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A Research Related to the Applicability of DEMATEL Method for Supplier Selection as an Optimization Model in Food & Beverage Enterprises*

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Abstract

The main objective of this study is to determine the applicability of The Decision Making Trial and Evaluation Laboratory (DEMATEL) technique, a recent method to attain optimization of supplier's selection methods in the food and beverages industry growing continuously both quantitatively and qualitatively. By modelling what kind of application process is followed in order to determine the applicability of DEMATEL technique to food and beverages enterprises within the scope of the research, it can be expressed as the application of the model and providing resource utilization efficiency in selection of the suppliers for the food and beverages enterprises. The field study was carried out regarding applicability of DEMATEL method, which has been applied at enterprises engaging in industrial production for a long time, for supplier selection in food and beverages enterprises as an optimization model/technique. The field study was conducted through a survey of quantitative data collection method and applied to 416 enterprises located in various provinces where high quality food and beverages enterprises of Turkey are heavily found. As a result of the research, it has been concluded that DEMATEL method can be applied effectively in food and beverages enterprises and food and beverages enterprises can reach the optimization level in line with the selection of the right suppliers by the application of DEMATEL method.

Keywords: Food and Beverages Enterprises, Supplier Selection, DEMATEL Method.

Yiyecek-İçecek İşletmelerinde Tedarikçi Seçiminde Optimizasyon Modeli Olarak DEMATEL Yönteminin Uygulanabilirliğine Yönelik Bir Araştırma

Öz

Bu çalışmanın temel amacı, nicel ve nitel büyümede devamlılık arz eden yiyecek-içecek endüstrisindeki, tedarikçi seçim yöntemleri optimizasyonuna ulaşabilmek için yeni bir tedarikçi seçim yöntemi olan DEMATEL tekniğinin uygulanabilirliğinin belirlenmesidir. Araştırma kapsamında DEMATEL yönteminin yiyecek-içecek işletmelerinde uygulanabilirliğinin belirlenmesi durumunda nasıl bir uygulama süreci izlenmesi gerektiği modellenmesi suretiyle, modelin uygulanması ve yiyecek-içecek işletmeleri tedarikçi seçim yöntemlerinde kaynak kullanımı etkinliği sağlanması olarak ifade edilebilir. Endüstriyel üretim gerçekleştiren işletmelerde uzun süredir uygulanan bir yöntem olan DEMATEL yönteminin yiyecek-içecek işletmelerinde tedarikçi seçimde optimizasyon sağlama tekniği olarak uygulanabilirliğine yönelik alan araştırması gerçekleştirilmiştir. Çalışmada alan araştırması, nicel veri toplama tekniği olan anket yöntemiyle gerçekleştirilmiş, Türkiye'nin yüksek nitelikli yiyecek-içecek işletmelerinin yoğun olarak bulunduğu büyük şehirlerde 416 işletmede uygulanmıştır. Araştırma sonucunda yiyecek-içecek işletmelerinde DEMATEL yönteminin yiyecek-içecek işletmelerinde etkin şekilde uygulanabilirliğine yönelik bir sonuca ulaşılmış, DEMATEL yönteminin uygulanması ile yiyecek-içecek işletmelerine doğru tedarikçi seçimi doğrultusunda optimizasyon seviyesine ulaşılabileceği tespit edilmiştir.

Anahtar Kelimeler: Yiyecek-İçecek İşletmeleri, Tedarikçi Seçimi, DEMATEL Yöntemi.

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INTRODUCTION

Although there are various studies on techniques of supplier selection, it can be said that the number of studies on the methods of supplier selection in food and beverages enterprises is rather limited. In accordance with a comprehensive literature review, no study carried out with the DEMATEL method for supplier selection in food and beverages enterprises operating in Turkey has been found. In this context, it is assumed that the study will contribute to the scientific literature significantly. In addition, when the results obtained from the study are shared with the food and beverages enterprises, productivity level in selection of the suppliers may be increased. With the application of this study; it will be possible to shorten the cycle time, to reduce logistics costs and to achieve efficiency in inventory level through various supplier selection techniques. The ultimate importance of this study is to make contribution to the literature, service quality of food and beverages and increase customer satisfaction.

