A STUDY ON MEDIATOR EFFECT OF THE REVERSE LOGISTICS ACTIVITIES ON PERFORMANCE

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ABSTRACT

The value attributed to reverse logistics performance in organisations is likely to affect market performance positively. Being one of the first attempts to question this proposition, we distinguished some internal and external factors that affect the reverse logistics performance and examined in the light of market performance of most of the largest firms in Turkey. General findings suggested that perceptions of the executives of the firm with regard to the internal applications and the external factors we selected were directly proportional to the performance of the reverse logistics applications of the firm. Our research highlighted the competitiveness achieved by the support of the top management of the firm for the reverse logistics applications. Results indicate that firm's increasing profit margin affected the reverse logistics performance in a significant and positive manner. Another finding of our research was neither the internal factors nor the external factors, except for the reverse logistics performance, directly affect the organizational performance. As for practical implications, managers were recommended to identify which aspects of reverse logistics factors could be taken as core competencies by the descriptive information obtained.

INTRODUCTION

The reverse logistics performance includes the processes for the planning, implementation and control of effective backward flow of the supply chain for the purpose of ensuring the revaluation or the properly disposal of the raw materials, semi-finished and end products, and the relevant information from the consumption point to the origin. In some studies before, the factors which affect the reverse logistics performance counted as the internal and external factors.

One of the main purposes of this study is to be able to verify the relation which is rife between the reverse logistics performance and the market performance of the firm. Within this framework, the internal and external factors affecting the reverse logistics performance are taken into account and the relation between both factors and the reverse logistics performance is examined. Also, the identification of the possible effects of the internal and external factors affecting the reverse logistics performance on the organizational performance is the other focus. Moreover, the relations between the factors compatible with the relevant literature such as the competitiveness level of the organization, the reverse logistics competency, the clarity between the organization and the other stakeholders having the supply chain partnership, which have been separated at the research stage and the reverse logistics performance, have been examined.

In this study, at first, the reverse logistics performance and the internal and external factors affecting the reverse logistics performance are examined and the relationship between the reverse logistics performance and the market performance of the organization are revealed. The following section includes the validity and reliability studies of the scales used in line with the purpose of the research, the testing of the hypotheses and the analyses for the research. The final section includes the findings and conclusion of the research.

Reverse Logistics Performance

Nowadays, due to globalization and the requirement of quick response to customers, an effective management of the supply chain has incrementally become more crucial by providing contribution to the value adding processes and affecting the performance (Ross, 2000: 1-4). In addition, the legal amendments made with increasing sensitivity in relation to the environment as well as the changing demands of the consumers and the development of the concept of corporate social responsibility have led to the redesign of the traditional supply chain and thereby defined as the reverse logistics.

It is observed that companies can reduce the use of raw materials, utilize the recycled products by processing them and decrease the waste cost ratios thanks to the effective reverse logistics management which is based on the transaction cost economics and resource-based view theory (Autry et al., 2001). It is also emphasized that the acceptance of the strategic value of the reverse logistics applications is still not at the required level as well as the financial and customer relations-based positive results obtained (Daugherty et al., 2005: 78).

Lambert and Stock (1981) defined the reverse logistics as "proceeding in the wrong direction on a one-way road" due to the importance of the uni-directional product transmission. Stock defined (1998) the reverse logistics as the role of the logistics in the product returns, resource saving, recovery, material replacement, reuse of the materials, disposal and burning of the wastes, and repair and reproduction (Rogers and Tibben-Lembke, 2001: 4). Rogers and Tibben-Lembke defined the reverse logistics, from a wider point of view, as the process for the planning, implementation and control of the flow of the raw materials, semi-finished and finished products or

packaging materials from the manufacturer, distributer or usage point towards to a specific production point. In other words, it was described as the process for the movement of the products from the final usage points for appreciation or recycling of them with the least damage to the environment (Rogers and Tibben-Lembke, 1998:2). Furthermore, it is seen that the reverse logistics is described as the backward design of the supply chain in order to manage the flow of the products or components for reproduction, recovery, disposal or using the resources in an effective manner (Dowlatshahi, 2000, p. 144).

