Is Democracy Effective in Sustainable Development? Empirical Evidence from E7 Countries

Sürdürülebilir Kalkınmada Demokrasi Etkili mi? E7 Ülkelerinden Ampirik Kanıtlar

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ABSTRACT

Without democracy and the alternative channels it brings, it is challenging to guarantee sustainable development. The lack of a democratic dimension of sustainable development research enables citizens and institutions to realize their development visions. In this context, the study aims to investigate the effects of democracy on sustainable development empirically. The relationship between democracy and sustainable development was investigated with the help of the annual data for the period 1990-2019 and the Han and Phillips (2010) method for the E-7 countries. According to the findings, democracy has a statistically significant and positive effect on sustainable development. On the other hand, the variables of GDP, innovation, and renewable energy consumption discussed in the study also have a positive and statistically significant effect on sustainable development. The study's findings show that democracy is a significant factor in promoting sustainable development in E-7 countries.

ÖZ

Demokrasi ve getirdiği alternatif kanallar olmadan, sürdürülebilir kalkınmayı garanti etmek zordur. Sürdürülebilir kalkınma araştırmalarının eksik kalan demokrasi boyutu, vatandaşların ve kurumların kalkınma vizyonlarını gerçekleştirmelerini sağlar. Bu kapsamda çalışmanın amacı, demokrasinin sürdürülebilir kalkınmada üzerinde etkilerini ampirik olarak araştırmaktır. Demokrasi ve sürdürülebilir kalkınma arasındaki ilişki, 1990-2019 dönemine ait yıllık veriler ve E-7 ülkeleri için Han ve Phillips (2010) yöntemi yardımıyla araştırılmıştır. Elde edilen bulgulara göre demokrasinin, sürdürülebilir kalkınma üzerinde istatistiki olarak anlamlı ve olumlu bir etkisi vardır. Öte yandan çalışmada ele alınan GSYİH, inovasyon ve yenilenebilir enerji tüketimi değişkenlerinin de sürdürülebilir kalkınma üzerinde pozitif ve istatistiksel olarak anlamlı bir etkisi vardır. Çalışmanın bulguları, E-7 ülkelerinde sürdürülebilir kalkınmanın desteklenmesinde demokrasinin çok önemli bir faktör olduğunu göstermektedir.

1. Introduction

Today, many people in many developing countries have difficulty meeting their most basic needs, such as food, shelter, and clothing. In addition to basic needs, the desire of people in these countries to improve their quality of life cannot be ignored. In this context, in a world where poverty and inequalities exist, environmental deformations increase on the one hand. On the other hand, an economically unsustainable system causes problems worldwide to increase day by day. In this respect, sustainable development is an understanding that means more opportunities to meet basic needs and build a better life for all segments (Çelik and Sofracı, 2022; Brundtland, 1987). In addition to all these, the survival and growth of the world economy in environmental, social, and

economic crises that have been experienced for years have become an opinion accepted by many scientists. The reflection of growth, the increase in real production on development, is directly related to how growth is achieved and constitutes the primary source of the crises, as mentioned above. Looking at the growth dynamics in developing and underdeveloped economies, it is known that among the sources of growth, productivity is low, and it causes irreversible damage to nature and people.

As Peşkircioğlu (2016) stated, development can only be sustainable in human-centered societies strengthened by productivity-based growth by sharing the gains arising from productivity growth, providing the principle of social justice, and protecting the resources of future generations. At this point, the concept of development comes to the fore. While development is concerned with how growth is achieved, it is also about how growth gains are shared by the general public, the social and environmental costs of growth, the impact of growth on quality of life, and how effectively resources are used. Therefore, development refers not only to the quantitative increase of produced goods and services but also to social development, environmental quality improvement, and welfare increase. This is now known as sustainable development.
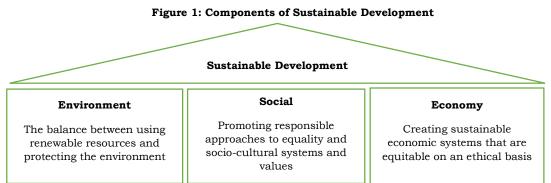
Sustainable development draws attention as a concept that requires radical changes in thinking and lifestyle without reducing the quality of life. Based on this change, it aims at solutions regarding environmental management, social responsibilities, and economics, which are in universal solidarity rather than being a consumption society (Özmehmet, 2012:3; Ar and Ar and Uğuz, 2017). On the one hand, sustainable development aims to eliminate the economic, sociocultural, and environmental problems experienced in society. On the other hand, it aims at policies that will prevent these problems from occurring again. In this context, it is necessary first to increase awareness of the issues that arise. Secondly, it should be ensured that the right decisions are made during the elimination of these problems.