In present conditions, competition is known to be among supply chains, rather than enterprises. It is necessary to reduce supply risks, decrease purchased product costs, optimize the business processes and inventory levels and respond promptly to consumer demands in order to achieve competitive advantage. It is also necessary to select the supplier suitable for the aims and objectives to create a well-functioning supply chain. Each failure in the supply chain will increase the competitiveness as it will affect the whole system. Selecting the appropriate supplier for an enterprise is an essential strategic decision. Supplier selection is a decision-making process that helps reduce the number of potential suppliers and can provide optimization in food and beverage businesses. In this process, there are many factors that affect each other. It is assumed that DEMATEL method, one of the decision making methods with various criteria may be used to determine the relationship between the factors with the analytical and matrix-based decision-making method (Si, et al.,2018; Shekerian, et al.,2016; Kaushik & Somvir,2015; Kashi,2015).

DEMATEL method was developed between 1972 and 1976 by Geneva Research Centre of Battelle Memorial Institute and Human Affairs Program. DEMATEL shows how components within cause and effect matrix interact with each other. In this matrix, the higher the average value of the elements is, the closer the interaction among the criteria is. DEMATEL is an effective method analyzing the structure and interdependent relations among the system components or valid number of alternatives (Govindan, Khodaverdi, & Vafadarnikjoo, 2016; Zhu & Xu, 2016). DEMATEL can rank (regulate) the criteria depending on their priorities in terms of types of relations and impacts on one another. The criteria with higher impact on other criteria and high priority are called as cause criteria and the ones under impact with low priority are called as effect criteria. In DEMATEL Method, there should be *n* interactive criteria evaluated by *H* decision specialist group. After the decisions makers and criterias are ascertained, assessments may be carried out in the following steps. With DEMATEL method, the weight of criteria can be identified and the significance level of the criteria can be arranged in order. This method measures the level of impact between the criteria rather than relations within the system. In this study, by solving complicated and intertwined problems in selection of the supplier, which is a significant decision for the food and beverages enterprises, identifying the effect and efficiency of the criteria and using DEMATEL multi criteria decision making method, the most appropriate supplier amount alternative ones can be selected (Abdel-Basset, Manogaran, Gamal & Smarandache, 2018; Liu, Deng, & Chan, 2018).

Hori & Shimizu (1999) utilized DEMATEL method while suggesting designing methods of human interface for surveillance control systems. Sawaragi, Horiguchi & Kuroda (2006) analyzed in their approach they formed the causal relations between the definition data reproduced and statistical relations with DEMATEL method in order to develop a distribution support system that aims to facilitate effective division of various technical skills. Seyed-Hosseini, Safaei & Asgharpour (2006), used DEMATEL method in re-prioritization of defect modes in system failure mode and effect analysis. Huang, Shyu, & Tzeng (2007) identified the requirements for restructuring of innovation policy portfolio for SIP Mall industry with DEMATEL method. Tzeng, Chiang & Li (2007) used DEMATEL method in evaluation interdependent effects in e-learning programs and dependent and independent variables. Liou et al. (2008) used DEMATEL method to analyse structural relations among various factors to establish an effective security systems for the airlines. In his study, Wu (2008) transforms the relationships between the DEMATEL method and the causes and consequences of the criteria in choosing information management strategies into a visual structural model and a uses them as a way to solve the internal dependencies within a set of criteria as well.

Chang (2009) describes a risk priority number using the OWGA and DEMATEL methods together to evaluate risk sequences regarding failure issues. Li & Tzeng (2009) used DEMATEL method in their study to show and discover required basic services to the users of Semiconductor-Intellectual-Property (SIP) Mall and to attract the providers of SIP to a SIP Shopping Mall. BPNN and DEMATEL methods are used together to alter the importance-performance analysis model.

DEMATEL method is used to adjust the significance of quality characteristics and to identify causal relationship between the core order winners and qualifiers problem and to calculate the scope of mutual effect and causal relationship between the qualities. Tseng (2009a), in his study, suggests an evaluation approach to evaluate service quality perceptions with DEMATEL method. Tsai & Chou (2009) utilized DEMATEL, ANP and ZOGP methods in the selection of management systems for sustainable developments of SMEs. First of all, they used DEMATEL method to establish mutual relations between the criteria required by the organizations. Lin & Tzeng (2009) suggest development strategies and working models for vendors and science (technology) park officials to increase the added value of a science system (technology parks) by using DEMATEL. In his study, Tseng (2009b) aimed to present a perception approach dealing service quality expectations of a real estate agency with unpredictability. With regard the objective of the study, grey-fuzzy DEMATEL method was used. Li & Tzeng (2009) created a visual representation- impact relations map in which participants organized their own activities meaning the final product in the world to find critical services provided by the Semiconductor Intellectual Property Center.