It is specified that a general reverse logistics process includes the activities of the collection and storage, the control and separation, the reprocessing/ recovery and inter-stage transportation and redistribution of the recycled products. It is underlined that throughout the process of reverse logistics, the ease of supplying the product, the timing and the compatibility of the delivery conditions are considered among the indicators of the performance of the reverse logistics (Langley and Holcomb, 1992). Finally, it can be said that the reverse logistic performance increase with the efficient reverse logistics applications. In addition, in this study the reverse logistics performance is examined in terms of the customer satisfaction, the cost saving, the expected time adherence, the developing competition ability and efficiency.

The Antecedents of the Reverse Logistics Performance

The sustainability of the reverse logistics processes require the harmonization of the internal factors with the changing external environmental conditions in a rapid manner. The antecedents of the reverse logistics performance can be grouped as external and internal factors (Roger and Tibben-Lembke, 1998; Ho et al., 2012; Ha, 2012). External Factors are comprised of (1) customer awareness and requests, (2) cooperation of the supply chain partners, (3) information and communication technologies, (4) laws and regulations. To be customer oriented affect positively proactive approaches for the recycling works of the companies and provide competitive advantage (Valle et al., 2005; Ha, 2012: 81). The cooperation of the business partners allow to decide faster in the complex processes, to reduce the costs and to utilize the resources more effectively and increase the performance (Ravi and Shankar, 2005; Ji, 2006). The information and communication technologies of the business partners ensure the real-time information provided within the logistics process and increase the performance (Sundarraj and Talluri, 2003). Many companies put their reverse logistics activities into practice due to the legal obligations and the pressures from the social environments (Rogers and Tibben-Lembke, 1998:32). The corporate image of the company within the framework of the reverse logistics activities and sustainability of the natural conditions are accepted as strategies which increase the company performance (Rogers and Tibben-Lembke, 1998; Dawlatshahi, 2000, 2005).

In the relevant literature, the aspects defined as internal factors can be generally grouped as; (1) Support of the top management, (2) Presence of the clearly defined management policy of the organization, (3) Ease of access to the available resources of the organization and integration of all functions of the organization, (4) Reverse Logistics Competency. It is understood that while there is a positive and significant relationship between the support of the top management and the reverse logistics performance (Prahinski and Kocabasoglu, 2006; Shafiq and Naqvi, 2012:120), the absence of a clearly defined company policy reduce the performance of the reverse logistics applications (Ravi and Shankar, 2005; Ho et al., 2012). In addition, the effective information sharing and the integration within the organization increase the reverse logistics performance (Daugherty et al, 2005) and the market performance of the organization (Daugherty et al., 2002; Mai et al., 2012). It is also stated that the logistic abilities have positive affects on the operating performance (Lu and Yang, 2006; Richey et al., 2007). In this study, the product collection and acquirement competency, the product recovery competency, the ease of refund to the customers and the reprocessing and repair quality are considered within the scope of the reverse logistics ability.

Market Performance

It is known that one of the prerequisites of ensuring the competitive advantage for the organizations is to behave accordingly customer-oriented. Nowadays, because of the augmentation of environmental awareness of the customers and their choices of the environment-friendly products, the organizations develop their strategies for meeting these demands and thereby increasing their market performances. It is specified that the demands of the customers in this direction positively affect the recycling works of the companies (Valle et al., 2005; Ha, 2012). The previous studies determined the positive and significant relationship between the organization's reverse logistics performance and the market performance (Mentzer and Konrad, 1991; Langley and Holcomb, 1992; Lambert and Burduroglo, 2000; Fugate et al., 2010; Mai et al., 2012; Ha, 2012).

The Method and the Hypotheses

A research was planned on the largest 500 companies in Turkey in line with the reverse logistics applications of the organizations and the research subject. The model of the draft research is as seen in the Figure 1. The question form mailed in electronic environment was sent to all companies and a survey was applied

between September 2013 and February 2014 by using the reminder posts, phone calls and face to face meeting methods in order to increase the rate of return. In order to assure that the question forms applied by survey method are answered in a correct and reliable manner, an effort was made to apply the question form to the organization's personnel related to the logistic management and to reach effective participants in the reverse logistics application decisions.

