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A Study on Determining the Supply Chain Risks Perception Levels of Manufacturing Companies in TRC1 Region*

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ABSTRACT: *In this study, the purpose is to determine the supply chain risks of the manufacturing companies that are active in Adıyaman, Gaziantep and Kilis in TRC1 Region. For this purpose a scale consisting of 25 statements was used to collect data from 302 manufacturing companies in TRC1 Region Organized Industrial Zones. The One Way ANOVA Test was used in order to determine whether there are significant differences between the 8-Dimensional structure that was obtained as a result of the Factor Analysis and the demographical variables. At the end of the analyses it was determined that there was a significant difference between the supply chain risk perception levels of the companies according to their cities, sectors, the number of their employees and activity durations.*

Keywords: *Supply Chain, Risks, Organized Industrial Zones, EFA, TRC1 Region.*

I. INTRODUCTION

Supply chain risks constitute a relatively new field in supply chain management [1]. The activities of the companies becoming more complex, the increasing importance of specialization, and activities spreading to wider areas caused that new problems emerged in supply chain. Recent important developments in the world have revealed the damaging impacts of risks for companies [2]. Among these important developments there are the melamine crisis in dairy products in China and similar problems in food sector, major disasters like flood, tsunami and earthquakes, industrial and social unrests at global level, and mistakes and breakdowns specific to supply chain [3], [4], [5]. This situation has brought with it an increasing interest in supply chain risk, and has been the subject in many studies conducted in the field of management, industry, and manufacturing. For this reason, supply chain risks has become the center of organizational welfare and sustainability [6], [7], [8].

This study aims to examine the supply chain risks in terms of companies, to reveal whether there are significant differences between the demographical variables of the companies, and to increase the awareness of their managers on increasing the efficiency of supply chains.

II. PERCEIVED RISKS ON SUPPLY CHAIN

Supply function is an activity related with the raw materials, semi-products or auxiliary materials used in manufacturing. During the supply process of these raw materials or other materials that are the main elements of industrial activities, there are some problems like quality, amount, time, and price [9]. The majority of these problems stem from the suppliers or from the uncertainty in supply market. A market which does not have adequate suppliers, which has a limited capacity, and where price changes and currency fluctuations are much bears a high-level risk. In addition to these, increasing external resource use and the financial strength of the suppliers will also increase the uncertainty and the risk in the market [10].

There are also some other risks stemming from economic developments, the change sin business world and in social life, the disasters that are influential on the success of supply chain, fast changes in the market, socio-political risks and economic risks [11].

The first one of these is the disasters whose intensity and number is increasing in recent years. According to Munich Re (2005), the economic influences of drought, flood, storms and hurricanes, earthquakes, tsunamis and similar disasters are extremely significant [12]. In addition to these, terrorist attacks, wars, strikes or sabotages and some other human-originated disasters are also among the events that influence supply chain. In studies conducted so far, it has been accepted as a consensus that these problems that may be observed in supply chain will influence supply chain activities, and decrease the yield of it [13],[14].

The second one is the growing complexity of the structure of the supply chain, which is also influential on the success of this structure. Increasing R&D and production costs, supplier relations, increasing dependency on new technologies, legal liabilities, fast-changing customer demands, and increasing expansion of the international market and production network are influential in the formation of this complex structure [15].

As the third factor, the obligation of managers to increase the supply chain revenues and performances constitute a pressure on supply chain. The increasing product diversity and the obligation of presenting new products are some examples for this situation. In this context, companies take precautions like on-time production systems to decrease the costs, supplier inventory system and decreasing the supply costs. In addition, companies also prefer to increase outside-sources to decrease the costs for maintaining resources within the company [14]. According to Lee (2004), the companies that succeed in this establish an efficient supply chain and increase their abilities and speeds and try to have agility to increase the performance of supply chain and the company [16]. However, according to Lee (2004), this situation also leads to decreases in supply flexibility and disruptions in covering the demands in case the process is not managed well. This situation brings a major burden for the companies [15].

As the fourth and last item, the predictable risks that emerge when companies are suppressed in a violent competition are also influential in the efficiency of supply chain. According to Svensson (2002), these risks pose an obstacle for companies in contacting end-users; and this forms a danger in reaching the targets of the companies in the long run [17]. The general consideration in the literature claims that the underlying reasons of disruptions in supply chain and harmful influences on companies are formed by these risks [3], [15].