Shieh, Wu & Huang (2010) applied the DEMATEL method to evaluate the importance of the criteria in identifying significant success factors of hospital service quality and to build a causal relationship between the criteria. Chen & Chen (2010) suggested a novel unified multi criteria decision making approach based on DEMATEL, fuzzy ANP and TOPSIS to create an innovation support system for Taiwanese higher education institutions. Wu, Chen & Shieh (2010) evaluated the performance criteria of employment service support program staff by DEMATEL method. Lee, Lib, Yen, & Huang (2010) applied DEMATEL method to evaluate the behavioral intentions of the consumers who were introduced plasma technology. Büyüközkan & Öztürkcan (2010) aim to develop a novel approach based on combined ANP and DEMATEL technique to assist identify six sigma projects and projects of priority especially in logistics companies. Tseng (2010), in his research on students regarding balanced score card (BSC) made a multi criteria evaluation that emphasizes the importance of performance measurement. In this study, ANP and DEMATEL methods were used together. Tsai, Chou & Lai (2010a) used DEMATEL method at the first place in evaluation of the web sites of the national parks and ANP and Vikor methods respectively.

Tsai, Hsu, Chen & Lin (2010b) utilized DEMATEL method to identify complex relationships for selection decisions and cost assessments of corporate social responsibility programs in the hotel sector and to create a network structure between cost and differentiation advantage criteria. Hsu, Kuo, Chen & Hu (2013b) used DEMATEL method to establish a relationship structure between criteria in the selection of outsourcing providers. Aksakal & Dağdeviren (2010) found ANP and DEMATEL methods as an integrated approach for personnel selection. In this study, the interdependent weight values of the criteria were determined by DEMATEL method and the solution of the integrated algorithm developed for the selection of the personnel was carried out using the ANP method.

In their study, Chang, Chang, & Wu (2011) applied the fuzzy DEMATEL method to determine the key factors that are effective in supplier selection. Hu, Chiu, Cheng, & Yen (2011) performed performance analysis of quality characteristics using gap analysis and multiple regression analysis. They used DEMATEL method to find the superior characteristics of the problem, to determine the interaction level of the different quality characteristics and to analyze the cause-effect relationship. Hung (2011) focuses on the requirement to plan the supply chain well in order to achieve competitive advantage in the global risk environment. He suggested the use of fuzzy DEMATEL-ANP and fuzzy target programming methods for operation-based supply chain planning. Jassbi, Mohamadnejad, & Nasrollahzadeh (2011) utilized the fuzzy DEMATEL method to comprehend the causal relationships between strategic criteria. They used DEMATEL method to determine the relationships between strategic objectives and to draw a strategic map. Yang & Tzeng (2011) evaluated the criteria in blog design by factor analysis and DEMATEL method. Yang, Shieh & Tzeng (2013) suggested an integrated multi-criteria decision making method based on VIKOR, DEMATEL and ANP techniques in the assessment of risk control points in information security. Kuo (2011) used DEMATEL method to provide the appropriate bit structure between the criteria when choosing a location for a logistics company.

The model suggested by Tsai, Chou & Leu (2011) for web based marketing of airline industry is based on the marketing mix of 4P where DEMATEL method is used and perspective on web site quality. Tseng, Wu & Nguyen (2011) applied the fuzzy DEMATEL method in their study as to proving the impact of information technology on supply-chain management in order to demonstrate the interrelationships between all criteria. Dalalah, Hayajneh & Betieha (2011) established a fuzzy multi-criteria decision-making model for the supplier selection. A modified fuzzy DEMATEL model is presented to address the effective relationship between the evaluation criteria. Büyüközkan & Çiftçi (2012) suggested a mixed model in evaluation of green suppliers by using fuzzy DEMATEL, fuzzy ANP and

