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REVERSE LOGISTIC PERCEPTION OF EMPLOYEES IN PRODUCTION ENTERPRISES OPERATING IN TOURISM DESTINATIONS

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ABSTRACT

Reverse logistics is mostly applied in sectors where there is production and assembly. Sending the goods back to the place of production to be recovered or disposed of provides both cost and environmental advantages. In this context, the environment is crucial for tourism, so reverse logistics. This study investigates the reverse logistics perceptions of employees of manufacturing companies in tourism destinations. In August 2019, a survey was used to collect data from 450 employees working in manufacturing enterprises in Antalya province, an important tourism destination. Since the data were normally distributed, parametric tests were performed. In this context, independent samples t-test and one-way ANOVA analyses were performed from parametric tests. As a result of factor analysis, five dimensions for reverse logistics perception were obtained. These dimensions are recycling, reproducing, product optimization, alternative recycling methods and refurbishing. The findings show that employees' perception of reverse logistics is generally low. Employees' perception of reverse logistics did not show a statistically significant difference depending on gender, age or income variables. On the other hand, it was found that the reverse logistics perception of employees showed a statistically significant difference according to marital status and educational status. According to these results, it has been determined that single employees have a more positive approach to reverse logistics than married employees. In addition, it has been observed that employees who graduated from primary school have a lower perception of refurbishing.

Keywords: Reverse Logistics, Tourism, Employee

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TURİZM DESTİNASYONLARINDA FAALİYET GÖSTEREN ÜRETİM İŞLETMELERİNDE ÇALIŞANLARIN TERS LOJİSTİK ALGISI

Dr. Halil İbrahim KARAKAN

ÖZET

Bu çalışma, turizm destinasyonlarındaki üretim şirketlerinin çalışanlarının tersine lojistik algılarını araştırmaktadır. Tersine lojistik, ürün iadelerini ve bunların sürdürülebilirlik üzerindeki etkilerini yönetir ve bu tür ortamlardaki işletmeler için çok önemlidir. Ağustos 2019'da önemli bir turizm destinasyonu olan Antalya'da 450 üretim işletmesi çalışanından veri toplamak için anket tekniği kullanılarak nicel analiz yapılmıştır. Veriler normal dağılım gösterdiği için parametrik testler uygulanmıştır. Araştırma kapsamında faktör analizi, bağımsız örneklemler t-testi ve tek yönlü ANOVA gibi çeşitli analiz teknikleri kullanılmıştır. Araştırmada, tersine lojistik algısının geri dönüşüm, yeniden üretim, ürün iyileştirme, alternatif geri dönüşüm yöntemleri ve yenileme şeklinde beş boyuta sahip olduğu tespit edilmiştir. Bulgular, katılımcılar arasında tersine lojistik algısının genel olarak düşük olduğunu göstermektedir. Cinsiyet, yaş ve gelire bağlı olarak çalışanların tersine lojistik algısında istatistiksel olarak anlamlı bir farklılık bulunmamıştır. Ancak tersine lojistik algısının medeni durum ve eğitim durumuna göre anlamlı şekilde farklılaştığı tespit edilmiştir. Bekâr çalışanların evli çalışanlara göre geri dönüşüme karşı daha olumlu bir algıya sahip olduğu tespit edilmiştir. Ayrıca ilkokul mezunu çalışanların "yenileme" algısının daha düşük olduğu görülmüştür. Sonuç olarak, bu çalışma, benzerlerinden farklı olarak, turizm destinasyonlarındaki üretim şirketlerinde çalışanların tersine lojistik algılarını ortaya koymaktadır. Sonuçlar, turizm sektöründe sürdürülebilir uygulamaların teşvik edilmesinin önemini vurgulamakta ve tersine lojistik konusunda daha derin bir anlayışa ve farkındalığın artırılmasına duyulan ihtiyacı ortaya koymaktadır.

Anahtar Kelimeler: Tersine Lojistik, Turizm, İşgören

1. INTRODUCTION

The concept of reverse logistics has gained importance in recent years and has become an area where businesses seek new opportunities for environmental sustainability and economic efficiency. The main factors supporting this interest include the contribution of legal regulations, the increasing environmental awareness of consumers and the expansion of the social responsibilities of businesses (Castell et al., 2004).

Reverse logistics is the activities that plan, implement and control the flow of raw materials and materials, semi-finished or finished products and related information from the point of consumption to the manufacturer or supplier and the flow of transactions to gain economic value or disposal. In this process, the collection of packaging materials returned for various reasons, defective, faulty products as well as waste packaging materials, sending them to recycling facilities, putting them back into production and transforming them into economic value is an added value created by reverse logistics (Kayar, 2015, pp. 51-52) Reverse logistics has become a critical tool in achieving sustainability goals.

The term reverse logistics is generally defined as the processes of efficiently planning, implementing and controlling secondary material warehouses, material flow and related information in order to recover or dispose of the material by appropriate methods, unlike the traditional supply chain (As cited in Acar and Kara; 2014: 318). According to another definition, reverse logistics is the movement of end-of-life and damaged products in the reverse direction within the supply chain for repair, maintenance, sorting or disposal (Erdal et al., 2010, p. 467). This concept deals with the journey of products from the point of consumption to the point of production at the end of their life cycle. During this journey, raw materials, in-process stocks, final products and related information should be managed efficiently and cost-effectively. In addition, the recovery and proper disposal of products to preserve their value is also an important part of this process (Agrawal et al., 2015).

The concept of reverse logistics has been handled with different definitions over time. Initially, definitions addressing the reverse flow of material were developed. However, later definitions emphasized more on the environmental and sustainability aspects. Kroon and Vrijens (1995) defined *reverse logistics* as activities and capabilities involving reducing, managing, and disposing harmful or harmless wastes from products or packaging materials. However, this definition has limitations as it includes a broader scope of reverse logistics (Büyükkeklik & Ergülen, 2016).

According to Fleischmann et al. (1997), reverse logistics is a process that covers all logistics activities from the used product that is no longer required by the user to the product that can be reused in the market. According to this definition, reverse logistics involves the physical transport of the used product from the end user to the manufacturer in terms of distribution planning. The next step is transferring the returned product by the manufacturer to the reusable product is to be transformed.

