THE IMPACT OF RENEWABLE ENERGY STRATEGIES ON BUSINESSES' GREEN MANAGEMENT PRACTICES WITHIN THE FRAMEWORK OF SUSTAINABLE DEVELOPMENT GOALS

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ABSTRACT

The purpose is to investigate green management practices and to conduct a qualitative analysis of the objectives and goals pursued by businesses that adopt "green management" practices in their operations. It also seeks to explore the methods employed and outcomes achieved, and provide recommendations based on these results. The population of this study is businesses in Turkey that implement green management practices, and the sample specifically includes those in Istanbul. Data from 398 businesses were analysed in this study. The research findings indicate a positive relationship between sustainable development (SD) and awareness of renewable energy (RE), and between sustainable development and organizational performance, as well as between sustainable development and the implementation of green management practices. These results suggest that participants' improved perceptions of green management practices are associated with higher organizational performance. It has been observed that an increase in participants' perception of sustainable development leads to a rise in their perception of green management. Similarly, greater awareness of sustainable development is linked to improved organizational performance. Furthermore, the moderating effects of SD and RE strategies on the impact of green management practices on organizational performance have been established.

KEYWORDS: Sustainable Development, Renewable Energy, Green Management Practices, Organizational Performance.

1. INTRODUCTION

The wasteful use of limited natural resources by humans has led to environmental problems that have gradually become global in scope. The measures taken by individual countries to address these global environmental problems have proven insufficient, prompting the United Nations to publish the Sustainable Development Goals (SDGs) in 2015 to ensure the sustainability of natural resources and promote sustainability across all areas, primarily the environment. One of the most important steps toward achieving the SDGs is using clean, environmentally friendly energy. Countries have opted for renewable energy (RE) sources over fossil fuels, which harm the environment and are nonrenewable. These developments have led businesses, which play a significant role in the economy, to adopt green management practices to achieve sustainable production while also considering environmental sensitivities. Thus, businesses that adopt green management practices aim to ensure the continuity of their resources and improve performance by adopting environmentally conscious production practices.

Concerns about equality within and between generations have been at the heart of sustainable development (SD), particularly the unequal distribution of world resources (including global natural resources), but the focus to date has mostly been on intergenerational equality. In other words, it is important that the resources and ecological balance available to humanity today do not pose problems for future generations. Therefore, it is possible to define sustainable development policy in a typical way as policies that provide future generations with the opportunity to achieve similar or higher levels of well-being than those currently available (Noord & Vourc'h, 1999: 7). As a result, in order to make the concept of economic development sustainable, it is essential not to harm the global ecosystem, to increase people's welfare, and to ensure the continuity of the current situation. These elements are important issues that need to be addressed globally. This is because while people's needs are increasing indefinitely, the resources provided by the environment remain very limited. From this perspective, it is important to use limited resources effectively to increase economic, social, and cultural well-being and to pass this on to future generations.

Sustainable development encompasses not only economic progress but also social equality and development models that protect social equality. In this context, sustainable development comprises three dimensions: social, economic, and environmental. The sustainability of development is not solely dependent on economic progress; it also requires social and environmental progress (Şahin & Kutlu, 2014: 56).

Renewable energy sources, also known as clean energy sources, are of great importance for the future. The environmental problems caused by the use of fossil fuels in energy production, which continue to worsen and threaten the survival of living beings, make the use of renewable energy sources imperative (Torunoğlu Gedik, 2015: 30).

Renewable energy sources refer to energy sources that exist in nature, are obtained without the need for a production process, have little harm or impact on the environment, are not fossil-based, and are constantly renewed (Ataman, 2007: 97). As a result of these natural phenomena occurring in nature, wind, solar, geothermal, hydroelectric, and biomass energies, and marine wave and tidal energy are obtained. These resources do not disappear as they are consumed; the used resource can renew itself as quickly as possible (Adıyaman, 2012, p. 36).

From the Industrial Revolution to the present day, the daily increase in human-made tools and equipment, the proliferation of factories, and the problems in the atmosphere, water, and oxygen that affect the lives of living beings have begun to damage natural vegetation. These problems were recognized in the 1980s, and it was concluded that if no action was taken, they would directly affect the lives of living beings. Many countries, primarily the US, Sweden, and the UK, stated that measures to address environmental problems would be in their best interests and began to take precautions. After these activities, developed countries began to make decisions with the awareness that the environment is a serious issue that must not be harmed, in line with their economic, social, and political goals (Eren, 2013, p. 132).

Green management means that businesses operate with an awareness of their environmental responsibilities. The main target of the green management concept is for businesses to consider and implement environmental protection awareness alongside long-term economic growth. The concept of green management emerged due to insufficient attention to the environment, the problems this created, society's understanding of these problems, and the rise in public awareness. The green management approach adopted to overcome these problems benefits both companies and society (Akatay & Aslan, 2008: 318).

This study aims to examine green management practices and to qualitatively analyze the goals and

objectives of businesses that implement "green management" in their activities, the methods they adopt, and the results they achieve, and to develop recommendations based on these results. The main problem statement of the study is: "Is there an effect of sustainable development goals and renewable energy strategies on the relationship between companies' green management implementations and organizational performance?"

2. CONCEPTUAL FRAMEWORK

With industrialization, the transition to mass production, and the perception that natural resources are unlimited, sustainable practices have become increasingly important today. As in all production activities, the importance of green management practices and green production in businesses, which are vital for the existence and continuation of humanity and all living things, is increasing locally, regionally, and globally every day. In this context, it is important to analyze the economic, managerial, and social objectives, targets, and outcomes of green management practices in businesses. Therefore, it is necessary to disseminate green management practices in Turkey and implement the necessary strategies as soon as possible.

1.1.   Sustainable Development

Today, with globalization and increased competition among businesses, human-caused damage to nature is also increasing in parallel (Delihasan, Özcan, & Erkasap, 2021, p. 1946). Thus, businesses strive to increase their performance on the one hand, while also trying to use resources at the lowest possible level on the other. Environmental issues such as global warming have heightened sensitivity, and sustainability has become crucial not only for businesses but also for consumers and other stakeholders. The UN Sustainable Development Summit resulted in the adoption of the "2030 Sustainable Development Goals" by 193 countries. At the summit, the elimination of poverty in countries was identified as an important element of sustainable development (Social Benefit Summit, 2016).

1.2.   Renewable Energy

The 1970 oil crisis and the sudden rise in energy prices led to efforts to use energy resources more effectively and to adopt renewable energy sources. The environmental awareness that began in 1990 revealed that conventional energy production and consumption had negative effects on the environment and natural resources (Gürbüz, 2003, p. 89).

Existing living conditions and differences in these conditions cause energy consumption to increase continuously. Current energy resources are insufficient due to increased consumption. Energy demand continues to rise due to ongoing population growth, higher population growth rates, industrialization-driven needs, and rising living standards. The environmental damage caused by fossil energy sources, the risk of energy depletion, price volatility, insufficient energy supply, and increased dependence on foreign countries make it inevitable to turn to renewable energy sources (Albayrak, 2019, p. 50).

As global warming and climate change intensify due to greenhouse gas emissions from burning fossil fuels, the high social, environmental, and economic costs of nuclear energy make it increasingly evident that governments should turn to domestic and renewable energy sources (Letcher, 2022). Today, the importance of using domestic energy sources to ensure sustainability, protect ecological balance, and produce renewable energy is increasing (Bartik, 2018, p. 34).

1.3.   Green Management

Due to the depletion of underground resources on our planet, business managers need to address ecological issues and shift their management mindset (Nemli, 2001: 212). As a result, businesses must adopt an environmentally centered management approach instead of the traditional approach. Research has revealed numerous factors that demonstrate the need for businesses to implement green management. Businesses acting in accordance with green management ensure that the economic benefits are recognized. However, businesses must meet certain conditions to adopt and implement green management (Karabulut, 2003: p. 46). The sole purpose of green management is not to reduce environmental damage. It also enhances the business's competitiveness. Therefore, businesses must implement green management practices in all areas of operation, including management, human resources, accounting, finance, production, marketing, and logistics (Ceyhan & Ada, 2015, p. 117).

In today's world, it is difficult for businesses in any industry to maintain sustainability without understanding their responsibilities to the environment and the challenges it faces. With this understanding, organizations must account for environmental factors in their forward-looking work plans. This is because environmental awareness provides businesses with a competitive advantage

(Atay & Dilek, 2013: 204). A review of studies emphasizes that environmental awareness and green management are critical for businesses and that businesses must focus on these issues to remain viable (Kara & Kaya, 2020).

1.4. Hypothesis Development

In the following subsections, theoretical relationships between the variables emphasized in the conceptual framework will be explained, and hypotheses will be presented.

1.5. Between Green Management And Organizational Performance

In today's world, it is difficult for businesses, regardless of industry, to maintain sustainability without awareness of their responsibilities to the environment and environmental issues. With this understanding, organizations must account for environmental factors in their forward-looking work plans. This is because environmental awareness provides businesses with a competitive advantage (Atay & Dilek, 2013: 204). A review of studies highlights that environmental awareness, green management, and related concepts are of great importance to businesses and that businesses must focus on these issues to remain viable (Kara & Kaya, 2020).

Karakuş and Erdirençelebi (2018) conducted research to assess the impact of green management approaches among SMEs operating in Konya on organizational success, functions, and efficiency. The research results revealed that the relationship between the green management approach and business functions positively affected business success and performance. Teixeira et al. (2013) found that implementing green management in organizations would offer new strategic opportunities. The study conducted by Claver et al. (2007) found that green management and environmental practices positively affect business performance.

A study by Karabulut (2003) found that environmental awareness and green management practices in businesses positively affect business performance. The study concluded that success indicators would increase according to the level of implementation of green management activities in businesses. A study by Florida and Davison (2001) found that understanding green management and implementing its activities within an organization can create new advantages. In their project, Handfield and colleagues (1997) emphasized the importance of organizations aiming for success by

applying green management principles to their business practices with environmental awareness. In their study, Porter and Van der Linde (1995) stated that adopting a green approach and fostering environmental awareness in business create important opportunities for the organization relative to its competitors. Based on this information, the following hypothesis was developed.