fuzzy TOPSIS methods Cheng, Chen, Hsiu & Hu (2012) applied the IPGA model and the DEMATEL method as a two-stage decision-making model in their study on service quality in the restaurants in order to control the relations between the characteristics of service quality. Ho, Feng, Lee, & Yen (2012) used regression analysis and DEMATEL method in evaluation of the supplier quality performance. In the study, they applied the DEMATEL method to determine which criteria are influenced in the evaluation of quality performance criteria. Wang & Tzeng (2012) used multi-criteria decision making techniques in the creation of brand value in their study titled brand marketing. In this study, in order to explain the relationship between the important criteria in brand marketing and to reveal the existing problems and gaps, DEMATEL, ANP and VIKOR were combined for an integrated study. Wang, Lin, Lin, Chung & Lee (2012) suggested a model based on DEMATEL to improve the performance of a matrix organization. This study was applied in the design project of an advanced technology facility. Wu (2012) suggested using a fuzzy DEMATEL method to demonstrate the critical factors for a successful information management application. Horng, Liu, Chou, & Tsai (2013) evaluated the important criteria such as creativity for the design of the restaurant site-to-be by DEMATEL method. Vujanovic, Momcilovic-Bojovic & Papic (2012) evaluated the maintenance management indicators of the vehicle fleet with ANP and DEMATEL methods.

Baykaşoğlu, Kaplanoğlu, Durmuşoğlu & Şahin (2013) used fuzzy DEMATEL and fuzzy TOPSIS method in the selection of trucks for a land transportation company. In this study, they used the DEMATEL method to find the weights of the criteria and then they applied the TOPSIS method to evaluate the alternatives according to the criteria. In order to improve the overall performance of suppliers in terms of carbon management, Hsu, Kuo, Chen & Hu (2013b) used a-13-criteria DEMATEL to recognize the effective criteria for carbon management in the green supply chain. Taking into account the interrelationships between the criteria, DEMATEL has been applied to address the importance and causal relationships among the supplier selection criteria. Horng et al. (2013) used the DEMATEL method to demonstrate the interactions and relationships between criteria in determining the important criteria of innovative physical food environment design. They formed the MCDM combining the ANP. In contrast to previous multi-criteria decision-making (MCDM) methods for the selection of outsourcing providers, Hsu, Liou & Chuang (2013a), used a new hybrid model using DEMATEL and ANP methods together. Dytczak & Ginda (2013) claimed that the concept of fuzzy data processing in DEMATEL requires a comprehensive idea.

Shafiee, Hosseinzadeh & Saleh (2014) found that the BSC approach was insuficient regarding the measurement of supply chain performance and failed to focus on the relationship among the four perspectives of the BSC approach. They used the DEMATEL method to determine all the relationships among these four perspectives. Milli (2014) tried to solve how passenger transporters at container terminal are directed with six sigma approach. They aimed to develop a novel approach based on a combined ANP and DEMATEL technique to help container terminals identify critical Six Sigma transport plans. With the DEMATEL method, the wights of the criteria can be determined and the severity of the criteria can be listed. This method also measures the degree of effect among the criteria beyond the relationship of the system.

RESEARCH METHOD

In the study, the survey method was used as data collection tool. The questionnaire prepared consists of 2 parts. The first part was established to determine demographic characteristics of food and beverage enterprises and participants. The second part covers the main line of the study. This part of the questionnaire consists of statements about acceptability of the implementation of DEMATEL method as an optimization model in the selection of suppliers for the food and beverage enterprises. During the creation of statements, a pilot study was carried out with 11 different food and beverage enterprises, and it was shaped by taking opinions from 7 experts in the food and beverage sector with academic titles. In this study, the data collection process was completed between June-August 2019 and the TR Criteria of Index Ethics of the Council of Higher Education was announced on January 1, 2020. Therefore, ethical committee approval could not be obtained. Therefore, ethical committee approval could not be obtained. In order to determine the attendance level of the participants, 5-point Likert-type expressions were used. These expressions are: 1: Strongly Disagree 2: Disagree 3: Partially Disagree / Partially Agree 4: Agree 5: Strongly Agree

RESEARCH FINDINGS

The data collected within the framework of the study were analyzed in two main sections: demographic profile of food and beverage enterprises and participants, and the effect of DEMATEL method on the optimization of the application trend levels in food and beverage enterprises. Table 1 analyzes the demographic profiles of the food and beverage enterprises participating in the research, including the operating capacities, the number of personnel,

the operating period of the enterprises, the location of the enterprises, the location of the enterprise and the destinations where the enterprises operate. In Table-1, the capacity of the enterprises was analyzed. The research was concentrated on 151 to 250 and over high capacity enterprises. It was determined that the majority of the enterprises were the ones employing up to 50 personel.

