

# A Scientific Map of Publications on Sustainable Development Goals in Türkiye

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**Abstract:** The achievement of the Sustainable Development Goals (SDGs) declared by the United Nations requires each country to take ownership of this process and develop policies that embrace and contribute to it. Academic studies conducted in the countries shed light on the process of producing these policies. This study attempts to reveal the scientific map of academic studies conducted in Türkiye on this subject to observe the trends in academia regarding SDGs. Accordingly, the general status of studies conducted on SDGs, international collaborations, the institutions working most on the subject, and the most studied concepts are examined. The study's dataset consists of bibliometric data from academic studies on sustainability retrieved from the Web of Science (WoS) database with the country selection 'TURKIYE' or 'TURKEY'. A total of 18 bibliometric analyses were performed using both the cumulative dataset meeting this criterion and the datasets obtained separately for each of the 17 SDGs. The results of these analyses were integrated into electronic spreadsheets and visualised using Tableau, a business intelligence tool. The research findings reveal that most studies in Türkiye focus on SDG 13, and the general trend in Türkiye is parallel to that of the world. It has been observed that international collaboration in studies on sustainability exceeds 40%. The researchers from Türkiye collaborate the most with countries like the United States, China, and Iran. The three institutions conducting the most research on sustainability are Istanbul Gelisim University, Istanbul Technical University, and Yıldız Technical University.

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## *Türkiye'de Sürdürülebilir Kalkınma Hedefleri Konulu Yayınların Bilimsel Haritası*

**Öz:** Birleşmiş Milletler tarafından ilan edilen Sürdürülebilir Kalkınma Hedeflerinin (SKH) gerçekleştirilmesi, her ülkenin bu sürecin sahiplenmesini ve onu kucaklayan ve ona katkıda bulunan politikalar geliştirmesini gerektirmektedir. Ülkelerde yürütülen akademik çalışmalar, bu politikaların üretilme sürecine ışık tutmaktadır. Bu çalışma, SKH'ler ile ilgili akademide gözlemlenen eğilimleri incelemek amacıyla Türkiye'de bu konuda yürütülen akademik çalışmaların bilimsel haritasını ortaya koymayı amaçlamaktadır. Bu amaçla, SKH'ler üzerine yapılan çalışmaların genel durumu, uluslararası iş birlikleri, konu üzerinde en çok çalışan kurumlar ve en çok kullanılan kavramlar incelenmiştir. Çalışmanın veri seti, Web of Science (WoS) veri tabanından "TURKIYE" veya "TURKEY" ülke seçimi ile elde edilen sürdürülebilirlik üzerine akademik çalışmalardan elde edilen bibliyometrik verilerden oluşmaktadır. Bu kriteri karşılayan kümülatif veri seti ve 17 SKH'nin her biri için ayrı ayrı elde edilen veri setleri kullanılarak toplam 18 bibliyometrik analiz gerçekleştirilmiştir. Bu analizlerin sonuçları elektronik tablolara entegre edilmiş ve bir iş zekası aracı olan Tableau kullanılarak görselleştirilmiştir.

Araştırma bulguları, Türkiye'deki çalışmaların çoğunun SKH 13'e odaklandığını ve Türkiye'deki genel eğilimin dünyadaki eğilimle paralel olduğunu ortaya koymaktadır. Sürdürülebilirlikle ilgili çalışmalarda uluslararası iş birliğinin %40'ın üzerinde olduğu gözlemlenmiştir. Türkiye'den araştırmacıların en çok iş birliği yaptığı ülkeler Amerika Birleşik Devletleri, Çin ve İran'dır. Türkiye'de sürdürülebilirlik konusunda en fazla araştırma yapan üç kurum İstanbul Gelişim Üniversitesi, İstanbul Teknik Üniversitesi ve Yıldız Teknik Üniversitesi'dir.

**Anahtar Kelimeler:** Sürdürülebilirlik, Bibliyometrik Analiz, Bilimsel Haritalama, Tableau

**Jel Kodları:** Q01, Q56, C88, O52

## 1. Introduction

The Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs), announced by the United Nations to ensure sustainable development, have both introduced a new conceptual framework to the literature and provided a vast dataset (United Nations, 2000; United Nations, 2015). Studies on the concept of sustainable development, which is addressed in the Brundtland Report as a growth model focused on ensuring that the resources spent on today's welfare do not jeopardise the welfare of future generations, have shown exponential growth due to the influence of this conceptual framework and extensive data set (World Commission on Environment and Development, 1987).

Along with the increase in the number of studies conducted in the field, numerous bibliometric analysis studies have been carried out to summarise the general profile (Ciuciuc et al., 2025). However, due to the high volume of scientific output in the field of sustainable development, existing bibliometric analysis studies tend to narrow their focus to specific SDGs or countries, depending on the goals or country in question.

Ciuciuc et al. (2025) and Dias Paião Júnior & Ferraz (2024) are among the researchers who conducted bibliometric analyses on the intersection of sustainable development with a particular topic. Ciuciuc et al. (2025) focus on the effects of academic studies in the field of sustainable development on institutional performance and reputation. Dias Paião Júnior & Ferraz (2024), meanwhile, address the effects of economic diversity on sustainability using both bibliometric analyses, a qualitative literature review tool, and a systematic literature review, a quantitative tool.

Numerous bibliometric analysis studies focusing on mapping the scientific landscape for one or more SDGs can be found in the literature (Dias Paião Júnior & Ferraz, 2024; Verma et al., 2025; Velazquez, 2025). Dibbern et al. (2023) examine studies related to SDG 6 in the WoS database, while Verma et al. (2025) conduct a bibliometric analysis of studies related to SDG 8 in the Scopus database. Velazquez (2025) examines the literature in the context of studies related to SDG 9, while Beloskar et al. (2024) focus on the bibliometric analysis of scientific research related to SDG 5 and Dhaigude et al. (2025) on SDG 12.

Academic studies conducted in a particular field shed light on the policies that relevant countries will produce (Siar, 2023). Therefore, narrowing down bibliometric analysis studies by country helps to see the impact of scientific research in that country on achieving the SDGs (Trane et al., 2023). However, there are only a limited number of bibliometric analysis studies in the literature that address the situation of a specific country or countries in terms of sustainable development. While Xu & Gao (2025) examine the impact of academic studies conducted in China on sustainable development in the context of rural planning, Trane et al. (2023) conducted a bibliometric analysis to reveal the impact of scientific research on achieving SDGs in the European Union. However, to the authors' knowledge, there is no study in the literature that maps the bibliometric landscape of research conducted on sustainable development in Türkiye.

In this context, the literature on regional approaches and policy coherence developed by the OECD (Organisation for Economic Co-operation and Development 2016)

emphasises that sustainable development is not merely a global agenda, but also a process that varies across local and national contexts (Swain and Ranganathan, 2021). In particular, the Policy Coherence for Sustainable Development (PCSD) approach demonstrates that ensuring coherence across different policy areas and objectives is critical to the effectiveness of sustainable development (Mbanda and Fourie, 2020). From this perspective, the SDGs on which academic knowledge was produced in the countries focused, its distribution across institutions, and the level of international cooperation provide important indicators for understanding the extent to which the sustainable development agenda is addressed in a holistic and coherent manner (Reverte, 2022, pp. 1891–1892). Therefore, examining the distribution of academic research on the SDGs, collaboration structures, and conceptual focuses within the Turkish context aims to reveal how the systemic nature of sustainable development is reflected in scientific output.

Building on the systemic and interdependent nature of the Sustainable Development Goals, the progress of the 17 SDGs that the United Nations targets to meet between 2015 and 2030 is being monitored through both United Nations reports and scientific research (United Nations, 2015; Bianchini et al., 2023; Borchardt et al., 2023). However, for these goals to be achieved, it is not sufficient for only a limited number of countries to take ownership of this process. Regardless of their economic levels, countries must work together for the welfare of the world and future generations (Sachs et al., 2019). Furthermore, it is recognised that scientific research conducted in a country has the potential to provide information for the development of policies aligned with the country's sustainable development goals (Siar, 2023). Collaboration between researchers from different countries will contribute to more comprehensive results in achieving these goals, which Sachs et al. (2019) define as a rescue effort for the entire planet. This study seeks to analyse the contribution of scientific studies conducted in Türkiye to the SDGs and to outline the general framework of how the SDGs are addressed in Türkiye. To this end, the following research questions are addressed.

*RQ1: What is the overall status of studies conducted on each sustainable development goal in Türkiye?*

*RQ2: What is the status of international co-authorship among researchers in Türkiye?*

*RQ3: Which institutions conduct the most studies on SDGs in Türkiye?*

*RQ4: What are the prominent concepts in studies conducted on SDGs in Türkiye?*

In line with this perspective, each research question in this study is based on the holistic and multi-level structure of the SDGs. Firstly, analysing the general distribution of studies across individual SDGs (RQ1) provides an indication of the extent to which scientific knowledge production reflects the balanced and systematic structure of the SDG framework, and reveals potential concentrations or gaps between the goals. Secondly, the examination of international co-authorship patterns (RQ2) corresponds to the global partnership dimension of sustainable development and highlights the role of cross-border scientific collaboration in addressing complex sustainability challenges. Thirdly, the identification of leading institutions contributing to SDG-related research (RQ3) enables an assessment of national research capacity and the institutional foundations supporting knowledge production in the field of sustainability. Finally, the identification of prominent concepts in the SDG literature (RQ4) helps to map the cognitive and thematic orientation of the research, thereby revealing how sustainability is framed, prioritised and operationalised within an academic context. When considered together, these questions enable us to assess how the systemic, collaborative, and policy-related nature of the SDGs is reflected within Türkiye's scientific research environment, whilst taking into account a comprehensive theoretical framework.

The second section of this study presents an overview of studies conducted in line with SDGs in the world and in Türkiye. The third section explains the research method, data source, data collection, and analysis process. The fourth section presents the findings

obtained as a result of the analysis. The fifth section summarizes the general findings of the study, explains its limitations, and lists recommendations for future studies.