H1: Businesses' green management practices effect organizational performance.

1.6. The Relationship Between Sustainable Development And Green Management

The main point of the emergence of green management is the concept of sustainable development. Sustainability refers to the protection of natural resources necessary for human life and the improvement of the quality of life, which is of great importance to people (Ar, 2011: 49). Due to changing conditions today, the economic development of businesses is increasingly constrained by the concept of sustainability. The concept of sustainability, which advocates for a better life, emphasizes the need for environmental, economic, and social awareness. Although sustainability is generally perceived as an environmental concept, it also encompasses the social responsibilities that companies, society, and individuals should be aware of (Sarıkaya & Kaya, 2007, p. 221).

The concept of sustainability, which emerged as a solution to environmental problems, encompasses practices that minimize environmental damage by incorporating sustainability principles into economic activities (Seyhan, 2010, p. 15). Sustainability is expressed as the transfer of our economic and environmental values to future generations. Green management, on the other hand, refers to efforts that aim to minimize environmental damage by integrating environmental values with management concepts. The benefits of green management include meeting society's environmental expectations and ensuring a legacy for future generations by protecting the environment. Therefore, the concept of green management is consistent with sustainability goals (Uluçeçen, 2019, p. 52).

Murphy argues that green management has a preminent effect on sustainable development. The reason is that he believes reducing greenhouse gas emissions, which can contribute to global warming, will have a preminent effect on the environment and that green management will also benefit businesses (Murphy, 2002). Based on this information, the following hypothesis has been developed.

H2: Sustainable development goals affect

businesses' green management practices.

1.7. The Link Between Sustainable Development And Organizational Performance

Energy productivity is the reduction of energy consumption without negatively impacting production or lowering the standard of living, achieved by recovering various types of waste through recycling or new technologies, and by minimizing energy losses within the organization, which occur in many forms, such as heat, steam, and electricity. The greatest benefit of conscious energy consumption and energy savings is reducing energy imports, thereby improving the government's balance of payments and enhancing energy security. In addition, it prevents environmental damage, supports environmental protection, and can positively impact organizational performance (Fidan, 2006: 63). It contributes to the country's economy, greenhouse gas emissions reduction, sustainable energy, energy supply security, and environmental protection. It should not be forgotten that the energy gained through energy productivity is appropriate, clean, and national energy (Erdoğan, 2016, p. 229). Therefore, the following hypothesis has been developed.

H3: Sustainable development goals affect organizational performance.

1.8. Moderating Effect Of Sustainable Development And Renewable Energy Strategies

The importance of renewable energy sources in meeting energy needs is increasing day by day for both developed and developing countries. Numerous studies have shown that renewable energy sources play an important role not only as energy sources but also in addressing climate change, reducing poverty, improving global energy access, enhancing energy security, and achieving sustainable development (United Nations, 2014, p. 3). At the same time, energy is the most important driver of the country's current account deficit. Therefore, renewable energy sources must be used instead of fossil fuels to raise society's welfare and minimize harm (Erdoğdu, 2016, p. 67).

RE has a crucial share in achieving the social, economic, and environmental goals of sustainable development. Therefore, energy has become an important issue in SD studies, and the target of supplying people's energy requirements without any harm to the economy or the environment has come to the fore (Öymen & Ömeroğlu, 2020, p. 1071). To ensure development and energy continuity, it is necessary to use renewable energy sources that are

environmentally friendly and do not disrupt the ecological balance. In this context, recycling efforts should be valued, and efforts should focus on preventing unnecessary resource use and increasing energy efficiency (Karabıçak & Özdemir, 2015, p. 45).

The use of fossil fuels is among the biggest problems contributing to climate change and environmental imbalance. Studies on this subject vary by the country's level of growth. Energy efficiency in developed countries aims to increase wealth and shift toward energy sources that cause little or no environmental damage. In developing countries, it aims more to increase economic benefits and reduce scarcity. Countries must switch to renewable energy through technological means to achieve the goals of sustainable development (Dinçer & Aslan, 2008, pp. 65-66). Based on this information, the following hypothesis has been developed.

H4: Sustainable development goals and renewable energy have a moderating impact on the relationship between businesses' green management practices and organizational performance.

3. METHOD

This study, which examines the effect of renewable energy strategies within the context of the Sustainable Development Goals on businesses' green management practices and organizational performance, was designed as a correlational survey. The research findings were obtained using SPSS and LISREL statistical programs. Confirmatory factor and reliability analyses were conducted on the data. Correlation and hierarchical regression analyses were performed to test the cause-and-effect relationships.

1.9. Population And Sample

The population of this study comprises businesses in Turkey that implement green management. The sample consists of businesses in Istanbul Province that are implementing green management. In the sampling method, each participant has an independent chance of being selected for the sample (Büyüköztürk et al., 2013). A 5% margin of error and a 95% confidence level were used to determine the sample size, which was calculated to be 385 people.

1.10. Measures

During the data collection process, the survey was utilized. The research data were obtained using a demographic information form, the Sustainable Development Scale, the Renewable Energy Awareness Scale, the Green Management

Scale, and the Organizational Performance Scale. The demographic information form consists of 8 questions prepared by the researcher to determine participants' gender, age, marital status, educational status, and other information.

Sustainable Development Scale: Developed by Ling (2019), the scale comprises 9 items across 3 factors. It measures sustainable development in environmental, social, and economic terms. The questionnaire items were designed to have a five-point Likert scale. Specifically, there are five options for responding to each item on the sustainable development scale. These options are weighted as follows: (1. Strongly Disagree, 2. Disagree, 3. Neutral, 4. Agree, 5. Strongly Agree).

Renewable Energy Awareness Scale: Since the scale developed by Çakırlar (2015) defines two factors, affective and cognitive, the items in the measurement tool were designed to capture these factors. When creating items for the cognitive factor, care was taken to include general information about relevant sources, the usage situation in Turkey, and the economic and ecological pros and cons. When creating the affective factor, care was taken to select items that assessed interest, sensitivity, and awareness toward renewable energy sources. It consists of 23 statements on a 5-point Likert scale.

Green Management Scale: The Green Management Scale, developed by Ling (2019), comprises 29 items across 5 factors. It measures perceptions of green management across the following factors: Market, Business Efficiency, Workforce, Motivation, and Challenges. The items in the questionnaire are designed to have a five-point Likert scale. Specifically, there are five options to respond to each element of the sustainable development factors. These options are weighted as follows: (1. Strongly Disagree, 2. Disagree, 3. Neutral, 4. Agree, 5. Strongly Agree).

Organizational Performance Scale: This scale, developed by Chen and Lai (2006), consists of 8 items and a single factor. The items in the questionnaire are designed to have a five-point Likert scale. Specifically, there are five options for responding to each item in the sustainable development factors. These options are aligned with other scales used in this study.

4. FINDINGS AND RESULTS

The study's findings on the demographic variables are presented in Table 1.

Table 1: Distribution By Demographic Variables (N=398).

Variable	Group	Number (n)	Percentage (%)
Gender	Female	208	52,3
	Male	190	47,7
Eğitim Durumu	High School and below	55	13,8
	Associate - Undergraduate	124	31,2
	Graduate	219	55,0
Age Groups	18 - 25	50	12,6
	26 - 30	115	28,9
	31- 35	124	31,2
	36- 45	82	20,6
	46 and over	27	6,8
Years Working	1 Year or less	59	14,8
	2-5 Years	151	37,9
	6-10 Years	111	27,9
	11-15 Years	50	12,6
	16-20 Years	11	2,8
	21 Years and more	16	4,0
Reward	Yes	230	57,8
	No	168	42,2
ISO Certificate	Yes	258	64,8
	No	140	35,2
Active Years of Business	1 year or less	4	1,0
	2-5 years	12	3,0
	6-10 years	21	5,3
	11-15 years	78	19,6
	16-20 years	104	26,1
	21 years or more	179	45,0

Position at Work	Employee	195	49,0
	Lower-level manager	111	27,9
	Middle-level manager	68	17,1
	Senior-level manager	24	6,0

Table 1 shows that 52.3% of the participants in the study were women; 55% had postgraduate education; 31.2% were aged 31-35; 37.9% had 2-5 years of seniority; 57.8% had received awards; 64.8% had ISO certification; 45% had been in business for 21 years or more; and 49% were in employee positions.

1.11. Confirmatory Factor And Reliability Analyses

The confirmatory factor analysis and reliability results for the sustainable development, renewable energy awareness, green management, and organizational performance scales are

presented in Tables 2, 3, 4, 5, 6, 7, 8, and 9, respectively.

1.11.1. Factor Analysis Results Of The Sustainable Development Scale

The KMO and Bartlett test results for the SD scale's factor analysis are shown in Table 2. The KMO value for the scale's factor analysis was 0.945. Accordingly, the sample size is suitable for factor analysis (KMO>0.500). In the Bartlett test, the X2 value was 5329.038 and was statistically significant (p<0.05). Accordingly, the normal distribution was provided. Based on all of the test results, the data are available for factor analysis.

Table 2: Factor Analysis Results For The Sustainable Development Scale With KMO And Bartlett Values.

Cronbach's Alpha	Factor	Items	Factor Loading	Explanatory Power of the Factor (%)	AVE	CR	KMO	
0,98	Environment	SK1	,948	40,06	0,91	0,95	0,945	
		SK2	,946					
		SK3	,919					
	Social	SK4	,935	25,24	0,92	0,91		
		SK5	,906					
	Economic	SK6	,917	19,74	0,82	0,95	Bartlett Test	
		SK7	,924				X^2	5329,038
		SK8	,926				Sd	36
		SK9	,876				P	,000
Total Variance Explained				85,04				

The scale includes 9 items, and its factor loadings range from 0.88 to 0.95. A DFA analysis was conducted to confirm the factor structure of the Sustainable Development scale determined by

AFA. The most commonly used fit indices for interpreting the analysis results, including X2/df, RMSEA, GFI, CFI, NFI, and RMR values, are presented in Table 3.