Fig 1. Reasons and object of reverse logistics performance.

Research Methodology and Sample

The research is a virtually descriptive and partly exploratory study. The reverse logistics performance of the organization is affected by various factors. The importance which each organization attaches to its reverse logistics function and its competency on this matter are different. The internal and external factors are composed of the judgments prepared at the five point Likert scale. The resources used for the variables which represent the organizational performance and the reverse logistics factors are as presented below.

1. Reverse logistics performance (5 variables) Fawcett and Smith (1995),
2. Market performance of the organization (5 variables) Jaworski and Kohli (1993) and Claycomb et al. (1999),
3. External factors in the reverse logistics performance (5 variables) Autry (2005) and Ha (2012),
4. Internal factors in the reverse logistics performance (8 variables), Daugherty et al. (2001) and Ha (2012).

The sample size of the research has been calculated according to the level of e=0.04 and α=0.05 (Green et al., 1988: 340). The sample size that can be accepted for the safety level of 0.95 of the proportional estimation of the principal mass standard deviation and variances is n=600. The application has been made to a sample above this number with a coincidental accessibility. The returns and the questionnaire forms have been distributed in sufficient number by reporting that they have been read. The required rate of return is minimum n=405 for the statistical method applied. For instance, the rate of return of the questionnaire form had exceeded 35% and the number of the participants consisting of the executives, being member to 88 organizations, has reached n=603 and the statistical applications had been started.

Method and Tool of Data and Information Gathering

The survey has been executed by way of face to face negotiation, mail and phone calls. It has been tried to identify the variables that might affect the reverse logistics performance by negotiating with the logistics company owners performing Istanbul-centered activities as well as the secondary resources for the purpose of developing the scales that will create the questionnaire form. This was done before proceeding to the relevant field study regarding the research. Those of the expressions arising in line with the information obtained from the primary and secondary resources which are close to each other have been combined and the draft questionnaire form has been prepared. The questionnaire form created had been applied to a group of 40 people receiving postgraduate education in Gelisim University for the necessary simplifications.

Hypotheses of the Research

The hypotheses developed at the significance level of α=0.05 in light of the review of literature and discussions made in line with the purpose of the research are listed below.

H1= There is a relation between the external factors and the reverse logistics performance.
H2= There is a relation between the external factors and the organizational performance.
H3= There is a relation between the internal factors and the reverse logistics performance.
H4= There is a relation between the internal factors and the organizational performance.
H5= There is a relation between reverse logistics performance and market performance of the organization.

In addition to the principal hypotheses, the following hypotheses have been researched as well for the relations between the unobservable variables compatible with the literature arising as a result of the factor analysis performed:

H6= There is a relation between the competitiveness of the organization and the reverse logistics performance.
H7= There is a relation between the reverse logistics competency and the reverse logistics performance.
H8= There is a relation between the reverse logistics performance and the clarity between the organization and the other stakeholders having supply chain partnership.

The research hypotheses have been tested by the structural equation model analysis.

Examination of the Data and Information

Our findings have been subjected to the multivariate statistical analyses. A series of validity and reliability analyses have been conducted before testing the hypothesis. The factor analysis has been applied for the validity examination with regard to the scales included in the research and the total clarified variance of each factor has been determined. This analysis which researches the origin of the mutual dependence between the variables ensures the submission and interpretation of the data in a more concise manner. As the total clarified rate of change, 50 % and above are considered good (Greval, Monroe and Krishnan, 1998). The total clarified rates of change obtained for the scales in the validity analyses have been compared with the value of 0.50. The reliability analysis (Cronbach's Alpha) has been applied for the evaluation of the reliability, in other words, the internal consistency of the variables generated for the research. While evaluating the scale reliabilities, 70 % lower limit in the relevant literature has been taken as basis. In the exploratory researches, the limit is reduced to 0.60 (Hair et al., 1998: 118).

The structural equation model has been applied in order to determine whether there is compliance between the data and the model and to reveal the relations among the latent variables included in the research hypotheses. For testing the research hypotheses, SPSS 21.0 and AMOS 21.0 package programs have been used.