In realizing sustainable development, it is necessary to take common social steps. In this context, the concept of sustainable development, an influential agenda for the UN since the 1987 Bruthland report, has become a global agenda with the 17 Global Sustainable Development Goals approved by 193 member countries at the UN Sustainable Development Summit held in 2015. The global targets set to create a sustainable future by eliminating the problems expressed as social inequality and environmental problems in the world until 2030 are accepted as a worldwide guide in producing solutions (Ar and Uğuz, 2017). In line with this global guide, one of the most important phenomena that will contribute to the realization of sustainable development is democracy.

Democracy distributes political power in favor of the majority and leads to policies that reduce inequality (Reuveny and Li, 2003:577-578; Artan and Kalaycı, 2014). Democracy causes trade unions and political parties representing the low and middle classes to direct public policies toward income redistribution. These more organized union and political party groups are more successful in influencing policy practitioners. In short, it is expected that the increase in the democracy levels of the countries will reduce the income distribution injustice and increase the country's general welfare and thus achieve sustainable development.

Sustainable development focuses on three social, economic, and environmental factors, as expressed in Figure 1. Although each of these factors is important, scientists consider the environmental factor the most serious one as it carries the possibility of irreversible damage. Environmental quality has attracted great interest in academia and industry in recent years. The carbon emissions of greenhouse gases associated with human activities are thought to be the primary driver of global warming. For this reason, great importance is given to controlling carbon emissions worldwide to provide a better life for future generations, especially in developing countries that face significant pressure to reduce carbon emissions.

Figure 1: Components of Sustainable Development

Environment	Social	Economy
The balance between using renewable resources and protecting the environment	Promoting responsible approaches to equality and socio-cultural systems and values	Creating sustainable economic systems that are equitable on an ethical basis

Source: Plessis, 2010: 379; Ar ve Uğuz, 2017.

Although sustainable development is more associated with environmental dimensions, without a democratic political system, the limited resources of countries and the related concerns will have a limited effect on the decisions taken. In addition to the environmental dimension, the social dimension of sustainable development, which includes human and social characteristics, is also critical. The social dimension of sustainable development allows each individual to increase their capacity. It is based on the moral authority to provide primary human conditions that give these individuals a fair opportunity. In addition to meeting this basic human need, it also increases democratization by providing individuals with a higher quality of life (Joseph, 2001: 227).

The economic dimension refers to the dimension of sustainable development that does not have a negative impact on environmental and social sustainability. An ideal and sustainable economy provides the highest general welfare with the least resource use and environmental damage. In this context, to be economically sustainable, the public demand for natural resources is provided as long as it is less than the renewable resource supply of nature (Gedik, 2020: 211). On the other hand, it is known that the level of democratization affects the development of the economic dimension of sustainable development. Democracy promotes equal distribution of political power.

In this context, the main motivation of the study, Is there a relationship between democracy and sustainable development for E-7 countries? is to seek an answer to the question empirically. Although there are many studies in the literature examining the relationship between democracy and economic growth and the relationship between democracy and poverty, there are few studies examining the relationship between democracy and sustainable development. Without democracy and the alternative channels it brings, it is challenging to guarantee sustainable development. The lack of democracy dimension of research on sustainable development ensures that citizens and institutions realize their development vision. Therefore, studies in the current literature neglect the supportive role of democracy in sustainable development principles. In this sense, the study is expected to fill an essential gap in the literature.

