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RANKING VALUE-CREATING GREEN APPROACH PRACTICES AND CHOOSING IDEAL GREEN MARKETING STRATEGY FOR LOGISTICS COMPANIES

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Abstract: *The deterioration of environmental factors, economic and technological development, the formation of complexity in societies, the rise of complex structures have made the environment and green management practices more important. Especially value-creating green approaches are considered as critical components in both public and private sector applications and defined as indicators of success in terms of sustainability. On the other hand, green marketing strategies are also important practices that have a positive impact on the environment and should be carefully emphasized for the inheritance of nature to future generations. Recently, it has been on the agenda quite a lot and it is understood for all sectors.In this study, it is aimed to determine the criteria for value-creating green approach practices in logistics companies operating in the TR A1 region due to the above mentioned importance and to choose the most ideal green marketing strategy. In solving this problem, Multi Criteria Decision Making (MCDM) methods, which are a complex decision-making method, have been used. According to the results of the research, it was determined that the most important criterion in value creating green approach applications as Environmental Focused Strategic Decisions (C3), and the least important criterion as Environmental Life Cycle Analysis (C2). It has been determined that the most ideal green marketing strategy is Green Innovation (A1). Accordingly the importance of the environmental based strategic decisions is revealed in terms of creating green marketing strategy for companies.*

Key words: *Green Approaches, Value Creating Green Approaches, Green Marketing Strategy, ENTROPY, MAUT.*

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1. Introduction

Nowadays, waste and gas emissions generated by supply chains are a major source of serious environmental problems, leading to global warming and acid rain (Bloemhuf et. al., 1995). Within the scope of supply chains, various studies are carried out to minimize the damages to the ecosystem. With globalization, solutions in all areas of supply chains have increased. These fields are; environmental compliance requirements, supply chain requirements and consumer demands, sustainability and corporate social responsibility projects (Shecterle and Senxian, 2008).

In addition to reducing costs in a competitive market environment, businesses were forced to adopt more environmentally friendly policies as a result of the Kyto Protocol signed in 1997. Logistics is one of the main operations of the company. For this reason, logistics is costly and damages the environment. The purpose of green logistics is to reduce the environmental impacts of businesses while continuing their logistics activities.

Environmental negativities related to global warming in recent years have caused consumers to take part in activities aimed at protecting the environment. As a result, consumers began to act in a way that could affect their purchasing process. Therefore, it has become necessary for companies to change their business models in order to adapt their activities to green trends. The decision theory approach has become an important tool for providing real-time solutions to uncertainty problems, especially for sustainable engineering and environmental sustainability problems in engineering processes (Stojčić et al, 2019).

Perceived value is the value that the product or service has in the mind of the consumer. In other words, it is a consumer's general assessment of net benefit (Bolton & Drew, 1991; Patterson & Spreng, 1997). Based on this definition, green value, which is a new concept for this study, It can be expressed as the evaluation of a product or service consisting of the net benefit between what is received and what is given according to the consumer's environmental desires, sustainable expectations and environmentally sensitive needs.

Green logistics is an issue that has recently developed and become widespread in the transportation sector. The world's leading transport companies have begun to transition to green logistics since the early 2000s and local companies since 2010. Along with the laws and incentives applied in developed countries, railway, maritime and inland waterway transportation has also been used as a substitute for the road.

Green marketing activities are carried out with support from all relevant departments of the business in order to focus on customer needs and values. The adoption of a green marketing strategy is reorienting a business in terms of how it launches and manages its green practices, It also affects how it reacts to rapidly growing green customer demand and changes in dynamic market conditions, how it targets its customers, how it promotes market offers and how it uses green initiatives to create a sustainable competitive advantage (D'Souza et al., 2015). While applying green marketing strategies of businesses; It is important for them to know how to initiate and manage green activities, define their target customers, and encourage market resources to benefit from green activities in building sustainable competitiveness (Shi & Yang, 2019).

In an environment where competition is increasing, in order to gain competitive advantage, it is very important to integrate green marketing practices with every function of the business for a trustworthy corporate reputation, a green image for trustworthy corporate reputation, green marketing strategies to create a green image and strong green marketing strategies. In particular, green approaches that create value are seen as critical components in both public and private sector applications and are defined as indicators of success in terms of sustainability. In this context, determining the difficult and value-creating green approach marketing strategies, which is a complex process, and combining multiple variables to make decisions can be considered as a problem.

