than they need to respond more quickly to shortages. This phenomenon, on the one hand, causes a lot of accumulated inventory among the members of the chain, which increases the cost and final price of the goods, and on the other hand, causes additional production [10].

Another problem that supply chain management commonly faces in the production chain is the problem of over-transportation. One of the reasons for the creation of additional transportation is the existence of a pressure system in the production sector, which generally organizations in the supply chain have a pressure system. In

general, the MRP system and all scheduling systems are called compression. In a pressure system, materials flow to a workstation before it needs more [11].

Another problem that supply chain management faces is the amount of trust that the system has to have in the forecasting process, and this trust and reliance may cause the organization serious problems in all planning because assuming the existence of a production system. Pressure in the organization, all schedules of different stages of product production and its delivery to the customer are based on forecasts [12].

The supply chain is a dynamic system that evolves over time. Not only does customer demand and supplier capabilities change over time, but supply chain relationships evolve over time. For example, as customers' purchasing power increases, the pressure on manufacturers and suppliers to produce more diverse and higher quality products and ultimately the production of customized products increases [13].

Green supply chain management

Today, the world is facing issues such as global warming, various types of pollution, increasing amounts of greenhouse gases, etc., which can potentially lead to the extinction of humanity. Therefore, environmental protection and related strategies soon became a priority of programs, as an important organizational innovation. On the one hand, the organization had to pay attention to profitability and competitive advantage, on the other hand, to eliminate or minimize waste (energy, greenhouse gas emissions, chemical / hazardous, solid waste). It was here that the idea of a green supply chain came up and soon caught everyone's eye. Due to the economic, social and environmental challenges that have threatened organizations in the last decade, the customer orientation approach and focus on its demands and design the organization strategy accordingly (creating customer satisfaction) its ability to create an advantage. Competitiveness is lost in organizations. If in the past two decades, customer orientation was the factor of organizational competitive advantage, today, due to the challenges created through customer orientation, organizations have moved away from this focus [14].

Today, green supply chain managers in leading companies try to benefit from improving their environmental performance throughout the supply chain as a strategic weapon to gain a sustainable competitive advantage by creating utility and environmental satisfaction throughout the supply chain [15]. Green supply chain management, integrating supply chain management with environmental requirements in all stages of product design, selection and supply of raw materials, production and manufacturing, distribution and transfer processes, delivery to the customer and finally after consumption, recycling and reuse management The purpose is to maximize the efficiency of energy consumption and resources along with improving the performance of the entire supply chain [16].

Supply chain greening is the process of considering environmental criteria or considerations throughout the supply chain. Green supply chain management, integrating supply chain management with environmental requirements in all stages of product design, selection and supply of raw materials, production and manufacturing, distribution and transfer processes, delivery to the customer and finally after consumption, recycling management and Reuse in order to maximize the efficiency of energy and resource consumption along with improving the performance of the entire supply chain [17].

Normal and green supply chains are different. The first difference between the two is that the normal supply chain focuses on economic goals and values, while in the green chain too much attention is paid to environmental goals. If in a normal chain, environmental standards are considered, then often within the optimal range. Are preserved. For example, normal chains simply ignore the effects of toxins on humans and ignore their effects on the environment [18]. In addition, they often focus more on controlling the final product and in the meantime do not prevent the occurrence of negative effects during the production process. Although in some cases the costs of green supply chain management are higher than in the normal chain, the consumer's conscience towards the environment helps the organization to create a brand image and consequently gain a unique competitive advantage [19]. Table 1 shows the supplier evaluation criteria in green supply chain considerations.

Table 1 Supplier Evaluation Criteria in Green Supply Chain Considerations

	Criteria
1	Unwillingness of industries to take effective environmental measures
2	Lack of human resources in quantitative terms
3	Fear of failure to learn the green supply chain in order to lose the organization's competitive advantage
4	Product reliability
5	The amount of resources and energy consumed per unit of product
6	Growth of profitability and efficiency
7	Green warehousing
8	Water, soil and air pollution by the final product
9	Water, soil and air pollution by waste
10	Public dissemination of environmental information
11	Return on investment
12	Assessing suppliers from an environmental point of view
13	Designed to reduce resource and energy consumption
14	Training and presenting patterns of correct energy consumption
15	Continuous analytical study of the working condition of machines and examination of their wear status
16	Recycling of waste and waste within the company
17	employee satisfaction
18	Timely delivery
19	Water, soil and air pollution in the reprocessing process
20	Voluntary participation in Environmental Protection Agency programs
21	Existence of advanced equipment for transportation of materials, final product and waste; In such a way that it has the least loss and scattering
22	Cooperation with customers
23	Green production costs
24	Use energy label
25	Use of environmental labels