Table 3: DFA Results Related To The Sustainable Development Scale.

CMIN(X^2)	sd	X 2/sd	RMSEA	GFI	CFI	NFI	RMR
242,70	82	2,95	0,005	0,95	0,98	0,98	0,039

According to the DFA results for the Sustainable Development Scale, the (X2) value is 242.70, and the df are 82. In terms of fit indices, a chi-square/df value of 3 or less indicates a good fit (Hair et al., 2012; Sümer, 2000). The scale's (X2/df) value was 2.95, indicating good model fit. An RMSEA value and RMR value of ".08" or less,

and GFI, CFI, and NFI values of ".90", which indicates a good fit (Sümer, 2000). Therefore, the scale shows a good fit based on the DFA results. The coefficients and path diagram for the item-factor relationships calculated with DFA are presented in Figure 4.
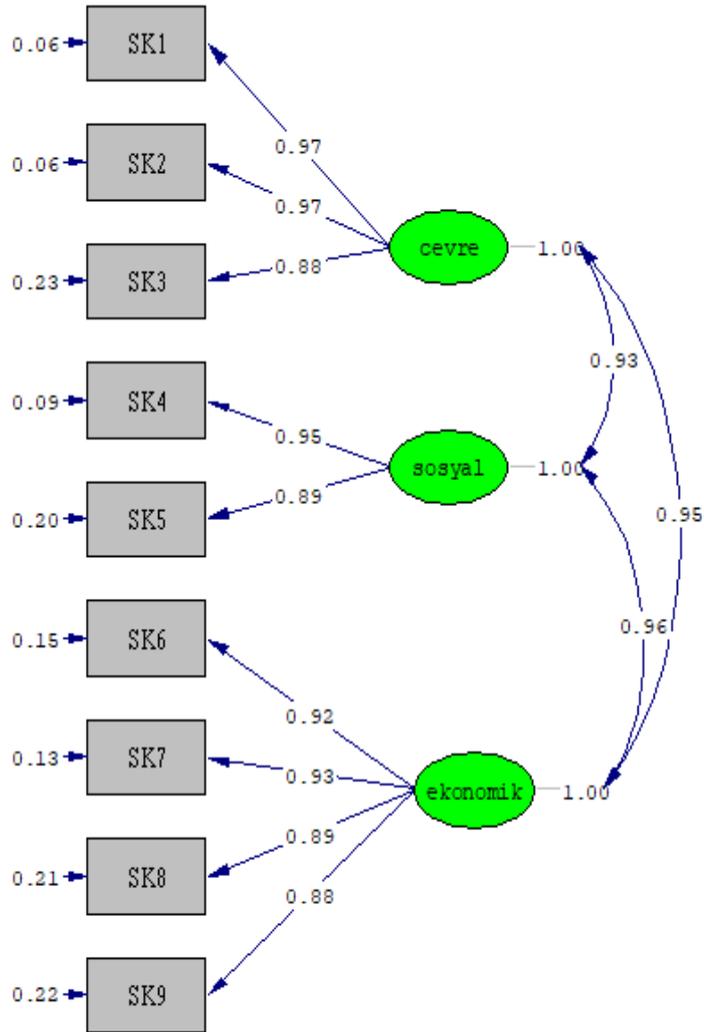
Chi-Square=242.70, df=82, P-value=0.00000, RMSEA=0.005

Figure 1: Path Diagram of The Sustainable Development Scale.

Figure 1 presents the structural and correlation coefficients for the relationship between each scale item and its corresponding factor. The scale's goodness-of-fit was good, as indicated by the X2/df, CFI, and RMR values.

1.11.2. Factor Analysis Results Of The Renewable Energy Awareness Scale

The KMO and Bartlett test results for the renewable energy awareness scale's factor analysis are shown in Table 4. The KMO value for the scale's

factor analysis was 0.958. Accordingly, the sample size is sufficient for factor analysis (KMO > 0.500). In the Bartlett test, the X2 value was 13553.897 and was statistically significant (p<0.05). Accordingly, the normal distribution was provided. Based on all of the test results, the data are available for factor analysis.

It was decided that the scale showed a two-factor structure. An analysis was performed to determine the distribution of questions across the two factors in the two-factor structure, and the results are presented in the table.

Table 4: Analysis Results Related To The Factors Of The Renewable Energy Awareness Scale And KMO And Bartlett Values.

Cronbach's Alpha	Factor	Items	Factor Loading	Explanatory Power of the Factor (%)	AVE	CR	KMO
0,88	Biliş	YEF1	,730	55,62	0,73	0,89	0,958
		YEF2	,617				

		YEF3	,802					
		YEF4	,686					
		YEF5	,581					
		YEF6	,823					
		YEF7	,741					
		YEF8	,647					
		YEF9	,583					
		YEF10	,872					
		YEF11	,804					
		YEF12	,828					
		YEF13	,846					
		YEF14	,825					
		YEF15	,812				Bartlett Test	
		YEF16	,879				*X:*	13553,897
		YEF17	,893				Sd	253
		YEF18	,881				P	,000
	Duyuş	YEF19	,848	23,01	0,89	0,98		
		YEF20	,891					
		YEF21	,832					
		YEF22	,906					
		YEF23	,859					
Total Variance Explained				78,63				

The scale is the sum of all items, without scale subfactors. It consists of 23 questions with factor loadings ranging from 0.952 to 0.681. The factor's total variance explained is 78.63%, and Cronbach's Alpha is 0.88. Since 0.80 < 0.88 < 1.00, the scale was considered highly reliable.

A DFA examination was conducted to validate the factor structure of the Renewable Energy Awareness scale determined by AFA. The X2/sd, RMSEA, GFI, CFI, NFI, and RMR values, which are the most commonly used fit indices for interpreting the analysis results, are given in Table 5.

Table 5: DFA Results Related To The Renewable Energy Awareness Scale.

CMIN(X²)	sd	X 2/sd	RMSEA	GFI	CFI	NFI	RMR
1983,07	729	2,72	0,174	0,90	0,94	0,94	0,013

According to the DFA results for the Renewable Energy Awareness Scale, the (X2) value is 1983.07 and the degrees of freedom (df) is 729. In terms of fit indices, a chi-square/degrees of freedom value of 3 or less indicates a good fit (Sümer, 2000). The (X2/df) value of the scale was found to be 2.72, and the model fit was determined to be good. An RMSEA value and

RMR value of ".08" or less, and GFI, CFI, and NFI values of ".90" or higher indicate good fit (Hair et al., 2012; Sümer, 2000). Therefore, the scale shows a good fit based on the fit indices obtained from the DFA results. The coefficients and path diagram for the item-factor relationships calculated using DFA are presented in Figure 6.
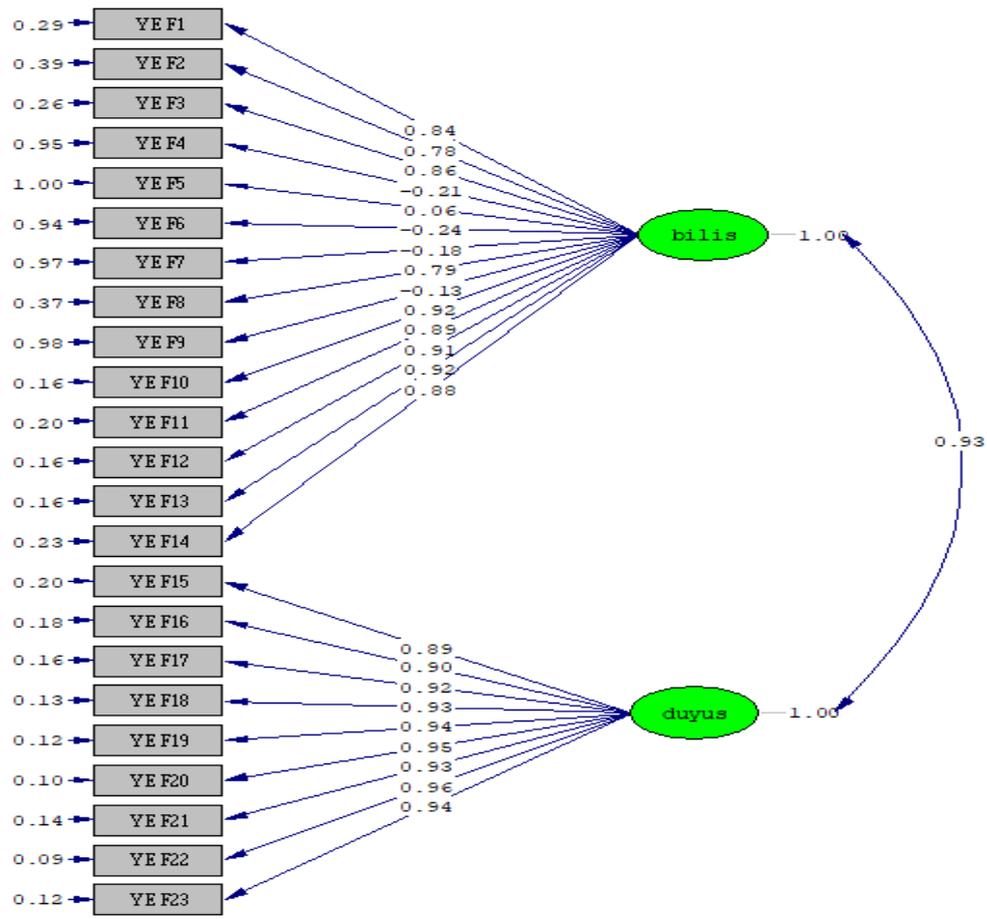
Figure 2: Path Graph For The Renewable Energy Awareness Scale.

Figure 2 presents the structural coefficients and correlation coefficients related to the relationship between each item on the scale and the factor it belongs to. When examining the scale's goodness-of-fit values, it was determined that it showed good fit based on the X2/df value, CFI, and RMR values.

