

Sustainability Entrepreneurship and the Importance of International Policies in Sustainable Development

Abstract

In the world of today, despite economic developments, there is an increase in negative social and environmental conditions. Sustainable development is to improve a better quality of life for current and future generations. Sustainable entrepreneurs develop products and services that are suitable for society and the environment instead of using traditional business processes and systems. Sustainable development and providing a liveable life for future generations depend on these entrepreneurs' use of innovation in their business processes and the effects of this situation on society. The aim of this study is to conceptually address the importance of international policies in sustainability entrepreneurship within the framework of the European Union's climate change and environmental sustainability policies, considering the social, environmental, and economic dimensions of sustainable development. Literature review methodology provides the advancement of knowledge by scoping and analysing previous research on the study. A literature review will be conducted regarding the research method, and determinations and suggestions will be presented within the framework of the purpose of the study. The data is collected from European Commission and Eurostat database. Entrepreneurship plays an important role in the transformation of countries towards a more sustainable future by protecting the environment and in harmonizing social, economic, and ecological goals. Climate change is one of the most important challenges of the 21st century. As climate change becomes more evident, the European Union's environmental policy has also evolved. The EU's policies on climate change and environmental sustainability create opportunities for technological development and sustainable entrepreneurship.

Keywords: Welfare economics, Sustainability entrepreneurship, sustainable development

Sürdürülebilirlik Girişimciliği ve Sürdürülebilir Kalkınmada Uluslararası Politikaların Önemi

Özet

Günümüzde ekonomik gelişmelerle birlikte olumsuz sosyal ve çevresel koşullarda artışlar görülmektedir. Sürdürülebilir kalkınma, mevcut ve gelecek nesiller için daha iyi bir hayat kalitesi sağlamaktır. Sürdürülebilirlik girişimciliği ise, geleneksel iş süreçlerini, sistemlerini kullanmak yerine topluma ve çevreye uygun ürün ve hizmetler geliştirmektedir. Sürdürülebilir kalkınma ve gelecek nesillere yaşanılabilir bir yaşam sağlamak, bu girişimcilerin inovasyonu iş süreçlerinde kullanmalarına ve bu durumun toplum üzerindeki etkilerine bağlıdır. Bu çalışmanın amacı, sürdürülebilir kalkınmanın sosyal, çevresel ve ekonomik boyutlarını kavramsal olarak ele alarak, Avrupa Birliği'nin iklim değişikliği ve çevresel sürdürülebilirlik politikaları çerçevesinde sürdürülebilirlik girişimciliğinde uluslararası politikaların önemini kavramsal olarak ele almaktır. Literatür tarama metodolojisi, kapsam belirleme, ve çalışmayla ilgili daha önce yapılmış araştırmaları analiz ederek bilginin ilerlemesini sağlamaktadır. Çalışmanın yöntemine yönelik literatür araştırması yapılarak, çalışmanın amacı çerçevesinde tespitler ve öneriler sunulacaktır. Veriler, Avrupa Komisyonu ve Eurostat veri tabanından toplanmıştır. Girişimcilik, ülkelerin çevreyi koruyarak, daha sürdürülebilir bir geleceğe doğru dönüşümlerinde ve sosyal, ekonomik ve ekolojik hedeflerin uyumlaştırılmasında önemli rol oynamaktadır. İklim değişikliği, 21. yüzyılın en önemli zorluklarından biridir. Avrupa Birliği'nin çevre politikası, iklim değişikliğinin belirgin hale gelmesiyle gelişme göstermiştir. Avrupa Birliği'nin iklim değişikliği ve çevresel sürdürülebilirlik konularındaki politikaları teknolojik gelişme ve sürdürülebilir girişimcilik için fırsat yaratmaktadır.

Anahtar kelimeler: Refah ekonomisi, sürdürülebilir girişimcilik, sürdürülebilir kalkınma,

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1 Introduction

With the Coal and Steel Agreement in 1952 and the Euratom Agreement in 1957, the EU founding member states saw the necessity of a common policy in the field of energy. Energy has been an important element of European policy over the past two decades. The subjects included in the European Energy Policy announced by the European Commission in 2007 are sustainability, security of supply and competitiveness. European Energy Policy focused on the severe processes caused by climate change. In 2007, during the seven years of the European Strategic Energy Technology Plan (SET-Plan) and the 7th Framework Research Program (FP7), it committed to increase the EU's annual expenditure on energy research by 50% (EU) (European Union, 2023).

Science and Technology policy is gaining importance as the growth factor of the future by the European Union. Horizon 2020 is one of the research and innovation programs created by the European Union to support and promote research in the European Research Area (ERA) (Kim and Yoo, 2019). Recently, the concept of sustainability has attracted attention in research in the socio-economic and management fields. This concept represents the relationship between the development of society and economic factors and is influenced by the environmental, socio-cultural and economic environment (Rosato et al., 2021). The United Nations 2030 Agenda, also known as the Sustainable Development Goals (SDGs), provides a framework for human development across the universe through complementary goals and indicators. There are calls for a review of the SDGs for the stability of human-natural systems and for new assessments of economic, social and environmental well-being that can lead to sustainable development (Moallemi et al., 2022).