Table 1. Analysis of Demographic Profiles of the Food and Beverages Enterprises

Variables	Frequency (n)	Percentage (%)
Enterprise Capacity		
50 and under	18	4,34
51-100	39	9,38
101-150	77	18,48
151-200	83	19,94
201-250	95	22,82
250 and over	104	25,04
Total	**416**	**100,0**
Number of Staff		
1-25	127	30,58
26-50	89	21,38
51-75	81	19,44
76-100	64	15,37
100 and over	55	13,23
Total	**416**	**100**
Operation Period		
Less than 2 years	23	5,54
2-5 years	59	14,16
6-10 years	71	17,04
11-15 years	85	20,43
16-20 years	29	6,96
21-25 years	26	6,25
25 years and over	123	29,62
Total	**416**	**100**
Location		
In the city center	344	82,72
Outside the city	72	17,28
Total	**416**	**100**
Core Business		
Restaurants	246	59,06
Cafe	128	30,82
Bar	19	4,58
Other	23	5,54
Total	**416**	**100**

lthough the operation periods of the enterprises participating in the research show differences, it can be stated that a large part of the enterprises are composed of enterprises operating for medium and long terms. In the selection of the location of the enterprises, it was determined that a large part of the enterprises was operating in the city center while still a significant number of enterprises operating outside the city. A significant proportion of the food and beverage businesses included in the field research were found to operate as restaurants and cafes. The study was carried out in 36 provinces and the population densities of the provinces and food and beverage enterprises were included in the study considering the numerical weights. Within this framework, field research was carried out in provinces with high potential of food and beverages enterprises such as Istanbul, Ankara, Izmir, Antalya, Aydın, Muğla, Bursa, and Gaziantep and Hatay, which have international recognition in the field of gastronomy.

In the research, the demographic profiles of the managers who contributed to the research regarding the food and beverage enterprises included in the study were analyzed in Table 2. The majority of the managers (89, 92) who participated in the study were found to be males. In this context, it can be concluded that male managers are dominant in most of the food and beverage companies. When the age ranges of the managers are examined, it is observed that the age is concentrated on 40 years and over.

Although the research is mostly carried out by the managers who are the business owners (42, 56), it can be stated that the managers working as general manager and chef are not at negligible levels. In fact, it has been determined that a significant group of managers has been reached in terms of selection of suppliers in food and beverage enterprises by the business owner and senior managers. While most of the managers included in the study are associate, high school and equivalent school graduates, it is determined that the proportional weights of the managers with bachelor's degree cannot be ignored.

Variables	Frequency (n)	Percentage (%)
Provinces where the enterprise operate		
Adana	14	3,36
Afyonkarahisar	3	0,72
Ankara	19	4,58
Antalya	31	7,44
Aydın	24	5,78
Balıkesir	6	1,44
Bolu	3	0,72
Bursa	18	4,34
Çanakkale	6	1,44
Denizli	7	1,68
Diyarbakır	7	1,68
Edirne	10	2,41
Erzurum	3	0,72
Eskişehir	12	2,89
Gaziantep	19	4,58
Hatay	14	3,36
İstanbul	42	10,08
İzmir	23	5,54
Kahramanmaraş	6	1,44
Kayseri	6	1,44
Kocaeli	12	2,89
Konya	9	2,16
Kütahya	3	0,72
Manisa	9	2,16
Mersin	12	2,89
Mardin	6	1,44
Muğla	28	6,72
Nevşehir	12	2,89
Ordu	4	0,96
Sakarya	11	2,64
Samsun	7	1,68
Sivas	4	0,96
Şanlıurfa	8	1,92
Tekirdağ	5	1,21
Trabzon	7	1,68
Van	6	1,44
Total	**416**	**100**

As a result of the pilot study and literature review, propositions for the application stages of the model have been developed in Table 3 in order to determine the applicability of the DEMATEL method in food and beverage enterprises. In this regard, 10 propositions were developed such as 1- Determination Level of Causality Relationship between Complex Factors with DEMATEL Method for Supplier Selection, 2- Determination Level of Causality Relationship Analysis among Complex Factors with DEMATEL Method for Supplier Selection, 3- Determination Level of Agreeable Cause-Effect Relationship with DEMATEL Method for Supplier Selection, 4- Determination Level of Criteria Weight with DEMATEL Method for Supplier Selection, 5- Determination Level of benefiting from Expert Knowledge with DEMATEL Method for Supplier Selection, 6- Determination Level of Criteria Significance Determination with DEMATEL Method for Supplier Selection, 7- Determination Level

Table 2. Analysis of Demographic Profiles of the Managers In The Food And Beverages Enterprises Contributing To The Research