## 2. Theoretical Background and Literature Review

The United Nations announced the 2030 SDG agenda, consisting of 17 sustainable development goals, with the aim of addressing the protection of global environmental well-being alongside the growth of world economies (United Nations, 2015). These goals are presented in Figure 1.

Sustainable development is viewed as an integrated system that requires not only a balance between economic, social and environmental dimensions (Strezov, Evans, and Evans, 2017), but also the management of the dynamic and interdependent relationships between these dimensions (Guillen-Royo, Guardiola, and Garcia-Quero, 2017). The promotion of Policy Coherence for Sustainable Development (PCSD) is recognised as a key implementation tool, designed as a goal-based and results-oriented framework in the emergence and dissemination of the 2030 Agenda (Zeigermann, 2018). This phenomenon has also been reflected in the literature in recent years as ‘normative coherence for sustainable development’ (Koff, Challenger, Ros Cuellar, Aguilar Orea, and Lara Lopez, 2023).



**Figure 1.** Framework of the 17 SDGs defined under the 2030 Agenda (United Nations, 2015).

The Sustainable Development Goals (SDGs) established by the United Nations were designed as a set of interrelated goals that reflect this systemic structure (UN General Assembly, 2015). In this context, it is stated that progress towards one goal can either support or undermine other goals (Allen, Metternicht, and Wiedmann, 2018, p. 1454; Nilsson et al., 2018). Whilst the existence of such bidirectional effects is debated in the literature (Barbier and Burgess, 2019; Brand, Furness, and Keijzer, 2021; Lusseau and Mancini, 2019), the sustainable development process must be addressed through a holistic and coherent approach that takes into account synergies and trade-offs between goals (Xiao, Liu, and Ren, 2023, pp. 1135–1136). This systemic perspective necessitates that academic knowledge production regarding sustainable development be analysed using an epistemic networks approach that reflects the relationships and distribution between goals, rather than focusing solely on specific goals (Song and Jang, 2023, p. 2795). This systemic perspective is further reinforced by studies emphasizing that achieving the SDGs requires deep and coordinated transformations across sectors and actors, underscoring

the need for integrated and systemic approaches to sustainable development (Sachs et al., 2019).

Taken together, these perspectives establish a systemic and relational theoretical foundation for understanding sustainable development, framing the SDGs not as isolated targets but as an interconnected policy architecture; building on this foundation, the empirical literature has predominantly examined how country-level conditions shape the implementation and outcomes of the SDGs.

The approach to SDGs by countries that are parties to the UN is generally addressed in academic literature in terms of financial development (Ozili and Iorember, 2024; Yap et al., 2023), institutional capacity (Barbier and Burgess, 2021; Reverte, 2022), and technological infrastructure (Leal Filho et al., 2022; Singh and Ru, 2023). Studies targeting overarching goals such as the SDGs are naturally influenced by all kinds of country conditions. In this respect, these goals not only reflect the impact of country conditions but also provide institutional transformation, thereby establishing a strategic infrastructure framework. Looking at studies conducted in different countries on the institutional policy outcomes of SDGs, Dai, Ahmed et al. (2023) examine the long-term effects of external conflicts, economic growth, and government stability on the ecological footprint in Pakistan, while He et al. (2023) examine the role of public R&D investments in leading renewable energy investor countries in mitigating climate change and reveal that these investments significantly limit climate pressures under SDG-13. Dinçer, El-Assadi, Saad & Yüksel (2024) address the issue of SDG-aligned prioritization in sustainability reporting by analysing the causal relationships between statements under SDG-13, SDG-7, and SDG-12. Findings obtained using the QSFS-based DEMATEL method reveal that statements related to the biosphere dimension guide other sustainability dimensions and that the importance analysis for sustainable energy is the most effective reporting criterion. In their work, Kartal et al. (2025) analyse the effects of new factors such as the energy transition index and environmental policy stringency in leading emerging economies (2000–2020) on the ecological footprint and carrying capacity factor of GDP, renewable energy use, and foreign direct investment using the KRLS method. Empig et al. (2023) analyse the relationships between the CSI Nexus, consisting of climate change, sustainable forest management, and information and communication technologies, and the SDG targets using a system thinking approach. The findings reveal that climate change is strongly related to sustainable forest management, while ICT has a limited impact within the SDG framework, offering implications for policy prioritization. In his 2024 study, Adebayo examines the effects of technological innovation on income distribution in BRICS-T countries between 1992 and 2019 using quantile causality and quantile regression methods. The findings reveal that the effects of technological innovation on income inequality vary across countries and different segments of the distribution, offering policy implications for SDGs. Khan et al. (2024) analyse the determinants of renewable energy consumption and CO<sub>2</sub> emissions in the United States between 1990 and 2020 using a TVP-SV-VAR model to examine their contribution to carbon neutrality goals. The findings reveal that renewable energy use, eco-innovations, and climate policy uncertainties reduce emissions; conversely, financial development increases CO<sub>2</sub> emissions across all periods. In their work, Koçulu and Topçu (2024) design and implement an SDG unit based on the learn-think-act approach to address the lack of curriculum for teaching SDGs at the middle school level in Türkiye. The findings of this study also show that the 8-week implementation significantly increased students' knowledge levels regarding SDGs. In another study, Koçulu (2025) compares the effect of SDG teaching based on the learn-think-act approach with traditional lecture-based teaching in developing sustainability awareness among seventh-grade students in Türkiye. The findings reveal that this approach has a meaningful and powerful effect on students' sustainability awareness. In their study, Khan et al. (2025) analyse the effects of natural resources and technological innovation on the sustainable development index in OECD countries between 1990 and 2020, taking globalization and participatory

democracy into account as control variables. The findings of the study reveal that natural resources and technological innovation support the achievement of SDGs, while democracy and globalization shape this relationship in different ways, offering policy implications. In their work, Ekmen and Kocaman (2023) examine the remote sensing literature under SDG-11 for the period 2016–2023 using bibliometric and thematic analyses, revealing an increasing research trend on urban ecological quality, land use change, and impervious surfaces. The findings of their work highlight deep learning and machine learning-based methods, while showing that areas such as disaster resilience, inclusivity, and cultural heritage have been relatively neglected, thus providing guiding insights for sustainable urban policy and planning. In their study, Wang et al. (2025) examine the effects of artificial intelligence on carbon inequality in 67 countries between 1995 and 2019, revealing that artificial intelligence increases carbon inequality between and within countries due to its energy-intensive structure and uneven distribution. The findings suggest that AI's negative effects can be reversed by overcoming thresholds of commercial openness, global value chain integration, and strong governance, offering policy implications under SDG-13 and SDG-10. In their study, Aras et al. (2024) examine SDGs from a dual materiality perspective using ESG indicators across 1,888 companies in OECD financial institutions, revealing how banks prioritize SDGs. The findings show that financial materiality, dual materiality, and fuzzy logic-based dual materiality approaches are related to SDGs at different levels, advancing the literature by offering methodological and managerial implications for the financial services sector's contribution to the 2030 agenda. In their study, Çelik et al. (2025) analyse 166 countries using machine learning-based clustering and classification methods based on 2025 SDG Index data, revealing structural differences in sustainability performance. The authors' findings show that SDG scores and regional performance are the strongest factors in determining country clusters, providing actionable insights for cluster-specific policy designs for the 2030 agenda. In their work, Seçmen and Ibrahim (2025) developed sustainable development indicators aligned with SDGs for unique urban structures in Nigeria. Multi-criteria analyses based on AHP and ANP reveal that sustainable livelihoods have a leverage effect on other goals and are a fundamental priority that triggers improvements in areas such as resilience, disaster preparedness, and health. Adebayo et al. (2023) examine the relationship between renewable and non-renewable energy sources and their ecological footprint in newly industrialised countries during the period 1990–2018 using panel data methods. The findings reveal that economic growth and fossil fuel use increase environmental degradation, while renewable energy sources such as hydro and geothermal do not lead to environmental improvement, offering policy implications for SDGs. In their work, Al-Mulali et al. (2025) examine the effects of economic, energy, and ESG-based policy uncertainties on SDG performance in 21 countries during the period 2002–2022 using panel and quantile regression methods. The authors' findings reveal that policy uncertainty weakens SDGs, particularly in low-performing countries, whereas strong governance structures mitigate these negative effects. Akdam et al. (2025) contributed to more accurate modelling of global health indicators in line with SDG-3 through applied results obtained from COVID-19 case fatality rate data. Munir et al. (2025) examine the determinants of carbon emission reductions in 83 developed and developing countries between 1996 and 2022 using a panel ARDL model. The findings reveal that renewable energy consumption significantly reduces emissions in both the short and long term, whereas energy efficiency and private investments can increase carbon intensity in the long run, highlighting the importance of policy and cross-sectoral collaboration for global sustainability goals. Lyu et al. (2025)'s study examines the asymmetric health impacts of fossil fuel dependency in Sub-Saharan Africa between 1990 and 2022 using quantile-based methods, revealing a marked increase in respiratory diseases, disability, and out-of-pocket health expenditures, particularly among vulnerable groups. In their work, Yadav et al. (2025) develop a multi-criteria decision-making framework integrating Fermatean fuzzy sets, LOPCOW, and DEMATEL to identify and prioritise barriers to gender equality