“Industrial leadership” is important to achieve industrial competitiveness by supporting research and innovation activities of enterprises, investing in future-oriented technological areas such as telecommunications, nanotechnology, advanced materials, biotechnology, space, advanced manufacturing, and processes to improve productivity and innovative capabilities (Kim and Yoo, 2019). The EU aims to encourage and provide entrepreneurs with systems that include new digital technologies. This also becomes important for large enterprises working with SMEs. The global economy makes working with businesses compatible with the digital economy in the supply chain more efficient (Brodny & Tutak, 2022). Horizon 2020 focuses on strengthening the competitiveness of SMEs by promoting and supporting innovation processes (Kim & Yoo, 2019). The European Union (EU) agreed on a common financial resource by borrowing from financial markets on July 21, 2020, in order to take measures against the economic difficulties experienced during the pandemic period and for the future of the EU. From these resources, a total of €750 billion has been allocated to empower member states with new investments and reforms through the EU's Next Generation EU2. (Crescenzi et al., 2021). It is important for entrepreneurs to have digital talent in order to seize the opportunities of digitalization. The EU Commission sees the EU's Digital skills gaps and states that more than 40% of Europe lack basic digital skills. The Recovery and Resilience Facility makes an important contribution to support digital transformation in the EU. (Next Generation EU, 2022). The Recovery and Resilience Facility (RRF), as the core element of the NextGenerationEU program, is a tool created to prepare the EU for the future, providing grants and loans to ensure that member states are prepared for threats and opportunities and to support investments (European Union, 2023).

In this study, the social, environmental and economic dimensions of sustainable development and the importance of international policies in sustainability entrepreneurship within the framework of the EU's climate change and environmental sustainability policies are conceptually discussed. In addition, the support of the European Commission's Strategic Energy Technology Plan, Framework Research Program and Next Generation EU programs and Recovery and Resilience Facility (RRF) in technology processes within the scope of sustainable entrepreneurship and sustainable development are examined.

2 Sustainability Entrepreneurship

Production increased rapidly as unit costs were minimized thanks to learning by doing and economies of scale. Public research and development (R&D) expenditures and technology are accelerating this change (Soriano and Mulatero, 2011). Diesendorf (1999) stated the following as business reasons for a business choosing to promote sustainability.

- Reducing the business' risk of lawsuits and consumer boycotts due to consumer-perceived bad practices.
- Reducing production costs by using energy and resources more efficiently and converting waste into resources or marketable products.
- To produce products and services that are socially sensitive to the environment and to provide market advantage.
- To increase customer loyalty by developing better practices within the scope of sustainability and meeting changing society expectations (Diesendorf, 1999).

Entrepreneurship focuses on new and emerging opportunities in the market to raise capital (Ketchen et al., 2007). The modern entrepreneurship theorist Joseph Schumpeter (1954) described the concept of entrepreneurship as innovative. Schumpeter expressed the process of awakening change in society by discovering new possibilities by entrepreneurs with the concept of 'creative destruction'. In this context, entrepreneurship is seen as the ability

to introduce innovation, such as production method, technological development, product/service, distribution systems and a new organizational form (Tilley and Young, 2006).

Sustainable entrepreneurship is becoming increasingly important in different sectors such as international institutions, businesses, and universities. The development of the "2030 Agenda for Sustainable Development", which was approved by the United Nations (UN) in 2015 and creates a framework for cooperation in many areas, is also linked to the importance of sustainable entrepreneurship. The "Global Sustainable Development Report 2019" states that socio-environmental-economic systems must transform as quickly as possible to ensure community welfare, public health and environmental impact as the topics to be included in 2030 for the Sustainable Agenda. The data show the importance and need for sustainable entrepreneurship and innovation practices (González-Serrano et al., 2020). Sustainable innovation is defined as "the integration of conservation and development to ensure that the transformation to be created in the world ensures the survival and well-being of all people" (Dresner, 2008). In order to achieve the United Nations' (UN) sustainable development goals (SDGs), it is accepted to use sustainable energy resources and not to use carbon-based resources such as oil and gas. This important situation arising from environmental problems has been a transition period in businesses and countries (Arslan et al., 2023). Sustainable entrepreneurship is the explore, create and implementation of entrepreneurial opportunities that contribute to sustainability by generating social and environmental benefits for society (Pinkse and Groot, 2015). In sustainable entrepreneurship, they use businesses as a tool for the continuity of resources focused on sustainable development and including business design (Gibbs, 2006).

3 Social, Environmental and Economic Dimensions of Sustainable Development

Schumpeter (1952) states that entrepreneurs use the new production model to transform the static structure into a dynamic economic change in order to make profit in their businesses with the concept of innovation (Harvey et al., 2010). While it was thought that entrepreneurs were primarily engaged in activities to create economic value, in new entrepreneurship models, the economic value created appears as a method to go for a purpose or a combination of different values. Sustainable entrepreneurship is a concept that combines the economic, social and environmental aspects of the value creation process. (González-Serrano et al., 2020). It is important to provide innovative solutions to ensure community welfare and address the problems in sustainability in sectors that are between economic/financial value and protecting the natural environment. What is required of businesses is to balance managerial demands for strategy and economic viability that will provide economic sustainability with environmental and social needs (Meglio and Di Paola, 2021). The concept of sustainable development began to develop in the 1980s. It provides an information network for the scientific research community, policy makers, business and NGOs on sustainable development, environmental problems. In addition, the social effects of environmental problems have been noticed (Tilley and Young, 2006).