Supply chain risks may influence companies in reaching their long-term as well as short-term success in an important level. For example, major companies like Toyota and Honda experienced very serious problems after the tsunami disaster in 2011. Similarly, Ford, Toyota, Honda and Audi and similar other companies called many cars back because of the problems that emerged due to suppliers. In 2000, Royal Philips, which is Supplier Company, had a fire and Ericson Company had to stop production and lost 400 million dollars [18]. Another electronics giant Apple, could not cover customer demands due to a disruption in the supply chain of DRAM chips after the earthquake in 1999 [14]. As a last item, Boeing Company had to announce that it experienced pile-up problems in production charts and had to delay orders for 15 months, which disappointed its customers [19]. This and other similar examples show that even major companies in the world experience many problems in supply chain, manufacturing sales, and distribution activities, and have difficulties in controlling them. Companies that cannot resolve these problems in an efficient manner are exposed to physical, financial losses as well as psychological and social negative consequences [20].

III. METHOD

The Purpose of the Study

The purpose in the study is to determine the supply chain risk perception levels of the companies that are active in TRC1 Region, to determine whether there are significant differences between the sub-dimensions formed as a result of factor analysis and the demographical properties, and to contribute to the literature in this field.

The Study Population and the Sampling

The study is limited with the questions developed to measure the variables in the study and with the data collected in the context. The borders of the study consist of the manufacturing companies that are active in OIZs[1] in TRC1 Region. The TRC1 Region consists of the cities of Gaziantep, Adıyaman and Kilis, which are located in Southeastern Anatolian Region. There are 8 Organized Industrial Zones (OIZs) in Gaziantep, 4 in Adıyaman, and 1 in Kilis in TRC1 Region, which makes 13 in total. 11 of these zones are active. 1.126 companies are active in current OIZs, and 95.749 people are employed in them [21].

The borders of the study consisted of the manufacturing companies that are active in OIZs in TRC1 Region. It was determined that the minimum sampling size was 287 according to 5% error rate within 95% confidence interval [22]. Firstly, the necessary permissions were received from the OIZ Managements, and the managers of the companies were interviewed face to face to collect the data. In this context 302 questionnaires were applied. It was determined that all of the questionnaires were proper for analysis.

The Data Collection Tool and the Analyses that will Be Conducted

The data collection tool consists of 2 sections. In the first section, there are questions that aim to determine the number of the employees of the companies, the sectoral distribution, activity durations and their cities. In the second section, there are the risks that are experience in supply chain. Supply Chain Risk Scale was developed by using the model of Chopra and Sodhi (2004) and had 29 questions, which have widespread acceptance in the literature.

Firstly, the Exploratory Factor Analysis was used in order to determine the factor loads of "*Supply Chain Risk Scale"* and then the Confirmatory Factor Analysis was applied in order to determine whether the data are consistent with the dataset or not. The reliability analysis of the scale was made, and then the One Way ANOVA

[1] OIZs: Organized Industrial Zones (OSB in Turkish Language)

test was applied in order to determine whether there were significant differences between the dimensions of the companies and their demographical variables.

IV. FINDINGS

Demographical Findings

The sector of the companies, which participated in the study, their personnel numbers, and the properties about the cities they were active in were determined in this section. In this context, 54,3% of the companies in which the questionnaires were applied were in the textile sector; 14,6% were in the construction sector; 12,9% were in the food sector; 6,6% were in the chemistry sector; 4,6% were in the marble sector; 3,3% were in the plastic sector; 3,3% were in the machinery sector and 0,3% were in the furniture sector. It was determined that 33,8% of the companies had 50-99 employees; 26,2% of the companies had 1-49 employees; 18,2% of the companies had 100-149 employees; 14,9% of the companies had 150-249 employees; 4,6% of the companies had 250-499 employees; and 2,3% of the companies had 500 and over employees. It was also determined that 82,8% of the companies which participated in the study were active in the OIZs in Gaziantep; 14,2% were in Adıyaman and 3,0% were in Kilis.