1.11.3. Factor Analysis Results Of The Green Management Scale

The KMO and Bartlett test results for the green management scale's factor analysis are shown Table 6. The KMO value for the scale's factor analysis was 0.975. Accordingly, the sample size is sufficient for factor analysis (KMO > 0.500). In the Bartlett test, the X2 value was 21943.489 and was statistically significant (p<0.05). Accordingly, the normal distribution was obtained. Based on all of the test results, the data are available for factor analysis.

Table 6: Analysis Results Related To The Factors Of The Green Management Scale.

Cronbach's Alpha	Factor	Items	Factor Loading	Explanatory Power of the Factor (%)	AVE	CR	KMO	
0,99	Market	YY1	,863	35,83	0,98	0,97	0,975	
		YY2	,867					
		YY3	,883					
		YY4	,841					
		YY5	,866					
	Work Efficiency	YY6	,866	15,72	0,86	0,89	Bartlett Test	
		YY7	,883				X^2	21943,489
		YY8	,858				sd	406
		YY9	,930				p	,000
		YY10	,895					
	Workforce	YY11	,866	12,22	0,89	0,98		

		YY12	,860				
		YY13	,841				
		YY14	,854				
		YY15	,895				
		YY16	,866				
		YY17	,778				
	Motivation	YY18	,857	11,12	0,96	0,90	
		YY19	,904				
		YY20	,870				
		YY21	,882				
		YY22	,856				
	Challenges	YY23	,878	10,81	0,75	0,97	
		YY24	,811				
		YY25	,696				
		YY26	,885				
		YY27	,886				
		YY28	,787				
		YY29	,833				
	Total Variance Explained			85,70			

The scale is a single-factor scale; it is obtained by summing all items. It consists of 29 questions with factor loadings ranging from 0.963 to 0.810. The factor's total variance explained is 85.70%, and Cronbach's Alpha is 0.99. Since the values range from 0.80 to 1.00, the scale is highly reliable.

Table 7: DFA Results Related To The Green Management Scale.

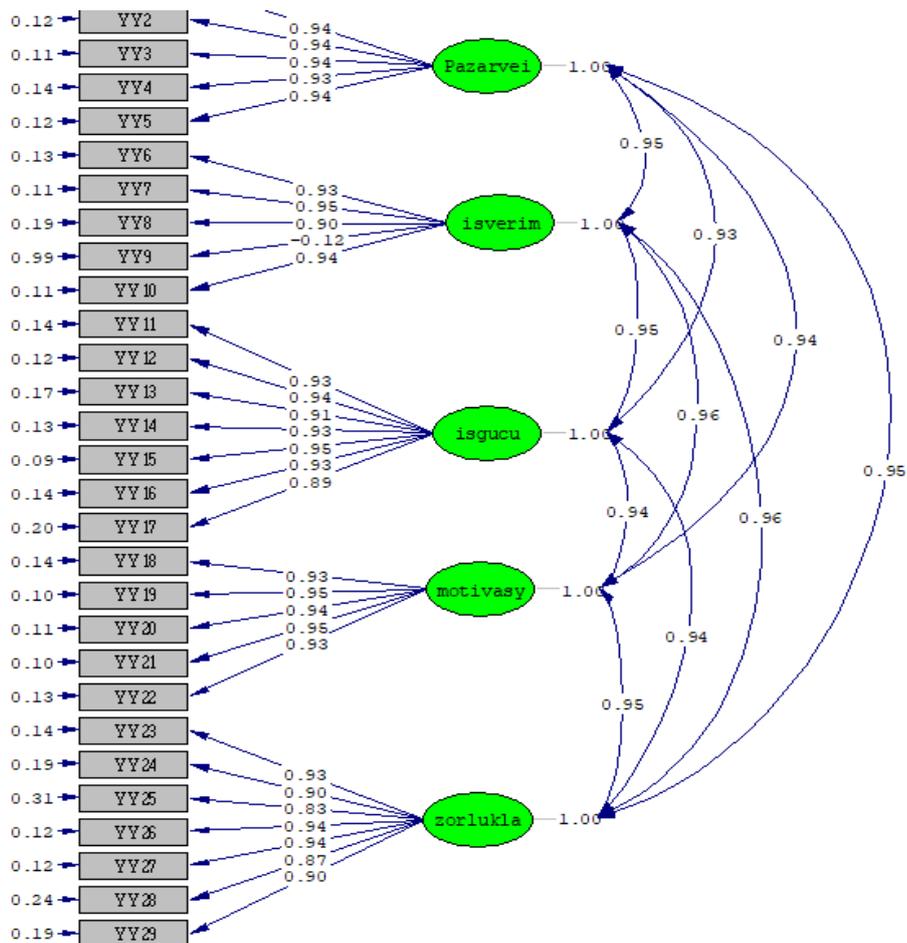| CMIN(X²)	sd	X 2 /sd	RMSEA	GFI	CFI	NFI	RMR
2241,54	767	2,92	0,006	0,91	0,98	0,98	0,025

Figure 3: Path Graph For The Green Management Scale.

According to the DFA results for the Green Management Scale, the ($X2$) value is 2241.54 and the degrees of freedom (df) is 767. In terms of fit indices, a chi-square/degrees of freedom value of 3 or less indicates a good fit (Sümer, 2000). The scale's ($X2/df$) value was 2.92, and the model fit was good. An RMSEA value and RMR value of ".08" or less, and GFI, CFI, and NFI values of ".90" or higher indicate good fit (Sümer, 2000). In this context, the scale shows a

good fit based on the fit indices obtained from the DFA results. The coefficients and path diagram for the item-factor relationships calculated with DFA are presented in Figure 3.

Figure 3 presents the structural coefficients and correlation coefficients related to the relationship between each item on the scale and the factor it

belongs to. When examining the scale's goodness-of-fit, it showed a good fit based on the $X2/df$, CFI, and RMR values.

1.11.4. Factor Analysis Results Of The Organizational Performance Scale

The KMO and Bartlett test results for the organizational performance scale's factor analysis are presented in Table 8. The KMO value for the scale was calculated as 0.955 in the factor analysis. Accordingly, the sample size is available for factor analysis (KMO>0.500). In the Bartlett test, the $X2$ value was 5657.041 and was statistically significant (p<0.05). Accordingly, the normal distribution was provided. Based on all of the test results, the data are available for factor analysis.

Table 8: Analysis Results Related To The Factors Of The Organizational Performance Scale.

Cronbach's Alpha	Items	Factor Loading	Explanatory Power of the Factor (%)	AVE	CR	KMO	
0,99	op1	,914	90,87	0,78	0,98	0,955	
	op2	,916				Bartlett Test	
	op3	,896					
	op4	,917				X^2	5657,041
	op5	,920				sd	28
	op6	,899				p	,000
	op7	,908					
	op8	,901					
Total Variance Explained				90,87			

It is a measure obtained by summing all items, without scale subfactors. It consists of 8 questions with factor loadings ranging from 0.959 to 0.946. The factor's total variance explained is 85.70%, and Cronbach's Alpha is 0.99. Since the values range from 0.80 to 1.00, the scale was considered highly reliable.

A DFA examination was conducted to validate the factor structure of the Organizational Performance scale determined by AFA. The $X2/sd$, RMSEA, GFI, CFI, NFI, and RMR values, which are the most commonly used fit indices for interpreting the analysis results, are given in Table 9.

Table 9: DFA Results Related To The Organizational Performance Scale.

CMIN(X^2)	sd	$X2/sd$	RMSEA	GFI	CFI	NFI	RMR
195,06	72	2,71	0,008	0,92	0,98	0,98	0,014

According to the DFA results for the Organizational Performance Scale, the ($X2$) value is 195.06 and the degrees of freedom (df) is 72. In terms of fit indices, a chi-square/degrees of freedom value of 3 or less indicates a good fit (Sümer, 2000). The scale's ($X2/df$) value was 2.71, indicating good model fit. An RMSEA value and RMR value of ".08" or less,

and GFI, CFI, and NFI values of ".90" or higher indicate good fit (Sümer, 2000). In this context, the scale shows a good fit based on the fit indices from the DFA results. The coefficients and path diagram for the item-factor relationships calculated using DFA are presented in Figure 4.
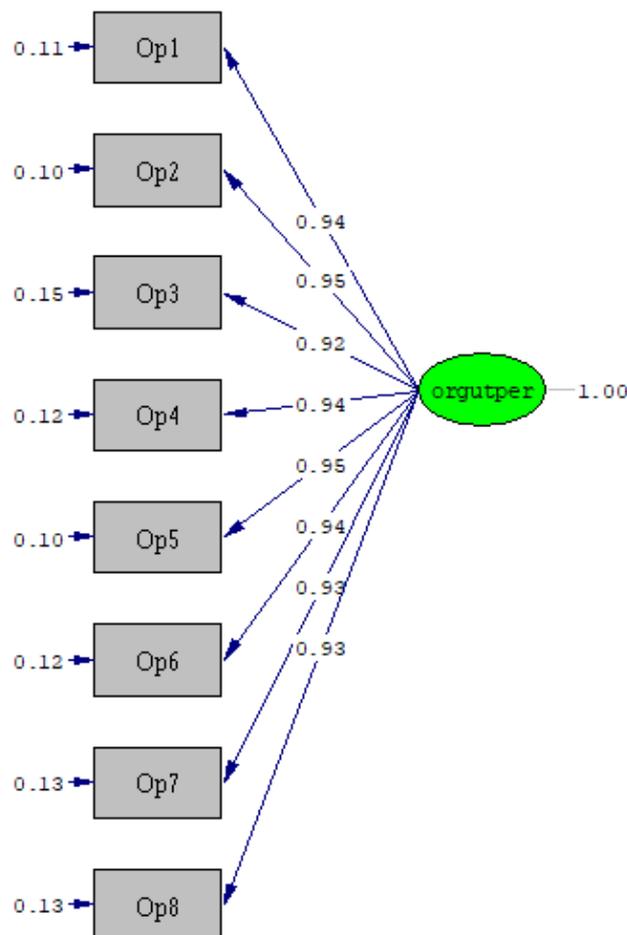
Chi-Square=195.06, df=72, P-value=0.00000, RMSEA=0.008

Figure 4: Path Graph For The Organizational Performance Scale.