Dowlatshahi (2000) defined "reverse logistics" as the process by which manufacturers systematically accept products or parts returned from the point of consumption. This process aims to manage the return of products for possible recovery, remanufacture or disposal. Reverse logistics involves complex operations such as sorting, processing, storage and appropriate routing of incoming products. This process is important for environmental sustainability and economic benefit and is integral to modern supply chain management. Dowlatshahi's concept has attracted much attention in business and academic literature to reduce waste and use resources more efficiently. Reverse logistics plays an important role in the final stages of the product life cycle and is recognized as a critical component for sustainable business practices.

Reverse logistics can create an important strategic advantage for businesses today. Factors such as reusing raw materials, bringing them into the economy through recycling or reducing disposal costs help businesses to reduce their costs and increase their profitability. For example, providing metal scrap collected by metal scrap brokers to steel producers can provide economic benefits by minimizing costs with zero raw material use (Aydın et al., 2017).

Large companies like IBM have achieved significant economic gains by recycling parts extracted from returned products (İlgün, 2010). Therefore, reverse logistics applications reduce costs and increase revenues (Autry et al., 2000).

Reverse logistics provides a financial advantage for businesses and contributes to environmental sustainability goals. Recycling raw materials and reusing products can prevent the depletion of natural resources and reduce negative environmental impacts. Therefore, reverse logistics positively affects both businesses and the environment. This study examines the reverse logistics perception of the managers of production enterprises operating in touristic destinations. Touristic destinations are regions where environmental sensitivity and sustainability goals are particularly important.

For this reason, understanding the reverse logistics practices of enterprises in touristic destinations is important in terms of environmental sustainability. This study aims to increase awareness in this field and encourage sustainability practices by examining the reverse logistics perception of the employees of production enterprises in tourist destinations. As a result, this study emphasizes the environmental benefits of reverse logistics for businesses in tourism destinations.

Understanding how manufacturing businesses in tourist destinations approach this concept can increase their competitive advantage and contribute to environmental sustainability. This study aims to provide a new perspective on the reverse logistics literature.

2. LITERATURE REVIEW

Reverse logistics is a subject that needs to be researched in many aspects (Avşar, 2023). Due to the decrease in the amount of raw materials in the face of the rapid increase in the world population, the need to obtain materials to be used instead of raw materials by recycling has led to the concept of reverse logistics. Lambert and Stock (1981) defined this concept's first definition. The Council for Logistics Management (CSCMP) made the first known definition of reverse logistics in the 1990s. Thus, studies on this subject have started to be carried out.

Carter and Ellram (1998) examined the reverse logistics literature by focusing on transport, packaging, purchasing and environmental issues. As a result of the review, they determined that the factors affecting reverse logistics activities are different from those of traditional logistics. The study presents theoretically based propositions for reverse logistics programs and a model of drivers and constraints.

Pokharel and Mutha (2009) examined current developments in research and practice in reverse logistics (RL) through content analysis of published literature. Various web-based search engines, books and conference proceedings were used in the literature review. The study showed that research in Reverse logistics is multifaceted and distinguishes itself from forward logistics.

The review also showed that the publication on Reverse logistics has increased, especially since 2005, and therefore, Reverse Logistics is recognized as a driving force in supply chain and logistics.

Hall et al. (2013) asked open-ended questions to 84 reverse logistics experts working in the defense industry. They used a content analysis method to extract and categorize goals, challenges and metrics for reverse logistics processes. They aimed to address the challenges faced by reverse logistics practitioners by aligning reverse logistics metrics with objectives. The study's findings showed that there needs to be more clarity between goals and metrics. In goal-setting theory, this disconnect can negatively affect performance and goal achievement.

Subramanian et al. (2014), in their study titled "Factors for implementing end-of-life product reverse logistics in the Chinese manufacturing sector," aimed to understand and prioritize the factors of end-of-life product reverse logistics in the Chinese manufacturing sector. For this purpose, they conducted multiple case studies in five industries in the manufacturing sector. They applied the analytic hierarchy process (AHP) to prioritize management factors for successful RL implementation in the Chinese manufacturing sector. The results showed that Chinese firms would likely engage in RL activities with external factors like strict government regulation.

Reverse logistics is the return, exchange, refurbishment, remarketing and disposal of products. Customers may return products for various reasons, such as end-of-life, expired, poor quality, and non-kosher. Ngadiman et al. (2016), "Reverse Logistics in Food Industries: A Case Study in Malaysia," investigated whether the challenges faced by reverse logistics implementation are affected by internal and external barriers. A survey application was utilized in the research. In the research, it was seen that the success of the implementation of reverse logistics in the Food and Beverage sector was affected by many factors. It was also found that agreements and regulations made by the government affect the success of reverse logistics practices.

It is known that the cost of reverse logistics activities, re-product production from used products, is less than producing new products from scratch. However, not only does cost advantage play a role in the importance of reverse logistics for companies, but legal obligations, customer satisfaction and social responsibility play a major role. Sorkun (2017) investigated the main motivation of manufacturing firms in Turkey to engage in reverse logistics activities. For this purpose, he analyzed the reverse logistics processes of Vestel, one of Turkey's strong brands. As a result of this analysis on the reverse logistics activities of Vestel, it was determined that the main motivation that led Vestel to reverse logistics activities was "to fulfill its legal obligations."

Customers' environmental awareness is increasing day by day. In addition to the quality of the products they want, customers want the products to have the least environmental damage at the end of production and use. Yalçı et al. (2017) analyzed consumers' perspectives on reverse logistics in line with their social responsibility awareness. The questionnaire form prepared for this purpose was applied to consumers in Edirne province.

As a result of the research, it was determined that there is a linear and positive relationship between social responsibility, green purchasing and recycling activities.

Reverse logistics cover all operations related to the recovery of products or packaging materials. Eyüpoğlu and Bastı (2017) addressed the problems encountered in reverse logistics and solution suggestions with the example of the food sector. The study investigated the level of logistics activities in the food sector, including recycling and reusing products and packaging returned from the consumer and other stages of the supply chain, disposal of unusable wastes, the pressure on enterprises and the problems experienced. As a result of the research, it was determined that there are no structured reverse logistics units in food companies yet. The main reason is that reverse logistics activities are considered a necessity rather than an income-generating activity. It was stated that one of the main problems experienced by companies is the difficulty in planning due to uncertainty.