Sosyo-Demographic Characteristics and Findings

In the Table 1, the frequency and percentage distributions in relation to the certain socio-demographic characteristics of the executives within the scope of the research such as age, gender, education, occupation and experience are given.

Table 1. Socio-Demographic Characteristics of the Participants

Age	n	%	Gender	n	%	Marital Status	N	%	Educational Status	n	%
22-29	142	41	Male	328	93	Married	28	62	Postgraduate	72	20
30-40	65	18	Female	24	7	Single	134	38	Undergraduate	280	80
Over 40	145	41									

Position	n	%	Sector Experience	n	%	Company Experience	n	%
Board Chairman	6	2	More than 20 Years	84	24	More than 20 Years	15	4
Top-level Executive	70	20	10-20 Years	148	42	10-20 Years	70	20
Mid-level Executive	170	48	3-9 Years	69	20	3-9 Years	82	24
Low-level Executive	106	30	2 Years and Less	49	14	2 Years and Less	183	52

Validity and Reliability Analyses

Table 2. Clarified variances and alpha coefficients of the factors in the structural equation model and factor loads of the variables in the measurement model

Factor Names and Expressions	Factor Loads
F1: MARKET PERFORMANCE OF THE ORGANIZATION (Clarified Variance: 0,86) (Alpha: 0,90)	
(d5)Consistency and reliability of the reverse logistics	0,850
(d6)Sales amount of the last year compared to the principal competitors	0,749
(d12) Awareness and customer requests	0,770
(d9)Customer satisfaction of the last year compared to the principal competitors	0,901
(d10) General competitiveness of the last year compared to the principal competitors	0,923
(d11) Laws and regulations (manufacturer responsibilities, arrangements etc.)	0,637
F2: REVERSE LOGİSTİCS PERFORMANCE (Clarified Variance: 0,70) (Alpha: 0,82)	
(d1) General reverse logistics performance	0,868
(d2) Reverse logistics efficiency	0,841
F3: COMPETITIVENESS OF THE ORGANIZATION (Clarified Variance: 0,62) (Alpha: 0,75)	
(d7)Profit margin of the last year compared to the principal competitors	0,906
(d17) Support given by the top management to the reverse logistics application	0,803
F4: İNTERNAL FACTORS (Clarified Variance: 0,62) (Alpha: 0,71)	
(d19) Integration of the organizational functions for the reverse logistics	0,731
(d21) Product recovery ability of the organization (repair, reproduction, recycling)	0,672
(d22) Ease of refund to the customers	0,614
(d23) Reprocessing and repair quality	0,823
F5: REVERSE LOGİSTİCS EFFECTIVENESS (Clarified Variance: 0,60) (Alpha: 0,75)	
(d3) Reverse logistics cost saving	0,622
(d4) Reverse logistics compatible with the expected time	0,789
F6: EXTERNAL FACTORS (Clarified Variance: 0,60) (Alpha: 0,70)	
(d20) Product collection and acquisition ability	0,842
(d13) Information technology	0,710
F7: CLARITY POLICY (Clarified Variance: 0,88) (Alpha: 0,92)	
(d14) Cooperation among the supply chain partners	0,922
(d16) Organization's having an open policy with regard to the return management	0,931

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization (Rotation converged in 9 iterations)

With regard to the examination of the data and information, the necessary validity and reliability analyses have been performed prior to the performance of the multivariate analyses. The factor analysis has been applied to the data matrix consisting of 23 variables in total for the reverse logistics performance. As a result of the analysis, eight factors which are significantly discrete from each other have been obtained. These eight factors obtained coincide with the dimensions set forth in the theoretical section of the research. The variables which are higher correlations have been taken to the analysis by taking out 3 variables (d8, d15 ve d18) the factor loads of which remain below 0.6 from the primarily obtained 23 variables. The variables taken out are the variables of -the access of the organizations to the return on capital of the last year, -the globalization effect and -the organization's available resources for the reverse logistics compared to the principal competitors. The total clarified variance is 84 %. The portion which cannot be clarified by the new variables and which can be characterized as data loss accordingly is 16 %. The total clarified variance's being above 50% is considered as a good ratio (Grewal et al., 1998). The alpha coefficient of each scale has been included for the reliability analysis. The alpha coefficient for all dimensions was above the lower limit of 0.70. Moreover, the variables given in the Table 2 indicate that these scales were reliable.