Firms need to be careful in creating green products and services and differentiating from competitors before selecting the green marketing strategies. That complicates the process of selecting and applying profitable green marketing strategy by managers too. Hence it is important to form value creating green marketing strategies for managers. In this context, it was aimed to determine the criteria for value-creating green approach practices in logistics companies operating in the TR A1 region (covering the provinces of Erzurum, Erzincan and Bayburt in northeastern region of Turkey) and to choose the most ideal green marketing strategy. Reasons for selecting the region of TRA1 are recent positive foreign trade based developments and the positive effects on the logistic activities. According to the authors' view there is not any study in the literature which aims to prioritize the value creating green approach practices and select the most ideal green marketing strategy with respect to logistics companies, and that shows the originality and novelty of the work.

The criterion weights were determined by the ENTROPY method and the MAUT Method was used in the selection of the most ideal green marketing strategy. In the later stages of the study, a detailed literature review was made for green values and green marketing strategies, ENTROPY and MAUT Method were applied to the study, and the study was completed with the Results and Recommendations section.

2. Literature Review

A detailed literature review on the value creating green approach and green marketing strategies is given below:

Confente and Ruso (2009) argued that the recyclability of products and packaging and the creation of limited spaces for logistics applications are examples of green logistics practices. Lopes et al. (2010), green value indicators are based on the certification of environmental management system, reducing energy consumption and using renewable energy. In addition, it is seen that product and packaging refer to environmentally friendly and coordinated transportation to recycling by acting with green awareness in product design. As a result of a study conducted by Hu and Hsu (2010) on companies in Taiwan, green supply chain implementation has been dealt with in four dimensions: supplier management, product recycling, enterprise relationship and life cycle management. Kim and Han (2011) demonstrated that both freight transport and storage actions are among the green logistics indicators. Zhang and Zhao (2012) demonstrate the importance of disposal of waste within the enterprise, stating that measures should also be taken for freight transport. Evangelista et al. (2012), it is seen that the legal regulations and the actions related to

freight transportation are added to the green logistics indicators. According to Seroka (2014), it connects green logistics indicators to the cooperation between product designer and supplier, environmental cooperation with customers, legal regulations, green design and reverse logistics. Wichaisri and Sopadang (2014) showed that activities aiming to minimize waste rate, intermodal transportation systems, cargo transportation activities and raising awareness of the organizational structure are among the green logistics indicators. Jaller et al. (2015), in addition to the legal regulations, the use of environmentally friendly vehicles and intermodal transport systems and the prevention of traffic congestion that may occur during the distribution of the cargo are presented as green logistics indicators. Atrek and Özdağoğlu (2016) provided data on the current status of green supply chain applications in the aluminum joinery sector in İzmir. As a result of the study, it was concluded that green supply chain applications are not at the desired level and should be developed. Zengin (2017) examined the effects of green logistics practices in sustainable development and aims to evaluate the situation in Turkey on green logistics. There are businesses that consider the practice green logistics in Turkey. Korucuk (2018) determined the effect of green logistics applications on the competitiveness and hospital performance with the application it has applied to 31 public-private-university hospitals operating in Ankara. Korucuk and Memiş (2019) have been prioritized by determining the performance factors of green port practices in enterprises that have received a green port certificate in Istanbul.

Research on green marketing strategies, on the other hand;

Kumar et al. (2012), as a result of their study, emphasized the necessity of including environmental awareness in this process while developing the strategies of businesses that want to be successful in an intense competitive environment.

Leonidou et al. (2013) In a study on hotel businesses operating in Greece, it was concluded that green marketing strategies can provide a competitive advantage, especially for hotel businesses operating in a highly competitive environment. Nadanyiova et al. (2013), in their study on small, medium and large-scale enterprises operating in Slovakia, stated that the inclusion of green marketing activities in the business processes of the enterprises will provide a competitive advantage against their competitors.

Eneizan et al. (2016) stated that green marketing strategies are effective on perceived business performance. Simao and Lizboa (2017), in their research on Toyota, determined that maintaining their activities in an environmentally conscious manner will provide them with some advantages such as low cost, improvement of production process, and increasing the corporate image.