26	Green transportation
27	Product recycling
28	Observance of the necessary standards in the purchase of machinery, equipment and tools from a technical point of view; environmental
29	Designing products for the needs and wants of customers
30	Lack of technical expertise and alternative design for products in accordance with environmental requirements
31	Lack of access to appropriate environmentally friendly technology, process and materials to accept the green supply chain
32	Environmental management systems
33	Commitment to periodic environmental assessment
34	Organizational participation and supplier life cycle management
35	Life cycle costs
36	Environmental competence
37	Having 14000ISO certificate
38	Having ISO 14001 certification
39	Buy green
40	Green distribution
41	Green logistics
42	Reverse logistics supplier company
43	Customer satisfaction
44	Product design to prevent the use of hazardous substances in the production process
45	The organization currently lacks the flexibility to make new changes to the system
46	Green design
47	Promoting green culture (observing environmental considerations) in the company's workspace
48	Total environmental quality management
49	Number of crimes and warnings received from the Environmental Protection Agency
50	Existence of a secondary consumer market for solid waste produced
51	Establish control and monitoring systems to comply with environmental standards
52	Support for the green supply chain by senior and middle managers
53	Green packaging
54	Recycling the product after its useful life
55	Manage and control the production of hazardous air pollutants
56	Long product life

3-Mathematical methods used

TODIM Technique

TODIM technique is one of the introduced techniques that is used to solve multi-criteria decision making problems (Gomez et al., 2013). So far, several techniques have been introduced to solve multi-criteria decision

making problems (Hatami et al., 2013). One of them is the TODIM technique, which was first proposed by Gomez and Lima (1992). This technique is based on nonlinear forecasting theory whose value function is similar to the profit / loss function of forecasting theory. The TODIM technique presents the differences between the values of each of the two options obtained with respect to each criterion relative to a reference criterion (Kahneman and Torsky, 1979). This technique eliminates random inconsistencies from pairwise comparisons using pairwise comparisons (Gomez and Rengal, 2009).

Fuzzy DEMATEL (FDEMATEL) Technique

The fuzzy approach is used to deal with the uncertainty and ambiguity in the respondents' verbal expressions. Various ranges based on the conventional scoring scale of DEMATEL have been proposed. (Habibi et al., 2014)

Research method

The most basic part of performing any data collection technique is then analyzing this data to present the basic assumptions and questions of each research. Efforts have been made to use the most appropriate techniques for data collection and analysis, given the importance of evaluating suppliers with regard to supply chain considerations. Therefore, the Delphi method has been used to screen the criteria that affect the evaluation of green supply chain suppliers. The relationship map of each indicator uses the technique (multi-criteria decision making) of Fuzzy-DALALA -DEMATEL. Finally, the new TODIM technique has been used to rank suppliers.

Profile of industry experts

A total of 13 employees of the warehousing and delivery unit in Dosheh and Kaleh dairy companies have been recruited to localize the variables and review the criteria of green supply chain suppliers obtained from the research literature. In the next stage, after determining the criteria, 6 suppliers of raw materials of Dosheh Dairy Company have been used to determine the relationships in the fuzzy dimethyl technique and the degree of importance of the criteria in the DALALA technique.

These people have postgraduate, bachelor and master degrees and have worked in this field for more than 15 years. In the third stage, 10 experts from the research industry have been assigned to score the criteria selected in the previous stages and the mentioned points have been used. Method of collecting information from the research literature section and identifying the criteria affecting the selection of suppliers of green supply chains, by reviewing articles and sources and internal references and Latin sources and articles of Internet search engines and reviewing sites such as EmeraldInsight.Com and modir.ir and Many other sites have used reference articles and management journals.

Data Collection tools

In this study, considering the subject and methods used to localize the variables and determine the relationships and the degree of importance of the criteria, field questionnaires and surveys of experts, 3 questionnaires have been used. In order to identify the effective criteria in finding green supply chain suppliers,

domestic scientific articles from Latin sources and similar domestic and Latin studies and selection and approval by experts in this field have been used.

Data Analysis Method

In this study, the effective criteria in the green supply chain have been identified and described, and the fuzzy and DALALA technique has been used to analyze, evaluate and determine the relationships and the degree of importance of the criteria. Finally, the selection and ranking of suppliers from among 6 suppliers uses the TODIM method.