Relations between the Reverse Logistics and the Dimensions of the Organizational Performance

The model compatibility and the relations between the latent variables can be examined by using the regression and factor analysis together via the structural equation model. The numbers of the variables that we created in order to test our hypotheses by using Amos 21 package program are seen in the Table 3.

Table 3. Number of the variables included in the model

Number of the variables in the model	47
Number of the observable, internal variables	20
Number of the unobservable, external variables	27

The number of the variables in our model is 47. 20 of them (d1 to d23, except for d8, d15, d48) are the observed, internal variables; 27 of them in total are the external variables, 20 variables (e1 to e23, except for e8, e15, e18) are the part of the indicator variables which cannot be explained and 7 variables are the latent variables (the part of the latent variable from F1 to F7 which cannot be explained).

In order to examine the compatibility between the research hypotheses and the data, the measurement model has been developed. When the compatibility between the model and the data is examined as per the measurement model, (see Table 4), it is seen that the model accords well in accordance with both the ratio of "$\chi 2$/degree of freedom" and the other compatibility statistical valuation criteria. It is accepted that the ratio of $\chi 2$/ degree of freedom equal to five or below shows the presence of a good compatibility between the model and the data. These results ($\chi 2$/ degree of freedom =312,128/ 298=1,047) indicate the validity of the measurement model.

Table 4. Results of the Structural Equation Analysis performed with regard to the Measurement Model

Valuation Criterion	Research Model	Ideal Model	Independent Model	Abbreviations
Chi Square / Degree of Freedom	1,047	0,000	426,250	$\chi 2$/DF
Square Root of the Average Errors	0,031	0,000	0,275	RMR
Goodness Fit Index	0,975	1,000	0,448	GFI
Rectified Goodness Fit Index	0,967		0,392	AGFI
Normalized Fit Index	0,976	1,000	0,000	NFI
Relative Fit Index	0,932		0,000	RFI
Incremental Fit Index	0,978	1,000	0,000	IFI
Proportional Fit Index	1,000	1,000	0,000	CFI
Square Root of the Correction Average	0,005	0,000	0,212	RMSEA
.05 Index of the Critical Sample Size	405		1.206	HFIVE
.01 Index of the Critical Sample Size	479		1.264	HONE

In Table 4, the first column includes the compatibility dimensions of the model and the data and the second column includes the measurements. The third column indicates the ideal model-data compatibility and the forth column indicates the valuation in the case of the independency of the model and the data (the least compatibility). All fit indexes indicated in the second column exhibit the almost ideal compatibility of the model and the data. The square root of the correction average is desired to be below 0.08. Furthermore, the critical sample size gives the number of 405 for the 95 % confidence interval. Our sample size ensures the results to be used in other researches safely.

The results concerning the evaluation of the research hypotheses are shown in the following tables.

Table 5. Standardized/ Non-Standardized Regression Coefficients of the Latent Variables in the Measurement Model with the Indicator Variables

Relations	Calculated value	Standard error	t-value	Standardized Value	Significance (P)
d5 ← F1	1.000			0.731	0.000
d6 ← F1	0.995	0.085	12.399	0.684	0.000
d12 ← F1	1,001	0,081	12,328	0,672	0,000
d9 ← F1	1.453	0.046	13.896	0.602	0.000
d10 ← F1	1.315	0.049	14.105	0.875	0.000
d11 ← F1	1.223	0.044	16.825	0.796	0.000
d1 ← F2	1,000			0,733	0,000
d2 ← F2	0.873	0.050	23.511	0.902	0.000
d7 ← F3	1.000			0.644	0.000
d17 ← F3	0.987	0.047	15.191	0.664	0.000
d19 ← F4	1,000			0,821	0,000
d21 ← F4	0.999	0.044	21.328	0.869	0.000
d22 ← F4	0.800	0.047	18.346	0.795	0.000
d23 ← F4	1.000	0.001	24.490	0.706	0.000
d3 ← F5	1,000			0,887	0,000
d4 ← F5	0.833	0.057	17.836	0.730	0.000
d13 ← F6	1.000			0.745	0.000
d20 ← F6	0.899	0.073	18.155	0.821	0.000
d14 ← F7	1,000			0,870	0,000
d16 ← F7	1,052	0,093	23,779	0,707	0,000