under SDG 5. Their findings reveal that traditional perspectives and a lack of awareness regarding women's rights are key determinants, offering causal and actionable intervention areas for policymakers. Yildiz and Markoc (2025) address the relationship between minimalist design principles and the United Nations SDGs within the context of rapidly increasing urbanisation and construction-focused growth in Türkiye, using a comprehensive decision support model. The authors found that resource and process simplification, particularly linked to SDG 11 and SDG 12, along with user-centred flexible design principles, offer measurable and actionable contributions to Türkiye's sustainable housing and architecture policies. In their work, Ahmed et al. (2025) directly examine the marginal effects of artificial intelligence and solar energy on the SDGs Index in the world's ten largest economies between 2000 and 2022 using the KRLS method. They found that the impact of artificial intelligence varies by country and level of success, while solar energy, economic globalisation, and institutional capacity generally support SDG performance in a positive direction. Dindar (2025) examines the sustainability reports of 12 large companies operating in the Turkish automotive manufacturing sector, assessing the alignment of GRI-based environmental, social, and economic indicators with the UN SDGs. The findings show that, despite the high level of quantitative reporting on social indicators, environmental issues are more prominent at the narrative level, while there are significant reporting gaps in SDGs related to governance (5, 8, and 16). The study proposes a structural approach to strengthen GRI-SDG alignment in the Turkish automotive sector, highlighting the imbalance between quantitative scope and qualitative depth in sustainability reporting. Göçoğlu et al. (2025) state that the adaptation priorities of countries vulnerable to climate change are shaped by socio-economic structure and institutional capacity, and that the agriculture and food sectors are the most sensitive areas. Their analysis of National Adaptation Plans reveals that adaptation policies focus primarily on awareness and capacity building, and that country-specific strategies are crucial for effective climate adaptation. Güldal (2025) examines the relationship between SDG 2 and agricultural input efficiency in OECD countries, revealing that SDG 2 scores based on social indicators do not always reflect resource efficiency. The author's findings recommend integrating input efficiency criteria into SDG 2 and adopting a holistic approach with other SDGs to enable a more accurate assessment of sustainable agriculture and food security. Building on the holistic structure of the SDGs adopted by the United Nations in 2015, Ghanem et al. (2025) propose a national SDG monitoring index for Jordan based on indicators. While pointing to a strong synergy between SDG 6 and SDG 9 and clear trade-offs in SDG 5, it shows that despite progress in the 2005–2022 period, current trends make it difficult to fully achieve any of the goals by 2030, necessitating a policy focus on low-performing targets. Akça et al. (2025) examine the long-term relationship between technological innovation and income inequality in Türkiye using data from 1990 to 2021 within the framework of the Technological Kuznets Curve hypothesis. Their findings show that technological innovation, represented by patent applications, increased income inequality until 2008, but after this threshold, the effect reversed, and public spending played a balancing role in the long term. The results of the study indicate that technology-focused growth strategies in Türkiye need to be supported by education, skills development, and social welfare policies. Garan and Güneş (2025) examine the contribution of university-industry-public interaction to sustainable urban governance by addressing SDG 11 within the framework of the triple helix model. A qualitative analysis of MARUF21 documents shows that universities are pioneers in innovative proposals, industry focuses on application-oriented solutions, and the public sector's contribution is mostly limited to the policy level, whereas digital platforms strengthen collaboration and knowledge sharing. In his study, Yüncü (2025) argues that, despite joint commitments, significant differences in the performance of the SDGs persist between European Union member and candidate countries. In his study, using an indicator-based comparative analysis based on EUROSTAT data, he compares Türkiye's SDG performance with that of European countries, highlighting its potential in areas where it excels, particularly in

gender equality, clean energy, decent work, and poverty reduction, while also identifying its weaknesses in these areas, as we have seen extensively in other studies in the literature, in a policy-oriented manner. In their study, Bekil and Genel (2024) investigated how the sustainability communication of fashion brands under SDG 12 reflects on the sustainability and brand perceptions of young consumers aged 18–25 living in Istanbul, in the context of the negative effects of fast fashion on environmental sustainability. The qualitative study found that young people have a high level of awareness regarding sustainable consumption, but that the sustainability messages of fast fashion brands have varying effects on their purchasing decisions. In his study examining the role of agent-based artificial intelligence systems in the context of sustainability and ethics, Parmaksız (2025) demonstrated that, in order for these systems to deliver societal benefits, they must be developed in accordance with the principles of human oversight, transparency and ethical design.

Building on the PCSD framework, the structure of scientific knowledge production can be interpreted as an indirect indicator of coherence in sustainability-oriented efforts. Uneven distribution of research across SDGs, limited cross-institutional concentration, or weak international collaboration patterns may signal fragmentation in the knowledge base, which in turn can hinder integrated policy development. Conversely, balanced thematic coverage and strong collaborative networks may indicate a more coherent and system-oriented approach to sustainability. In this sense, bibliometric patterns are not merely descriptive outputs but reflect deeper structural dynamics related to policy alignment and strategic prioritisation. Table 1 summarises the findings of studies conducted in the SDG literature without any contextual focus.

**Table 1.** The Findings of Studies Conducted in the SDG Literature

Author(s) – Year	Scope / Country(ies)	SDG Focus Area	Method	Key Findings	SDG Dimension (Economic, Social, & Environmental)
United Nations (2015)	Global	All SDGs	Policy Document	The 2030 Agenda provides a comprehensive framework for sustainable development.	All
Ozili & Iorember (2024); Yap et al. (2023)	Multiple countries	All SDGs	Econometric analysis	The indirect relationship between financial development and SDG achievement has been demonstrated.	All
Barbier & Burgess (2021); Reverte (2022)	Multiple countries	All SDGs	Corporate analysis	It has been emphasized that institutional capacity determines sustainable development performance.	All
Leal Filho et al. (2022); Singh & Ru (2023)	Multiple countries	All SDGs	Literature / Panel analysis	It has been demonstrated that the technological infrastructure supports SDG progress.	All
He et al. (2023)	Renewable energy leaders	SDG 13	Panel analysis	Public R&D investments are reducing climate pressures.	Environmental
Dinçer et al. (2024)	Multiple countries	SDG 7 SDG 12 SDG 13	DEMATEL	Energy and biosphere-focused reporting guides other SDGs.	Economic and Environmental
Kartal et al. (2025)	Emerging economies	SDG 7 SDG 13	KRLS	Energy conversion improves environmental quality.	Economic and Environmental
Empig et al. (2023)	Global	SDG 13 SDG 15	Systems thinking	ICT's SDG impact is limited; forest management has been found to be critical.	Environmental
Adebayo (2024)	BRICS-T	SDG 10	Kantil analysis	The impact of technological innovation on income inequality varies from country to country.	Social
Khan et al. (2024)	ABD	SDG 13	TVP-SV-VAR	Renewable energy reduces emissions.	Environmental

Koçulu & Topçu (2024); Koçulu (2025)	Türkiye	SDG training	Experimental	SDG-based teaching increases awareness of sustainability.	All
Khan et al. (2025)	OECD	All SDGs	Panel analysis	Natural resources and technology support SDG achievement.	All
Ekmen & Kocaman (2023)	Global	SDG 11	Bibliometric	Machine learning methods are prominent in urban ecology studies.	Economic
Wang et al. (2025)	Multiple countries (67)	SDG 10 SDG 13	Panel analysis	Artificial intelligence can increase carbon inequality.	Social and Environmental
Aras et al. (2024)	OECD finance	All SDGs	ESG analysis	Banks address SDGs with varying levels of importance.	All
Çelik et al. (2025)	Multiple countries (166)	All SDGs	Machine learning	International sustainability clusters have been identified.	All
Bekil & Genel (2024)	Türkiye	SDG 12	Qualitative analysis	Youth are highly aware, but their purchasing power is limited.	Economic
Parmaksız (2025)	Global (Scopus, 218 publications, 2023–2025)	SDG 3, SDG 4, SDG 8, SDG 9, SDG 12, SDG 13, SDG 16	Bibliometric analysis + Topic modeling (Parallel LDA) + KNIME	The necessity of human oversight, transparency and ethical design in the use of artificial intelligence	All

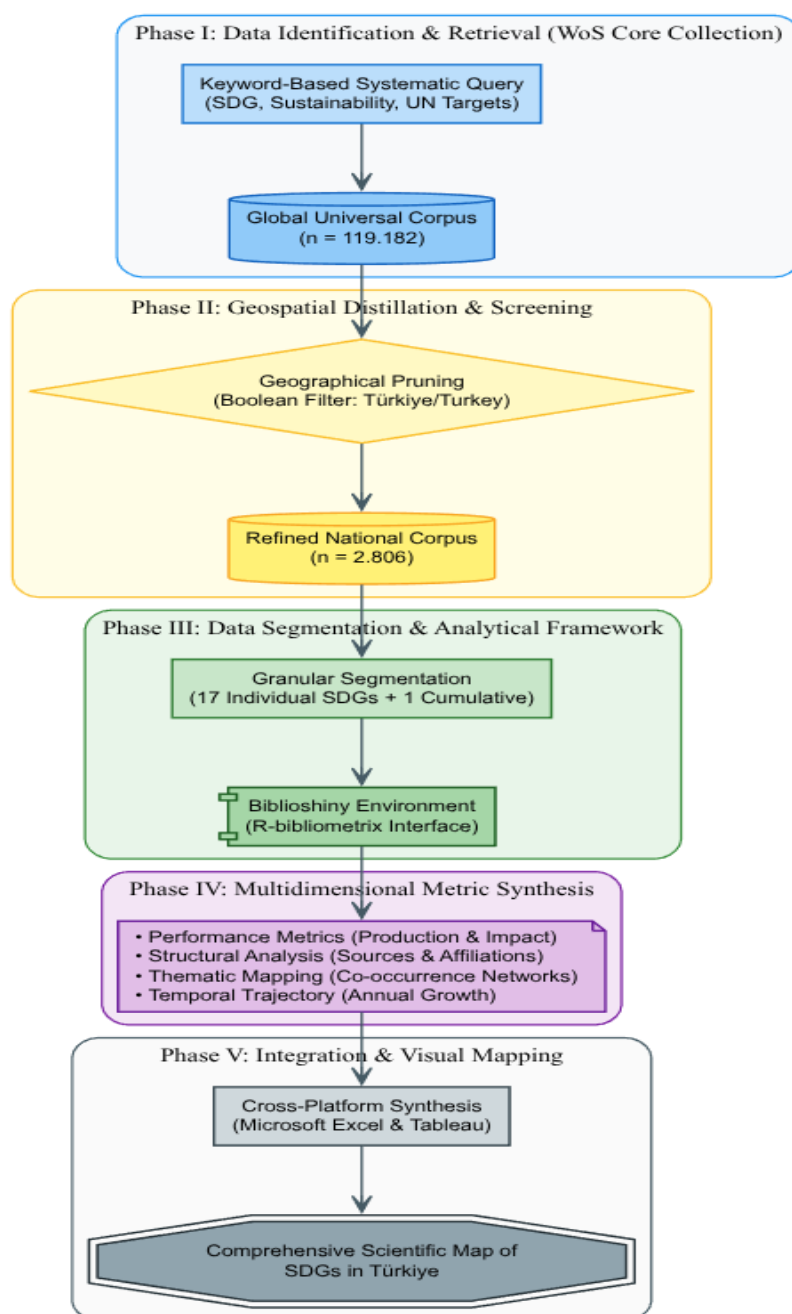
Source: Created by the authors.