Figure 4 presents the structural and correlation coefficients for the relationship between each scale item and its factor. When examining the scale's goodness-of-fit, it showed a good fit based on the X2/df, CFI, and RMR values.

The normal distribution was evaluated using the kurtosis and skewness coefficients. Table 10 presents the descriptive findings for the scales along with the kurtosis and skewness coefficients.

1.11.5. Normal Distribution Analysis

Table 10: Descriptive Statistics (N=398).

Scales	Min	Max	Avg.	SS	Skewness		Kurtosis	
					Statistics	Std. Error	Statistics	Std. Error
Environmental	1,00	5,00	3,7525	1,11083	-,855	,122	-,019	,244
Social	1,00	5,00	3,8417	1,16306	-,895	,122	-,063	,244
Economic	1,00	5,00	3,6476	1,12241	-,673	,122	-,301	,244
Sustainable Development Scale	1,00	5,00	3,7158	1,09246	-,799	,122	-,048	,244
Cognitive Awareness	2,43	4,36	3,5138	,41659	-,093	,122	-,804	,244
Emotional Awareness	1,00	5,00	3,9084	,99724	-1,062	,122	,795	,244
Renewable Energy Awareness Scale	2,13	4,52	3,6682	,56326	-,557	,122	-,376	,244
Market and Demand	1,00	5,00	3,9256	1,01589	-1,076	,122	,684	,244

Work Efficiency and Cost Savings	1,00	5,00	3,6387	,84485	-,991	,122	1,358	,244
Labor and Financial Incentives	1,57	5,00	3,7100	,72453	-1,188	,122	1,010	,244
Motivation for Green Management Strategy	1,00	5,00	3,9593	1,02966	-1,037	,122	,465	,244
Challenges of Green Management Strategy	1,00	5,00	3,8661	,97834	-,973	,122	,637	,244
Green Management Scale	1,14	5,00	3,8155	,86921	-1,205	,122	1,154	,244
Organizational Performance Scale	1,00	5,00	3,8574	1,01291	-,933	,122	,417	,244

According to the analysis results, the mean scores for the sustainable development scale, the renewable energy awareness scale, the green management scale, and the organizational performance scale were 3.71, 3.66, 3.81, and 3.85, respectively. In this case, the scale values used in the study are above the mean. The skewness and kurtosis values for Sustainable Development, Renewable Energy Awareness, Green Management, and Organizational Performance are between +2 and -2. In the research scale analysis, according to George and Mallery (2010), for the data to have a normal distribution, the skewness and kurtosis values must be between +2 and -2. Accordingly, the data are normally distributed.

Table 11: Correlation Table Between Scales (N = 398).

No	Scales	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Environmental	1													
2	Social	,890**	1												
3	Economic	,938**	,843**	1											
4	Sustainable Development Scale	,985**	,906**	,980**	1										
5	Cognitive Awareness	,366**	,365**	,351**	,369**	1									
6	Emotional Awareness	,730**	,697**	,693**	,729**	,509**	1								
7	Renewable Energy Awareness Scale	,671**	,647**	,638**	,671**	,803**	,922**	1							
8	Market and Demand	,703**	,662**	,665**	,700**	,541**	,883**	,855**	1						
9	Work Efficiency and Cost Savings	,584**	,532**	,543**	,575**	,372**	,811**	,729**	,873**	1					
10	Labor and Financial Incentives	,720**	,685**	,683**	,718**	,577**	,946**	,915**	,883**	,826**	1				
11	Motivation for Green Management Strategy	,679**	,654**	,651**	,682**	,534**	,866**	,840**	,925**	,886**	,890**	1			
12	Challenges of Green Management Strategy	,654**	,615**	,631**	,656**	,506**	,861**	,824**	,927**	,888**	,861**	,923**	1		
13	Green Management Scale	,701**	,661**	,667**	,699**	,534**	,915**	,874**	,966**	,932**	,933**	,969**	,969**	1	
14	Organizational Performance Scale	,759**	,717**	,765**	,777**	,509**	,868**	,830**	,889**	,788**	,866**	,860**	,873**	,898**	1

Based on the correlation analysis in Table 11, there is a positive relationship between the sustainable development scale and the renewable energy awareness scale among participants in the study (r=0.67, p<0.01). Furthermore, there is a significant and positive relationship between the sustainable development scale and the green management scale (r=0.69, p<0.01). Also, there is a positive relationship between the sustainable development scale and the organizational performance scale (r=0.77, p<0.01).

But then, a positive relationship between the renewable energy awareness scale and the green management scale has been obtained (r=0.77, p<0.01). Again, there is a significant and positive relationship between the renewable energy awareness scale and the organizational performance scale (r=0.73, p<0.01). Finally, there is a significant and positive relationship between the green management scale and the organizational performance scale (r=0.79, p<0.01). The four scales used in the study were found to be highly and positively correlated with one another.

Table 12: Impact Analysis Of Green Management Practices İn Businesses On Organizational Performance.

Değişken	B	Beta	t	Sig.	VIF	R	R2	Adjusted R2	F
Constant	-,188		-1,582	,114	10,157				
Market and Demand	,399	,401	6,062	,000*	5,641				
	-,169	-,141	-2,863	,004*	5,511				
Business Productivity and Cost Savings	,464	,332	6,827	,000*	10,649	,912a	,832	,829	,000b
	,027	,027	,403	,687	9,923				
Labor and Financial Incentives	,327	,316	4,834	,000*	10,157				

The factors of the participants' green management practices attitude scale significantly affect their perceptions of organizational performance [(R= .912, R²= .832) F(5,392)= 387.033; p<0.01]. The regression analysis results indicate that, where the factors of the participants' green management practices attitude scale were considered as the exogenous (independent) variable and their perceptions of organizational performance as the endogenous (dependent) variable, the factors of the participants' green management practices attitude scale explain 83.2% of the variation in their perceptions (R²= .832). In other words, increases in participants' perceptions of the factors in the green management practices scale are associated with higher organizational performance.

- It can be said that 16.8% of the change in participants' perceptions of organizational performance is related to other factors. Looking at the t-values of the regression analysis,
- The Market and Demand factor [t= 6.062, p= .000 (p<0.05)] is positive;

- The Work Efficiency and Cost Savings Factor [t= -2.863, p= .004 (p<0.05)] is negative;
- The Labor and Financial Incentives Factor [t= 6.827, p= .000 (p<0.05)] is positive; and

Challenges of Green Management Strategy Factor [t= 4.834, p= .000 (p<0.05)]. It is understood that perceptions significantly affect perceptions of organizational performance. In this case, a 100-unit increase in the market and demand factor of green management practices will increase organizational performance by 39.9%. Organizational performance will decrease by 16.9% with a 100-unit increase in the work-efficiency and cost-savings factor of green management practices. There is a negative effect. In this case, organizational performance will increase by 46.4% with a 100-unit increase in the labor and financial incentives factor of green management practices. In this case, a 100-unit increase in the challenge factor of green management practices will increase organizational performance by 32.7%. On the other hand, perceptions of the motivation factor for green management practices do not affect organizational performance.

Table 13: Impact Analysis Of Green Management Practices İn Businesses Regarding The Sustainable Development Goals.

Variable	B	Beta	t	Sig.	VIF	R	R²	Adjusted R²	F
Constant	1,708		15,344	,000					
Environmental	,376	,481	3,969	,000*	11,537	,706a	,498	,495	,000b
Social	,131	,176	2,244	,025*	4,819				
Economic	,052	,068	,656	,512	8,316				

The factors of the participants' sustainable development attitudes scale significantly influence their perceptions of green management [(R= .706, R²= .498) F(3,394)= 130.454; p<0.01]. As a result of the regression analysis, where the factors of the participants' sustainable development goals attitude scale were taken as the independent variable, and

their perceptions of green management as the dependent variable, the factors of the participants' sustainable development attitudes explain 49.8% of the variation in their perceptions (R²=.498). In other words, an increase in participants' perceptions of the factors of the sustainable development attitude scale increases their perception of green management.

It can be said that 50.02% of the change in participants' perceptions of green management is related to other factors. Looking at the t-values of the regression analysis performed;

- Environmental Factor [t= 3.969, p= .000 (p<0.05)] positively;
- Social Factor [t= 2.244, p= .025 (p<0.05)] positively affects perceptions of green management in a meaningful way.

In this case, a 100-unit increase in the environmental factor of sustainable development will increase green management by 37.6%. A 100-unit increase in the social factor of sustainable development will increase green management by 13.1%. On the other hand, perceptions of the economic factor of sustainable development do not affect green management.

Table 14: Impact Analysis Of Sustainable Development Goals On Organizational Performance İn Businesses.

Variable	B	Beta	t	Sig.	VIF	R	R²	Adjusted R²	F
Constant	1,169		10,185	,000		,779ª	,607	,604	,000ᵇ
Environmental	,177	,194	1,805	,072	11,537				
Social	,159	,183	2,635	,009*	4,819				
Economic	,388	,430	4,717	,000*	8,316				

The factors of the participants' sustainable development attitude scale significantly affect their perceptions of organizational performance [(R=.779, R²=.607) F(3,394)=202.798; p<0.01]. As a result of the regression analysis, where the factors of the participants' sustainable development attitudes scale were taken as the independent variable and the perceptions of organizational performance as the dependent variable, the factors of the participants' sustainable development attitudes scale explain 60.7% of the variation in perceptions (R²=.607). In other words, the increase in participants' perceptions of the factors in the sustainable development attitudes scale is associated with higher organizational performance.

It can be said that 39.3% of the change in participants' perceptions of organizational performance is related to other factors. Looking at the t-values of the regression analysis performed,

- Social Factor [t= 2.635, p=.000 (p<0.05)] positively;
- Economic Factor [t= 4.717, p=.000 (p<0.05)] positively affects their perceptions of organizational performance in a meaningful way.