The United Nations 2030 Agenda, also known as the Sustainable Development Goals (SDGs), provides a framework for human development across the universe through complementary goals and indicators. There are calls for a review of the SDGs for the stability of human-natural systems and for new assessments of economic, social and environmental well-being that can lead to sustainable development (Moallemi et al., 2022). The SDGs entered into force in January 2016. It was conducted by UNDP, the UN development agency. The SDGs are a comprehensive effort to take action to end poverty, protect the world and ensure the well-being of humanity. The SDGs are an organization that aims to create clear roadmaps on the right decisions to economically improve life for future generations (Aslan, 2018).

According to the definition of neo-classical economic theory, sustainability is the maximization of welfare over time. Most economists refer to maximizing welfare as maximizing the benefit from consumption (Harris, 2003). The social dimension covers underdeveloped and developing countries globally. In this process, by adopting the principles of equality, capacity building, technology transfer and financial support can be done with the encouragement of the UN to this process. The social dimension aims to empower the poorest by providing opportunities for investment and participation in human capital (Gupta and Vegelin, 2016). The gap between rich and poor is widening between countries and within many countries. This difference has started to be experienced in countries that are seen as great power in recent years (Diesendorf, 1999).

In the environmental dimension, the protection of ecosystems and natural resources is fundamental to sustainable economic production and intergenerational equity. Economic sustainability includes maintaining or increasing different types of capital that will provide economic production. These include manufactured capital, natural capital, human capital, and social capital (Harris, 2003). Ecological modernization is the realization of transformation in institutions in modern society for ecological problems. In ecological modernization, capitalism uses innovation as a driving force in environmental problems. The benefits of businesses with ecological modernization approaches are as follows:

- Preventing environmental pollution and ensuring work efficiency in waste generation,
- No loss of workforce thanks to the improvement of the business environment,
- Increasing sales in environmentally friendly products and services.

In the study of Gibbs (2006), as one of the measures to be taken in the transition to ecological modernization as a political program, he stated that "transferring the objectives of the environmental policy to other policies and thus enabling the adoption and diffusion of new technologies and new production processes.

4 Sustainable Development and European Union Policies

Creating the necessary conditions to ensure sustainable development is the basic element of the national policies of all developed countries (Balcerzak and Pietrzak, 2016). Research indicates that government support and incentives in R&D related to low-carbon technologies accelerate innovation systems to provide new technologies to the market, if provided. It is seen that government support for R&D is an important pioneer in innovation efficiency. In the process of promoting this innovation system, the Framework Research Program (FP), which addresses EU policy objectives, is funded through the scope of joint research and innovation (Calvo-Gallardo et al., 2022). The EU has developed an integrated technological innovation policy to create and develop different growth patterns by addressing the problems experienced by the member states. The First FP was established in 1984 and established eight technological innovation policies until the Horizon 2020 policy prepared in 2014. The objectives of the policies are to take necessary steps to solve social problems such as economic growth, climate change, aging society and to secure Europe's global technological and industrial competitiveness (Kim and Yoo, 2019).

The support of the European Commission's Strategic Energy Technology Plan, Framework Research Program, Horizon 2020, Next Generation EU program and Recovery and Resilience Facility (RRF) in technology processes within the scope of sustainable entrepreneurship and sustainable development are explained in the following.

SET-Plan: Strategic Energy Technology Plan

Due to the weight of global competition and economic crises in European countries, budget allocations to climate and clean energy policies may be limited by the public. Despite this, it was emphasized in the EU Energy Technologies and Innovation Communication that Europe should be clear about these policies until 2050 (Ruester et al., 2014). The SET-Plan was adopted by the EU in 2008 for the implementation of research and innovation in low carbon technologies. The Plan has been addressed as one of the important issues in EU policy, where limited resources are required to achieve the short- and long-term climate and energy targets adopted since 2007 (Eikeland and Skjærseth, 2021). EU policy generally consisted of elements such as supporting R&D, setting medium and long-term targets and meeting the conditions. Renewable energy policy continues as a national policy. In order for this policy to be effective, it is important that the EU Member States are compatible within the scope of the agreed strategic objectives. This means going beyond public policy to involve all R&D authorities in the energy sector (Soriano and Mulatero, 2011).