Variables	Frequency (n)	Percentage (%)
Gender		
Male	374	89,92
Female	42	10,08
Total	**416**	**100,0**
Age		
21-25	21	5,04
26-30	35	8,41
31-35	48	11,52
36-40	53	12,73
41-45	87	20,91
46-50	81	19,44
50 and over	91	21,95
Total	**416**	**100**
Position		
Business Owner	177	42,56
General Manager	141	33,89
Assistant General Manager	18	4,34
Chefs	53	12,73
Restaurant Chief	21	5,04
Purchasing Supervisor	6	1,44
Total	**416**	**100,0**
Latest Degree Achieved		
Primary School	29	6,96
Secondary School	43	10,32
High School	119	28,61
Associate	134	32,24
Bachelor	78	18,74
Master	13	3,13
Doctorate	---	---
Total	**416**	**100,0**

of impact among Criteria with DEMATEL Method for Supplier Selection, 8- Determination Level of Dependent Criteria Weight with DEMATEL method for Supplier Selection, 9- Determination The level of multi criteria decision making with DEMATEL method and 10- Determination Level of Optimization Effect with DEMATEL method for Supplier Selection. These propositions include the applicability in the current practice and in case of effective implementation.

DEMATEL method in the selection of suppliers, the importance and processes of the DEMATEL model and the contribution of the DEMATEL model in the scope of supply chain management in enterprises have been determined. In the second part of the study, the data obtained from the field study conducted for the feasibility of DEMATEL management in food and beverage enterprises were analyzed. As a result of the

Table 3. Proportional Eights Regarding Applicability of DEMATEL Method In Selection of Suppliers For The Food And Beverages Enterprises

	Actual Application	Potential Application
	Proportional Eights (%)	
Determination Level of Causality Relationship between Complex Factors with DEMATEL Method for Supplier Selection	9,53	91,38
Determination Level of Causality Relationship Analysis among Complex Factors with DEMATEL Method for Supplier Selection	14,68	85,12
Determination Level of Agreeable Cause-Effect Relationship with DEMATEL Method for Supplier Selection	21,66	82,79
Determination Level of Criteria Weight with DEMATEL Method for Supplier Selection	29,36	93,72
Determination Level of benefiting from Expert Knowledge with DEMATEL Method for Supplier Selection	13,11	92,12
Determination Level of Criteria Significance Determination with DEMATEL Method for Supplier Selection	23,18	98,62
Determination Level of impact among Criteria with DEMATEL Method for Supplier Selection	19,13	91,43
Determination Level of Dependent Criteria Weight with DEMATEL method for Supplier Selection	16,39	82,17
Determination The level of multi criteria decision making with DEMATEL method	10,22	96,28
Determination Level of Optimization Effect with DEMATEL method for Supplier Selection	6,13	97,46

In line with the findings in Table 3, it has been found that DEMATEL model is highly applicable in the scope of supply chain optimization in food and beverage enterprises. However, in view of obtained findings, it has been concluded that DEMATEL method could not be applied to a great extent. There is significance difference especially in Determination Level of Causality Relationship between Complex Factors with DEMATEL Method for Supplier Selection, Determination The level of multi criteria decision making with DEMATEL method and Determination Level of Optimization Effect with DEMATEL method for Supplier Selection

CONCLUSION AND RECOMMENDATIONS

At the end of the study, the results of the literature and field research were included. In literature review as the first part of the research, the contribution of findings obtained from the field study, it was determined that DEMATEL method is highly applicable in the selection of food and beverage suppliers.

As a result of literature review and field research, it has been concluded that DEMATEL method has been applied to food and beverage companies in a large scale, however, in order to realize optimization effectively, there are some obstacles and some strategies need to be developed. Upon overcoming these obstacles, the following recommendations have been developed to increase the efficiency of the method;

- Purchasing departments of the food and beverage enterprises should be converted into the supply chain management department both physically and philosophically.

- In the supply chain management department, optimization mechanism should be developed especially for supplier selection,
- In the supply chain management department, employees who are experts in the DEMATEL method should be employed in the selection of suppliers.
- Employees of all levels should be informed about the DEMATEL method in the food and beverage enterprises.

In this study, in the event that constraints of the DEMATEL method within the scope of supplier selection in food and beverage companies are overcome, the applicability of the system has been determined and recommendations have been developed to increase its effectiveness. In the next studies, it is suggested that studies should be carried out to determine and eliminate the obstacles to the applicability of DEMATEL method within the scope of optimization of the supplier selection in food and beverage enterprises.

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