Karimi et al. (2017) tried to bring together the proposed two-stage messenger problem and supplier selection problem in a green supply chain, where the seller must select suitable suppliers to purchase raw materials and finished products. It is assumed that the seller has several types of vehicles that can send them to receive raw materials purchased from selected suppliers. It is also assumed that the greenhouse gas (GHG) emissions emitted by vehicles depend on the total distance between vendors and suppliers. A limitation on the total GHG emissions of selected vehicles is also considered. The aim of the study is to maximize the expected total vendor profit relative to the total cost of supplier selection and the total transportation cost of vehicles subject to budget and storage space constraints. As a

result of the calculations, it has been shown that an increase in the number of raw materials will cause a decrease in the purchased quantity of each raw material and final product at the beginning of the sales period.

Suresh et al. (2018) investigated the attitudes of consumers towards environmentally friendly products developed by the e-commerce site Tamil Nadu business towards green marketing strategies. Dzulkarnain et al. (2019), using SWOT analysis, aimed to formulate a green marketing strategies that can be applied in local private agricultural industry development.

Gedik (2020), the existence of environmental strategies of the enterprise; It aimed to measure whether it differs according to green marketing practices, environmental protection studies, elements of the green marketing mix, environmental responsibilities and customer relations.

Kumar and Rodrigues, (2020) considered two UK-based manufacturing companies. One of them is semiconductor manufacturing company (case A) and other is furniture manufacturing company (Case B). Case A and Case B are considered 'polar types' and are similar in different respects. They are similar in their commitment to integrating lean and green practices and have formed cross-functional teams to maximize the potential benefits from the integrated approach. They found that the real benefit of integrated lean and green practices can be realized when a cross-functional team works together across organizational boundaries from design to product delivery and after-sales service.

Handoko et al. (2021) made a case study of the pallet problem for the pulp and paper industry in Indonesia. They aimed to establish pallet material strategy and innovation using the concept of Reduce, Reuse and Recycle (3R) in the pallet supply unit to meet the needs of the production unit and avoid product delivery delays. In a closed-loop system, (solid) finished products were sent to consumers on wooden pallets, and the pallets were stored and reused at the consumer's site for later return (to the manufacturer); pallets used can carry a payload of more than 600 kg. With this green approach, it is aimed to overcome the pallet shortage of the pulp and paper manufacturing industry.

The fact that there is no study on value-creating green approach practices and choosing the most ideal green marketing strategy in the detailed literature review makes the subject valuable. On the other hand, it is thought that the study will contribute to the literature in terms of the field of application and the methods used.

In TR A1 region, ENTROPI and MAUT, which are among the Multi Criteria Decision Making (MCDM) methods for value-creating green approach practices and choosing the most ideal green marketing strategy, have been utilized. Because MCDM methods; It is one of the methods applied differently from statistical analysis techniques, that is, objective and non-objective factors are evaluated together. Analyzes are carried out within the framework of expert opinions, and at the same time, the study can be shaped according to the opinion of a single expert or a group of experts. (Korucuk, 2019).

3. Methodology

In this section, value creating green approach applications and ENTROPY and MAUT methods used in choosing the most ideal green marketing strategy are explained.

3.1. Entropy

Entropy is one of the weighting methods that reflect reality. Entropy, an effective method used to explain the maximum uncertainty or minimum certainty of the problem, also eliminates human-induced errors. In practice, the smaller the value in the method, the smaller the degree of irregularity (Wu et al., 2011: 5163-5165; Çiçek, 2013: 59; Korucuk et al., 2019).

The application steps of Entropy weight method are given below (Abdullah and Otheman, 2013: 26; Korucuk et al., 2020).

Step 1. Creating the Initial Decision Matrix

For a multi-criteria decision problem with m decision alternatives and n evaluation criteria, an initial decision matrix is created as follows:

$$X_{mxn} = \begin{matrix} X_{11} & X_{12} & \cdots & X_{1j} \\ X_{21} & X_{22} & \cdots & X_{2j} \\ \vdots & \vdots & \ddots & \vdots \\ X_{i1} & X_{i2} & \cdots & X_{ij} \end{matrix} \tag{1}$$