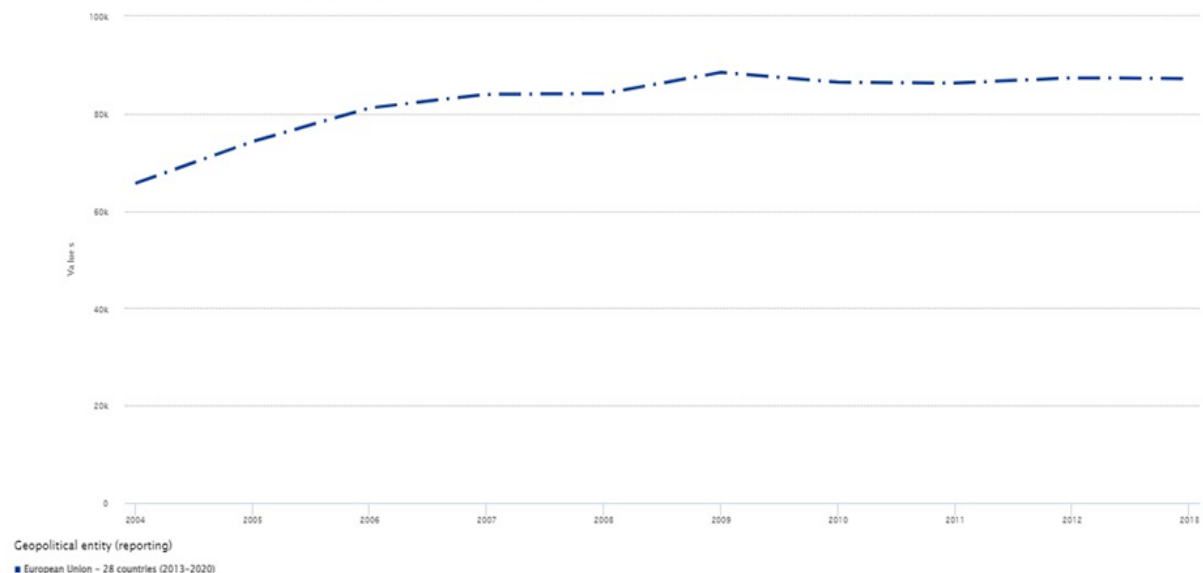


Figure 1. Environmental protection expenditure (2004-2013) (Million euros and million national currency units)

2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
65.651,88	74.248,65	81.157,77	83.932,02	84.123,56	88.446,73	86.427,57	86.251,19	87.340,85	87.183,99

Table 1. Environmental protection expenditure - million Euros (EU 28 countries) **Source:** Eurostat, 2022

Looking at Figure 1, there is no visible change in the increase in environmental protection expenditures of EU member countries between 2004 and 2013. Figure 2 and Table 1 includes information on environmental protection expenditures in the EU between 2006 and 2021. National expenditure on environmental protection (NEEP) measures the resources used to protect the natural environment during a given period. According to Eurostat's estimates, EU spending on environmental protection, measured by the NEEP sum, increased by 54% from 2006 to 2021. It is stated that environmental protection investments increased by 10% in the period of 2006-2021. Due to the economic crisis in 2009, environmental protection investments seem to decline. Especially in 2016, it is seen that there is a great decrease in environmental protection investments as a result of the decrease in these investments in the member states (Eurostat, 2022).

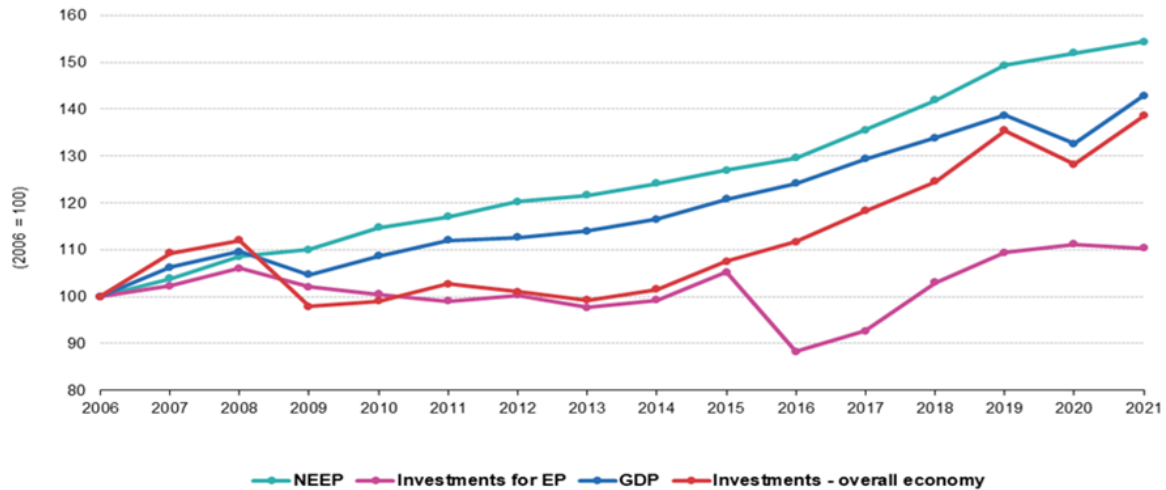


Figure 2: Environment Protection and Economic Indicators, EU, 2006-2021 *Source:* Eurostat, 2022

In the study of Wiesenthal et al. (2010) they explained the Global SET-Plan scenario as seen in Table 2. In the study, the Global SET-Plan scenario assumed that all world regions and technology manufacturers carried out R&D activities within the scope of the SET-Plan prepared by the EU between 2010-2020.

Technology	R&D investment needs (bn Euros)
Wind energy	6
Photovoltaics	9
Concentrating solar power	2.3 ¹⁶ (+4.7 as deployment investment)
Bioelectricity	2.0 ¹⁷
CCS (Carbon Capture and Storage)	3.0 ¹⁸ (+10.5 as support for first-of-a-kind investment)

Table 2: Estimated RD&D Investment Needs for the Period 2010-2020 in the EU *Source:* Wiesenthal et al. (2010)

In the study of Janssen et al. (2012) they explained the “needs and recommendations for market implementation in 2050”. In the research, it is stated that the markets will be shaped by the effects of climate change, oil and gas scarcity, high cost of fuel, CO₂ allowance prices and sustainability issues, and that this problem will be overcome by applying financing and other resources for R&D in the bottleneck problem of the sectors by making use of wind energy. It is noted that €2 to 5 million for certain EU research dimensions can strongly assist cooperation (Janssen et al., 2012). It has been seen that Europe needs a skilled and expert workforce for its future goals in energy and climate policies, and that the EU needs to develop some scopes in its SET-Plan. For this reason, a report titled "Strategic Energy Technology Plan Study on Energy Education and Training in Europe" was published by the European Commission in 2014. This report covers education and training issues in all areas of sustainable energy technology. The report also states that Europe will achieve a climate-targeted sustainable energy system by 2050 by launching innovations, new products and services, and business ideas. The EU's SET-Plan is accepted as the roadmap for Europe to achieve these goals. SET-Plan encompasses training and job creation as well as research and industrial applications (European Commission, 2014).