An effective and standardized reverse logistics process can give a company a competitive advantage over its peers and competitors. Thanks to their superior processes and ability to meet customers' demands, they can gain a larger market share in their industry. Mutuku and Moronge (2020) also aimed to evaluate the impact of reverse logistics on the performance of food and beverage manufacturing firms in Kenya and to make recommendations on the proper use of reverse logistics management practices in manufacturing companies. The study concluded that product return management, recycling management, disposal management and product repackaging positively correlate with the performance of food and beverage manufacturing firms in Kenya. The study also recommended that food and beverage manufacturers adopt reverse logistics to improve performance.

The study of Akça and Akdoğan (2023) aims to determine whether green procurement, green packaging, green distribution, reverse logistics and logistics performance factors vary according to the enterprises' activities and the managers' demographic characteristics. In this study, data were collected through a survey of 120 food business managers from the Istanbul Chamber of Industry 2017-2018, "Turkey's Top 1000 Enterprises," the data obtained were tested with Independent Samples T Test and One-Way ANOVA. In the analyses, it was concluded that green procurement, green distribution, green packaging, reverse logistics and logistics performance factors show a significant difference according to some demographic variables. In contrast, some do not show a significant difference according to others.

For this study, firstly, national and international literature has been systematically reviewed by us. However, it has been observed that there are a limited number of studies in the related literature within the scope of reverse logistics in the field of tourism. It has been determined that these studies were conducted in the universe of domestic employees. Therefore, this study is unique regarding the research universe and will contribute to the literature.

3. RESEARCH METHODOLOGY

The survey technique, a quantitative analysis method, was utilized in this study. Sayın's (2017) scale was employed to determine employees' perceptions of reverse logistics in tourism destination operating production companies. Abbreviations of technical terms used are explained when first introduced. Due to its cost and time efficiency, convenience sampling was used to collect data from 450 employees in Antalya in August 2019. From the 410 questionnaires gathered, only those suitable for analysis were analyzed. The study's scale underwent validity and reliability analysis, with a Cronbach Alpha value of 0.870. According to Kalaycı (2009, p. 404), a Cronbach Alpha value above 0.60 implies a reliable scale; thus, this study's scale is highly reliable. Parametric tests are justifiable as the kurtosis and skewness values of the item scores show a normal distribution between +1.5 and -1.5 (Tabachnick & Fidell, 2013: 613). In conducting the research, various tests were carried out, including factor analysis, independent samples t-test, and one-way ANOVA test.

Aim: This article aims to understand and analyze the perception of reverse logistics of employees in manufacturing enterprises operating in tourism destinations. *Reverse logistics* is a process that involves the return of products to consumers and how businesses manage these returns. This study aims to reveal the perceptions of employees in production enterprises in the tourism sector on reverse logistics and to evaluate the potential effects of these perceptions on enterprises' sustainability and environmental impacts.

Importance: Manufacturing businesses operating in tourism destinations are often associated with large amounts of product utilization and waste generation. How these businesses manage their reverse logistics processes is important for sustainability. The importance of this paper is to understand the perception of reverse logistics of businesses operating in tourism destinations to guide how to reduce environmental impacts and increase sustainability.

Limitations: Some limitations of this study may be as follows:

- The research may only focus on manufacturing enterprises operating in a specific tourism destination, so there may be limitations in making generalizations.

- Due to the data collection methods and sample size used in the study, the results obtained may differ in different conditions and destinations.

Research Problem: The research problem of this study is to understand how employees in manufacturing enterprises operating in tourism destinations perceive reverse logistics and the effects of this perception on the sustainability practices of these enterprises. In addition, the challenges and success factors these enterprises face in managing reverse logistics processes can also be addressed as a research problem.

4. RESULTS

This section presents the research findings through factor analysis, Independent Sample T-Test, and One Way ANOVA tests. The obtained results are displayed in the tables below. One-way ANOVA is a statistical analysis method used to determine the statistical significance among groups. It is employed to evaluate differences among three or more groups. Specifically, it is used to ascertain whether there is a statistically significant difference among the means of these groups (Montgomery, 2017).

The Independent Sample T Test determines the statistical significance of differences between means of two independent groups. This test allows for comparing a variable between two groups and assesses whether the difference in means between these groups is statistically significant or occurred by chance (Howell, 2012). Table 1 illustrates the demographic characteristics of the participants.

Table 1: Demographic Characteristics of Participants

Gender	**n**	**%**
Female	174	42,4
Male	236	57,6
Total	**410**	**100,0**
Marital Status	**n**	**%**
Married	340	82,9
Single	70	17,1
Total	**410**	**100,0**
Age	**n**	**%**
18-25 Years Old	54	13,2
26-35 Years Old	207	50,5
36-45 Years	110	26,8
46-55 Years	31	7,6
56 years old or Above	8	2,0
Total	**410**	**100,0**
Education Status	**n**	**%**
Primary Education	6	1,5
High School	46	11,2
Bachelor's Degree	296	72,2
Postgraduate	62	15,1
Total	**410**	**100,0**
Monthly Income (₺)	**n**	**%**
Minimum Wage	155	37,8
Minimum Wage - 5000 ₺	148	36,1
5001 ₺ - 7500 ₺	65	15,9
7501 ₺ And Above	42	10,2
Total	**410**	**100,0**

The table presents the demographic characteristics of 410 participants. Firstly, looking at the gender distribution, it can be observed that 57.6% of the participants are male, while 42.4% are female. Regarding marital status, 82.9% of the participants are married, while 17.1% are single. This result indicates that the majority of the participant group is married. When examining the age distribution, most participants fall within the 26-35-year-old category, accounting for 50.5%. Participants in the 36-45-year-old category make up the second-largest group, with a percentage of 26.8%. Regarding education level, most participants hold a bachelor's degree, at 72.2%, while 15.1% have postgraduate degrees. It can be seen that 37.8% of the participants earn the minimum wage, and 36.1% earn between the minimum wage and 5000 ₺. Participants with higher income levels make up 25.9% of the group. These data points indicate that the participants have diverse income levels.