While calculating the non-standardized regression coefficients, one of the indicator variables below each latent variable coincidentally receives the value of "1". In the light of this value, the indicator loads of the other indicator variables belonging to the latent variable are calculated. It is seen that the standardized regression numbers of these loads, which have been generated by evaluating their locations as per the value of 1, are within the range of 0,488 and 0,962. It is seen in the Table 5 that the indicator loads of all indicator variables, in other words the values in relation to their regression coefficients are considerably significant (p: 0,000). Table 6 includes the covariance values indicating the relations of the latent variables with the indicator variables.

Table 6. Covariance Values between Latent Variables in the Measurement Model

Relations	Calculated value	Standard error	t-value	Significance (P)	Result
d5 ← F1	0.125	0.044	6.251	0.022	+
d6 ← F1	0.150	0.085	7.502	0.040	+
d12 ← F1	0,175	0,081	8,756	0,011	+
d9 ← F1	0.279	0.046	8.378	0.002	+
d10 ← F1	-0,351	0,049	-9,031	0,000	+
d11 ← F1	0.053	0.004	1.591	0.137	-
d1 ← F2	0,195	0,091	4,875	0,021	+
d2 ← F2	0.187	0.059	4.675	0.023	+
d7 ← F3	0.127	0.195	3.819	0.041	+
d17 ← F3	0.185	0.047	5.556	0.009	+
d19 ← F4	0.170	0.355	5.108	0.033	+
d21 ← F4	0.168	0.168	5.049	0.034	+
d22 ← F4	0.141	0.147	4.237	0.044	+
d23 ← F4	0.156	0.061	4.683	0.028	+
d3 ← F5	0,275	0,290	6,872	0,033	+
d4 ← F5	0.322	0.057	8.050	0.007	+
d13 ← F6	0,401	0,044	8,024	0,000	+
d20 ← F6	0.490	0.073	9.804	0.000	+
d14 ← F7	0,449	0,311	8,984	0,000	+
d16 ← F7	0.111	0.093	2.226	0.009	+
F2 ← F3	0,218	0,054	4,368	0,000	H6 Acceptance
F2 ← F4	0,176	0,071	3,523	0,005	H3 Acceptance
F2 ← F5	0,227	0,080	4,547	0,000	H7 Acceptance
F2 ← F6	0,207	0,049	5,175	0,003	H1 Acceptance
F2 ← F7	0,296	0,041	7,408	0,000	H8 Acceptance
F1 ← F2	0,338	0,013	8,452	0,000	H5 Acceptance
F1 ← F3	0,074	0,069	1,856	0,122	-
F1 ← F4	0,032	0,052	1,604	0,281	H4 Rejection
F1 ← F5	0,009	0,190	0,453	0,597	-
F1 ← F6	-0,114	0,209	-2,851	-0,079	H2 Rejection
F1 ← F7	0,126	0,301	3,157	0,071	-

In our study in which the reverse logistics application has been examined, the relations between the dimensions arising as a result of the factor analysis and the latent variables have been considered at the significance level of α=0,05. The results of the hypotheses determined for the examination of the relations are shown in the Table 6. The effect of the factors forming the reverse logistics performance has been found as foreseen. The perceptions of the executives of the organization with regard to the internal applications and the external factors have a significant and positive relation with the achievement of the reverse logistics applications of the organization as foreseen. In this way, the 1st and 3rd hypotheses have been verified and H1 and H3 have been accepted. The organizational competitiveness represented by the support of the top management of the organization to the reverse logistics applications and its increasing profit margin significantly and positively affects the reverse logistics performance as well. Thus, H6 has been accepted. The share of the reverse logistics effectiveness determined with the reverse logistics applications compatible with the cost saving and expected time is also positive and significant as foreseen. This ensures the acceptance of H7. There is a significant and positive relation between the open reverse logistics policy determine with the collaboration among the supply chain partners and the organization's having an open policy in relation to the return management and the reverse logistics performance. As a result of this, H5 has been accepted. Also, the relation between the reverse logistics application performance and the general performance of the organization as set forth the 5th hypothesis imposing the mediator variable role on the dependent variable of the reverse logistics has been found significant and positive as well and H5 has been accepted.