In this case, a 100-unit increase in the social factor of the sustainable development scale will increase organizational performance by 15.99%. A 100-unit increase in the economic factor of the sustainable development scale will increase organizational performance by 38.8%. On the other hand, perceptions of the environmental factor of the sustainable development scale do not affect organizational performance.

In Figure 5, the moderator effect is tested using Model 2 of the HAYES templates for the mediation model test (Hayes, 2022).
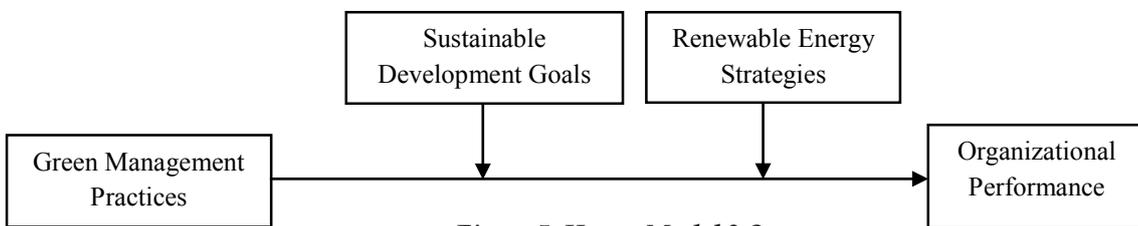

Figure 5: Hayes Model 2 Structure.

The moderating effects of sustainable development goals and renewable energy strategies on the causal effect of green management practices on organizational performance were analyzed using the PROCESS macro developed by Hayes (2022) in SPSS. The table indicates the PROCESS hierarchical regression analysis results.

Table 15: Process Hierarchical Regression Analysis.

Independent Variables	β	Std. Err.	T	P	LLCI	ULCI
Constant	3,8589	,0257	150,0653	,0000	3,8083	1,7298
Green Management	,6965	,0563	12,3775	,0000*	,4569	,8071

Sustainable Development Goals	,2553	,0266	9,5928	,0000*	,2030	,3077
Interaction between Green Management and Sustainable Development Goals	,1050	,0321	,3263	,0044*	,0526	,0735
Renewable Energy Strategies	,2208	,0750	2,9444	,0034*	,0734	,3682
Interaction between Green Management and Renewable Energy Strategies	,1960	,0695	-,2820	,0055*	,1563	,1171
R=,9239 R2=,8536 F=457,3004 p=,0000						
Interaction result R2 ΔR2=,000 F=,0534 sd=2,0000 p=,9480						

The regression model with the implemented model's beta coefficients is presented. The PROCESS analysis determined that the moderating effect of Sustainable Development Goals and Renewable Energy Strategies on the effect of the green management variable on organizational performance is statistically significant (F=0.534; df(2.00); t=.2820; p=.005; LLCI= .1563; ULCI=.1171).
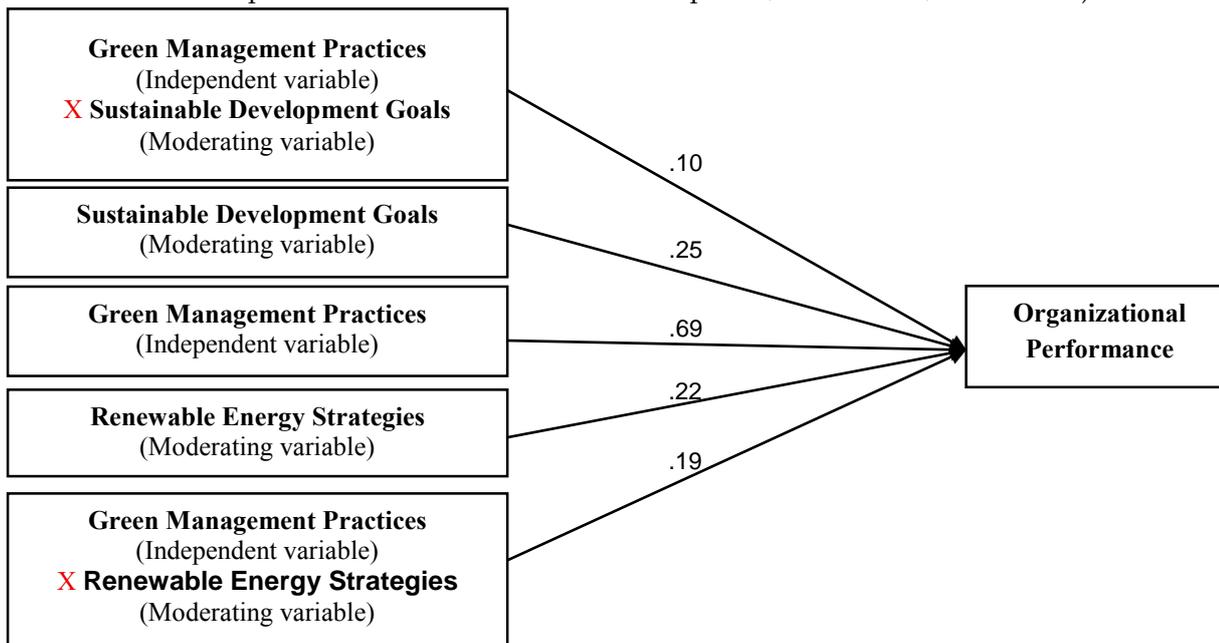

Figure 6. Research Model.

According to the Figure 6, the effect of green management practices on organizational performance was β=.69. On the other hand, the effect of sustainable development goals alone on organizational performance was β=.25, and the effect of renewable energy strategies on organizational performance was β=.22. The effect of green management practices and sustainable development goals on organizational performance was β=.10. The effect of green management practices and renewable energy strategies on organizational performance was β=.19. In this case, it can be said that renewable energy strategies are more effective than sustainable development goals when combined with green management practices. In other words, implementing renewable energy strategies alongside green management practices may be more effective for organizational performance (Hayes, 2022).

The results of the hypotheses are presented in Table 16, which aligns with the research findings.

Table 16: Evaluation Of Hypotheses.

Hypotheses	Explanation	Result
H1: Green management practices in businesses affect organizational performance.	Market and Demand Factor [t= 6.062, p= .000 (p<0.05)] positively; • Work Efficiency and Cost Savings Factor [t= -2.863, p= .004 (p<0.05)] negatively; • Labor and Financial Incentives Factor [t= 6.827, p= .000 (p<0.05)] positively and • Challenges of Green Management Strategy Factor [t= 4.834, p= .000 (p<0.05)] positively; However, there is no effect of the Motivation Factor for Green Management Strategy.	Based on these results, the first hypothesis of the study, "H1: Green management practices of organizations affect organizational performance," is ACCEPTED.

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H2: Sustainable development goals affect green management practices of organizations.	• Environmental Factor [t= 3.969, p= .000 (p<0.05)] positively; • Social Factor [t= 2.244, p= .025 (p<0.05)] positively • However, the Economic Factor has no effect.	Based on these results, the second hypothesis of the study, "H2: Sustainable development goals affect companies' green management practices," is ACCEPTED.
H3: Sustainable development goals affect organizational performance..	• Social Factor [t= 2.635, p= .000 (p<0.05)] positively; • Economic Factor [t= 4.717, p= .000 (p<0.05)] positively • However, the Environmental Factor has no effect.	Based on these results, the third hypothesis of the study, "H3: Sustainable development goals affect organizational performance," is ACCEPTED.
H4: Sustainable development goals and renewable energy have a moderating effect on the relationship between green management practices and organizational performance.	The effect of green management practices on organizational performance was β=.69. On the other hand, the effect of sustainable development goals alone on organizational performance was β=.25. The effect of renewable energy strategies on organizational performance was β=.22. The effect of green management practices and sustainable development goals on organizational performance was β=.10. The effect of green management practices and renewable energy strategies on organizational performance was found to be β=.19. In this case, it can be said that green management practices and renewable energy strategies together are more effective than sustainable development goals. In other words, for organizational performance to be effective, implementing renewable energy strategies alongside green management practices may be more effective..	Based on these results, the fourth hypothesis of the study, "H4: Sustainable development goals and renewable energy have a moderating effect on the relationship between green management practices and organizational performance in businesses," is ACCEPTED

5. DISCUSSION AND CONCLUSION

Based on the findings of the study; a significant and positive relationship between participants' scores on the sustainable development scale and the renewable energy awareness scale; between the sustainable development scale and the green management scale; between the sustainable development scale and the organizational performance scale; between the renewable energy awareness scale and the green management scale; between the renewable energy awareness scale and the organizational performance scale, and between the green management scale and the organizational performance scale were obtained. The results show that increases in participants' perceptions of the factors of the green management practices scale are associated with higher organizational performance.

In this case, while increases in market and demand factors resulting from green management practices improve organizational performance, improvements in work efficiency and cost savings will decrease it. In other words, there is a negative effect. It is observed that increases in participants' perceptions of the sub-factors of the sustainable development attitudes scale are associated with greater perceptions of green management. The results show that increases in participants' perceptions of the factors in the sustainable development attitudes scale are associated with higher organizational performance. Both sustainable development and renewable energy strategies have a moderating effect on the impact of green management practices on organizational performance.

The results for renewable energy awareness are above average. When reviewing the literature on behaviors, attitudes, and perceptions supporting this research in similar studies, it is possible to find many studies conducted in various countries (Zyadina et al., 2012; Stigka, Paravantis, and Mihalakakou, 2014; Lee, Kim, and Lee, 2016; Çelikler & Aksan, 2016).

Studies in this field are also conducted in Turkey. It has been explained that perceptions of renewable energy include limited information and misunderstandings (Saraç & Bedir, 2014). Studies examining RE awareness also exist (Karatepe et al., 2012; Chen et al., 2014). However, RE has been addressed in very little detail by employers and investors, both in Türkiye and internationally. Therefore, the empirical results presented in this study can make a significant contribution to the literature and shed light on future studies.