4-Results

Identify and evaluate effective criteria

Criteria affecting the green supply chain have been extracted using articles. Which included 113 criteria affecting the green supply chain, which after reviewing experts and screening unrelated criteria was reduced to 57 effective and related criteria, and localization finally reduced the criteria involved in this evaluation to 25 criteria. For localization in this research, the Delphi method has been used, so that after selecting the criteria and screening the duplicate criteria using the opinion of experts, 56 criteria for survey and localization were included in the questionnaires and the industry experts were asked. Give them a score of 1 to 10 based on the effectiveness of each of these criteria. After reviewing the scores given to the criteria and the supervisor's guidance, the criteria that had scores greater than 7 were selected to be used in the next stage of the research. Using the Delphi technique to localize the criteria, 25 criteria scored 7 or more points.

Table 2 Criteria's symbol and scores

Criteria	Symbol	The score of each criteria
Water ,soil and air pollution by waste	C1	7.692308
Public dissemination of environmental information	C2	7.461538
Return on investment	C3	7.615385
Training and presenting patterns of correct energy consumption	C4	7.230769
Recycling of waste and waste within the company	C5	7.538462
Timely delivery	C6	7.615385
Voluntary participation in Environmental Protection Agency programs	C7	7.307692
Existence of advanced equipment for transportation of materials, final product and waste; In such a way that it has the least loss and scattering	C8	8.307692
Use energy label	C9	7.615385
Product recycling	C10	7.384615
Organizational participation and supplier life cycle management	C11	7.384615
Environmental competence	C12	7
Having ISO 14001 certification	C13	8
Buy green	C14	8.538462
Green distribution	C15	7.307692
Green logistics	C16	7
Reverse logistics supplier company	C17	8

Product design to prevent the use of hazardous substances in the production process	C18	8.384615
The organization currently lacks the flexibility to make new changes to the system	C19	8.615385
Green design	C20	7.076923
Existence of a secondary consumer market for solid waste produced	C21	7.615385
Support for the green supply chain by senior and middle managers	C22	8.384615
Green packaging	C23	8.384615
Recycling the product after its useful life	C24	9.692308
Manage and control the production of hazardous air pollutants	C25	7.692308

Determining structural relationships and dimensions of criteria

At this stage, after selecting 25 criteria affecting the selection of the supplier of the green supply chain, 6 experts were asked to examine the internal relations of these criteria to each other, based on the relationships between the criteria and the impact of each on the other (Give a score from 0 to 4 on criterion i on criterion j). All of these criteria are denoted by the letter C, which stands for Criteria, as described in Table 2.

Also Definite total correlation matrix (defuzzy total correlation matrix) related to T_c criteria is shown in Table 3

Table 3 Definite total correlation matrix (defuzzy total correlation matrix) related to Tc criteria