Table2: Factor Analysis

Reverse Logistic Scale Items	Factors				
	Recycling	Remanufacturing	Product Improvement	Alternative Recycling Methods	Refurbishing
	Factos Loadings				
Products subject to recycling must be stored correctly when necessary.	0,778				
It is the responsibility of the manufacturer to dispose of the products that need to be destroyed in a way that does not harm the environment.	0,669				
Product recycling is an important issue in landfilling	0,629				
Recycling reduces environmental pollution.	0,582				
If the product requires incineration for legal reasons, energy should be recovered without harming the environment	0,551				

Technologically obsolete products are remanufactured by adapting them to current technology.	0,676	
The remanufactured product has the same characteristics as the new product	0,651	
Product reconditioning extends the life of the product.	0,598	
After the used product is disassembled, critical parts are checked and replaced if necessary.	0,558	
Products subject to reuse do not affect product performance	0,537	
The main objective of the regeneration process is to obtain a product with the desired quality.	0,501	
Reuse of waste materials ensures sustainable development.		0,663
Re-production is the most economical application in the realization of sustainable development goals.		0,658
The reuse process increases the profitability of the company.		0,614
The quality standards applied to the product used in the past should also be applied to the product subject to remanufacturing.		0,533
What is important in the repair process is the compliance of quality standards.		0,531

The product can also be improved during remanufacturing.			0,525			
If it is not possible to recycle the product, incineration should be applied.				0,806		
Incineration is preferred for products that will not bring economic benefits				0,795		
Burial should be applied if the product contains harmful substances during the incineration phase				0,599		
The quality of the reconditioned product may be slightly lower than the quality of the new product.						0,769
Quality standards control in rework is not as stringent as for new product						0,526
Re-working is the process of bringing the used product up to a specified quality level.						0,513
Eigen Values	,512	3,719	3,331	2,469	2,063	
Total explained variance 50,487%, KMO: 0,897						

Table 2 shows the findings from the factor analysis. As per the table, the reverse logistics perception scale contains twenty-three statements and five factors. The eigenvalues over 1 and the total variance value explained (50.487%) by the factors provided in the factor analysis depicted that the factor loads of the propositions ranged between 0.501 and 0.806.

As a result of these procedures, the initial factor was labeled "Recycling," it was established that this factor comprised five propositions. The second factor was labeled "Remanufacturing," it was determined that this factor comprised six propositions. The third factor was dubbed 'Product Improvement,' it was determined that this factor comprised six propositions. The fourth factor was dubbed "Alternative Recycling Practices" and was discovered to be composed of three statements. The fifth factor, entitled "Refurbishing," was discovered to have three propositions.

Table 3: T-Test Results According to Gender

Factors	Gender	$\bar{x}$	Standard Deviation	t	p
Recycling	Female	1,6313	,53130	-,636	
	Male	1,6654	,53926		525
Reproduction	Female	2,3725	,58574	-,093	,926
	Male	2,3780	,62282		
Product Optimization	Female	1,7773	,45575	-1,293	,197
	Male	1,8375	,48116		
Alternative Recycling Methods	Female	2,2838	,85678	-,444	,657
	Male	2,3207	,78443		
Refurbishing	Female	2,3044	,65539	-1,380	,168
	Male	2,3892	,55256		

Table 3 shows the results of the t-tests to analyze the differences in participants' attitudes toward the different factors according to their gender. For the recycling factor, female participants have a lower mean score ($\bar{x}$=1.6313), while male participants have a higher mean score ($\bar{x}$=1.6654). This result suggests that, on average, male participants have slightly more positive attitudes towards recycling than female participants. However, statistical analysis shows that the observed difference is not significant (t=-0.636; p=0.525). Therefore, there is no statistically significant gender difference in attitudes towards recycling among the participants.

For the factor 'Reproduction,' female participants have a low mean score ($\bar{x}$=2.3725), while male participants have a similar mean score ($\bar{x}$=2.3780). These scores are quite close, indicating similar attitudes towards reproduction for both genders. The p-value is 0.926, indicating that there is no statistically significant gender difference in attitudes towards reproduction.

On the factor 'product optimization,' female participants have a low mean score ($\bar{x}$=1.7773), while male participants have a similar mean score ($\bar{x}$=1.8375). This result means that, on average, male participants may have a slightly more favorable opinion of product optimization. However, the difference is not statistically significant. The p-value is 0.197, meaning there is no strong evidence of a gender difference in attitudes towards product optimization.

On the 'alternative recycling methods' factor, female participants have an average score of 2.2838 and male participants have an average score of 2.3207. These scores are similar, suggesting that both genders have similar attitudes towards alternative recycling methods. The t-statistic is -0.444, and the p-value is 0.657, indicating no statistically significant gender difference.

On the factor "refurbishing," female participants have a low mean score ($\bar{x}$=2.3044), while male participants have a similar mean score ($\bar{x}$=2.3892). This result suggests that, on average, male participants may have slightly more positive attitudes towards renovation. However, the difference is not statistically significant as with the other factors. The p-value is 0.168, meaning there is no strong statistical evidence of a gender difference in participants' attitudes towards refurbishment.

In summary, the t-test results suggest that there are no statistically significant gender differences in participants' attitudes towards recycling, reuse, alternative recycling methods, and product optimization. Although there are some minor differences in the mean scores between the genders, these differences are not strong enough to be considered statistically significant.

Table 4: T-Test Results According to Marital Status

Factors	Gender	$\bar{x}$	Standard Deviation	t	p
Recycling	Married	1,6212	,51599	-2,071	**,039**
	Single	1,8676	,60703		
Reproduction	Married	2,3742	,60434	-,045	,964
	Single	2,3778	,58830		
Product Optimization	Married	1,7872	,46528	-1,501	,134
	Single	1,8790	,47165		
Alternative Recycling Methods	Married	2,2832	,83132	-,880	,379
	Single	2,3799	,80000		
Refurbishing	Married	2,3270	,61518	-,971	,332
	Single	2,4058	,61269		

Table 4 presents the results of the t-tests conducted to investigate possible differences in participants' attitudes toward the various factors based on their marital status. Concerning the recycling factor, the data reveal interesting insights: married participants have a low mean score ($\bar{x}$=1.6212), while single participants have a higher mean score ($\bar{x}$=1.8676). This result suggests that, on average, single participants have slightly more positive attitudes towards recycling than their married counterparts. However, the statistical analysis makes this finding significant (p=0.039). These results indicate that there is indeed a statistically significant difference in attitudes towards recycling between married and single participants. In other words, marital status influences participants' perceptions of recycling.