The Findings on Supply Chain Risk Scale

In order to determine the structural validity of the ""Supply Chain Risk Scale", firstly the Exploratory Factor Analysis was applied. In addition to this, the KMO (Kaiser-Meyer-Olkin) Test and Bartlett's Sphericity Tests were made use of in order to test whether the factor analysis could be applied to the dataset or not. As a result of the KMO Analysis of the scale, the sampling adequacy value was determined as 0,769 and the Bartlett's Sphericity Test gave meaningful result [$\chi 2$ (300) =2859,764, $\rho<0.001$], which shows that the correlation relation between the items is proper for factor analysis.

Inverted Components Matrix table shows to which factor the items are loaded, and their factor loads. The V1, V11, V7 and V19 expressions in the scale were removed from the scale as a result of the Exploratory Factor Analysis because of cross-loading. These 4 statements were removed from the scale and the EFA was repeated. The results obtained in the latest EFA are given in Table 1 above.

Table 1: Factor Analysis Results of Participants

Rotated Component Matrix[a]								
	Component							
	Capacity and Supply Risks	Prediction and Planning Risks	Technological Risks	Political Risks	Product Risks	Delay Risks	Inventory Risks	Stoppage Risks
V18	**,684**							
V3	**,669**			,377				
V8	**,618**							
V6	**,568**					,334		
V17	**,561**							
V29	**,513**	,405					,454	
V21		**,730**						
V15		**,676**						
V28		**,673**						
V16	,400	**,605**						
V13			**,877**					
V12			**,857**					
V14			**,740**					
V4				**,901**				
V5				**,885**				
V23					**,899**			
V25					**,899**			
V9						**,798**		
V10						**,762**		
V24							**,693**	
V27	,327						**,656**	
V26		,397					**,570**	
V20								**,788**
V2								**,782**
V22								**,469**
KMO		**0,769**						
Bartlett's Tests		**□2 (300) =2859,764**						

In order to determine the structural validity of the Supply Chain Risk Scale, the EFA was applied and the scale was re-organized. The total variance explanation rate of the 25 statements, which constitute the scale, was found to be 67.651%. With the Exploratory Factor Analysis, the scale had its latest form as 25 statements

and 8 factors. In this context, the factors that were obtained were named as *Capacity and Supply Risks, Prediction and Planning Risks, Technological Risks, Political Risks, Product Risks, Delay Risks, Inventory Risks, Stoppage Risks* by considering the literature data in this field.

After the factor structure of the scale was determined with the Exploratory Factor Analysis, the Confirmatory Factor Analysis (CFA) was made in order to test the structural validity of the scale. The Goodness of Fit values showed that the scale had a good fitness with the data. Right at this point, the Standardized Regression Weights were examined, and V16 statement was also removed from the scale due to low regression value. The Modification Indices (MI) of the CFA were also examined, and associations were made in the error covariance of some statements in order to improve the goodness of fit value of the model. Modifications were made between V2 and V20 statements, between V28 and V16 statements, between V18 and V8 statements, between V18 and V6 statements, between V3 and V6 statements. After each modification, the CFA was repeated again and again, and the obtained values showed that the data fit the 8-factor structure of the scale. The Goodness of Fit values are given in Table 2.

Table 2: Goodness of Fit Values of Scales

	□2	df	CMIN/ DF □5	GFI □.85	AGFI □.80	CFI □.90	NFI □.90	TLI □.90	RMSEA □.08
SCRS	570.47	242	2.36	.87	.83	.88	.81	.85	.07

Reliability Analyses were made for each factor in the scale, and the Cronbach's Alpha Reliability Coefficients are given in Table 3. As it is stated in Table 3, the Cronbach's Alpha Value of the scale, which consisted of 25 statements, was found to be 0.794. This value shows the Internal Consistency Reliability of the 25 statements, which constituted the scale.

Table 3: Reliability (α) Findings of Factors

Factors		(□)	Factors		(□)
Factor 1	Capacity and Supply Risks	**0.731**	*Factor 5*	Product Risks	**0.856**
Factor 2	Prediction and Planning Risks	**0.712**	*Factor 6*	Delay Risks	**0.866**
Factor 3	Technological Risks	**0.814**	*Factor 7*	Inventory Risks	**0.517**
Factor 4	Political Risks	**0.868**	*Factor 8*	Stoppage Risks	**0.577**
Supply Chain Risk Scale (α) : **0.794**					

The averages of the sub-dimensions in the scale and the findings on standard deviations are given in Table 4.