The study is organized as follows. After the introduction, a summary of previous research that reveals the relationship between democracy and sustainable development is presented. Then, the data set, model, and method used in the study are introduced. Then, the findings obtained from the study were included, and evaluations were made. Finally, policy recommendations were made within the framework of the findings obtained in the study.

2. Literature Review

When the economics literature is examined, it has been observed that although there are many studies on democracy and development, the number of studies examining the relationship between democracy and sustainable development is limited. Many studies have focused on the relationship between carbon emissions, which expresses the environmental dimension of sustainable development, and democracy at the level of democracy. Therefore, this study is expected to fill this gap in the literature.

Studies on sustainable development and improvement of environmental quality indicate that the formation of democracy in the country also impacts these concepts. For example, Payne (1995), in his study examining the relationship between freedom and the environment, stated that in democratic countries, the population is freer. As a result, the public can pressure their governments to gather information about a sustainable environment and express their preferences, thus improving the quality of the environment. In most of the studies conducted later, it is thought that citizens living in a more democratic environment have easier access to information. These citizens are better organized and protest negative situations better in the face of a formation against sustainable development.

One of the critical studies examining the relationship between democracy and sustainable development, which is limited in the literature, is Zhang et al. (2023) work. Zhang et al. (2023), the relationship between sustainable development and renewable energy consumption, population growth and democracy in South Asian countries, the Common Associated Effects Average Group-Generalized Moments Method (CCE-GMM) estimation technique, the Joint Related Effects Average Group (CCE-MG) and They investigated using Augmented Average Group (AMG) techniques developed by Eberhardt and Teal (2010) and Eberhardt and Bond (2009). The study found evidence that renewable energy can significantly and positively affect sustainable development, population growth hinders sustainable development, and democracy provides sustainable development.

Another critical study on democracy is the study of Haseeb and Azam (2021). The study conducts an empirical investigation of the relationships between carbon emissions, corruption, democracy, tourism, and environmental degradation in selected low, lower-middle, upper-middle, and high-income countries for the period 1995-2015 using FMOLS and Dumitrescu Hurlin Panel Causality Tests. The study shows that carbon emissions have a more significant effect in low-income countries than in high-income countries, and democracy helps in reducing CO_2 emissions in high-income countries. In addition, the study includes findings that there is bidirectional causality between democracy and tourism variables and between corruption and CO_2 emission variables. Similarly, Acemoğlu and Robinson (2005) supported the view that there is a strong link between democracy and the environment. They stated that most individuals have the right to choose in more democratic countries. They also observed that governments should not ignore this in their economic policies. To put it more clearly, the marginal cost of implementing environmental policies is lower in democratic countries than in autocratic countries, as voter preferences are more important.

Ahmed et al. (2021), in their study of the G7 countries, examined the role of environmental regulations and democracy in sustainable development from 1985-2017. Empirical evidence shows that economic growth increases the ecological footprint, while democracy and environmental regulations reduce the ecological footprint and contribute positively to ecological sustainability. On the other hand, it is also stated that democracy makes states and political entrepreneurs more sensitive to environmental, social, and economic demands in ensuring sustainable development.

On the other hand, in the study, results were obtained that democracy prevents environmental degradation and increases the share of renewable energy. Lv (2017), on the other hand, examined the effects of GDP and democracy on carbon emissions, one of the environmental indicators of sustainable development, with the help of the Quantile Regression Model for 19 developing countries with the data of the 1997-2010 period. Findings from the study provide significant evidence that income levels drive the nonlinear link between democracy and environmental pollution. In particular, a positive correlation was found between lower CO_2 emissions and higher income countries and the level of democracy. On the other hand, Cetin et al. (2022) examined the relationship between democracy and ecological footprint, an important indicator of sustainable development in Turkey, with the help of the ARDL Boundary Test, with the

data of the period 1980-2018. As a result of the study, they found the effect of democracy on the ecological footprint to be negative.

On the other hand, in Turkey, besides democracy, economic growth, financial development, trade openness, and urbanization variables were preferred as additional explanatory variables. While financial development, economic growth, and urbanization positively affected the ecological footprint, there was a statistical difference between commercial openness and ecological footprint. No significant relationship was detected.