def	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18	c19	c20	c21	c22	c23	c24	c25
c1	0	0.266	0.256	0	0.259	0.248	0.261	0	0	0.258	0	0	0	0	0.252	0.248	0	0	0	0	0	0.251	0	0.247	0.25
c2	0	0	0.255	0	0.251	0	0.259	0	0	0.248	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
c3	0.256	0.265	0	0.257	0.275	0.247	0.262	0	0.256	0.262	0.246	0.262	0	0	0.249	0.249	0.251	0	0	0	0.256	0	0.249	0	0.259
c4	0.278	0.28	0.272	0.227	0.281	0.26	0.276	0.258	0.25	0.275	0.264	0.251	0	0.255	0.255	0.27	0.26	0.252	0	0.253	0.263	0.259	0.257	0.255	0.272
c5	0.266	0.278	0.266	0.246	0	0.248	0.262	0.247	0.251	0.261	0.251	0.261	0.248	0.251	0	0.263	0.256	0.254	0	0	0.25	0.259	0.247	0.258	0.263
c6	0.262	0.266	0.262	0.264	0.274	0	0.273	0.251	0.246	0.265	0.248	0.257	0	0	0.251	0.257	0.253	0.248	0	0.246	0.25	0.255	0.256	0.246	0.263
c7	0.256	0.261	0.254	0.236	0.257	0	0	0	0	0.258	0	0.246	0	0	0	0.251	0	0	0	0	0	0	0	0.253	0.257
c8	0.26	0.261	0.258	0.256	0.278	0	0.259	0	0.248	0.261	0	0	0	0	0	0.256	0.249	0	0	0	0	0	0	0.249	0.252
c9	0.248	0.251	0	0	0.248	0	0.253	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.247	0	0.246	0.247
c10	0.251	0.259	0	0	0.256	0	0.249	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.247
c11	0.256	0.258	0.255	0	0.266	0.254	0.268	0	0.246	0.268	0	0.25	0	0	0	0.254	0	0.25	0	0	0	0.247	0.248	0.246	0.262
c12	0	0.262	0.253	0	0.267	0	0.261	0	0	0.247	0.246	0	0	0	0	0	0.251	0	0	0	0	0	0	0	0
c13	0.248	0.268	0.266	0	0.269	0.256	0.261	0	0.256	0.262	0.247	0.256	0	0	0.251	0.251	0.254	0	0	0	0	0	0.247	0.247	0.265
c14	0.253	0.277	0.26	0.251	0.269	0	0.262	0	0.248	0.256	0.251	0.25	0	0	0.249	0.257	0.25	0.248	0	0	0.253	0.248	0	0.248	0.254
c15	0.263	0.28	0.265	0	0.268	0.252	0.267	0	0.251	0.271	0	0.254	0	0.249	0	0.26	0.25	0.249	0	0	0.259	0.247	0	0.249	0.256
c16	0.254	0.277	0.262	0.247	0.27	0	0.268	0.247	0.255	0.262	0.248	0.258	0	0	0.25	0	0.249	0.247	0	0	0	0.253	0	0.25	0.261
c17	0.252	0.272	0.262	0	0.265	0	0.255	0	0.25	0.261	0	0.253	0	0	0	0.25	0	0	0	0	0	0.254	0	0.251	0.255
c18	0	0.261	0.251	0	0.252	0	0.255	0	0	0.246	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.251
c19	0.26	0.28	0.26	0	0.272	0	0.267	0	0	0.259	0.251	0.248	0.246	0	0.246	0.254	0.239	0	0	0	0.25	0	0	0.252	0.261
c20	0.252	0.276	0.267	0	0.261	0.249	0.268	0.247	0.258	0.263	0	0.255	0	0	0.252	0.252	0.258	0	0	0	0	0.261	0	0.254	0.26
c21	0.262	0.264	0.246	0.249	0.259	0.254	0.26	0	0	0.254	0	0.252	0	0	0	0.254	0.248	0.253	0	0	0	0.246	0	0.25	0.247
c22	0.252	0.268	0	0	0.259	0	0.257	0.251	0.256	0.266	0.247	0.256	0	0	0.257	0	0	0.253	0	0	0.247	0	0	0.256	0.252
c23	0.26	0.277	0.257	0.248	0.273	0	0.264	0	0.251	0.261	0.249	0.253	0	0	0	0.258	0.25	0	0	0	0.247	0	0	0.251	0.261
c24	0	0.26	0.249	0.247	0.248	0	0.259	0	0.253	0	0	0	0	0	0	0.247	0.248	0	0	0	0	0	0	0	0
c25	0.251	0.271	0.259	0	0.257	0	0.261	0.247	0	0.255	0	0.248	0	0.251	0	0.247	0.245	0.247	0	0	0	0.253	0	0.251	0.225

Threshold effect

The Threshold effect for Table 4 is 0.245

After de-fuzzy operation, the total correlation matrix related to the dimensions and criteria of the model, D will be the sum of rows and R will be the sum of its columns, which will be used in designing and compiling the network map and structural relationships.

Table 4 DALALA technique data table

	D	R	D+R	D-R	W
C1	6.066	6.322	12.388	-0.255	0.0405
C2	5.874	6.666	12.54	-0.792	0.041
C3	6.199	6.392	12.591	-0.192	0.0411
C4	6.474	6.066	12.541	0.408	0.041
C5	6.297	6.57	12.867	-0.273	0.042
C6	6.296	6.04	12.336	0.256	0.0403
C7	6.024	6.516	12.541	-0.492	0.041
C8	6.121	5.976	12.098	0.145	0.0395
C9	5.863	6.136	11.999	-0.272	0.0392
C10	5.83	6.417	12.247	-0.587	0.04
C11	6.146	6.043	12.189	0.102	0.0398
C12	6.025	6.21	12.236	-0.185	0.04
C13	6.207	5.85	12.057	0.357	0.0394
C14	6.19	5.974	12.164	0.216	0.0397
C15	6.263	6.069	12.332	0.194	0.0403
C16	6.208	6.24	12.447	-0.032	0.0406
C17	6.137	6.124	12.261	0.013	0.04
C18	5.871	6.053	11.924	-0.183	0.0389
C19	6.171	4.749	10.921	1.422	0.036
C20	6.247	5.886	12.134	0.361	0.0396
C21	6.095	6.083	12.178	0.012	0.0398
C22	6.136	6.111	12.247	0.026	0.04
C23	6.183	5.992	12.175	0.191	0.0398
C24	5.948	6.181	12.128	-0.233	0.0396
C25	6.136	6.342	12.478	-0.206	0.0408