Table 4: Descriptive Findings for the Major Variables

Factors	Mean	SD
Capacity and Supply Risks	1.55	,436
Prediction and Planning Risks	1.86	,581
Technological Risks	1,70	,600
Political Risks	3.30	,893
Product Risks	1.93	,871
Delay Risks	1.76	,717
Inventory Risks	2.14	,607
Stoppage Risks	2.60	,606

V. CROSS ANALYSES

Table 5: The Analysis Results of the Companies according to the Activity City Variable

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Capacity and Supply Risks	Between Groups	3,740	2	1,870	10,478	**,000**
	Within Groups	53,360	299	,178		
	Total	57,099	301			
Prediction and Planning Risks	Between Groups	1,175	2	,588	1,750	,175
	Within Groups	100,383	299	,336		
	Total	101,559	301			
Technological Risks	Between Groups	2,235	2	1,117	3,153	**,044**
	Within Groups	105,961	299	,354		
	Total	108,196	301			
Political Risks	Between Groups	84,267	2	42,134	80,828	**,000**
	Within Groups	155,863	299	,521		
	Total	240,130	301			
Product Risks	Between Groups	3,003	2	1,502	1,991	,138
	Within Groups	225,537	299	,754		
	Total	228,540	301			

Delay Risks	Between Groups	1,902	2	,951	1,859	,158
	Within Groups	152,944	299	,512		
	Total	154,845	301			
Inventory Risks	Between Groups	2,861	2	1,430	3,960	**,020**
	Within Groups	108,000	299	,361		
	Total	110,861	301			
Stoppage Risks	Between Groups	6,797	2	3,398	9,803	**,000**
	Within Groups	103,656	299	,347		
	Total	110,453	301			

In order to determine whether the supply chain risk perception levels of the companies varied according to the activity city, the One-Way Anova Test was applied. The results showed that the *Capacity Supply Risks* ($\rho = 0.000 < 0.01$), *Technological Risks* ($\rho = 0.044 < 0.05$), *Political Risks* ($\rho = 0.000 < 0.01$) and *Inventory Risks* ($\rho = 0.02 < 0.05$) differed according to the activity city variable. The Tukey HSD and LSD multiple comparisons tests were made use of in order to determine between which groups the differences were. In this context, the *Capacity Supply Risks Perception Levels* of the companies that are active in Adıyaman are higher than those in Gaziantep (Average difference 0,319, $\rho < 0.01$). In addition to this, according to the LSD Multiple Comparison Test, the *Technological Risks Perception Levels* of the companies in Adıyaman are higher than those in Gaziantep (Average difference 0.222, $\rho < 0.05$). According to Tukey HSD, the *Political Risks Perception Levels* of the companies in Gaziantep are higher than those in Adıyaman (Average difference 1.433, $\rho < 0.01$); the *Political Risks Perception Levels* of the companies in Kilis are higher than those in Adıyaman and Gaziantep (Average difference 2,231 $\rho < 0.01$; Average difference 0.798 $\rho < 0.01$). As the last item, the *Inventory Risks Perception Levels* of the companies in Adıyaman are higher than those in Gaziantep (Average difference 0.277 $\rho < 0.05$).

Table 6: The Analyses Results According to the Sectors of the Companies

ANOVA						
		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Capacity and Supply Risks	Between Groups	,936	6	,156	,820	,555
	Within Groups	56,163	295	,190		
	Total	57,099	301			
Prediction and Planning Risks	Between Groups	1,270	6	,212	,623	,712
	Within Groups	100,289	295	,340		
	Total	101,559	301			
Technological Risks	Between Groups	1,646	6	,274	,760	,602
	Within Groups	106,550	295	,361		
	Total	108,196	301			
Political Risks	Between Groups	12,030	6	2,005	2,593	**,018**
	Within Groups	228,100	295	,773		
	Total	240,130	301			
Product Risks	Between Groups	61,973	6	10,329	18,293	**,000**
	Within Groups	166,567	295	,565		
	Total	228,540	301			
Delay Risks	Between Groups	5,179	6	,863	1,701	,120
	Within Groups	149,667	295	,507		
	Total	154,845	301			
Inventory Risks	Between Groups	14,496	6	2,416	7,396	**,000**
	Within Groups	96,365	295	,327		
	Total	110,861	301			
Stoppage Risks	Between Groups	11,931	6	1,989	5,954	**,000**
	Within Groups	98,522	295	,334		
	Total	110,453	301			