There are studies in the literature in which democracy evaluates sustainable development negatively regarding environmental factors. For example, Kinda (2011) examined the impact of democratic institutions on environmental quality for 122 developing and developed countries with data from 1960 to 2008. In their study findings, they found results that democratic institutions attract investments that harm environmental quality.

The literature has no consensus about the relationship between democracy and sustainable development. In addition to studies stating that the relationship between democracy and sustainable development is linear, there are opinions that the concepts in question are not linear. For example, Congleton (1992), in his study examining the relationship between political institutions and pollution control, states that democratic countries have higher methane and Chlorofluorocarbon (CFC) emissions than non-democratic countries, negatively affecting sustainable development.

3. Data Set And Methodology

3.1. Data Set

In the study, with the primary motivation of determining the relationship between democracy and sustainable development for E-7 countries, a model was created as stated below:

$$SDI = F\ (DEMO,\ GDP,\ RE,\ PATENT) \qquad (1)$$

Equation (1) is rewritten in a panel data form as follows:

$$SDI_{it} = \beta_{0i} + \beta_{1i}\ DEMO_{it} + \beta_{2i}\ GDP_{it} + \beta_{3i}\ RE_{it} + \beta_{4i}\ LOG\ PATENT_{it} + \varepsilon_{it} \qquad (2)$$

Panel data between 1990 and 2019 regarding the variables expressed in Equation 2 were used. In Equation (2), i represents the panel individual (country), t represents the period, and ε_{it} defines the error term with constant variance and zero means.

The sustainable development index (SDI), which is the leading research subject of the study, is an index designed to calculate the ecological efficiency in ensuring the human development of nations and consists of two parts: the human development index and the ecological impact index. The data related to this were obtained from the sustainabledevelopmentindex.org page. In the study, explanatory variables were chosen following the literature. These variables and variable names are classified according to the following factors:

1. As an economic factor, real GDP (GDP, World Bank- WDI database), innovation (patent, World Bank- WDI database)

2. Renewable energy consumption as an environmental factor (RE, World Bank- WDI database)

3. The Democracy index (demo, www.democracymatrix.com) was a regulatory factor.

3.2. Methodology

Panel data: It provides more effective parameter estimations since it contains more data diversity and degrees of freedom than cross-section data and time series. In addition, it allows the analysis of models with complex relationships. In addition, since the panel data contains the relationships in the time dimension and the specific information of the units, it makes it possible to control the unobservable variables more easily. Panel data is preferred to cross-section data and time series in many respects. It provides more consistent estimations by bringing together the data of different units by revealing the dynamic structures of economic behavior (Hsiao, 2007: 2-6; Demirci, 2018).

In the study, Dynamic Panel Data analysis developed by Han and Phillips (2010) was used to determine the effects of democracy on sustainable development. Dynamic panel data analysis is one of the most used methods among the analysis methods based on panel data. With dynamic panel data models, the effect of the dependent variable in the past period on the dependent variable in the current period is measured. Dynamic panel data models, unlike static panel data models, are models with lagged variables or variables (Küçükkaya et al., 2019: 65; Tatoğlu, 2013: 65). The inclusion of the lagged dependent variable in the model eliminates the non-stationary residual problem in static panel data models. The traditional Dynamic panel data model is expressed as follows:

$$\gamma_{it} = \delta\gamma_{it-1} + X'_{it-1}\beta + \epsilon_{it} \tag{3}$$

$$\epsilon_{it} = \mu_{it} + v_{it} \tag{4}$$

The i and t indices in equations 3 and 4 represent the country and time dimensions, respectively. In addition, μi in equation 4 is i. expresses the unit effect, and since it is constant throughout the whole time, both/and γ_{it-1} are a function of this unit effect (Baltagi, 2005, p.135).