### 3. Methodology

Bibliometric analysis studies are a scientific mapping method that examines studies on a subject in the literature through quantitative data with the support of software tools (Aria & Cuccurullo, 2017; Donthu et al., 2021). Bibliometric analysis is a valuable method for revealing the general profile, development, and interactions within the literature when traditional literature review methods are limited (Donthu et al., 2021). This study aims to map the scientific landscape of studies conducted in Türkiye in line with the United Nations SDGs. The phases applied in the method are presented in Figure 2.

To this end, in Phase 1, WoS, a database that indexes widely used and high-quality journals, was selected for data collection. First, to obtain a compilation of all studies conducted within the scope of the UN SDGs in the WoS database, all publications matching the keywords Sustainable Development Goal, SDG, UN Development Target, Sustainability Goal, Sustainable Development Target, or UN Sustainability Objective were scanned. As of 26 September 2025, the date the data was extracted, a total of 119,182 studies containing the specified keywords were found in the WoS database. In the second stage, as the main focus of the research was studies conducted in Türkiye, the search was repeated with the query text below, limiting the search to Türkiye. As a result of this query, 2,806 studies conducted in Türkiye within the scope of the SDGs were obtained.

*“Sustainable development goal\* (Topic) or SDG\* (Topic) or UN development target\* (Topic) or Sustainability goal\* (Topic) or Sustainable development target\* (Topic) or UN sustainability objective\* (Topic) and TURKIYE or TURKEY (Countries/Regions)”*



**Figure 2.** Phases applied in the method

The dataset obtained from the query was subsequently categorised into separate datasets corresponding to each of the seventeen SDGs. The categorisation process was carried out via keyword-based matching derived from the official United Nations Sustainable Development Goals framework. Publications associated with more than one SDG were included in all relevant SDG categories. In line with the research questions, eighteen datasets—comprising both the cumulative studies conducted in Türkiye under the SDGs and studies related to each individual SDG—were subjected to bibliometric analysis using the Biblioshiny interface of the bibliometrix R package developed by Aria and Cuccurullo (2017). The bibliometric analysis included Main Information, Annual Scientific Production, Annual Citations Per Year, Most Relevant Sources, Most Relevant Affiliations, Country Scientific Production, Most Frequent Words, Word Cloud, and Co-occurrence Network analyses. The outputs generated through Biblioshiny, which were

organised into separate files for each of the 17 SDGs as well as for the cumulative SDG results, were synthesised and integrated in Microsoft Excel in line with the research questions, and summary tables were created accordingly. These tables were subsequently transferred to the Tableau platform, which was used solely for visualisation purposes. Furthermore, as the “Average Number of Co-Authors per Document” values for certain SDGs in “Table 3. Türkiye’s Collaboration Metrics Across the SDGs” were observed to be unusually high, median values, which are not directly provided by Biblioshiny, were calculated using the R programming language and the results were integrated into the relevant table.

#### 4. Findings

RQ1: What is the overall status of studies conducted on each sustainable development goal in Türkiye?

This research question is addressed under two headings. First, Table 2 compares the number of studies conducted for each SDG both globally and in Türkiye up to the date this study was conducted and provides the growth rates of studies conducted in Türkiye specifically.

**Table 2.** Overview of Türkiye’s Contribution to Global SDG Studies

SDGs	Growth Rate (%)	Documents (Türkiye)	Documents (Global)	Türkiye/Global (%)
Goal 1	20.59	69	5,651	1.22
Goal 2	16.65	218	15,758	1.38
Goal 3	25.69	297	24,407	1.22
Goal 4	17.05	113	5,297	2.13
Goal 5	18.44	69	5,496	1.26
Goal 6	14.57	158	11,662	1.35
Goal 7	26.01	1,004	19,155	5.24
Goal 8	19.57	725	8,019	9.04
Goal 9	23.66	1,052	26,581	3.96
Goal 10	14.31	59	2,576	2.29
Goal 11	19.45	459	25,682	1.79
Goal 12	27.29	970	18,166	5.34
Goal 13	24.19	1,139	34,705	3.28
Goal 14	12.62	249	17,731	1.40
Goal 15	13.06	262	19,446	1.35
Goal 16	5.95	12	1,451	0.83
Goal 17	7.2	33	2,287	1.44
Total	6.94	2,806	119,182	2.35

It is observed that the most frequently addressed targets in Türkiye align with global trends. SDG 13 and SDG 9 have been the two areas receiving the most attention within the United Nations' sustainability goals, both globally and in Türkiye. SDG 16, on the other hand, is the least researched goal among the 17 SDGs, both globally and in Türkiye.

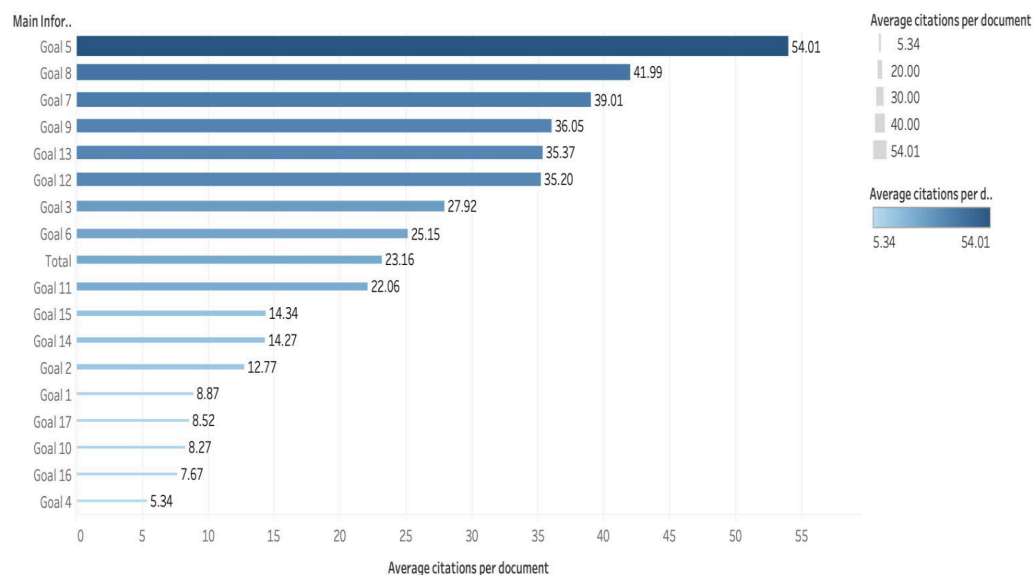
When examining Türkiye’s share among all publications indexed in the WoS database on SDGs, it is seen that Türkiye’s contribution is around 1% in 9 of the 17 SDGs. However, studies conducted in Türkiye on SDG 8 constitute more than 9% of all publications indexed in the WoS database. In the areas of SDG 7 and SDG 12, 5% of the studies indexed in the WoS database were conducted in Türkiye.

When examining the growth rates of initiatives undertaken in Türkiye in line with SDGs, it is observed that annual growth exceeds 20% for seven SDGs. The highest growth

rate is 27% for SDG 12. SDG 7 and SDG 3 are the other development goals with annual growth rates above 25%.

Secondly, Figure 3 shares the average number of citations for the studies conducted in Türkiye for each SDG up to the date this study was conducted.

SDG 5 is one of the top ten SDGs most frequently studied in Türkiye, yet it emerges as the development goal receiving the most citations among SDG studies, with an average of 54 citations per document. The second most cited SDG is SDG 8, which accounts for more than 9% of all publications searched in the WoS database. For more than half of the 17 SDGs, the average citation per document is above 20. SDG 4 studies conducted in Türkiye are the least cited SDG.



Sum of Average citations per document for each Main Information About Data. Color shows sum of Average citations per document. Size shows sum of Average citations per document. The marks are labeled by sum of Average citations per document. The view is filtered on sum of Average citations per document, which keeps non-Null values only.

**Figure 3.** Average citations per document

RQ2: What is the status of international co-authorship among researchers in Türkiye?

The literature emphasises that all countries must make efforts to achieve sustainable development (Sachs et al., 2019). In this context, this research question examines the approaches of researchers working on this topic in Türkiye towards international collaboration and identifies the countries with which they collaborate most frequently. Table 3 examines the number of single-author publications, Average Number of Co-Authors per Document, Median Number of Co-Authors, and international co-authorship numbers separately for each target and cumulatively for all SDGs. In Table 3, the three largest values for each column are colour-coded from dark blue to a lighter shade.