Framework Research Programme (FP7)

The 7th Framework Program for Research and Technological Development (FP7) is a financial instrument used by the EU to support research and development (Kesner-Škreb, 2009). European Commission tailored the FP7 to jointly contribute to the European Research Area (ERA) deployment, as well as to the energy technology objectives established in the SET-Plan. The FP7 covering the years 2007-2013 has a total budget of over 50 billion Euros (Llombart-Estopiñán, et al., 2011). The program aims to support the EU to create a low-carbon, knowledge-based society and to increase public and private R&D investments for this purpose (EUR-Lex, 2010).

FP7 has positively impacted Europe's industrial competitiveness by increasing scientific research. It is stated how the EU finances research and innovation. These issues are also addressed in the Horizon 2020 programme. FP7 has strategically included SMEs with €6.4 million financing for the cooperation programme. The FP7 Environment program covers the environment for sustainable development, climate change and resource efficiency. 494 projects were financed with a budget of 1.7 billion Euros from FP7 (European Commission, 2016).

Horizon 2020 policy

Horizon 2020 is the EU's financing program for the years 2014-2020 and 80 billion Euros is used for research and innovation processes (European Commission, Horizon 2020). The EU supports grants in the fields of Industry 4.0 (I4.0) and Industry 5.0 within the scope of the Innovation Action Horizon programmes. It is aimed to create a "public finance distribution mechanism" to support SMEs or medium-sized companies in the digital transformation process (Fair et. al., 2023). European Union (EU) policy explains innovation as the result of an interactive evolutionary process involving many actors (Cronin et al., 2022). In line with the Paris Agreement, the EU is implementing a policy to achieve its climate goals and to transform the EU into a zero-greenhouse gas emission economy by 2050. The EU framework program Horizon 2020 has been supported under the Green Deal, accelerating research and innovation. It was later replaced by Horizon Europe, the EU research and innovation framework programme. As a learning platform to support these plans, key programs such as LIFE and Interreg have been developed for the EU that serve interregional cooperation, facilitating a sustainable, renewable energy-based, climate-neutral and resilient economy (Husiev et. al., 2023). Horizon Europe is the EU's funding program until 2027 for research and innovation with a budget of 95.5 billion euros. Horizon Europe has aimed to optimize investments in the European Research Area to accelerate economic growth and support industrial competitiveness (European Commission Horizon Europe, 2020).

The visions of sustainable development goals (European Commission Horizon Europe, 2021):

- Combating climate change
- Support for the UN's Sustainable Development Goals
- Increasing the EU's economic growth competitiveness
- To develop and support EU policies in research and innovation in global processes and to ensure cooperation in the implementation phase.
- Supporting information and technologies
- Creating employment, accelerating economic growth.

Next Generation EU Program and Recovery and Resilience Facility (RRF)

Next Generation EU is the EU's €800 billion financial instrument to support the development of the economy post-COVID-19 pandemic and create a greener, more digital and stronger future. NextGenerationEU's other important tool is the Recovery and Resilience Tool, which consists of €723.8 billion in grants and loans to support the transformation and investment of EU member states. The repayment of EU borrowing allocated to NextGenerationEU is planned to be long-term from 2028 to 2058. Loans will be repaid by the borrowing member states and grants will be repaid by the EU budget. It is stated that the Commission has proposed additional own resources to the EU budget to assist in the repayment of the grants, and they will submit a second new equity data in the third quarter of 2023 (European Commission NextGenerationEU, 2023).

A global pandemic was declared by the World Health Organization (WHO) on January 31, 2020, with the emergence of the coronavirus disease (COVID-19), which has negatively affected public health and all activities in the world. All countries have been affected economically by health measures (Ehrenberg, et. al, 2021). It is stated that 90% of NextGenerationEU funds will be used through the Recovery and Resilience Facility (RRF) between 2021-2027 (European Commission, 2021). The Recovery and Resilience Facility (RRF) aims to minimize the economic and social impact of COVID-19. It provides benefits for EU Member States to adapt to sustainable digital transformation and to prepare Europe for digital transformation and growth targets. The RRF provides member states with funds to invest in digital transformation and projects. In this transformation; expanding very high-capacity networks, enabling the digitalization of businesses, especially SMEs; increase basic and advanced digital capabilities; Supporting R&D studies on the digitalization and distribution of advanced technologies is included (European Commission, 2023).