It is known that in econometric analysis using fixed effects dynamic spatial panel models, ordinary least squares management on the first difference transformed data causes efficiency deviations in the parameter of the lagged variable. To solve this problem, using variable means techniques or Arellano and Bond's (1991) estimator helps avoid such biases. However, Arellano and Bover (1995) and Blundell and Bond (1998) stated that these techniques could create problems in obtaining effective results, especially when the lagged variable parameter is close to one. For this reason, it is recommended to overcome these problems, a new estimator was developed. (Wooldridge, 2002; Green, 2007). Han and Phillips (2010) developed an estimator better at making dynamic panel predictions. This method, developed by Han and Phillips, has shown that it makes it possible to eliminate the problems of weak instruments even when the parameter of the lagged variable is close to one. Also, this method is the same for stationary data for non-stationary data. Also, this estimator does not impose any restrictions on the panel size. The only assumption needed for the model's estimation is that the residues follow the white noise process.

Due to the advantages mentioned above, the Dynamic Panel Data Analysis method developed by Han-Philips (2010) was preferred in the study. The model in question is expressed in Equation numbered 5.

$$Y_{it} = \alpha I + \beta Y_{i0} + \lambda Y_{i(t-1)} + \gamma X + \rho_1 \omega Y_{i0} + \rho_2 \omega X + \epsilon_{it} \tag{5}$$

Y_{it} represents the Sustainable development index (SDI) for region i in year t; Y_{i0} represents the first Sustainable development index (SDI) in different regions. I represent the unit matrix; ω is a spatial weight matrix of order nxn. X represents the impact factors matrix. ρ1 and ρ2 represent spatial effects; α, β, λ, and γ are parameters to be estimated; and ε is a random error term.

3.3.   Results

In the study, which examines the relationship between democracy and sustainable development, examining the descriptive statistics of the variables before the model estimation constitutes an essential reference for obtaining stable estimations. In this context, the descriptive statistics of the variables are presented in Table 1.

Table 1: Descriptive Statistics

Variables	SDI	DEMO	GDP	RE	PATENT
Mean	8.85	0.57	5618	26.17	52519
Maximum	21.23	0.873	12006	58.65	1393815
Minimum	1.41	0.057	527	3.18	29
Standard deviation	4.46	0.266	3252	17.18	204089
Jarque-Bera Normality	19.72 (0.00)	28.91 (0.00)	16.75 (0.00)	18.13 (0.00)	6622 (0.00)
Number of Observations	210	210	210	210	210

According to the descriptive statistics results given in Table 1, it is seen that the variables with the highest standard deviation are GDP and Patent variables. The lowest standard deviation is seen in the Demo variable. The mean values for the variables were 8.85 for the SDI variable, 0.57 for the DEMO variable, 5618 for the GDP variable, 26.17 for the RE variable, and 52519 for the PATENT variable. Jarque-Bera test results, which indicate whether the variables show a normal distribution or not, suggest that the variables do not comply with the normal distribution. This result poses no problem for the analyses since the normal distribution is not a prerequisite in panel data analysis. Therefore, the descriptive test statistics of the variables used in the study do not contain any problems regarding the panel data analysis.

After the descriptive statistics in Table 1, the correlation matrices of the data set used in the study are included. The correlation matrix values given in Table 2 are accepted as an essential indicator to test the multicollinearity assumption between independent variables. Tabachnick and Fidell (2001) state that if the correlation coefficient between the variables is above 0.90, a multicollinearity problem may arise. When evaluated in this sense, it can be said that there is no multicollinearity problem, considering that the highest correlation coefficient was calculated as 0.74 among the variables used in the study.

Table 2: Correlation Matrix of Variables

Variables	SDI	DEMO	GDP	RE	PATENT
SDI	1	-0.20	0.74	-0.32	0.53
DEMO	-0.20	1	0.34	0.34	-0.44
GDP	0.74	0.004	1	-0.60	0.17
RE	-0.32	0.34	-0.60	1	-0.19
PATENT	0.53	-0.44	0.17	-0.19	1

In the next stage of the study, the model in Equation 1 was estimated with the help of the Han and Phillips (2010) method. While making this estimation, the Robust Hausman test was performed to determine the appropriate model. The Robust Hausman test in question gives accurate results in selecting the proper model even when there are deviations from the assumptions in the model. The Ho hypothesis is created using the resistant variances obtained from the bootstrap operations in the Robust Hausman test. The Robust Hausman test results show that the random effects model is suitable. Accordingly, Han and Phillips's (2010) random effects estimation results are given in Table 3.