The One-Way Anova Test was conducted to determine whether the supply chain risk perception levels of the companies differed according to their sectors. The results showed that the *Political Risks* ($\rho = 0.018 < 0.05$), *Product Risk* ($\rho = 0.000 < 0.01$), *Inventory Risks* ($\rho = 0.000 < 0.01$) and *Stoppage Risks* ($\rho = 0.000 < 0.01$) sowed significant differences according to the activity city. The Tukey HSD and LSD multiple comparisons tests were made use of in order to determine between which groups the differences were. In this context, it was observed that the companies in the textile sector perceived higher *Political Risks* than those in plastic and marble sector. According to the Tukey HSD and LSD Multiple Comparison Test, the companies in the textile sector perceive *Product Risks* more than all the other sectors; and the companies in the sector perceive *Product Risks* more than chemistry, construction, plastic, marble and machinery sectors. In

addition to this it was also observed that the companies in textile sector perceive *Inventory Risks* more than all the companies in other sectors. The food sector perceived this risk at a higher level than the textile sector. As the last item, the companies in plastic sector perceive the *Stoppage Risk* at a higher level than those in food, textile, chemistry, construction and marble sectors; the machinery sector perceives the *Stoppage Risks* at a higher level than the food, textile, chemistry, construction and marble sectors.

Table 7: The Analysis Results of the Companies according to the Number of the Employees Variable

ANOVA						
		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Capacity and Supply Risks	Between Groups	3,919	5	,784	4,362	**,001**
	Within Groups	53,181	296	,180		
	Total	57,099	301			
Prediction and Planning Risks	Between Groups	,863	5	,173	,508	,770
	Within Groups	100,695	296	,340		
	Total	101,559	301			
Technological Risks	Between Groups	3,682	5	,736	2,086	,067
	Within Groups	104,514	296	,353		
	Total	108,196	301			
Political Risks	Between Groups	2,264	5	,453	,563	,728
	Within Groups	237,866	296	,804		
	Total	240,130	301			
Product Risks	Between Groups	5,913	5	1,183	1,572	,168
	Within Groups	222,626	296	,752		
	Total	228,540	301			
Delay Risks	Between Groups	3,883	5	,777	1,523	,183
	Within Groups	150,963	296	,510		
	Total	154,845	301			
Inventory Risks	Between Groups	10,393	5	2,079	6,124	**,000**
	Within Groups	100,468	296	,339		
	Total	110,861	301			
Stoppage Risks	Between Groups	7,086	5	1,417	4,058	**,001**
	Within Groups	103,367	296	,349		
	Total	110,453	301			

The One-Way Anova Test was applied to determine whether the supply chain risk perception levels of the companies showed significant differences according to the number of their employees. The results showed that the *Capacity Supply Risks* ($\rho = 0.001 < 0.01$) , *Inventory Risks* ($\rho = 0.000 < 0.01$) ve *Stoppage Risks* ($\rho = 0.001 < 0.01$) showed significant differences. The Tukey HSD and LSD multiple comparisons tests were made use of in order to determine between which groups the differences were. In this context, it was determined that the companies that employed 500 and over employees had higher *Capacity Supply Risk Perception Levels* than those which employed 50-99, 100-149 and 15-249 employees. In addition, the companies that employed 1-49 and 50-99 employees perceived the *Inventory Risks* higher than those which employed 100-149 and 150-249 employees. As the last item, the *Stoppage Risks Perception Levels* of the companies that employ 1-49 employees are higher than the other groups.