**Table 3.** Türkiye's Collaboration Metrics Across the SDGs

SDGs	Documents (Türkiye)	Authors	Single-author	Avg Co-Authors	Median Co-Authors	International Co-authorships (%)
Goal 1	69	222	15	3.29	2	37.68
Goal 2	218	910	35	4.38	3	30.28
Goal 3	297	6,975	47	32.1	3	41.41
Goal 4	113	374	8	3.5	3	20.35
Goal 5	69	3,633	8	74.6	3	40.58
Goal 6	158	931	18	6.15	3	34.18
Goal 7	1,004	2,158	93	3.56	4	55.38
Goal 8	725	1,29	64	3.49	4	63.86
Goal 9	1,052	2,106	108	3.39	3	53.9
Goal 10	59	166	12	2.83	3	40.68
Goal 11	459	1,549	73	3.75	3	32.46
Goal 12	970	2,068	76	3.52	4	53.61
Goal 13	1,139	2,97	114	3.86	3	52.33
Goal 14	249	1,177	30	4.96	3	30.92
Goal 15	262	1,122	37	4.53	3	32.44
Goal 16	12	64	3	5.33	2	25
Goal 17	33	119	5	3.82	3	24.24
Total	2,806	14,014	359	7.17	3	41.02

Considering the average number of authors working on each SDG, it is evident that SDG 3 and SDG 5 occupy the top two positions. Furthermore, despite the limited number of publications on Goal 3 and Goal 5, it is observed that the number of authors working on these goals is quite high. As a natural consequence of this situation, Goal 3 and Goal 5 also lead the 17 SDGs in terms of the number of co-authors per document.

However, when these findings are evaluated together with the "Median Number of Co-Authors" values presented in Table 3, it becomes clear that the median value for both SDGs is only 3. This marked difference between the average and median values indicates that a limited number of mega-collaborative studies have led to an increase in the average number of authors. It is evident that the average number of co-authors is quite high due to the nature of the research. The mega-collaborative study conducted by Fullman et al. (2017), involving over 600 authors from 188 countries, is one of the studies illustrating the increase in the number of co-authors per document for these SDGs.

When examining the international co-authorship rate, it is seen that this rate is above 50% for five different SDGs. The SDGs with the highest international co-authorship rates are SDG 7, SDG 8 and SDG 9. Furthermore, two of those, SDG 7 and SDG 8, are among the targets with the highest median values.

When Table 3 and Figure 3 are interpreted together, it is seen that Goal 5, which has the highest number of co-authors per document, is also the SDG with the most citations. Furthermore, the three SDGs with the highest international co-authorship rates are also among the four goals with the most citations.

Figure 4 shows the distribution of publications within the scope of SDGs by country for the compilation of this study.

A total of 143 countries has contributed to this field; however, to improve the readability of the visualisation, only the names and number of studies from the top ten

countries with the most research is labelled on the map, while other countries are colour-coded according to the specified scale. As we collected data for Türkiye in this study, Türkiye naturally ranks first in the Countries Scientific Production list, while the top five countries with the most studies on the subject are, in order, the United States, China, Iran, India, and the United Kingdom.

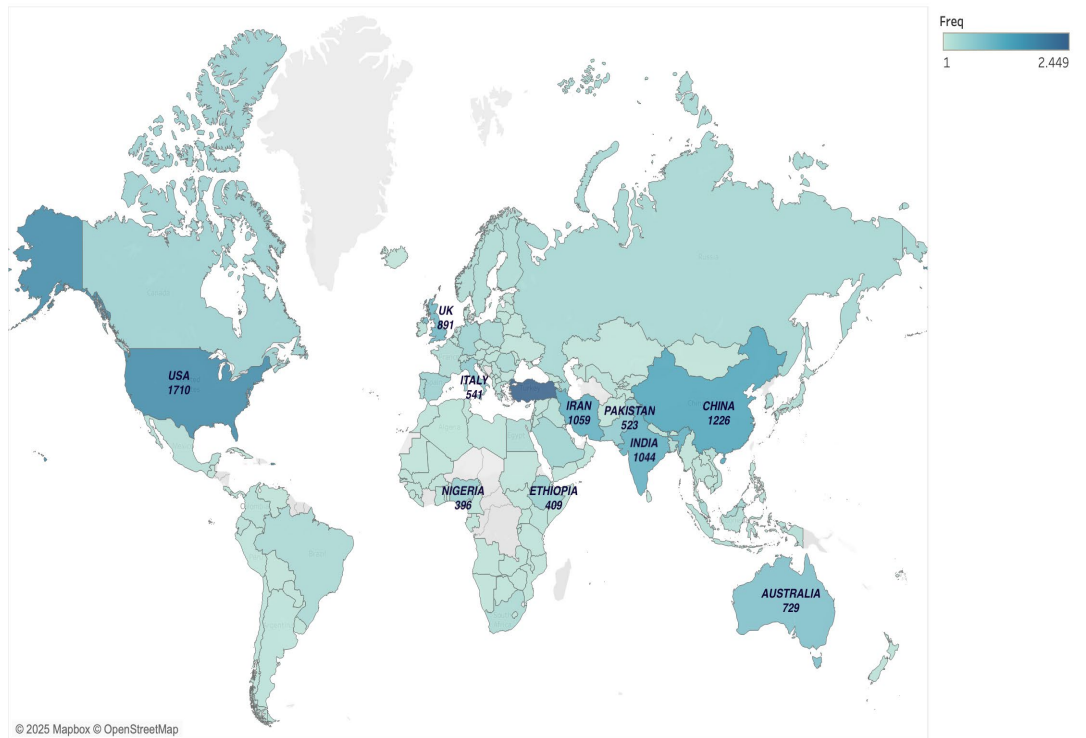


Figure 4. Countries Scientific Production

Figure 4 shows which countries publish the most, while Figure 5 presents a network diagram of countries collaborating with authors from Türkiye. In this diagram, the area of each circle, representing a country, increases in proportion to the intensity of international collaboration. The thickness of the lines showing the relationships between countries indicates the strength of the relationship. The Louvain algorithm was used to identify clusters in this network diagram consisting of 20 nodes.

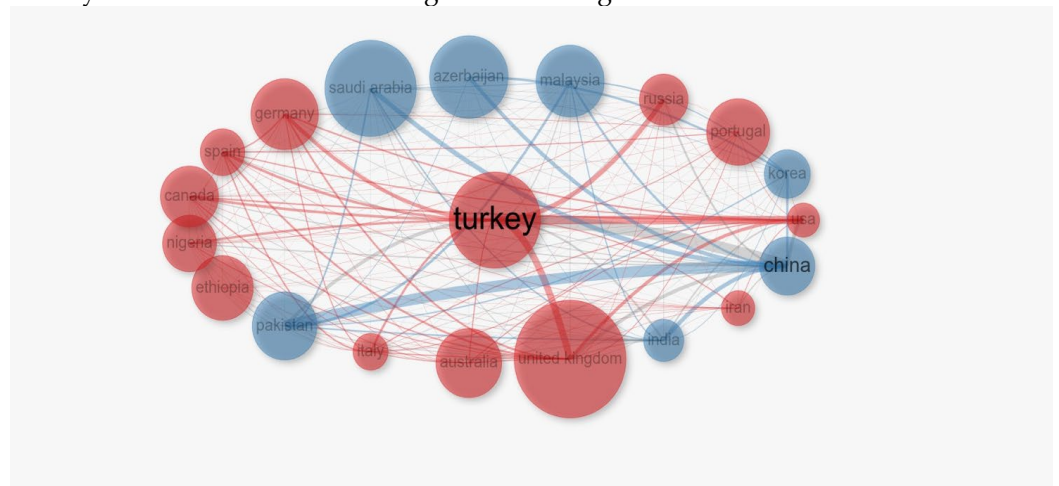


Figure 5. Cooperation network diagram of the countries

The dataset for this study consists of scientific research selected from the Wos database with Türkiye as the country of selection, placing Türkiye at the centre of the

network diagram. The red and blue colours represent clusters. Both clusters have more frequent and stronger relationships within themselves. There appears to be quite intensive international cooperation with the United Kingdom, Saudi Arabia, Azerbaijan and Malaysia. It is also possible to say that Türkiye has quite strong relations with the United Kingdom, the United States, Russia, and Germany.

RQ3: Which institutions in Türkiye conduct the most research on SDGs?

The 25 institutions that conduct the most work on sustainability in Türkiye are presented in Figure 6. When creating this graph, it was observed that some foreign institutions were in the top ranks, and these institutions were excluded to produce the following graph, which only includes institutions from Türkiye.

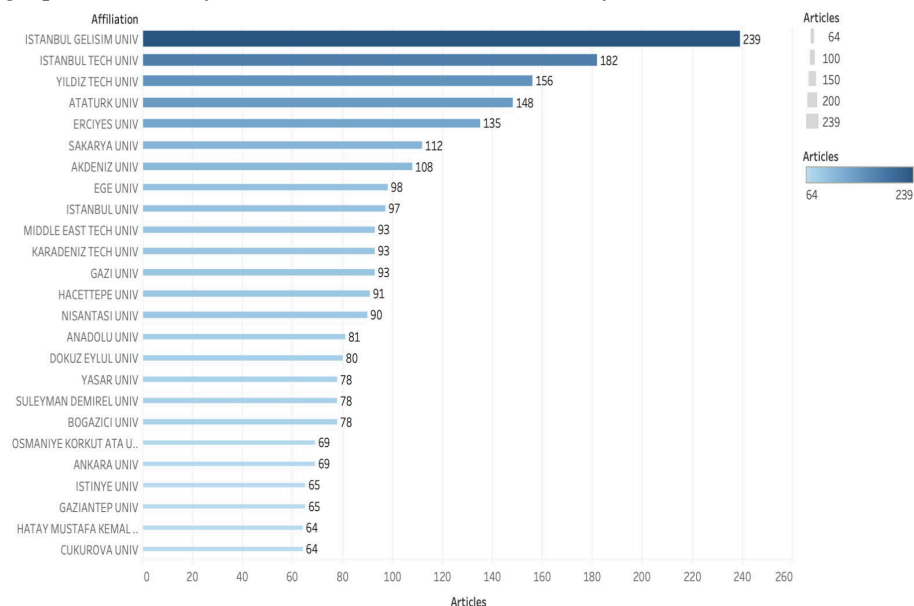


Figure 6. Top 25 Institutions Working Most in the Field of Sustainability

Of the 25 institutions conducting the most research in the field of sustainability in Türkiye, four are foundation universities, while the remaining 21 are public universities. The institution publishing the most on the subject is Istanbul Gelisim University, a foundation university. Istanbul Technical University, which ranks second after Istanbul Gelisim University, has conducted approximately 60 more studies. Only the top three institutions have conducted over 150 studies, and the number of institutions conducting over 100 studies is limited to seven.