The reproduction factor data show that married participants have a low mean score ($\bar{x}$=2.3742), while single participants also have a low mean score ($\bar{x}$=2.3778). These scores are extremely close, indicating that married and single participants have similar attitudes towards reproduction. The p-value is 0.964, highlighting that there is no statistically significant difference in attitudes toward reproduction based on marital status.

On the product optimization factor, married participants have a low mean score ($\bar{x}$=1.7872), while single participants have a slightly higher mean score ($\bar{x}$=1.8790). This result suggests that, on average, single respondents may have slightly more favorable views on product optimization. However, it is important to note that the difference is not statistically significant. The p-value is 0.134, indicating that there is no strong statistical evidence of a significant difference in attitudes toward product optimization between married and single respondents.

On the alternative recycling methods factor, married participants have an average score of 2.2832, while single participants have an average score of 2.3799. These scores are in the same range, indicating that both marital status groups have comparable attitudes toward alternative recycling methods. The t-statistic is -0.880, and the p-value is 0.379, confirming that there is no statistically significant difference in attitudes towards alternative recycling methods between married and single participants.

On the refurbishment factor, married participants have a low mean score ($\bar{x}$=2.3270), while single participants have a slightly higher mean score ($\bar{x}$=2.4058). This result suggests that, on average, single participants may have a slightly more positive attitude towards refurbishment. However, similar to the product optimization factor, the difference is not statistically significant. The p-value is 0.332, meaning there is no strong statistical evidence of a significant difference.

Table 5: ANOVA Test Results According to Age

Factors	Age	$\bar{x}$	Standard Deviation	f	p
Recycling	18-25 years old	1,7981	,63446	1,778	,132
	26-35 years old	1,6558	,55067		
	36-45 years old	1,5940	,48207		
	46-55 years old	1,5290	,40182		
	56 years and above	1,5500	,36645		
Reproduction	18-25 years old	2,4296	,57767	,825	,510
	26-35 years old	2,3874	,59676		
	36-45 years old	2,3009	,61443		
	46-55 years old	2,4032	,66774		
	56 years and above	2,5917	,36154		
Product Optimization	18-25 years old	1,9080	,47583	1,699	,149
	26-35 years old	1,7957	,49206		
	36-45 years old	1,7327	,43039		
	46-55 years old	1,8871	,39531		
	56 years and above	1,9167	,37796		
Alternative Recycling Methods	18-25 years old	2,3039	,77007	,501	,735
	26-35 years old	2,3333	,84761		
	36-45 years old	2,2661	,86517		
	46-55 years old	2,1322	,67168		
	56 years and above	2,4583	,58926		
Refurbishing	18-25 years old	2,2956	,61119	,279	,892
	26-35 years old	2,3696	,63679		
	36-45 years old	2,3242	,63126		
	46-55 years old	2,3011	,43337		
	56 years and above	2,2500	,49602		

Table 5 shows the results of the analysis of variance (ANOVA) test results to see if there are significant differences in the participants' attitudes toward different factors according to their age groups. The differences in the mean scores between the age groups are at low significance levels, and these significance levels vary between $\bar{x}$=1.5290 and $\bar{x}$=1.7981. However, the ANOVA test concludes that these differences are not statistically significant.

The p-value is 0.132, above the usual significance level of 0.05. Therefore, it can be concluded that age does not have a statistically significant difference according to the respondents' attitudes toward recycling.

When the reproduction factor is analyzed according to age groups, it can be seen that the mean values vary between $\bar{x}$=2,3009 and $\bar{x}$=2,5917. However, the ANOVA test showed that these differences were not statistically significant. The p-value is 0.510, higher than the typical significance level of 0.05. Therefore, age does not show a statistically significant difference according to the respondents' attitudes towards the production factor.

Concerning the product optimization factor, respondents from different age groups showed mean scores ranging from 1.7327 to 1.9167. Similar to the previous factors, the ANOVA test showed no statistically significant difference between the age groups. The p-value is 0.149, above the usual significance threshold of 0.05. Therefore, age does not show a statistically significant difference in the respondents' product optimization.

For the factor alternative recycling methods, the mean scores of the respondents ranged from $\bar{x}$=2.1322 to $\bar{x}$=2.4583 across the different age groups. The ANOVA test showed no statistically significant difference as with the previous factors. The p-value of 0.735 indicates that age does not significantly affect participants' attitudes towards alternative recycling methods.

Finally, respondents from different age groups showed mean scores ranging from $\bar{x}$=2.2500 to $\bar{x}$=2.3696 for the "renovation" factor. However, the ANOVA test did not show a statistically significant difference. The F-statistic is 0.279, and the p-value is 0.892, which exceeds the typical significance level of 0.05. Therefore, it is unlikely that age significantly affects respondents' attitudes towards renewal.

In summary, the results of the ANOVA test indicate that there are not significantly differences respondents' perceptions of recycling, remanufacturing, product optimization, alternative recycling methods or refurbishment.