As shown in Table 3, Spain was the first Member State to request payment on 11 November 2021. The information submitted by Spain was evaluated by the Commission and on 27 December 2021, 10 billion euros were paid to Spain. Milestones that include payment are the Climate Change and Energy Transition Act, minimum income support reform, measures to support SMEs digitization and development of digital capabilities, and reforms that strengthen the capacity to execute and monitor. The case of Spain shows that the Tool is visibly effective and supports the implementation of important reforms (European Commission, 2022). Reforms and investments in the plan provide the opportunity for Spain's more sustainable, green and digital transformation. Spain's recovery and resilience plan and the reforms aim at the challenges that may hinder lasting and sustainable

growth, as well as investments to enable digital transformation, the transition to a sustainable, low-carbon and climate-resilient economy (European Commission, Spain 2021).

	Payment request date	Number of milestones & targets (M&T)	Amount net of pre-financing (EUR)
Spain	11/11/2021	52	10 bn
France	26/11/21	38	7.4 bn
Greece	29/12/21	15	3.6 bn
Italy	30/12/21	51	21 bn
Portugal	25/01/22	38	1.16 bn

Table 3: Processing of Payment requests – 2021-2022 Source: (Next Generation EU- Recovery and Resilience Facility (RRF))

5 Conclusion

Sustainable development is seen as the social, environmental and economic component of development. The United Nations 2030 Agenda, also known as the Sustainable Development Goals (SDGs), provides a framework for social and economic development around the world through complementary goals and indicators. This includes a review of the SDGs for the stability of human and natural resource systems and assessments of economic, social and environmental welfare that can lead to sustainable development. Sustainable entrepreneurship is the discovery, creation and implementation of entrepreneurial opportunities that contribute to sustainability by generating social and environmental benefits for society. For this reason, the social, environmental and economic dimensions of sustainable development and the importance of international policies in sustainability entrepreneurship are conceptually discussed within the framework of the European Union's climate change and environmental sustainability policies.

Sustainable Entrepreneurship plays an important role in the transformation of countries towards a more sustainable future by protecting the environment and harmonizing social, economic and ecological goals. Climate change is one of the most important problems of the 21st century. As climate change becomes more apparent, the EU's environmental policies appear to be evolving. In addition, with the support given by the European Commission's Strategic Energy Technology Plan, Framework Research Programme, Horizon 2020, New Generation EU programs and the Recovery and Resilience Facility (RRF) to technology processes within the scope of sustainable entrepreneurship and sustainable development, especially the decrease in natural resources due to the impact of climate change it focuses on the precautions countries will take against the danger.

The European Union (EU) agreed on a common financial resource by borrowing from financial markets on July 21, 2020, in order to take measures against the economic difficulties experienced during the pandemic period and for the future of the EU. From these resources, a total of €750 billion has been allocated to empower member states with new investments and reforms through the EU's Next Generation EU2. It is important for entrepreneurs to have digital talent in order to seize the opportunities of digitalization. The EU's policies on climate change and environmental sustainability create opportunities for technological development and sustainable entrepreneurship.

The difficulties in social and environmental conditions are increasing in the world. The aim of sustainable development is to improve the quality of life of society by providing better conditions for present and future generations. For this reason, sustainable entrepreneurs have to develop products and services that are compatible with society and the environment, instead of traditional activities in their business processes. Sustainable development and providing a liveable life for future generations depend on sustainable entrepreneurs' use of innovation in all business processes and the positive effects of these processes on society. The protection of ecosystems and natural resources is the basis for sustainable economic production and intergenerational equity. Creating the necessary conditions for sustainable development has become the fundamental element of the national policies of all developed countries. It is seen that government support is important in research and development (R&D) and innovation processes related to low-carbon technologies.

It is important for countries to develop policies that will be a roadmap for entrepreneurs for sustainable development by preparing framework programs and to ensure the balance of human and nature. The findings of the current study show that the financing provided by the state is important for businesses to easily adapt to technological developments in their product and service activities and not be affected by global economic crises due to ecological problems in the world. It is seen that if government support and incentives are provided in the field of research and development (R&D) regarding low-carbon technologies, innovation systems are accelerated to introduce new technologies to the market, and that government support for R&D is an important pioneer in innovation activities. The EU has developed an integrated technological innovation policy to create and develop different growth models by addressing the problems experienced by the member states. The climate change and environmental sustainability policies of the EU create opportunities for technological development and sustainable entrepreneurship.