Table 8: The Analysis Results of the Companies according to Activity Duration

ANOVA						
		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Capacity and Supply Risks	Between Groups	3,769	4	,942	5,248	**,000**
	Within Groups	53,330	297	,180		
	Total	57,099	301			
Prediction and Planning Risks	Between Groups	6,589	4	1,647	5,151	**,001**
	Within Groups	94,970	297	,320		
	Total	101,559	301			
Technological Risks	Between Groups	3,626	4	,907	2,575	**,038**
	Within Groups	104,570	297	,352		
	Total	108,196	301			
Political Risks	Between Groups	9,322	4	2,331	2,999	**,019**
	Within Groups	230,808	297	,777		
	Total	240,130	301			
Product Risks	Between Groups	2,157	4	,539	,707	,587
	Within Groups	226,383	297	,762		
	Total	228,540	301			
Delay Risks	Between Groups	3,854	4	,963	1,895	,111

	Within Groups	150,991	297	,508		
	Total	154,845	301			
Inventory Risks	Between Groups	2,486	4	,622	1,704	,149
	Within Groups	108,375	297	,365		
	Total	110,861	301			
Stoppage Risks	Between Groups	1,866	4	,467	1,276	,279
	Within Groups	108,587	297	,366		
	Total	110,453	301			

The One-Way Anova Test was applied to determine whether the supply chain risk perception levels of the companies showed significant differences according to the activity duration of the companies. The results showed that the *Capacity Supply Risks* ($\rho = 0.000 < 0.01$), *Prediction and Planning Risks* ($\rho = 0.001 < 0.01$), *Technological Risks* ($\rho = 0.038 < 0.05$) and *Political Risks* ($\rho = 0.019 < 0.05$) showed significant differences according to the activity duration of the companies. The Tukey HSD and LSD multiple comparisons tests were made use of in order to determine between which groups the differences were. In this context, it was observed that the 16-20-year companies had higher *Capacity Supply Risks Perception Levels* than those 6-10-year and 11-15-year companies. It was also observed that the *Prediction and Planning Risks Perception Levels* of the 16-20-year companies were higher than the 1-5-year and 6-10-year companies. The *Technological Risks Perception Levels* of the 1-5-year companies were higher than the 11-15-year, 16-20-year and 20 and-over-year companies. As the last item, the companies with 21 and over durations had higher *Political Risks* perception levels than the 6-10-year and 16-20-year companies.

VI. RESULTS

This study was conducted to determine the Supply chain Risks for companies and to reveal whether these risks differed according to demographical variables among the companies, and aims to increase the awareness of managers on supply chain efficiency. As a result of the analyses that were made to determine whether the perception levels of the companies that were active in TRC1 Region showed differences or not according to the activity cities, it was observed that the companies in Adıyaman perceived the Capacity Supply, Technological and Inventory Risks higher than those in Gaziantep. In addition, it was also observed that the companies that are active in Kilis perceive the Political Risks higher than those in Adıyaman and Gaziantep. It is considered that being located near to the international border in influential in this.

When the study topic is considered in terms of sectors, it was observed that the companies in textile sector perceived the Product Risks higher than the other companies in the other sectors. It is considered that the "fashion" concept is influential in this situation. On the other hand, it was also observed that the textile sector perceived the Inventory Risks at a lower level than the other sectors.

When the results obtained according to the number of the employees are examined it is observed that the companies that employed 500 and over employees perceived *Capacity Supply Risks Perception Levels* higher. Especially the internal conflicts in Middle East and the uncertain conditions have caused that the companies that have major shares in these markets produce below their capacities and made these major companies feel the risk at higher levels. In addition, the companies that had 1-49 employees perceive the Inventory and Stoppage Risks higher than the other groups. It is considered that their structures that were not flexible and their inadequate logistics abilities are influential in this situation.

As the last item, the risk perceptions of the companies were examined according to their activity durations, and it was observed that the 16-20-year companies perceived the Capacity Supply Risks and Prediction and Planning Risks higher than the other groups. In addition, it was also determined that 1-5-year companies had higher *Technological Risks Perception Levels* than the other groups.

Further studies should be conducted also in other Statistical-Regional Units other than the TRC1 Region by expanding -TRB and TRA-, which will contribute to companies in these regions to determine the differences and taking precautions.

REFERENCES

[1] Nooraie, S.V. ve Parast, M.M., A Multi- Objective Approach to Supply Chain Risk Management: Integrating Visibility With Supply and Demand Risk, *International Journal of Production Economics*, (*161)*, 2015, 192-200.