Table 6: ANOVA Test Results According to Education Level

Factors	Education Level	$\bar{x}$	Standard Deviation	F	p
Recycling	Primary Education	1,5167	,44907	1,171	,321
	High School	1,7609	,63892		
	Bachelor's Degree	1,6212	,54394		
	Postgraduate	1,6887	,38671		
Reproduction	Primary Education	2,3611	,77040	,243	,866
	High School	2,4304	,62554		
	Bachelor's Degree	2,3757	,60853		
	Postgraduate	2,3306	,53773		
Product Optimization	Primary Education	1,6667	,45947	1,099	,349

	High School	1,9094	,54286		
	Bachelor's Degree	1,7962	,45990		
	Postgraduate	1,7688	,43977		
Alternative Recycling Methods	Primary Education	2,1333	,29814	1,094	,351
	High School	2,2609	,85176		
	Bachelor's Degree	2,2721	,83836		
	Postgraduate	2,4704	,76675		
Refurbishing	Primary Education	1,7222	,44305	5,703	**,001**
	High School	2,2101	,52285		
	Bachelor's Degree	2,3260	,58211		
	Postgraduate	2,5645	,75769		

Table 6 shows the analysis of variance (ANOVA) tests carried out to examine possible differences in participants' attitudes toward different factors according to their level of education. The Tukey test was used in the research because the variances were homogeneous. *Tukey's test* is a statistical method used in data sets with homogeneous (similar) variances.

This test determines the mean differences between groups and which groups are statistically different. It is particularly useful for detailed analysis of ANOVA results and multiple group comparisons in data sets with homogeneous variances (Tukey, 1949).

The mean scores ($\bar{x}$) of participants with different levels of education for the recycling factor showed differences ranging from those with primary education ($\bar{x}$=1.5167) to those with a Master's degree ($\bar{x}$=1.6887). However, the results of the ANOVA test showed that these differences were not statistically significant. The p-value is 0.321, above the typical significance level of 0.05. In conclusion, level of education has no significant effect on respondents' attitudes towards recycling.

Respondents with different levels of education have different mean scores for the reproduction factor. The mean scores for this factor are quite low. The ANOVA test shows that these differences are not statistically significant. The P-value is 0.866, indicating that the education level has no significant effect on the respondents' attitudes towards reproduction.

Concerning the product optimization factor, the mean scores of respondents with different levels of education differ. However, similar to the previous factors, the results of the ANOVA test show that these differences are not statistically significant. The p-value is 0.349, indicating that the level of education does not significantly affect the respondents' attitudes toward product optimization.

In the context of alternative recycling methods, respondents with different levels of education showed some differences in mean scores. However, the results of the ANOVA test show that these differences are not statistically significant. The p-value is 0.351, indicating that the level of education does not significantly affect the participants' attitudes toward alternative recycling methods.

For the renewal factor, the mean scores of participants with different levels of education differed, with those with primary education having the lowest mean score and those with postgraduate education having the highest mean score. However, the results of the ANOVA test show a statistically significant difference. The p-value is 0.001, indicating that the education level significantly affects the participants' attitudes toward renovation.

In summary, education level has no significant differences on attitudes towards recycling, remanufacturing, product optimisation and alternative recycling methods, while it has a significant difference on attitudes towards refurbishment. While attitudes towards refurbishment differ significantly between participants with different levels of education, the most positive attitudes come from participants with a Master's degree.

Table 7: ANOVA Test Results According to Income Level

Factors	Income (TL)	x̄	Standard Deviation	f	p
Recycling	Minimum Wage	1,6220	,58846	1,010	,388
	Minimum Wage – 5000 ₺	1,7017	,54518		
	5001₺ - 7500 ₺	1,6277	,48202		
	7501 ₺ ve üzeri	1,5619	,31926		
Reproduction	Minimum Wage	2,3431	,61491	2,251	,082
	Minimum Wage – 5000 ₺	2,3365	,57648		
	5001₺ - 7500 ₺	2,5513	,60231		
	7501 ₺ ve üzeri	2,3532	,60509		
Product Optimization	Minimum Wage	1,7978	,51602	,152	,929
	Minimum Wage – 5000 ₺	1,8086	,42312		
	5001₺ - 7500 ₺	1,8256	,47547		
	7501 ₺ ve üzeri	1,7659	,42302		
Alternative Recycling Methods	Minimum Wage	2,3100	,79545	1,597	,190
	Minimum Wage – 5000 ₺	2,3750	,85800		
	5001₺ - 7500 ₺	2,1077	,87024		
	7501 ₺ ve üzeri	2,2927	,71955		
Refurbishing	Minimum Wage	2,3106	,57073	2,331	,174
	Minimum Wage – 5000 ₺	2,3559	,68170		
	5001₺ - 7500 ₺	2,2410	,48055		
	7501 ₺ ve üzeri	2,5476	,67403		

Table 7 shows the results of the analysis of variance (ANOVA) tests carried out to investigate possible differences in participants' attitudes towards different factors according to their income level. The mean scores (x̄) of participants from different income groups differed for the recycling factor.

However, the results of the ANOVA test show that these differences are not statistically significant. The p-value is 0.388, which exceeds the standard significance level of 0.05. This result shows that income level does not significantly affect participants' attitudes towards recycling.

Respondents with different income levels showed differences in mean scores for the Reproduction factor. However, the results of the ANOVA test show that these differences are not statistically significant. The p-value is 0.082, indicating that income level does not significantly affect respondents' attitudes toward remanufacturing.

Concerning the Product Optimisation factor, the mean scores of participants with different income levels differed. However, similar to the previous factors, the results of the ANOVA test show that these differences are not statistically significant. The P-value is 0.929, indicating that income level does not significantly affect respondents' attitudes toward product optimization.

Regarding alternative recycling methods, differences were observed in participants' mean scores from different income levels. However, the results of the ANOVA test show that these differences are not statistically significant. The p-value is 0.190, emphasizing that income level does not significantly affect participants' attitudes toward alternative recycling methods.

For the factor renewal, differences were observed in participants' mean scores with different income levels. However, the results of the ANOVA test again show that these differences are not statistically significant. The p-value of 0.174 indicates that income level does not significantly affect participants' attitudes toward renewal.

In summary, as shown by the non-significant p-values in the ANOVA test results, income level is not a statistically significant factor influencing attitudes towards recycling, remanufacturing, product optimization, alternative recycling methods or refurbishment.