References

- Arslan, A., Al Kharusi, S., Hussain, S.M. & Alo, O. (2023). Sustainable entrepreneurship development in Oman: a multi-stakeholder qualitative study. *International Journal of Organizational Analysis*, **31**(8), p. 35-59. <https://doi.org/10.1108/IJOA-11-2022-3497>
- Aslan, T. (2018). *Conceptual Model for Sustainable Development: An Explorative Study on Social Entrepreneurship in Turkey*. Bahçeşehir University, Ph.D. Thesis.
- Balcerzak, A.P., & Pietrzak, M.B. (2016). Application of TOPSIS Method for Analysis of Sustainable Development in European Union Countries. *Institute of Economic Research Working Papers*, **22**(2016), p.2-12.
- Brodny, J. & Tutak, M. (2022). Digitalization of Small and Medium-Sized Enterprises and Economic Growth: Evidence for the EU-27 Countries. *Journal of Open Innovation Technology Market and Complexity* 2022, **8** (67), p.1-31, <https://doi.org/10.3390/joitmc8020067>
- Calvo-Gallardo, E., Arranz, N. and Fernández de Arroyabe, J. C. (2021). Analysis of the European energy innovation system: Contribution of the Framework Programmes to the EU policy objectives, *Journal of Cleaner Production*, **298** (2021), p. 1-16
- Calvo-Gallardo, E., Arranz, N. & Fernández de Arroyabe, J. C. (2022). Innovation systems' response to changes in the institutional impulse: Analysis of the evolution of the European energy innovation system from FP7 to H2020. *Journal of Cleaner Production*, **340** (2022) 130810, p.1-17. <https://doi.org/10.1016/j.jclepro.2022.130810>
- Crescenzi, R., Giua, M. & Sonzogno, G.V. (2021). Mind the Covid-19 Crisis: An evidence-based implementation of next generation EU). *Journal of Policy Modelling*, 2021(**43**), p. 278–297. <https://doi.org/10.1016/j.jpolmod.2021.03.002>
- Cronin, E., Fieldsend, A., Rogge, E. & Block, T. (2022). Multi-actor Horizon 2020 projects in agriculture, forestry and related sectors: A Multi-level Innovation System framework (MINOS) for identifying multi-level system failures. *Agricultural Systems*, **196**(103349), p. 1-13. <https://doi.org/10.1016/j.agsy.2021.103349>
- Diesendorf, M. (1999). Sustainability and Sustainable Development. In Dunphy, D, Benveniste, J, Griffiths, A. and Sutton, P. (eds) *Sustainability: The corporate challenge of the 21st century*, Sydney: Allen & Unwin, p.19-37.
- Dresner, S. (2008). *The Principles of Sustainability*. Earthscan, London, UK.
- Ehrenberg, J.P., Utzinger, J., Fontes, G., Mauricio da Rocha, E.M., Ehrenberg, N., Zhou, X.N. & Steinmann, P. (2021). Efforts to mitigate the economic impact of the COVID-19 pandemic: potential entry points for neglected tropical diseases. *Ehrenberg et al. Infect Dis Poverty*, **10**(2), p. 4-13, <https://doi.org/10.1186/s40249-020-00790-4>
- Eikeland, P.O & Skjærseth, J.B. (2021). The politics of low-carbon innovation: Implementing the European Union's strategic energy technology plan. *Energy Research & Social Science*, **76**(2021), p. 1-8. <https://doi.org/10.1016/j.erss.2021.102043>
- EUR-Lex (2010). <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM:i23022> (07.06.2023)
- European Commission (2014). *Strategic Energy Technology Plan Study on Energy Education and Training in Europe: Assessment Reports of the Expert Working Groups*. Publications Office of the European Union, ISBN 978-92-79-39145-3
- European Commission (2016). https://ec.europa.eu/commission/presscorner/detail/de/MEMO_16_146 (05.06.2023)
- European Commission (2021). *The EU's 2021-2027 long-term budget and NextGenerationEU: Facts and Figures*. Publications Office of the European Union. ISBN 978-92-76-30627-6. <https://doi.org/10.2761/808559>
- European Commission (2022). Report From The Commission to The European Parliament and The Council on the implementation of the Recovery and Resilience Facility, Brussels. https://commission.europa.eu/system/files/2022-03/com_2022_75_1_en.pdf (07.06.2023)
- European Commission Horizon (2020). https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-2020_en (07.06.2023).
- European Commission Horizon Europe (2021). The EU Research & Innovation Programme 2021-27. https://research-and-innovation.ec.europa.eu/document/9224c3b4-f529-4b48-b21b-879c442002a2_en (07.06.2023).