The research results show that perceptions regarding green management practices are above average. The main difference between lean and green production is that, in green production, the environment is treated as a constraint in product or process design, whereas in lean production, it is treated as a valuable resource (Franchetti & Bedal, 2008). Lean manufacturing can be considered an environmental support and a crucial link towards the vision-based goal of green engineering. On the other hand, the benefits of the green management approach for businesses include improving sustainability and quality of life, designing

environmentally friendly products, managing resources effectively, educating consumers, reducing environmental costs, etc. (Şenocak & Bursalı, 2018). Green business encompasses many areas, including design, purchasing, production, marketing, and logistics, with a green approach (Limsuwan, Thiengkamol, & Thiengkamol, 2021). In general, the most important applications of green management practices are reducing material use, energy consumption, and toxic emissions, and increasing recycling, renewable energy sources, product durability, and service intensity (Mihajlovska, 2021).

The study results show that perceptions of sustainable development are above average. The United Nations published the Sustainable Development Goals (SDGs) in 2015. These guide national and regional efforts and serve as a roadmap for solving problems. It is acknowledged that responsibility for our planet is closely linked not only to governments but especially to economic actors, and that these goals are expected to be implemented by 2030.

5.1. Theoretical Contributions

This study makes significant theoretical contributions to the literature by examining the relationships between sustainable development goals, renewable energy strategies, green management practices, and organizational performance within a comprehensive framework. First, the research distinguishes itself from existing studies by examining the impact of green management practices on organizational performance not only as a direct relationship but also in the context of the conditional (regulatory) role of sustainable development and renewable energy strategies. In this respect, the study shifts the green management–performance relationship to a more dynamic and multidimensional theoretical ground.

Second, revealing the different effects of the environmental, social, and economic dimensions of sustainable development on green management and organizational performance adds conceptual depth to the sustainability literature. The findings show that not all dimensions of sustainable development are equally effective, with some dimensions (particularly the social and economic dimensions) being more decisive on organizational outputs. This points to the inadequacy of treating sustainable development as a one-dimensional concept for businesses, theoretically supporting the need for multidimensional and differentiated models.

Third, the fact that renewable energy strategies show a stronger regulatory effect on the relationship

between green management practices and organizational performance compared to sustainable development goals indicates that energy-based sustainability approaches should be addressed in a more central position in organizational theory and green management literature. This finding shows that the impact of green management practices is not limited to managerial intent and environmental sensitivity, but can also produce higher performance outcomes when supported by concrete energy strategies.

Within the Turkish context, the study fills an important gap in the literature as one of the few empirical studies that addresses the variables of sustainable development, renewable energy, and green management within the same model, particularly at the business level. In this respect, the research contributes to the development of theoretical models explaining the relationship between sustainability and performance in developing countries and provides a solid theoretical foundation for future comparative and theory-building studies.

5.2. Practical Implications

The findings of this research provide important practical implications for businesses to restructure their sustainability and performance-focused strategies. First, raising employee awareness levels on renewable energy, green management, and sustainable development stands out as a fundamental tool that can increase the effectiveness of green management practices. In this regard, it is recommended that sustainability and energy awareness training modules be integrated into orientation programs, particularly for new employees.

The research results show that the impact of green management practices on organizational performance is further strengthened when considered in conjunction with renewable energy strategies. In this context, businesses should not only develop environmentally friendly management policies; they should also create concrete roadmaps for increasing energy efficiency, promoting renewable energy use, and saving energy. Energy consumption analyses, carbon footprint measurements, and energy efficiency audits can be considered fundamental implementation tools in this process.

Based on the findings, it is recommended that businesses design a Green Management Model that is renewable, scalable, and replicable, tailored to their own areas of activity. This model should be shaped

taking into account the business's current resource structure, sectoral dynamics, and strategic objectives, and should be supported by performance indicators. Considering the impact of the social and economic dimensions of sustainable development on organizational performance, it is important to address green management practices in an integrated manner with employee welfare, corporate reputation, and cost efficiency.

Another and final recommendation is that businesses conduct a performance-based needs analysis to assess their current status from the perspective of sustainable development and energy efficiency. Through these analyses, areas requiring improvement can be identified, and the contribution of green management practices to organizational performance can be made more systematic and measurable. This approach will contribute to positioning sustainability not only as an ethical responsibility for businesses but also as a strategic competitive advantage.

5.3. Limitations

This study was conducted within the framework of a correlational survey model to examine the relationships between renewable energy strategies, sustainable development goals, green management practices, and organizational performance. Due to the nature of this research design, the relationships between variables can be statistically demonstrated; however, it is not possible to make definitive conclusions regarding the causal aspects of these relationships. The findings are limited to explaining the interactions between variables and do not cover changes over time or cause-and-effect relationships.

Another limitation of the study is that, although the population consists of businesses implementing green management practices throughout Turkey, the sample is limited to businesses operating only in Istanbul. This may limit the generalizability of the findings to businesses operating in different cities, sectors, or scales. Considering regional economic conditions, corporate culture, and sector dynamics, it should be noted that the results may vary contextually.

The use of the survey technique in the data collection process and the measurement of all variables using self-reported Likert-type scales would be another limitation in our research. Data based on participants' perceptions and assessments may contain measurement-related limitations such as social desirability bias, perceptual bias, and common method bias. This situation may lead to responses being perceived as higher than they

actually are, especially for concepts that are normatively evaluated positively, such as green management and organizational performance.

Finally, multidimensional structures such as renewable energy awareness and sustainable development were primarily addressed in the analyses based on total scores. This approach may have limited the detailed examination of differentiated effects between sub-dimensions. Therefore, the study's findings reflect the general trends of the variables in question; however, they offer a limited perspective on in-depth inferences specific to the sub-dimensions.

5.4. Future Research Recommendations

Based on the findings of this study, various recommendations can be made for future research. First, since this study is based on a cross-sectional design, it is recommended that future studies be designed using longitudinal research designs. This would allow for a more robust testing of the change over time and the causal directionality of the effects of green management practices, sustainable development goals, and renewable energy strategies on organizational performance.

Second, the sample of the study is limited to businesses operating in Istanbul. Future comparative studies covering different provinces, regions, or countries will contribute to a more comprehensive understanding of the effects of cultural, sectoral, and institutional contexts on these relationships. In particular, comparisons between family businesses, SMEs, and large-scale businesses can reveal how green management practices operate in different organizational structures.

Thirdly, in this study, all data were collected through self-reporting scales. In future research, the use of multi-source data collection methods (managerial assessments, objective performance indicators, energy consumption data, environmental reports, etc.) will increase the validity and reliability of the findings. Furthermore, mixed-method studies supported by qualitative methods (in-depth interviews, focus group studies, case studies) may allow for a more in-depth interpretation of the findings.

A noteworthy finding in the research results is that the motivation dimension did not show a significant effect on the impact of green management practices on organizational performance. Therefore, in future studies, the mediating or moderating roles of variables such as employee motivation, green awareness, environmental values, or organizational commitment can be tested in separate models. This

approach will more clearly reveal the psychological and organizational mechanisms through which green management practices reflect on performance.

Finally, considering the finding that renewable energy strategies produce stronger performance outcomes when addressed alongside green management practices, it is recommended that future research focus on conceptual and empirical models centered on energy-focused sustainability strategies. Studies examining the contribution of energy efficiency, carbon footprint management, and renewable energy investments to business performance across different sectors will provide important theoretical and practical contributions to the literature.

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REFERENCES

Adıyaman, Ç. (2012). *Türkiye'nin Yenilenebilir Enerji Politikaları.* Yayınlanmamış Yüksek Lisans Tezi, Niğde Üniversitesi, Sosyal Bilimler Enstitüsü, Niğde.

Akatay, A., & Aslan, Ş. (2008). Yeşil Yönetim ve İşletmleri Iso 14001 Sertifikası Almaya Yönelten Faktörler. *Dokuz Eylül Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 10*(1), 318-335.

Albayrak, K. (2019). *Türkiye'nin Enerji Ekonomisi ve Cari Açık İçin Yenilenebilir Enerji Kaynaklarının Önemi.* Yayınlanmamış Yüksek Lisans Tezi, Sosyal Bilimler Enstitüsü, KTO Karatay Üniversitesi, Konya.

Ar, A. (2011). *Yeşil Pazarlama Tekstil Sektöründen Örneklerle.* İstanbul: Beta Yayınevi.

Ataman, A. (2007). *Türkiye'de Yenilenebilir Enerji Kaynakları.* Yayınlanmamış Yüksek Lisans, Ankara Üniversitesi Sosyal Bilimler Enstitüsü, Kamu Yönetimi ve Siyaset Anabilim Dalı, Ankara.

Atay, L., & Dilek, S. (2013). Konaklama işletmelerinde yeşil pazarlama uygulamaları: Ibıs Otel Örneği,. *Süleyman Demirel Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 18*(1), 203-219.

Bartik, A. (2018). *Türkiye'nin Enerji İhtiyacı ve Bu İhtiyacın Giderilmesinde Yenilenebilir Enerji Kaynaklarının Önemi.* Yayınlanmamış Yüksek Lisans Tezi, Kafkas Üniversitesi, Sosyal Bilimler Enstitüsü, Kars.

Büyüköztürk, Ş., Çakmak, E., Akgün, Ö. E., Karadeniz, Ş., & Demirel, F. (2013). *Bilimsel araştırma yöntemleri.* Ankara: Pegem Akademi.

Ceyhan, S., & Ada, S. (2015). İşletme Fonksiyonları Açısından Çevreye Duyarlı İşletmecilik. *Uluslararası Yönetim İktisat ve İşletme Dergisi, 11*(26), 115-138.

Chen, B., & Lai, W. (2006). The Influence of Green Innovation Performance on Corporate Advantage in Taiwan. *Journal of Business Ethics*, 331-339.

Chen, H., Lee, A., Xing, X., & Chen, H. (2014). The relationships of different modes of international alliance with performance of renewable energy enterprises. *Renewable Energy* , 464-472.

Claver, E., Lopez, M. D., Molina, J. F., & Tarí, J. J. (2007). Environmental Management and Firm Performance: A Case Study. *Journal of Environmental Management*, 606-619.