Table 3: Han and Phillips (2010) Estimation Results

Dependent Variable: SDI		
Variables	**Coefficient**	**Z statistic**
SDI (-1)	0.91	10.2***
DEMO	2.02	1.97**
GDP	0.001	9.93***
RE	0.06	2.44**
LOGPATENT	1.56	12.77***
Wald –test	365.18***	
F-test	73.03***	
Robust Hausman Test	0.05 (0.99)	

Note: ***, **, and * signs in the table indicate that the relevant test statistic is statistically significant at the 1%, 5%, and 10% significance levels, respectively.

According to the estimation results in Table 3, democracy has a positive and statistically significant effect on sustainable development in E-7 countries. This result indicates that democracy is an essential input for sustainable development. The increase in the level of democracy in emerging economies such as the E-7 encourages citizens to participate in decision-making at the societal, local, regional, and national levels. As McHugh (1995) puts it, the observed increase in the level of democracy ensures the establishment of a system for the distribution of resources acceptably by everyone. In other words, democracy provides input to the development process itself. For this reason, increases in democracy in E-7 countries will reflect positively on economic, social, cultural, and ecological development and will positively affect sustainable development.

Per capita income increases (GDP) in E-7 countries contribute positively to the sustainable development of these countries. This result can positively affect sustainable development, as national income increases in E-7 countries positively affect employment and minimize regional development disparities. The findings of Michael et al. (2019) are also compatible with these results.

It has been found that the increase in renewable energy consumption positively affects sustainable development. The increase in renewable energy consumption contributes to meeting the increasing energy demand in this way. This strengthens the sustainable development process as it will reduce pollution and greenhouse gas emissions in the sustainable development process. Therefore, as mentioned earlier, the finding shows that renewable energy is essential in realizing sustainable development. This finding aligns with the results of Hassaoun and Hicham (2020).

Finally, it has been concluded that innovation, which is considered the process of creating innovation, has a positive effect on sustainable development. This result shows that innovation is one of the driving forces of sustainable development. In other words, innovation in E-7 countries drives sustainable development by creating additional capacity for different economic and social environments and their successful implementation. This result is also compatible with Yiğit (2021).

4. Conclusion

Today's environmental problems threaten future generations as well as present generations. The international community and organizations that came together have attempted to develop cooperation in this regard. Sustainable development, which emerged as an approach that does not exclude the environment while providing economic and social development, has emerged as a unifying factor in many countries' fight against environmental problems and the solution to socio-economic issues. Based on the sustainable development goals accepted by the United Nations General Assembly, it is foreseen that ecological, social, and economic structures should be considered together in realizing sustainable development. These goals cannot be achieved without international cooperation. In this context, society, institutions, and organizations must have a say in attaining these goals in decision-making processes.

In this direction, in this study, the relationship between democracy and sustainable development in E-7 countries (China, India, Brazil, Mexico, Indonesia, Russia, and Turkey), which have high development rates and are expressed as significant future economies, has been investigated empirically. In this context, the effects of real GDP, innovation, renewable energy consumption, and democracy index on sustainable development were analyzed with the help of the Han and Phillips (2010) method and the panel data set containing the data between 1990-2019.

According to the results, democracy has a positive and statistically significant effect on sustainable development in E-7 countries. This result indicates that democracy is an essential input for sustainable development. The increase in the level of democracy in emerging economies such as the E-7 encourages citizens to participate in decision-making at the societal, local, regional, and national levels. On the other hand, it has been concluded that GDP, innovation, and renewable energy consumption positively affect sustainable development and democracy.

The findings of the study support that democracy is a crucial factor in supporting sustainable development in E-7 countries. Democracies guarantee the realization of the development vision of the countries with the opportunities they offer to the country's citizens. Therefore, it is difficult for countries to achieve sustainable development without arguments such as political rights and freedom of expression brought by democracy. Therefore, as supported by the study's findings, the priorities given to democracy in E-7 countries contribute to designing and implementing effective policies for sustainable development. As a result, developing policies promoting sustainable development principles in which democracy becomes a priority in E-7 countries will make it possible to achieve the goal of sustainable development.

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