It is a noteworthy finding that Istanbul Gelişim University ranks first among all institutions in Turkey in terms of SDG research outputs, leaving behind long-established technical universities. However, this result must be interpreted with careful consideration. One possible explanation lies in the labelling dynamics arising from the SDG indexing structure of the WoS. As the WoS system allows a single publication to be associated with multiple SDGs, the same study may be classified under several SDG categories. The findings presented in Figure 7 also demonstrate that Istanbul Gelişim University has a high number of matches across different SDG categories.

Furthermore, the fact that SDG matches in the WoS database are not directly determined by the authors, whilst the inclusion of SDG terminology in titles, abstracts and keywords may enhance visibility, may have contributed to this result. Furthermore, the keyword-based query structure used in the data collection process (“Sustainable Development Goal\*”, “SDG\*”, etc.) may have given a relative advantage to publications that directly use SDG terminology in their titles, abstracts or keywords.

Therefore, the findings should be interpreted not as a direct indicator of organisations’ overall sustainability performance, but as results reflecting their visibility within the WoS ecosystem of SDG-tagged publications.

Information on the top three institutions conducting the most research on each of the 17 SDGs in Türkiye is presented in Figure 7.

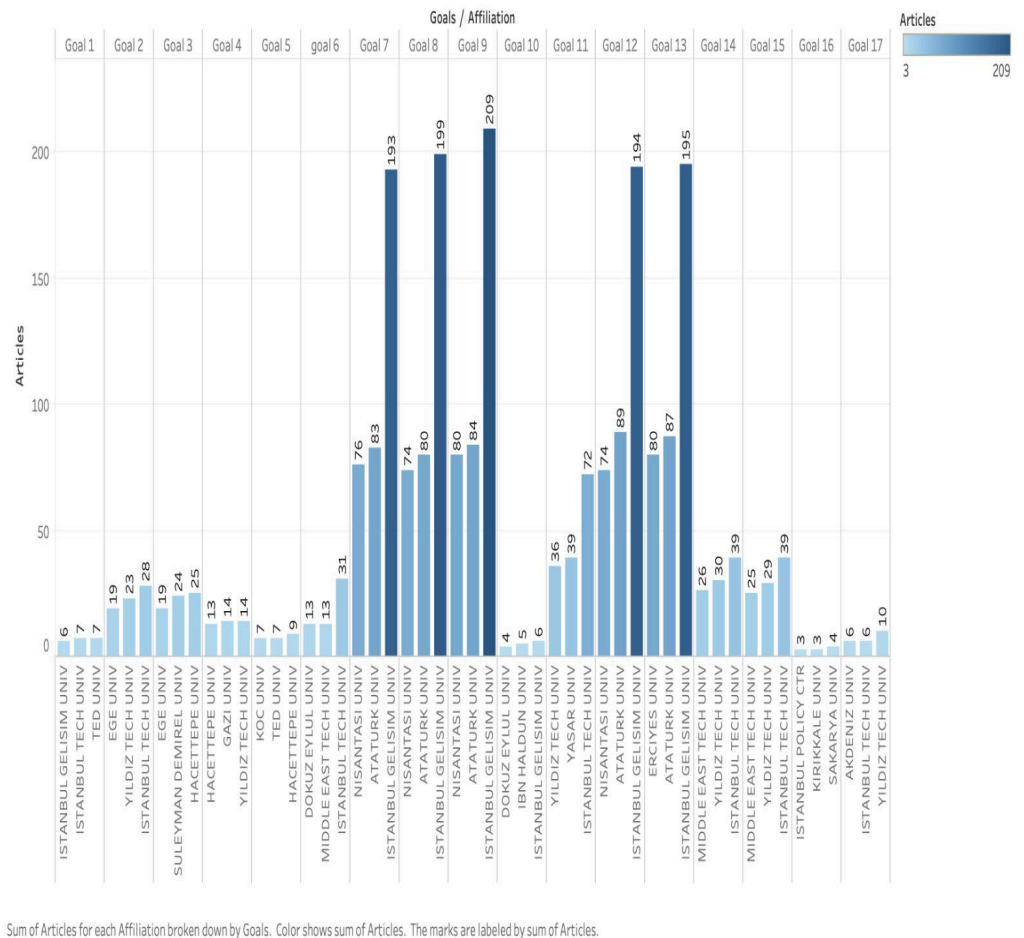


Figure 7. Top 3 Institutions Working Most in the Field of Each SDGs

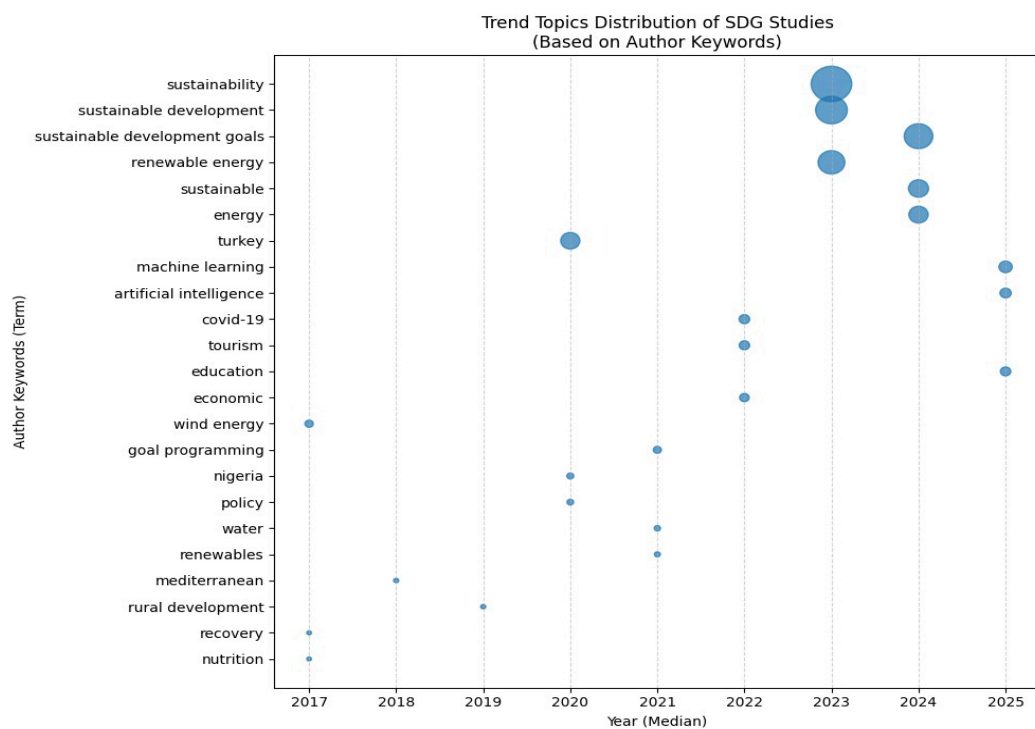
Figure 7 shows the three institutions that have conducted the most research on each of the 17 SDGs and the number of publications produced by these institutions. Istanbul Gelişim University, the institution conducting the most research on sustainability, also emerges as the institution with the most publications for six SDGs. This institution, which has conducted a total of 239 studies, corresponds to over 190 studies for each of SDG 7, SDG 8, SDG 9, SDG 12, and SDG 13.

As Nilsson et al. (2018) also point out, this situation stems from the strong links between the SDGs, meaning that steps taken for one SDG also have an impact on the others. With a similar perspective Sachs et al. (2019), emphasises that there are strong interdependencies among the SDGs. Consequently, a single policy or academic publication may contribute to more than one SDG simultaneously. In the SDG classification approach adopted in this study, publications can also be linked to multiple SDGs. For example, the publication by Gyamfi et al. (2025), which examines the relationship between economic growth and sustainability, is linked to SDG 7, SDG 8, SDG 9, SDG 12 and SDG 13 in the Web of Science database. Similarly, studies conducted by Onifade et al. (2021) and Barut et al. (2023) are also listed under multiple SDGs simultaneously in the WoS database. Consequently, the sum of the publication counts calculated on an SDG basis may exceed the total/cumulative publication count presented in the table.

RQ4: What are the prominent concepts in studies conducted on SDGs in Türkiye? To compare the prominent concepts in studies conducted on SDGs in Türkiye, Figure 8 first

examines the trending topics based on Author Keywords, and Figure 9 examines the trending topics based on Keywords Plus. Subsequently, Figure 10 compares strategic diagrams based on Keyword Plus themes using different clustering algorithms (Spinglass, Walktrap, Leiden, Louvain).

Author Keywords represent the keywords consciously selected by authors to reflect the focus of their work. Keywords Plus, on the other hand, are algorithmically derived from reference titles and consist of terms that reflect the conceptual background of the field.



**Figure 8.** Distribution of trending topics in SDG studies according to author keywords

The author's keywords most frequently relate to sustainability. Following sustainability, the importance of energy is evident. Another notable feature in the graph is that analysis methods are among the most frequently used keywords in 2025. Finally, in the years following the 2019 pandemic, tourism and economic issues were most frequently addressed alongside Covid-19.

Figure 9 shows that algorithmically generated keywords Plus keywords focus on carbon dioxide emissions, economic growth, impact, consumption, renewable energy, and management issues after 2023.