[2] Vissarion, D. Ve Popa, V., Supply Chain Risks Management (SCRM). Case Study: Steel Industry – Otelinox, *Supply Chain Management Journal, 5(1)*, 2014, 56-76.

[3] Chopra, S. ve Sodhi, M.S., Managing Risk to Avoid Supply Chain Breakdown. *MIT Sloan Management Review, (46)1*, 2004, 53-61.

[4] Hendricks, K., Singhal,V.D. ve Zhang, R., The Effect of Operational Slack, Diversification, And Vertical Relatedness on The Stock Market Reaction to Supply Chain Disruptions, *Journal of Operations Management*, (*27)*, 2009, 233-246.

[5] Narasimha, R. ve Talluri, S., Perspectives On Risk Management in Supply Chains, *Journal of Operations Management, 27(2)*, 2009, 114-118.

[6] Kleindorfer, P.R. ve Saad, G.H., Managing Disruption Risks in Supply Chains, Production and *Operations Management,14(1),* 2005, 53-68.
[7] Sanchez-Rodrigues, V., Potter, A. ve Naim, M. Evaluating The Causes Of Uncertainty in Logistics Operations, *Inretnational Journal of Logistics Management, 21(1),* 2010, 45-64.
[8] Ghagde, A., Dani, S. ve Kalawsky, R., Supply Chain Risk Management: Present and Future Scope, *Inretnational Journal of Logistics Management, 23(3),* 2012, 313-339.
[9] Dinçer, A.P. *Savunma Tedariğinde Karşılaşılan Sorunların Analizi ve Tedarik Sürecinin İyileştirilmesine Yönelik Öneriler–TSKGV Şirketleri Örnekleri,* doctoral diss. Ankara: Defense Academy of the Black War Academy, 2015.
[10] Büyüközkan, G., Tedarik Zincirinde Risk Yönetimi, *Journal of Logistic,* (*8),* 2008, 1-21.
[11] Bandaly, D., Satir, A., Kahyaoğlu, Y. ve Shanker, L., Supply Chain Risk Management – I: Conceptualization, *Framework and Planning Process, 14(4),* 2012, 249-271, doi:10.1057/rm.2012.7.
[12] Beniston, M., Linking Extreme Climate Events and Economic Impacts: Examples From The Swiss Alps, *Energy Policy*, (*35),* 2006, 5384-5392.
[13] Bogataj, D. ve Bogataj, M., Measuring the Supply Chain Risk And Vulnerability in Frequency Space, *International Journal of Production Economics 108 (1–2),* 2007, 291–301.
[14] Tang, C.S., Robust Strategies for Mitigating Supply Chain Disruptions. *International Journal of Logistics: Research and Applications, 9 (1),* 2006, 33–45.
[15] Wagner, S.M. ve Neshat, N., Assessing the Vulnerability of Supply Chains Using Graph Theory, *International Journal of Production Economics, (26),* 2010, 121-129.
[16] IshtiaqIshaq, M., Khaliq, W., Hussain, N. ve Waqas, M., A Review on Triple-A Supply Chain Performance, *School of Doctoral Studies (European Union) Journal*, 2012, 89-94.
[17] Jüttner, U., Peck, H. ve Christopher, M.,Supply Chain Risk Management: Outlining an Agenda for Future Research, *International Journal of Logistics : Research & Applications, 6(4),* 2003, 197-210.
[18] Chris, E., Ogbuehi, A. ve Briggs, C., Global Supply Chain Risks Management: A New Battleground for Gaining Competitive Advantage, *Proceedings of ASBBS, 15(1),* 2008, 278-292.
[19] Salkın, S.C., *Geleneksel ve E-Ticaret Tedarik Zinciri Risk Yönetiminin Sistem Dinamiği Yaklaşımıyla Modellenmesi*, master's diss. İstanbul: İstanbul Teknik University, Institute of Science, 2014.
[20] Ellis, S.C., Henry, R.M. ve Shockley, J., Buyer Perceptions of Supply Disruption Risk: A Behavioral View and Empirical Assessment, *Journal of Operations Management, (28),* 2010, 34-46.
[21] http://www.ika.org.tr./Sanayi-icerik-181.html, Date of Access: 2016.
[22] Sekaran, U., *Research Methods for Business: A Skill Building Approach,* (Second Edition, John Wiley & Sons, 450. 1992)