Step 2. Normalization of the Initial Decision Matrix

In the normalization process, the following formulas apply according to whether the criteria are benefit (2) or cost (3):

$$r_{ij} = \frac{x_{ij} - x_j^{min}}{x_j^{max} - x_j^{min}} \qquad i = 1,2,\ldots,m;\ j = 1,2,\ldots,n \tag{2}$$

$$r_{ij} = \frac{x_j^{max} - x_{ij}}{x_j^{max} - x_j^{min}} \qquad i = 1,2,\ldots,m;\ j = 1,2,\ldots,n \tag{3}$$

After the initial matrix is normalized, equation (4) is used by showing R = [rij]mxn in the matrix.

$$P_{ij} = \frac{r_{ij}}{\sum_{i=1}^{m} r_{ij}} \tag{4}$$

Step 3. Calculation of Entropy Value

The entropy value (Ej) is calculated using the following equation (5):

$$E_j = -k \sum_{i=1}^{m} P_{ij} ln\left(P_{ij}\right) \tag{5}$$

Where k is calculated by the formula $k = (\ln(m))^{-1}$.

Step 4. Calculation of Degree of Differentiation

The degree of differentiation of the entropy value (dj) is calculated using the equation (6):

$$d_j = 1 - E_j; \forall j \tag{6}$$

Step 5. Calculation of Entropy Weight

The objective weight (Wj) of each criterion is defined according to equation (7):

$$W_j = \frac{d_j}{\sum_{j=1}^{n} d_j}; \forall j \tag{7}$$

3.2. MAUT

MAUT method is a method used by Fisburn (1967) and Keeney (1974) to find the most useful alternative based on both qualitative and quantitative criteria. This method is aimed at finding the most useful alternative based on both qualitative and quantitative criteria. In fact, in the MAUT method, it is aimed to find the most beneficial alternative by making subjective data computable (Loken & Botterud, 2007). Basically, every decision maker consciously or indirectly tries to optimize by bringing all his perspectives together. The decision maker's preferences are also the utility function represented. The decision maker does not need to know this function at the beginning of the decision-making process, so first he has to build the function. The utility function is a way of measuring preferability or alternatives (Tunca et al., 2016).

In addition, decision makers may not be able to clearly reflect their opinions or express their thoughts clearly in determining the complex structure and relationships of real-life problems. In other words, there may be situations where the criterion values cannot be stated with exact expressions (Ergün, et al., 2020).

In this direction, the steps of the MAUT method are given below (Ishizaka & Nemery, 2013; Talkan and Uygun, 2014 and Ergün, et al., 2020);

Step 1: Determination of Criteria and Alternatives

The criteria (a_n) in the decision problem and the alternatives (x_m) that will help in selecting the criteria should be determined.

Step 2: Determination of Weight Values

Assignment is made to the weight values (w_j) that allow the alternatives to be evaluated correctly and for which priorities are determined. The sum of all (w_j) values must equal 1.

$$\sum_{i=1}^{m} w_j = 1 \tag{8}$$

Step 3: Determining the Decision Matrix

The value measures of the criteria are assigned. This assignment is made by considering paired comparisons for qualitative criteria, while quantitative values are

for quantitative criteria. Based on all these, value assignments are made in systems of 5, 100 and so on (xm).

Step 4: Calculation of Normalized Benefit Values

In the normalization process, firstly the best and worst values are determined for each feature and a value of 1 is assigned to the best value and 0 to the worst value. For the calculation of other values, the formula in Equation (9) below is used.

$$f_j(a_i) = \frac{f_i(a_i) - min(f_i)}{max(f_i) - min(f_i)} \tag{9}$$

Step 5: Calculation of Total Benefit Values

After the normalization process, the process of determining the benefit values is started. The utility function formula is as in Equation (10).

$$U(a_i) = \sum_{j=1}^{q} f_i(a_i).w_j \tag{10}$$

4. Findings

Under this title, a presentation of the findings obtained by applying ENTROPY and MAUT methods for value-creating green approach practices and the most ideal green marketing strategy in the TR A1 Region and the evaluations regarding these findings will be presented. In this study, the criteria for value-creating green approach practices were created by using expert opinions and literature review (Van Hoek, 1999, Sarkis, 2003 and Zhu et al. 2007) and shown in Table 1. Green marketing strategies options are formed (Rodrigue et al., 2001, Kemp and Pearson, 2007, Fargnoli et al., 2012 and Eneizan et al., 2016) are presented in Table 2.