Table 8: Correlation Results of Factors

		Recycling	Reproduction	Product Optimization	Alternative Recycling Methods	Refurbishing
Recycling	Pearson Correlation	1	,382**	,464**	,285**	,242**
Reproduction	Sig. (2-tailed)	,380**	1	,453**	,276**	,268**
Product Optimization	Pearson Correlation	,464**	,493**	1	,197**	,118*
Alternative Recycling Methods	Sig. (2-tailed)	,285**	,247**	,197**	1	,310**
Refurbishing	Pearson Correlation	,242**	,268**	,118*	,310**	1

Table 8 presents the correlation results between different factors, shedding light on the relationships between these factors. There is a positive correlation of 0.382 between Recycling and Reproduction. This result means that as attitudes toward Recycling increase, attitudes toward Reproduction also tend to increase. The correlation is statistically significant at the 0.01 significance level, indicated by the ** symbol.

A positive correlation of 0.464 exists between Recycling and Product Optimization, implying that as attitudes toward Recycling increase, attitudes toward Product Optimization also tend to increase. This correlation is statistically significant at the 0.01 significance level.

The correlation between Recycling and Alternative Recycling Methods is positive at 0.285, indicating that as attitudes toward Recycling rise, attitudes toward Alternative Recycling Methods also tend to rise. This correlation is statistically significant at the 0.01 significance level.

A positive correlation of 0.242 between Recycling and Refurbishing suggests that as attitudes toward Recycling increase, attitudes toward Refurbishing also tend to increase. This correlation is statistically significant at the 0.01 significance level.

A positive correlation of 0.493 is observed between Reproduction and Product Optimization, indicating that as attitudes toward Reproduction increase, attitudes toward Product Optimization also tend to increase. This correlation is statistically significant at the 0.01 significance level.

The correlation between Reproduction and Alternative Recycling Methods is positive at 0.276, implying that as attitudes toward Reproduction increase, attitudes toward Alternative Recycling Methods also tend to increase. This correlation is statistically significant at the 0.01 significance level.

These correlation findings provide valuable insights into the relationships between different factors and can be useful in understanding how participants' attitudes are interconnected in the study context.

CONCLUSION

This study examined how manufacturing company employees in tourist destinations perceive reverse logistics. It analyzed perceptions regarding five factors: recycling, remanufacturing, product improvement, alternative recycling methods, and refurbishment.

The findings indicate that the participants have a generally low perception of reverse logistics. Factors such as 'recycling,' 'remanufacturing,' 'product improvement,' 'alternative recycling methods,' and 'refurbishment' indicate a low perception of reverse logistics by both male and female participants.

Upon analysis of the results by gender, there were no statistically significant differences in the perception of reverse logistics between male and female participants. On average, both male and female participants had a low perception of reverse logistics across all factors.

Regarding marital status, the study revealed a statistically significant difference in perceptions of reverse logistics. Single employees held a more favorable perception of recycling than their married counterparts. Nevertheless, the perception of reverse logistics was generally low overall, across all factors, for both married and single participants.

The analysis based on age indicated that there was no statistically significant difference in reverse logistics perceptions between various age groups. Respondents of all age groups displayed limited awareness of reverse logistics.

In terms of educational attainment, a statistically significant difference was observed for the factor of "refurbishing." Further investigation using post hoc tests, specifically the Tukey test, demonstrated that employees with higher education levels better understood recycling than those with only a primary school education.

Income level was not found to have a statistically significant impact on perceptions of reverse logistics. On average, participants from all income groups demonstrated a limited understanding of reverse logistics.

Correlation analysis revealed that recycling has a moderate, positive correlation with remanufacturing, product optimization, alternative recycling methods, and refurbishment. Changes in recycling practices correspond to changes in remanufacturing and product optimization. Advances in alternative recycling methods are related to recycling practices. Refurbishment and recycling influence each other. These results emphasize the possible interconnections between these aspects and establish a groundwork for additional investigations into their dynamics and consequences.

DISCUSSION

The study's results corroborate the literature on reverse logistics, consistently highlighting a widespread need for more awareness and comprehension among employees across various sectors (Carter & Ellram, 1998; Pokharel & Mutha, 2009). This deficiency emerges as a recurring theme in discussions related to reverse logistics, and our study reaffirms its prevalence.

Consistent with our findings, prior research generally fails to demonstrate significant gender-based disparities in reverse logistics perception (Hall et al., 2013; Subramanian et al., 2014). Both male and female participants in our study exhibited similarly limited levels of understanding across all facets of reverse logistics.

Our study's revelation that single employees tend to hold more favorable perceptions of recycling aligns with existing research indicating that marital status can influence attitudes toward sustainable practices (Yalçı et al., 2017). However, it is crucial to emphasize that overall perceptions of reverse logistics remained modest for married and single participants.

Parallel to our findings, previous research has not consistently established age-related disparities in reverse logistics perceptions (Hall et al., 2013; Subramanian et al., 2014). Regardless of age, respondents in our study needed more awareness of reverse logistics.

The observation that individuals with higher education levels demonstrate a better understanding of recycling aligns with the broader notion that education can positively influence environmental awareness and sustainable practices (Kalaycı, 2009). It is worth noting that this disparity in perception was specific to recycling and did not extend to other dimensions of reverse logistics.

Our study's findings align with the prevailing idea that income level does not significantly influence perceptions of reverse logistics (Montgomery, 2017). Employees from diverse income brackets displayed comparable levels of understanding.

The study's correlation analysis unveiled intricate connections between different facets of reverse logistics, underscoring their dynamic relationships. Recycling exhibited moderate positive correlations with remanufacturing, product optimization, alternative recycling methods, and refurbishment. These findings imply that progress or alterations in one facet of reverse logistics may trigger consequences in others, emphasizing the necessity for comprehensive approaches to reverse logistics management (Aydın et al., 2017).

This discussion section contextualizes our study's results within the broader landscape of existing research on reverse logistics. It underscores the persisting knowledge gaps and challenges surrounding reverse logistics awareness while highlighting nuanced insights concerning demographic factors and their impact on perceptions. Furthermore, the identified correlations shed light on the intricate interplay between various aspects of reverse logistics, underscoring their interdependence and the need for holistic management approaches.

RECOMMENDATIONS

Awareness Raising Training: Companies should organize regular training programs to increase their employees' awareness of reverse logistics. These programs should emphasize reverse logistics and sustainability concepts.

Developing Strategies by Considering Employee Profiles: Companies can develop strategies by considering employee profiles. These strategies should be designed following different employee groups.