As a result of the test, two hypotheses could not exhibit a predicted relation and the null hypotheses belonging to H2 and H4 have been accepted. Except for the reverse logistics performance, neither the internal factors nor the external factors directly affect the organizational performance. Indeed, this is exactly the situation that is expected from a mediator variable model. On the other hand, other factors (F3, F5 ve F7) found with the factor analysis affect the reverse logistics performance of the organization, but cannot directly determine the general performance of the organization.

All reverse logistics variables representing the internal factors except for the effect of the laws and regulations, generated supportive results to the relevant literature by revealing such results that comply with the groups represented by them. Only for the laws and regulations, the effect on the reverse logistics applications has not been found significant in our research performed among the largest 500 organizations of Turkey.

CONCLUSION

The relation between the reverse logistics performance and the market performance of the firm has been questioned in this study. A significant and positive relation has been identified between both the internal applications and the external factors, and the performance of the reverse logistics as predicted. The results obtained are in line with the older research results and verify that the internal and external factors are effective in the achievement of the reverse logistics processes for Turkey (Brito et al., 2002; Rogers and Tibben-Lembke, 2001; Closs and Savitskie, 2003; Closs and Xu, 2000; Daugherty et al., 2002, 2005; Ji, 2006; Shafiq and Naqvi, 2012; Mai et al., 2012; Ho et al., 2012; Ha, 2012).

A significant and positive relation has been found between the reverse logistics performance and the market performance of the firm as predicted by other research results (Mentzer and Konrad, 1991; Langley and Holcomb, 1992; Lambert and Burduroglo, 2000; Fugate et al., 2010; Mai et al., 2012; Ha, 2012). Moreover, the relations between the factors such as the competitiveness level of the organization, the reverse logistics competency, the clarity between the organization and the other stakeholders having the supply chain partnership, which have been clustered by factor analysis, and the reverse logistics performance have been found positive (Daugherty et al., 2005; Ha, 2012; Ho et al., 2012; Shafiq and Naqvi, 2012). Competitiveness of the firm represented by the top management team support to the reverse logistics applications and increasing profit margin positively affected the reverse logistics performance.

The share of the reverse logistics applications compatible with the cost saving and expected time of the determined reverse logistics competency on the reverse logistics performance of the organization is positive and significant as predicted by other studies (Rogers and Tibben-Lembke, 2001; Autry et al., 2001; Autry, 2005; Prahinski and Kocabasoglu, 2006; Richey et al., 2007). Open reverse logistics policy determined with the collaboration among the supply chain partners and the organization's having an open policy in relation to the return management positively affected the reverse logistics performance as well.

Contrarily to predictions the internal and external factors did not have a significant effect on the organizational performance. Indeed, this was exactly the situation that was expected from a mediator variable model. The reverse logistics performance directly affected the organizational performance. The importance of the reverse logistics which appeared like an exact mediator variable has been strengthened. Other factors revealed by the factor analysis as well, affected the reverse logistics performance of the organization but could not directly determine the general performance of the organization.

All variables representing internal factors but the effect of the laws and regulations generated reliable results showing general tendency. On the contrary to the results obtained by the other researches the positive effect of the laws and regulations on the reverse logistics applications has not been found significant in our research performed among 88 large-scale organizations of Turkey (Rogers and Tibben-Lembke, 1998; Carter and Ellram, 1998; Dawlatshahi, 2000, 2005; Quintao et al., 2011; Ha, 2012), The identification of the reasons for this has been left to the further researches with wider participation amongst different cultures.

It will be useful to examine moderator effects of other factors of the reverse logistics influencing supply chain. Data that can be obtained based on the time series analysis in these researches would be more useful in the estimation of the weights of the factors to be taken into account in the reverse logistics and forecasting of the subsequent organizational behavior options. Furthermore firms would have been able to identify which aspects of reverse logistics factors could be taken as core competencies by the descriptive information obtained.

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