Table 1. Criteria for value-creating green aprroach practices

Criteria	Coded values
Systematic Environmentally Friendly Applications	(C1)
Environmental Life Cycle Analysis	(C2)
Environmental Focused Strategic Decisions	(C3)
Designing Recyclable and Reusable Products	(C4)
Product, Process and Service Valuation	(C5)
Decision Making and Tracking for Environmentally Friendly Products	(C6)
Green Supply Chain Initiative	(C7)

In Table 2 below, green marketing strategy options are given.

Table 2. Alternatives for green marketing strategy

Alternatives	Coded values
Green Innovation	(A1)
Green Logistics	(A2)
Green Pricing	(A3)
Green Design and Positioning	(A4)
Green Segmentation and Targeting	(A5)
Green Communication	(A6)
Green Alliance	(A7)

Academicians (3) who are the stakeholders of the subject; Erzurum (8 managers), Erzincan (4 managers), and Bayburt (2 managers). A total of 17 questionnaires were submitted to the managers of international logistic firms.

4.1. Weighting Criteria

At this stage, the initial decision matrix has been established to evaluate the criteria and seen as Table 3.

Table 3. Initial Decision Matrix for Entropy

Criteria	C_1	C_2	C_3	C_4	C_5	C_6	C_7
C_1	1	7.10	3.63	4.70	4.19	5.49	5.61
C_2	3.34	1	2.76	3.81	5.80	3.39	2.70
C_3	4.56	6.44	1	2.73	2.99	4.13	3.89
C_4	5.15	6.01	6.60	1	3.15	5.44	2.74
C_5	6.44	5.90	3.11	5.04	1	6.10	5.79
C_6	5.33	4.84	2.49	4.19	5.44	1	3.89
C_7	3.17	5.39	3.90	6.15	6.17	3.96	1

Following to that the normalization process is made and the normalized decision matrix is formed as Table 4.

Table 4. Normalized Decision Matrix for Entropy

Criteria	C_1	C_2	C_3	C_4	C_5	C_6	C_7
C_1	0.035	0.193	0.155	0.170	0.146	0.186	0.219
C_2	0.115	0.027	0.119	0.138	0.202	0.115	0.105
C_3	0.157	0.176	0.043	0.099	0.104	0.14	0.152
C_4	0.178	0.164	0.28	0.036	0.11	0.184	0.107
C_5	0.222	0.161	0.132	0.183	0.035	0.207	0.226
C_6	0.184	0.132	0.106	0.151	0.189	0.034	0.152
C_7	0.109	0.147	0.165	0.223	0.214	0.134	0.039

After computing entropy and degree of differentiation values, the objective weights of each criterion are obtained as Table 5.

Table 5. Weights (W_j) of criteria

Criteria	C_1	C_2	C_3	C_4	C_5	C_6	C_7
W_j	0.139	0.128	0.162	0.136	0.151	0.130	0.154

According to Table 5, "Environmental Focused Strategic Decisions", "Green Supply Chain Initiative", "Product, Process and Service Valuation" and "Systematic Environmentally Friendly Applications" were determined as the most important main criteria for internationally qualified logistics companies. On the other hand, the least important criteria were found to be "Environmental Life Cycle Analysis", "Decision Making and Tracking for Environmentally Friendly Products" and "Designing Recyclable and Reusable Products" respectively.

4.2. Ranking Alternatives

In this section, MAUT method is used to choose the most ideal green marketing strategy. Using the weights of the criteria obtained by the ENTROPY method, the most ideal green marketing strategy was selected with the MAUT method. Each alternative was evaluated using the MAUT questionnaire within the framework of the previously determined decision criteria. During the evaluation, the participants were asked to give each alternative a score of 1-5 (1- worst, 5- best).

Firstly inintial decsion matrix for alternatives in terms of MAUT method is created as Table 6.

Table 6. Initial Decision Matrix for MAUT

Alternatives	C_1	C_2	C_3	C_4	C_5	C_6	C_7
A_1	4	5	3	4	4	5	4
A_2	4	5	3	3	4	4	3
A_3	3	4	4	4	3	4	4
A_4	4	3	3	2	2	2	3
A_5	3	4	2	3	1	2	3
A_6	4	4	1	2	3	5	3
A_7	2	2	3	3	2	3	2

Then normalization process is applied and normalized decision matrix is obtained as Table 7.