Supplier Ranking

The companies in question have been introduced by Dosheh Dairy Sugar Experts to examine the raw materials and items needed by the company. At this stage, ten industry experts applied to the suppliers to score according to the 25 specified criteria. The response of these experts is based on a range that includes very poor, poor, average, good, excellent, which includes scores of 1 to 5 for each of the criteria to suppliers, respectively. After aggregating the opinions of experts, we first normalize the obtained matrix, which is summarized in Table 5.

Table 5

Criteria	Weights	Criteria	Weights	Criteria	Weights	Criteria	Weights	Criteria	Weights
C1	0.0405	C6	0.0403	C11	0.0398	C16	0.0406	C21	0.0398
C2	0.041	C7	0.041	C12	0.04	C17	0.04	C22	0.04
C3	0.0411	C8	0.0395	C13	0.0394	C18	0.0398	C23	0.0398
C4	0.041	C9	0.0392	C14	0.0397	C19	0.036	C24	0.0396
C5	0.042	C10	0.04	C15	0.0403	C20	0.0396	C25	0.0408

To perform the relevant calculations, one of the criteria must first be selected as the reference criterion, which is done by selecting the most important criterion. This was done by selecting the highest weight obtained in the DALALA technique stage and dividing the rest of the weights by this reference weight, in which the criterion (C5, waste and waste recycling within the company) was selected as the reference criterion. Table 6 shows the calculation of the reference weight.

Table 6 The calculation of the reference weight

Criteria	W	WRC	Criteria	W	WRC
C1	0.0405	0.964286	C14	0.0397	0.945238
C2	0.041	0.97619	C15	0.0403	0.959524
C3	0.0411	0.978571	C16	0.0406	0.966667
C4	0.041	0.97619	C17	0.04	0.952381
C5	0.042	1	C18	0.0398	0.92619
C6	0.0403	0.959524	C19	0.036	0.857143
C7	0.041	0.97619	C20	0.0396	0.942857
C8	0.0395	0.940476	C21	0.0398	0.947619
C9	0.0392	0.93333	C22	0.04	0.952381
C10	0.04	0.952381	C23	0.0398	0.947619
C11	0.0398	0.947619	C24	0.0396	0.942857
C12	0.04	0.952381	C25	0.0408	0.971429
C13	0.0394	0.938095			

After calculating the relative weight of each criterion, we obtain the degree of mastery of option i over criterion j according to the relevant criterion. First we get the difference (Pij-Pji) and then we calculate the value in the table based on the value given by the TODIM method.

5-Conclusion

The present study aims to evaluate the suppliers of the dairy company in the green supply chain, which has examined the criteria of the green supply chain. After using the fuzzy multi-criteria decision-making technique and considering the relationships between the criteria and uncertainty. In the experts' mental judgments, the fuzzy DEMATEL method has been used to determine how the criteria relate to each other. After determining the structural relationships between the criteria related to the degree of importance of each factor using the DEMATEL technique based on the DALALA technique, the weights of each criterion were determined and the weights obtained in the TODIM technique for ranking suppliers of one of the companies. Dairy is used. According to the

summary of experts' scores, the most attention of industry experts has been (product recycling after the end of its useful life).

Observance of recycling principles in waste within production units is one of the main criteria for experts to select a supplier and a good reason to continue the cooperation of industrial units with suppliers. Based on the results of this study, paying attention to waste and recycling it in the company environment is one of the most important criteria that should be considered. In addition, creating a suitable design for products or using raw materials with a new design that can be recycled and created. It is also important to have less environmental pollution to minimize pollution in their waste. According to the results, the highest score of dairy industry experts for selecting the best supplier has been due to the attention and efforts of this supplier to the issue of waste recycling in the company. Supplier A5 has also been selected as the best supplier based on benchmark data and expert ratings.

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