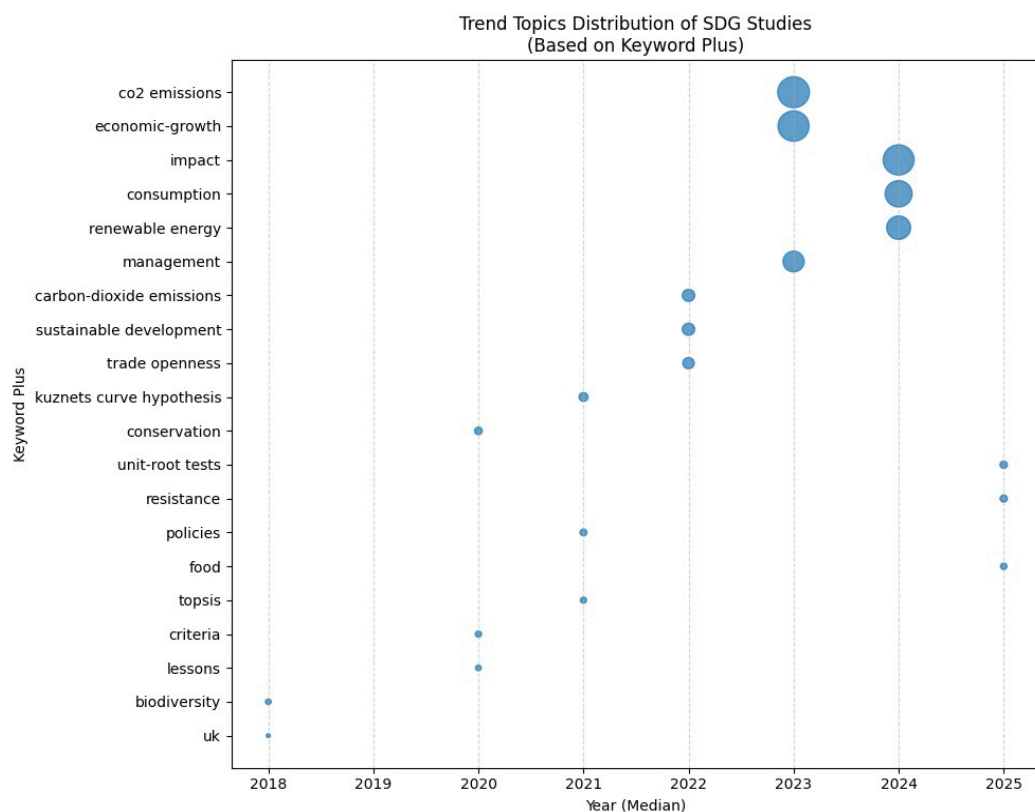


Figure 9. Distribution of trending topics in SDG studies according to keyword plus

Although these concepts are not specifically emphasised by the author, they are noteworthy topics. Figure 10 presents a comparison of strategic diagrams based on Keyword Plus themes with the Spinglass, Walktrap, Leiden, and Louvain clustering algorithms.

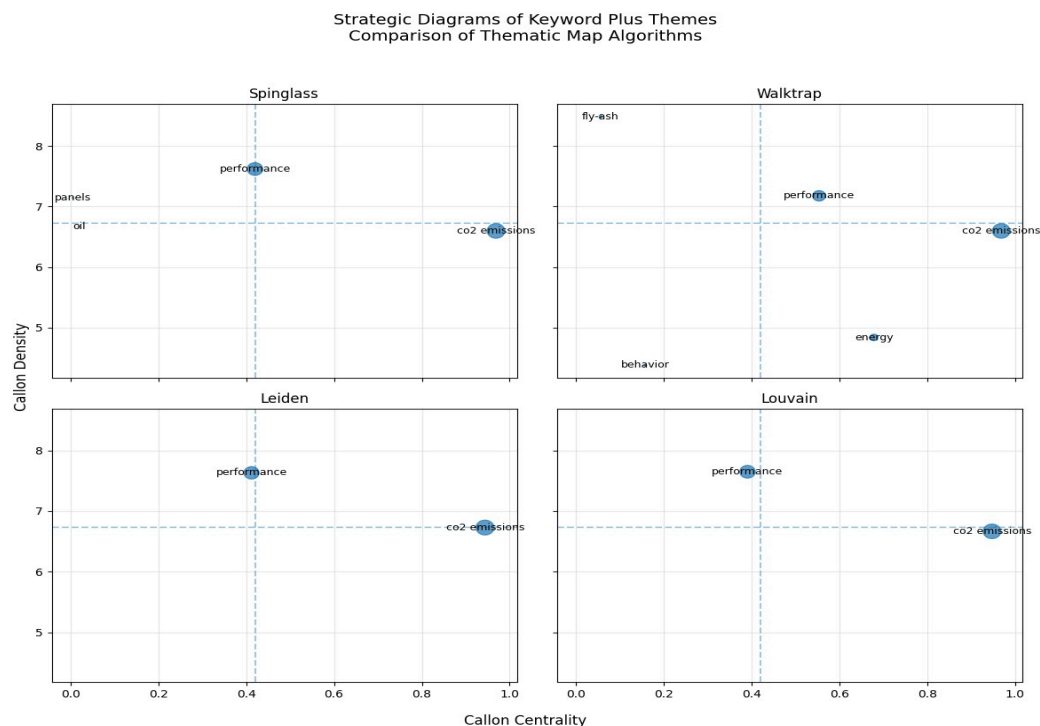


Figure 10. The comparison for keyword plus themes with Thematic map algorithms

In all four algorithms, the themes of 'performance' and 'CO2 emissions' consistently stand out. The Spinglass algorithm has identified the themes of "oil" and 'panels', which are high in density but low in centrality, as niche themes. The Walktrap algorithm, on the other hand, makes the themes 'fly-ash' and 'behaviour', which are themes that are not yet mature or have limited impact in the field, more visible. The Leiden and Louvain algorithms clearly represent the core conceptual structure of the field.

## 5. Conclusion

It is crucial for countries to develop policies on this subject, regardless of their income levels, to achieve the SDGs. Given that scientific output serves as a guide in policymaking, this study aims to reveal the share of scientific output in Türkiye within the global collective effort. To this end, a bibliometric analysis was conducted, selecting studies on sustainability from the WoS database where the country was listed as 'TURKIYE' or 'TURKEY'.

As in the study conducted by Borchardt et al. (2023) to examine the level of alignment between European Union policies and the SDGs, this study also found that interest in the SDGs is not equally distributed across each goal. It is seen that European Union policies focus on SDG 13 and SDG 8, while SDG 5 is a relatively less focused topic. It is seen that the SDGs on which scientific studies conducted in Türkiye are concentrated are parallel to the SDGs on which both European Union policies and scientific studies conducted worldwide are concentrated. While SDG 13 is the target most studied in Türkiye, it is noteworthy that studies conducted in Türkiye on SDG 8 constitute 9% of all publications in the WoS database.

Sachs et al. (2019) emphasise the importance of all countries working together in a comprehensive effort to achieve sustainable development. The findings of the article show that researchers from Türkiye are aware of this requirement and have achieved an international collaboration rate of over 40 per cent in studies conducted on sustainability. Studies conducted jointly with numerous countries, such as Fullman et al. (2017), have had a significant impact on this high rate of international collaboration. Furthermore, these findings support the view of Dorta-González & Dorta-González (2022) that the number of citations received by studies increases as the number of co-authors increases. It is noteworthy that SDG 5, which is the least studied in Türkiye but receives the most citations, is also considered to be identified and recommended by authors in other countries. The literature on the subject is particularly concentrated in journals focusing on social inclusion, human rights, and ethnic and racial studies (Çetin-Ayşe, 2024; Yılmaz & Adak, 2025).

Scientific studies shed light on policies to be developed in line with the SDGs through their outputs. (Siar, 2023). Collaboration between researchers from different countries in academic studies can contribute to producing more effective solutions to global problems. In this context, when examining the countries with which researchers from Türkiye collaborate most, the United States, China, and Iran are seen to be in the top three. When evaluating the institutions that contribute most to scientific production in the field of sustainability in Türkiye, Istanbul Gelişim University is seen to be in a leading position in this regard. As declared on its website, this university approaches the SDGs not as a vision but as a corporate responsibility (Istanbul Gelişim University, 2025). It is worth considering that only seven institutions have contributed to more than 100 studies for the 17 SDGs. Consequently, it is crucial to increase the number of these studies, which are expected to shed light on the country's sustainability policies, and for more universities to play an active role in this area and take action through institutional measures.

## 6. Limitations and Future Research

Although the dataset was comprehensively defined to suit the purpose of the study, certain limitations exist. Firstly, the data for this study was obtained from the WoS

database. Although WoS is a widely accepted and comprehensive database, there are many alternatives where scientific outputs are published. Secondly, the data for this article was obtained on 26 September 2025. There is a possibility that new studies with high impact will be conducted within the time frame. Another restriction is that this study is restricted to scientific outputs that select TURKEY as their country. Researchers' subjective biases, particularly in terms of interpretation, can also be considered another limitation. In addition, the dataset of the study was obtained by searching the WoS Database using keywords comprising fundamental concepts widely accepted in the literature regarding the concept of sustainable development. This has resulted in the search being limited to specific terms. Consequently, the current search may have excluded publications that do not use standard SDG terminology but are relevant to the subject.

Future comparative studies will enable a broader perspective to be presented. Furthermore, based on the view that scientific outputs serve as a guide in policymaking, this study outlines the general framework of the literature. A subject modelling study based directly on policy texts produced in Türkiye will also contribute to revealing the current situation. Future studies could outline an academic framework around objectives that have not been addressed in the Turkish context. Subsequent studies could identify areas of similarity or difference with other countries at a similar level of economic development. Research could focus on these distinctions by comparing the macro indicators of the countries concerned.