Table 7. Normalized Decision Matrix for MAUT

Alternatives	C_1	C_2	C_3	C_4	C_5	C_6	C_7
A_1	1	1	0.667	1	1	1	1
A_2	1	1	0.667	0.500	1	0.667	0.500
A_3	0.500	0.667	1	1	0.667	0.667	1
A_4	1	0.333	0.667	0	0.333	0	0.500
A_5	0.500	0.667	0.333	0.500	0	0	0.500
A_6	1	0.667	0	0	0.667	1	0.500
A_7	0	0	0.667	0.500	0.333	0.333	0

Following to that normalized benefit and total benefit values are computed according to the Eqs. (8) and (9) respectively. Matrix containing total benefit values is seen as Table 8.

Table 8. Matrix for Normalized Total Benefit Value

Alternatives	C_1	C_2	C_3	C_4	C_5	C_6	C_7
A_1	0.139	0.128	0.108	0.136	0.151	0.130	0.154
A_2	0.139	0.128	0.108	0.068	0.151	0.087	0.077
A_3	0.070	0.085	0.162	0.136	0.101	0.087	0.154
A_4	0.139	0.043	0.108	0	0.050	0	0.077
A_5	0.070	0.085	0.054	0.068	0	0	0.077
A_6	0.139	0.085	0	0	0.101	0.130	0.077
A_7	0	0	0.108	0.068	0.050	0.043	0

After that the ranking of the alternatives in this context is given in Table 9 as below.

Table 9. Ranking of Alternatives

Alternatives	A_1	A_2	A_3	A_4	A_5	A_6	A_7
U(ai)	0.946	0.758	0.795	0.417	0.354	0.532	0.269
Ranking	1	3	2	5	6	4	7

According to Table 9, where the alternatives are listed, the most ideal green marketing strategy in logistics companies has been "Green Innovation". Other important green marketing strategies were “Green Pricing”, “Green Logistics” and “Green Communication”, respectively. The least important green marketing strategy has been the “Green Alliance”. The other least important green marketing strategies were determined to be the "Green Design and Positioning" and the "Green Segmentation and Targeting", respectively. In this framework, the general ranking of green marketing strategies selection is A1> A3> A2> A6> A4> A5> A7.

5. Sensitivity Analysis

It is important to review the results of the model according to the demands of decision makers and different conditions. An essential component of the review is the detection of alternative ranking sensitivity in terms of varying decision makers’ judgments. For this study, a sensitivity analysis was done to present the alternative ranking according to the changes in criteria weight as per the judgments of the decision-makers (Korucuk, 2019). If this level of rationality is demanded from an individual decision-maker, then MCDM methods used as a support to rational decision making should also satisfy the condition (Pamučar et al., 2017) Several scenarios are formed for examining the alternative rankings for sensitivity analysis. While the first scenario assigns equal criteria weights, others allow for the interchange of weights between criteria. The obtained criteria weights for six scenarios are given in the Appendix A. The results for the alternative ranking of the six different scenarios are presented in Table 10.

Table 10. Sensitivity analysis results

Alternatives	A_1	A_2	A_3	A_4	A_5	A_6	A_7
Ranking	1	3	2	5	6	4	7
Scenario 1. Assigning equal weights to all criteria							
Ranking	1	3	2	5	6	4	7
Scenario 2. The interchange between criteria having the highest weight and the lowest weight							
Ranking	1	3	2	5	6	4	7
Scenario 3. The interchange between criteria having the second highest weight and the second lowest weight							
Ranking	1	3	2	5	6	4	7
Scenario 4. The interchange between criteria having the third highest weight and the third lowest weight							
Ranking	1	3	2	5	6	4	7

The results of the sensitivity analysis show a similar alternative ranking for the four different scenarios, an indication of the strength of the study in terms of significance and validity.