Çakırlar, E. (2015). *Ortaöğretim öğrencilerinin yenilenebilir enerji kaynakları konusundaki farkındalık düzeylerinin belirlenmesi.* Ankara: Hacettepe Üniversitesi, Eğitim Bilimleri Enstitüsü.

Çelikler, D., & Aksan, Z. (2016). The development of an attitude scale to assess the attitudes of high school students towards renewable energy sources. *Renewable and Sustainable Energy Reviews*, 1092–1098.

Çokluk, Ö., Şekercioğlu, G., & Büyüköztürk, Ş. (2016). *Sosyal Bilimler için Çok Değişkenli İstatistik SPSS ve LİSREL Uygulamaları.* Ankara: Pegem Akademi.

Delihasan, E., Özcan, A., & Erkasap, A. (2021). İnformal İletişimin Kurumsal Bağlılık Üzerinde Etkisi; Alanya'daki 5 Yıldızlı Otel Çalışanları Üzerine Bir İnceleme. *International Journal Of Social, Humanities*

and Administrative Sciences, 1946-1959.

Dinçer, M., & Aslan, Ö. (2008). *Sürdürülebilir Kalkınma, Yenilenebilir Enerji Kaynakları ve Hidrojen Enerjisi: Türkiye Değerlendirmesi.* İstanbul: İstanbul Ticaret Odası.

Erdoğan, S. (2016). *Arz Güvenliği Bakışı ile Türkiye'de Enerji Politikaları.* Ankara: Orion Kitabevi.

Erdoğdu, M. (2016). Türkiye İçin Bir Yeşil Sanayi Politikası Önerisi. *Economic Development: Social & Political Interactions*, 67-79.

Eren, E. (2013). *Stratejik Yönetim Ve İşletme Politikası.* İstanbul: Beta Yayınları.

Fidan, A. (2006). *Türkiye'de Enerji Tüketimi ve Ekonomik Büyüme İlişkisi.* Yayınlanmamış Yüksek Lisans Tezi, Gazi Üniversitesi, Sosyal Bilimler Enstitüsü, Ankara.

Florida, R., & Davison, D. (2001). Gaining From Green Management: Environmental Management Systems Inside and outside the Factory. *California Management Review, 3*(43), 64-84.

Franchetti, M. J., & Bedal, K. (2008). Lean as a Stepping Stone into Green Engineering. *Technology and Management*, 1398-1401.

Gürbüz, A. (2003). *Avrupa Birliği'nde Yenilenebilir Enerji Kaynaklarının Kullanımı ve Ülkemizde Durum.* AB'nin Enerji Politikası ve Tükiye'ye Yansımaları Çalıştayı-3. Ankara: Ulusal Politika Araştırmaları Vakfı.

Hair, J. F., Sarstedt, M., Pieper, T. M., & Ringle, C. M. (2012). The use of partial least squares structural equation modeling in strategic management research: a review of past practices and recommendations for future applications. *Long range planning*, *45*(5-6), 320-340.

Handfield, R. B., Walton, S. V., Seegers, L. K., & Melnyk, S. A. (1997). 'Green' Value Chain Practices in the Furniture Industry. *Journal of Operations Management*, 293-315.

Hayes, A. F. (2022). *Introduction to Mediation, Moderation, and Conditional Process Analysis, A Regression-Based Approach.* Guilford press.

Kara, E., & Kaya, A. (2020). Sanayi İşletmelerinde Çevre Bilinci ve Yeşil Yönetim Üzerine Bir Değerlendirme. *Uluslararası Toplu Araştırmaları Dergisi, 16*(30), 3163-3182.

Karabıçak, M., & Özdemir, M. (2015). Sürdürülebilir Kalkınmanın Kavramsal Temelleri. *Süleyman Demirel Üniversitesi Vizyoner Dergisi, 6*(13), 44-49.

Karabulut, E. (2003). *İşletmelerde Çevre Bilinci ve Yeşil Yönetim Uygulamalarının İşletme Başarısına Katkısını İncelemeye Yönelik Bir Araştırma.* Doktora Tezi. İstanbul: İstanbul Üniversitesi.

Karakuş, G., & Erdirençelebi, G. (2018). İşletmelerin Yeşil Yönetim Algılarının İşletme Performansı Üzerindeki Etkisini Ölçmeye Yönelik Bir Araştırma. *İşletme Araştırmaları Dergisi, 10 (4)*, 681-704.

Karatepe, Y., Varbak Neşe, S., Keçebaş, A., & Yumurtacı, M. (2012). The levels of awareness about the renewable energy sources of university students in Turkey. *Renewable Energy*, 174-179.

Lee, D., Kim, M., & Lee, J. (2016). Adoption of green electricity policies: Investigating the role of environmental attitudes via big data-driven search-queries. *Energy Policy*, 187–201.

Letcher, T. M. (2022). Global warming, greenhouse gases, renewable energy, and storing energy. In *Storing energy* (pp. 3-12). Elsevier.

Limsuwan, K., Thiengkamol, N., & Thiengkamol, C. (2021). Major Factors Affecting Green Economy Model. *Annals of the Romanian Society for Cell Biology*, 1074-1088.

Ling, Y. (2019). Examining green policy and sustainable development from the perspective of differentiation and strategic alignment. *Business Strategy and the Environment*, 1096-1106.

Mihajlovska, K. H. (2021). Importance of ıdentıfyıng cost management ın green busınesses. *Економски Развој-Economic Development*, 17-24.

Murphy, C. (2002). The Profitable Correlation between Environmental and financial performance: A Review of the Research.

Nemli, E. (2001). Çevreye Duyarlı Yönetim Anlayışı. *İstanbul Üniversitesi Siyasal Bilgiler Fakültesi Dergisi*, 211-224.

Noord, P., & Vourc'h, A. (1999). *Sustainable Economic Growth: Natural Resources and the Environment in Norway.* Paris: OECD working papers. Economic Department working papers ; no. 218.

Öymen, G., & Ömeroğlu, M. (2020). Yenilenebilir Enerjinin Sürdürülebilirlik Üzerindeki Rolü. *İstanbul Ticaret Üniversitesi Sosyal Bilimler Dergisi, 19*(39), 1069-1087.

Porter, M. E., & Van Der Linde, C. (1995). Green and Competitive: Ending the Stalemate. *Harvard Business Review*, 120–134.

Saraç, E., & Bedir, H. (2014). Sınıf Öğretmenlerinin yenilenebilir enerji kaynakları ile ilgili algılamaları üzerine nitel bir araştırma. *KHO Bilim Dergisi*, 19-45.

Sarıkaya, M., & Kaya, Z. (2007). Sürdürülebilir Kalkınmada İşletmenin Rolü: Kurumsal Vatandaşlık. *Celal Bayar Üniversitesi İ.İ.B.F. Yönetim ve Ekonomi Dergisi, 14*(2), 221.

Seyhan, G. (2010). *Sürdürülebilir Turzim Kapsamında Konaklama İşyerinde Çevreye Duyarlı Uygulamalar ve Yeşil Pazarlama: Örnek Olay Çalışması (Calista Luxury Resot Hotel-Antalya).* Dokuz Eylül Üniversitesi Sosyal Bilimler Enstitüsü Turizm İşletmeciği Ana Bilim Dalı Yüksek Lisans Tezi, İzmir.

Sosyal Fayda Zirvesi. (2016). Aralık 8, 2022 tarihinde http://www.sgsistanbul.org/surdurulebilir-kalkinma-hedefleri/ adresinden alındı

Stigka, E., Paravantis, J., & Mihalakakou, G. (2014). Social acceptance of renewable energy sources: Are view of contingent valuation applications. *Renewable and Sustainable Energy Reviews*, 100–106.

Sümer, N. (2000). Yapısal eşitlik modelleri: Temel kavramlar ve örnek uygulamalar. *Türk Psikoloji Yazıları*, 49–74.

Şahin, İ., & Kutlu, S. (2014). Cittaslow: Sürdürülebilir Kalkınma Ekseninde Bir Değerlendirme. *Journal of Tourism and Gastronomy Studies*, 55-63.

Şenocak, B., & Bursalı, Y. (2018). İşletmelerde Çevresel Sürdürülebilirlik Bilinci Ve Yeşil İşletmecilik Uygulamalari İle İşletme Başarisi Arasindaki İlişki. *Süleyman Demirel Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 161-183.

Teixeira, A. A., Bello, V. F., & de Oliveira, J. H. (2013). Article information :Greening a Brazilian Cotton Seed Processing Company From Challenges to Strategic Opportunities. *World Journal of Science, Technology and Sustainable Development*, 123–130.

Tekin, M., Etlioğlu, M., & Tekin, E. (2018). Kamu Kurumlarında Inovasyon ve Girişimcilik. *International Journal of Academic Value Studies*, 111-130 .

Torunoğlu Gedik, Ö. (2015). *Türkiye'de Yenilenebilir Eenerji Kaynakları ve Çevresel Etkileri.* Yüksek Lisans Tezi, İstanbul Teknik Üniversitesi, Fen Bilimleri Enstitüsü, İstanbul.

Uluçeçen, E. (2019). *Kurumsal Vatandaşlık ve Kurumsal Sosyal Sorumluluk Bağlamında Türkiye'nin Önde Gelen 100 Şirketinin Yeşil Yönetim Uygulamaları Açısından Web Sayfalarının İncelenmesi .* Giresun Sosyal Bilimler Enstitüsü İşletme Anabilim Dalı Yüksek Lisans Tezi, Giresun.

United Nations. (2014). Sustainable Development: Promotion Of New And Renewable Sources Of Energy,General Assembly Sixty-Ninth Session. *Digital Library*.

Yaşlıoğlu, M. M. (2017). Sosyal Bilimlerde Faktör Analizi ve Geçerlilik: Keşfedici ve Doğrulayıcı Faktör Analizlerinin Kullanılması . *Istanbul University Journal of the School of Business*, 74-85.

Zyadina, A., Puhakkab, A., Ahponenb, P., & Cronbergc, T. a. (2012). School students' knowledge, perceptions, and attitudes toward renewable energy in Jordan. *Renewable Energy*, 78-85.