- European Commission NextGenerationEU (2023). [https://commission.europa.eu/strategy-and-policy/eu-budget/eu-borrower-investor-relations/nextgenerationeu_en#:~:text=NextGenerationEU%20is%20the%20EU's%20%E2%82%AC,digital%20and%20more%20resilient%20future](https://commission.europa.eu/strategy-and-policy/eu-budget/eu-borrower-investor-relations/nextgenerationeu_en#:~:text=NextGenerationEU%20is%20the%20EU's%20%E2%82%AC,digital%20and%20more%20resilient%20future.). (07.06.2023)
- European Commission NextGenerationEU (2023). https://commission.europa.eu/strategy-and-policy/eu-budget/eu-borrower-investor-relations/nextgenerationeu_en (07.06.2023).
- European Commission Spain's recovery and resilience plan (2021). https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility/spains-recovery-and-resilience-plan_en
- European Commission, Horizon Europe (2020). https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en (07.06.2023).
- European Union (2023). https://european-union.europa.eu/principles-countries-history/principles-and-values/founding-agreements_en (08.06.2023).
- European Union (2023). Recovery and Resilience Facility. https://next-generation-eu.europa.eu/recovery-and-resilience-facility_en (04.06.2023)
- Eurostat (2021). Environmental protection expenditure https://ec.europa.eu/eurostat/databrowser/view/env_ac_explr2/default/table?lang=en (14.04.2023)
- Eurostat (2022). Environmental protection expenditure accounts, https://ec.europa.eu/eurostat/statisticsexplained/index.php?title=Environmental_protection_expenditure_accounts (14.04.2023)
- Fair, N., Modafferi, S., Nizamis, A. & Wajid, U. (2023). Effective project management of 3rd party funding in European Union Horizon Industry4.0 projects: sharing experiences from two use cases. *Procedia Computer Science* **219** (2023), p. 1985–1993. <https://doi.org/10.1016/j.procs.2023.01.499>
- Gibbs, D. (2006). Sustainability Entrepreneurs, Ecopreneurs and the Development of a Sustainable Economy. *Greener Management International*, No. **55**, Sustainability Entrepreneurship Research (Autumn 2006), p. 63-78. <https://www.jstor.org/stable/10.2307/greemanainte.55.63>
- González-Serrano, M.H., Añó Sanz, V. & González-García, R.J. (2020). Sustainable Sport Entrepreneurship and Innovation: A Bibliometric Analysis of This Emerging Field of Research. *Sustainability*, **12**(5209), p. 2-26. <https://doi.org/10.3390/su12125209>
- Gupta, J. & Vegelin, C. (2016). Sustainable development goals and inclusive development. *Int. Environ. Agreements*, **16** (2016), p.433–448. <https://doi.org/10.1007/s10784-016-9323-z>
- Harris, J.M. (2003). Sustainability and Sustainable Development. International Society for Ecological Economics Internet Encyclopaedia of Ecological Economics, February 2003. <https://isecoeco.org/pdf/susdev.pdf> (02.06.2023).
- Harvey, M., Kiessling, T. & Moeller, M. (2010). A view of entrepreneurship and innovation from the economist for all seasons Joseph S. Schumpeter, *Journal of Management History*, **16**(4) 2010, p. 527-531, <https://doi.org/10.1108/17511341011074004>
- Husiev, O., Arrien, O.U. & Enciso-Santocildes, M. (2023). What does Horizon 2020 contribute to? Analysing and visualising the community practices of Europe's largest research and innovation programme. *Energy Research & Social Science*, **95**(102879), p.1-13. <https://doi.org/10.1016/j.erss.2022.102879>
- Janssen, L.G.J, Arántegui, R.L., Brøndsted, P., Gimondo, P., Klimpel, A., Johansen, B.B. & Thibaux, P. (2012). *Scientific Assessment in support of the materials Roadmap enabling Low Carbon Energy Technologies Wind Energy*, Publications Office of the European Union, ISBN 978-92-79-22936-7
- Kesner-Škreb, M. (2009). 7th Framework Programme for Research and Technological Development, FP7. *Financial Theory and Practice*, **33**(3), p.363-364.
- Ketchen, D.J., Jr., Ireland, R.D. & Snow, C.C. (2007). Strategic entrepreneurship, collaborative innovation, and wealth creation. *Strategic Entrepreneurship J.*, **1**, p. 371-385. <https://doi.org/10.1002/sej.20>
- Kim, J. & Yoo, J., 2019. Science and Technology Policy Research in the EU: From Framework Programme to HORIZON 2020. *Social Sciences*, **8**(153), p.1-10. <https://doi.org/10.3390/socsci8050153>
- Llombart-Estopiñán, A., Jimenez, I.M. and Gallardo, E.C. (2011). The Strategic Energy Technology Plan: Financial Instruments. *International Conference on Renewable Energies and Power Quality*, **1**(9), p.15-22. <https://doi.org/10.24084/repqj09.006>
- Meglio, O. & Di Paola, N. (2021). Innovation and Entrepreneurship for Well-Being and Sustainability. *Sustainability*, **13**(9154), p.2-6. <https://doi.org/10.3390/su13169154>

- Moallemi, E.A., Eker, S., Gao, L., Hadjidakou, M., Liu, Q, Kwakkel, J., Reed, P.M., Obersteiner, M., Guo, Z. & Bryan, A. B. (2022). Early Systems Change Necessary for Catalyzing Long-term Sustainability in a Post-2030 Agenda, *One Earth*. Vol: **5**, p. 792–811.
- Next Generation EU (2022). Recovery and Resilience Scoreboard: Thematic analysis digital skills and education. European Commission. https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/assets/thematic_analysis/scoreboard_thematic_analysis_digital_skills.pdf. (04.06.2023)
- Pinkse, J. & Groot, K. (2015). Sustainable entrepreneurship and corporate political activity: overcoming market barriers in the clean energy sector, *Entrepreneurship Theory and Practice*, **39**(3), p. 633-654
- Rosato, P. F., Caputo, A., Valente, D. & Pizzi, S. (2021). 2030 Agenda and sustainable business models in tourism: A bibliometric analysis. *Ecological Indicators*. **121** (2021), p. 1-10
- Ruester, S., Schwenen, S., Finger, M. & Glachant, J.M. (2014). A post-2020 EU energy technology policy: Revisiting the strategic energy technology plan, *Energy Policy*, **66** (2014), p.209-217. <https://doi.org/10.1016/j.enpol.2013.11.044>.
- Soriano, F. H. & Mulatero, F. (2011). EU Research and Innovation (R&I) in renewable energies: The role of the Strategic Energy Technology Plan (SET-Plan). *Energy Policy*, **39**(2011), p.3582-3590. <https://doi.org/10.1016/j.enpol.2011.03.059>
- Tilley, F. & Young, W. (2006). Sustainability Entrepreneurs: Could They Be the True Wealth Generators of the Future? *Greener Management International*, No: **55**, Sustainability Entrepreneurship Research (Autumn 2006), p. 79-92
- Wiesenthal, T., Mercier, A., Schade, B., Petrič, H. & Szabó, L. (2010). *Quantitative Assessment of the Impact of the Strategic Energy Technology Plan on the European Power Sector*. Publications Office of the European Union. ISBN 978-92-79-17205-2