6. Discussion

Studies related to value-creating green aprroaches in terms of firms have gained importance in the recent years. In this study, the criteria for value-creating green approach practices in logistics companies operating in the TR A1 region were determined and the most ideal green marketing strategy was chosen. According to the ENTROPY results, Environmental Focused Strategic Decisions (C3) was found as the most important criterion regarding green value creation practices with the opinions of 17 people in total in the field of logistics and companies operating in the TR A1 region (Erzurum, Erzincan and Bayburt). This result is similar to the studies of Van Hoek (1999); Sarkis (2003); Zhu et al. (2007). In the ENTROPY method, the least significant criteria were obtained as Environmental Life Cycle Analysis (C2), Decision Making and Tracking for Environmentally Friendly Products (C6) and Designing Recyclable and Reusable Products (C4).

Besides, Green Innovation (A1) was obtained as the most ideal green marketing strategy and that is similar to the studies of Kemp and Pearson (2007); Lin et al. (2009); Zailani et al. (2011); Weng et al. (2015); Chu et al. (2019). On the other hand this result does not correspond to the studies of Crane (1998); Solvalier (2010); Fargnoli et al. (2012); Yılmazsoy and Schmidbauer (2015).

It is important to integrate the concepts of corporate reputation, green image, green marketing strategies and green marketing applications with the functions of firms in competitive environment. In this context, this study that aims to prioritize the value-creating green approach practices and select the most ideal green marketing strategy differs from others with respect to considered methodology and obtained results.

7. Conclusion and Future Suggestions

Industrialization and consumption culture directly harm the nature to which human is bound by an organic bond and with the realization of the irreversible consequences of this damage, "green activities" are rapidly gaining importance with the realization that the human race will directly affect both the present and future generations. In order to reduce the harm to nature, human based approaches have been abandoned and environmental based approaches have gained importance. In this direction, efforts have been started in order to minimize the harm caused by human beings to the environment in a wide range ranging from individuals on a global scale to the state and even to international organizations. Especially in the world, considering that raw material and energy costs are increasing and will continue to increase and these items will constitute the biggest item of production costs, businesses should use sustainability and therefore green marketing strategies. Green marketing strategies create a better working environment in businesses and feed lean practices by improving corporate performance, and although lean management does not focus on pollution, it has a positive effect on green management by ending activities that reduce environmental and productive inefficiencies.

In this study, experts who were thought to be parties to the subject were interviewed, but due to time constraints, the study was conducted in the TR A1 region. So it is difficult to generalize results for other regions of Turkey. With a similar study that will cover wider regions in the future, it may be possible to compare the results of green practices in logistics between regions. On the other hand, the problem addressed in this study can be applied to enterprises or producers operating in different fields on a sectoral basis. Similarly, the impact of different combinations of criteria affecting green logistics activities can be examined in future studies. In addition, this study can be developed in the future by adding fuzzy logic with other multi-criteria decision making and/or other parametric or non-parametric methods, and the results can be discussed by comparing them.

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Appendıx: Scenarios for alternative ranking

Table A1. Scenario 1 alternative ranking

	C_1	C_2	C_3	C_4	C_5	C_6	C_7
W_j	0.143	0.143	0.143	0.143	0.143	0.143	0.143

	A_1	A_2	A_3	A_4	A_5	A_6	A_7
U(ai)	0.953	0.763	0.786	0.406	0.359	0.548	0.263
Ranking	1	3	2	5	6	4	7

Table A2. Scenario 2 alternative ranking

	C_1	C_2	C_3	C_4	C_5	C_6	C_7
W_j	0.139	0.162	0.128	0.136	0.151	0.130	0.154

	A_1	A_2	A_3	A_4	A_5	A_6	A_7
U(ai)	0.957	0.769	0.784	0.405	0.366	0.555	0.246
Ranking	1	3	2	5	6	4	7

Table A3. Scenario 3 alternative ranking

	C_1	C_2	C_3	C_4	C_5	C_6	C_7
W_j	0.139	0.162	0.128	0.136	0.151	0.154	0.130

	A_1	A_2	A_3	A_4	A_5	A_6	A_7
U(ai)	0.946	0.751	0.795	0.410	0.354	0.539	0.269
Ranking	1	3	2	5	6	4	7

Table A4. Scenario 4 alternative ranking

	C_1	C_2	C_3	C_4	C_5	C_6	C_7
W_j	0.139	0.162	0.128	0.151	0.136	0.130	0.154

	A_1	A_2	A_3	A_4	A_5	A_6	A_7
U(ai)	0.946	0.751	0.800	0.412	0.362	0.522	0.272
Ranking	1	3	2	5	6	4	7