Communication Suitable for Education Level: Given that employees with advanced education levels have a better understanding of recycling, communication materials and training should be designed by the education level of employees. This result can promote more effective communication.

Sectoral Collaborations: Companies should collaborate with industry stakeholders to improve sustainability and reverse logistics practices. Intra-industry collaborations can help share best practices and raise awareness of sustainability.

Emphasis on Environmental and Social Responsibility: Companies should emphasize to their employees how reverse logistics can be linked to environmental and social responsibility. This result can help employees to encourage sustainability-oriented behavior.

These recommendations can contribute to efforts to raise awareness of reverse logistics and promote sustainable practices and can provide a basis for future research.

REFERENCES

Acar, A. Z., & Kara, K. (2014). Tersine Lojistik. İçinde A. Z. Acar ve A. M. Köseoğlu (Editörler), Lojistik Yaklaşımıyla Tedarik Zinciri Yönetimi. Nobel Akademik Yayıncılık.

Agrawal, S., Singh, R. K., & Murtaza, Q. (2015). A literature review and perspectives in reverse logistics. Resources, Conservation and Recycling, 97, 76-92.

Akca, T. D., & Akdoğan, M. Ş. (2023). Gıda İşletmelerinin Yeşil Lojistik Uygulamaları ve Lojistik Performanslarının Demografik Faktörlere Göre İncelenmesi. İktisadi İdari ve Siyasal Araştırmalar Dergisi, 8(21), 491-512.

Autry, C. W., Daugherty, P. J., & Glenn Richey, R. (2001). The challenge of reverse logistics in catalog retailing. International Journal of Physical Distribution & Logistics Management, 31(1), 26-37.

Avşar, İ. İ. (2023). Tersine Lojistik Konusunda Yapay Zekâ Araci Chatgpt İle Nitel Bir Araştirma. İşletmelerde Güncel Paradigmalar, 193.

Büyükkeklik, A., & Ergülen, A. (2016). Tersine Lojistik Çalışmalarının Araştırma Yöntemlerine Göre Sınıflandırılması. Pamukkale Üniversitesi, Sosyal Bilimler Enstitüsü Dergisi, 25(1), 47-73.

Carter, C. R., & Ellram, L. M. (1998). Reverse logistics: a review of the literature and framework for future investigation. Journal of Business Logistics, 19(1), 85-102.

Castell A., Clift R., France C. (2004). Extended producer responsibility policy in the European Union—a horse or a camel? Journal of Industrial Ecology, 8(1–2), 4-7.

Dowlatshahi, S., (2000). Developing A Theory of Reverse Logistics. Interfaces, 30 (3):143-155.

Erdal, M., Görçün, Ö. F., Görçün, Ö., & Saygılı, M. S. (2010). Entegre Lojistik Yönetimi. Beta Yayınları.

Eyüboğlu, G., & Bastı, M. (2017). Tersine lojistikte karşılaşılan sorunlar ve çözüm önerileri-Türk gıda sektörü örneği.

Fleischmann, M., Bloemhof-Ruwaard, M., Dekker, R., Laan, E., Nunen, A.E.E., Wassenhove, L.N. (1997). Quantitative Models for Reverse Logistics: A Review. European Journal of Operational Research, 103(1), 1-17.

Hall, D. J., Huscroft, J. R., Hazen, B. T., & Hanna, J. B. (2013). Reverse logistics goals, metrics, and challenges: perspectives from industry. International Journal of Physical Distribution & Logistics Management.

Howell, D. C. (2012). Statistical methods for psychology. Cengage Learning.

İlgün, A. (2010). Katı Atık Yönetimi Ve Ters Lojistik. Namık Kemal Üniversitesi Fen Bilimleri Enstitüsü Yüksek Lisans Tezi.

Kalaycı, Ş. (2009). SPSS uygulamalı çok değişkenli istatistik teknikleri. Asil Yayınevi.

Kayar, Y. (2015). Ters Lojistik Sürecinde Karşılaşılan Sorunlar Ve Çözümlere İlişkin Nitel Bir Araştırma. Namık Kemal Üniversitesi Sosyal Bilimler Enstitüsü İşletme Anabilim Dalı Yüksek Lisans Tezi.

Kroon, L., & Vrijens, G. (1995). Returnable containers: an example of reverse logistics. International Journal of Physical Distribution & Logistics Management.

Montgomery, D. C. (2017). Design and analysis of experiments. John Wiley & Sons.

Mutuku, A. K., & Moronge, M. (2020). Influence of Reverse Logistics on Performance of Food and Beverage Manufacturing Firms in Kenya. International Journal of Supply Chain and Logistics, 4(2), 129-151.

Ngadiman, N. I. B., Moeinaddini, M., Ghazali, J. B., & Roslan, N. F. B. (2016). Reverse logistics in food industries: A case study in Malaysia. International Journal of Supply Chain Management, 5(3), 91-95.

Pokharel, S., & Mutha, A. (2009). Perspectives in reverse logistics: a review. Resources, Conservation and Recycling, 53(4), 175-182.

Rogers, D. S., Lambert, D. M., & Knemeyer, A. M. (2004). The product development and commercialization process. The International Journal of Logistics Management, 15(1), 43-56.

Sayın, B. (2017). Katı Atıklarda Tersine Lojistik Üzerine Toplumsal Algı: Gaziantep'te Bir Uygulama Yüksek Lisans Tezi. Hasan Kalyoncu Üniversitesi Sosyal Bilimler Enstitüsü Uluslararası Ticaret Ve Lojistik Anabilim Dalı.

Subramanian, N., Gunasekaran, A., Abdulrahman, M., & Liu, C. (2014). Factors for implementing end-of-life product reverse logistics in the Chinese manufacturing sector. International Journal of Sustainable Development & World Ecology, 21(3), 235-245.

Tukey, J. W. (1949). Comparing individual means in the analysis of variance. Biometrics, 5(2), 99-114.

Yalçı, E. B., Altuğ, N., & Akın, Y. K. (2017). Tüketicilerin Sosyal Sorumluluk Bilinci Doğrultusunda Tersine Lojistiğe Bakış Açıları. Akademik Bakış Uluslararası Hakemli Sosyal Bilimler Dergisi, (60), 383-395.