## References

- Adebayo, T. S. (2024). Exploring the heterogeneous impact of technological innovation on income inequality: Formulating the SDG policies for the BRICS-T economies. *Energy & Environment*, 35(4), 1773-1792. <https://doi.org/10.1177/09583305x221145926>
- Adebayo, T. S., Akadiri, S. S., Adamu, Y., & Olasehinde-Williams, G. O. (2023). Disaggregated energy consumption and ecological footprint: proposing an SDG framework for newly industrialised countries. *International Journal of Oil, Gas and Coal Technology*, 32(4), 417-439. <https://doi.org/10.1504/ijogct.2023.129579>
- Ahmed, Z., Pinzon, S., & Rasheed, M. Q. (2025). Unlocking marginal SDG dynamics: A KRLS machine learning analysis of AI technologies and solar energy. *Geoscience Frontiers*, 102167. <https://doi.org/10.1016/j.gsf.2025.102167>
- Allen, C., Metternicht, G., & Wiedmann, T. (2018). Initial progress in implementing the Sustainable Development Goals (SDGs): A review of evidence from countries. *Sustainability Science*, 13(5), 1453-1467. <https://doi.org/10.1007/s11625-018-0572-3>
- Akça, M., Bulut, Ö. U., Topal, S., Balcı, Ö., Özyakışır, D., & Çamkaya, S. (2025). Is the Technology-Oriented Kuznets Curve Hypothesis Valid in Türkiye? An Assessment in the Context of SDG-10. *Sustainability*, 17(10), 4590. <https://doi.org/10.3390/su17104590>
- Akdam, N., Alamri, O. A., Dutta, S., Çiftci, F., & İyit, N. (2025). Bayesian estimation of the inverse Exponential Power distribution for COVID-19 case fatality analysis under SDG 3. *Scientific Reports*. <https://doi.org/10.1038/s41598-025-27264-7>
- Al-Mulali, U., Aslan, A., & Raboshuk, A. (2025). Uncertain Policies, Unsure Futures? Unraveling the Impact of Policy Shocks on SDG Achievements: A Case Study of 21 Countries. *Sustainable Development*, 34(3), 3169-3182.
- Aras, G., Kutlu Furtuna, O., & Hacıoğlu Kazak, E. (2024). SDG Impact Index with Double Materiality Perspective: Evidence from OECD Commercial Bank Industry. *Social Indicators Research*, 174(3), 967-1006. <https://doi.org/10.1007/s11205-024-03421-9>
- Aria, M., & Cuccurullo, C. (2017). bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, 11(4), 959-975. <https://doi.org/10.1016/j.joi.2017.08.007>
- Barbier, E. B., & Burgess, J. C. (2019). Sustainable development goal indicators: Analyzing trade-offs and complementarities. *World Development*, 122, 295-305. <https://doi.org/10.1016/j.worlddev.2019.05.026>
- Barbier, E. B., & Burgess, J. C. (2021). Institutional quality, governance and progress towards the SDGs. *Sustainability*, 13(21), 11798. <https://doi.org/10.3390/su132111798>
- Barut, A., Kaya, E., Bekun, F. V., & Cengiz, S. (2023). Environmental sustainability amidst financial inclusion in five fragile economies: Evidence from lens of environmental Kuznets curve. *Energy*, 269, 126802. <https://doi.org/10.1016/j.energy.2023.126802>
- Bekil, B., & Genel, Z. (2024). Moda Markalarının SDG 12 Mesajlarının Genç Tüketiciler Algısındaki Rolü: Nitel Bir Araştırma. *Türkiye İletişim Araştırmaları Dergisi*, (45), 52-75. <https://doi.org/10.17829/turcom.1374012>

- Beloskar, V. D., Haldar, A., & Gupta, A. (2024). Gender equality and women's empowerment: A bibliometric review of the literature on SDG 5 through the management lens. *Journal of Business Research*, 172, 114442. <https://doi.org/10.1016/j.jbusres.2023.114442>
- Bianchini, S., Bottero, P., Colagrossi, M., Damioli, G., Ghisetti, C. and Michoud, K. (2023). *Mapping the Scientific Base for SDGs and Digital Technologies*. Publications Office of the European Union, Luxembourg. <https://doi.org/10.2760/237170>
- Borchardt S., Barbero Vignola G., Buscaglia D., Maroni M., Marelli L. (2023). Mapping EU Policies with the Agenda 2030 and SDGs. Fostering Policy Coherence through text-based SDG Mapping. *Publications Office of the European Union, Luxembourg*. [doi:10.2760/110687\\_JRC130904](https://doi.org/10.2760/110687_JRC130904) .
- Brand, A., Furness, M., & Keijzer, N. (2021). Promoting policy coherence within the 2030 Agenda framework: Externalities, trade-offs and politics. *Politics and Governance*, 9(1), 108-118. <https://doi.org/10.17645/pag.v9i1.3608>
- Ciuciuc, V. E., Vătămănescu, E. M., & Gheorghiu, A. (2025). Sustainability in the Knowledge Economy: A Bibliometric Analysis of Research Trends and Policy Perspectives. In *Proceedings of the International Conference on Business Excellence* (Vol. 19, No. 1, pp. 3205-3220). Sciendo. <https://doi.org/10.2478/picbe-2025-0245>
- Çelik, S., Öztürk, Ö. F., Akkucuk, U., & Şaşmaz, M. Ü. (2025). Global Sustainability Performance and Regional Disparities: A Machine Learning Approach Based on the 2025 SDG Index. *Sustainability*, 17(16), 7411. <https://doi.org/10.3390/su17167411>
- Çetin-Ayşe, Ç. (2024). The startling effect of the word race: a glance at racism in Turkey through the eyes of young men who support gender equality. *Ethnic and Racial Studies*, 47(15), 3237-3258. <https://doi.org/10.1080/01419870.2023.2294012>
- Dai, J., Ahmed, Z., Pata, U. K., & Ahmad, M. (2023). Achieving SDG-13 in the era of conflicts: The roles of economic growth and government stability. *Evaluation Review*, 47(6), 1168-1192. <https://doi.org/10.1177/0193841x231160626>
- Dhaigude, A. S., Verma, A., & Nayak, G. (2025). Sustainable production and consumption: a bibliometric analysis of SDG-12 literature through a financial management lens. *Cogent Economics & Finance*, 13(1), 2467882. <https://doi.org/10.1080/23322039.2025.2467882>
- Dias Paião Júnior, G., & Ferraz, D. (2024). Economic diversification and sustainable growth: a systematic literature review and bibliometric analysis. *Environment, Development and Sustainability*, 1-49. <https://doi.org/10.1007/s10668-024-05667-2>
- Dibbern, T. A., Rampasso, I. S., Pavan Serafim, M., Bertazzoli, R., Leal Filho, W., & Anholon, R. (2023). Bibliometric study on SDG 6: analysing main content aspects by using Web of Science data from 2015 to 2021. *Kybernetes*, 52(9), 3119-3135. <https://doi.org/10.1108/k-05-2021-0393>
- Dinçer, H., El-Assadi, A., Saad, M., & Yüksel, S. (2024). Influential mapping of SDG disclosures based on innovation and knowledge using an integrated decision-making approach. *Journal of Innovation & Knowledge*, 9(1), 100466. <https://doi.org/10.1016/j.jik.2024.100466>
- Dindar, E. (2025). Performance Evaluation of Economic, Environmental, and Social Sustainability and GRI-Based SDG Disclosures in Turkey's Automotive Sector. *Sustainability*, 17(19), 8905. <https://doi.org/10.3390/su17198905>
- Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of business research*, 133, 285-296. <https://doi.org/10.1016/j.jbusres.2021.04.070>
- Dorta-González, P., & Dorta-González, M. I. (2022). Collaboration effect by co-authorship on academic citation and social attention of research. *Mathematics*, 10(12), 2082. <https://doi.org/10.3390/math10122082>
- Ekmen, O., & Kocaman, S. (2023). From pixels to sustainability: Trends and collaborations in remote sensing for advancing sustainable cities and communities (SDG 11). *Sustainability*, 15(22), 16094. <https://doi.org/10.3390/su152216094>
- Empig, E. E., Sivacioğlu, A., Pacaldo, R. S., Suson, P. D., Lavilles, R. Q., Teves, M. R. Y.,... Amparado Jr, R. F. (2023). Climate Change, Sustainable Forest Management, ICT Nexus, and the SDG 2030: A Systems Thinking Approach. *Sustainability*, 15(8), 6712. <https://doi.org/10.3390/su15086712>
- Fullman, N., Barber, R. M., Abajobir, A. A., Abate, K. H., Abbafati, C., Abbas, K. M., ... & Dubey, M. (2017). Measuring progress and projecting attainment on the basis of past trends of the health-related Sustainable Development Goals in 188 countries: an analysis from the Global Burden of Disease Study 2016. *The Lancet*, 390(10100), 1423-1459.
- Garan, Ö., & Güneş, İ. (2025). Reframing SDG 11 Through the Triple Helix Model: Rethinking Urban Sustainability and Institutional Synergy. *İktisat Politikası Araştırmaları Dergisi*, 12(2), 528-549. <https://doi.org/10.26650/jepri1650031>
- Ghanem, M. i. A. A. N., Javed, I., & Ekinci, A. (2025). Tracking Progress and Interlinkages in SDG Achievement: A Monitoring Index Approach with Insights from Jordan. *Environmental and Sustainability Indicators*, 100882. <https://doi.org/10.1016/j.indic.2025.100882>
- Gyamfi, B. A., Adebayo, T. S., Agozie, D. Q., Bekun, F. V., & Koy, A. (2025). Is sustainable energy consumption, technological advancement and urbanization fast addressing south Asia's green energy expansion deficits?. *Environment, Development and Sustainability*, 27(8), 19969-19998. <https://doi.org/10.1007/s10668-024-04684-5>

- Göçoğlu, V., Ayan, D., & Demirkol, A. (2025). Climate Change Adaptation Strategies in Vulnerable Countries Through the SDG 13: A Cross-Sectoral Analysis. *Sustainable development*, 34(1), 95–111 <https://doi.org/10.1002/sd.70254>
- Guillen-Royo, M., Guardiola, J., & Garcia-Quero, F. (2017). Sustainable development in times of economic crisis: A needs-based illustration from Granada (Spain). *Journal of Cleaner Production*, 150, 267-276. <https://doi.org/10.1016/j.jclepro.2017.03.008>
- Güldal, H. T. (2025). Bridging the gap between SDG 2 indicators and agricultural efficiency: Insights from OECD countries. *New Medit: Mediterranean Journal of Economics, Agriculture and Environment= Revue Méditerranéenne d'Economie Agriculture et Environnement*, 24(4). <https://doi.org/10.30682/nm2504a>
- He, X., Khan, S., Ozturk, I., & Murshed, M. (2023). The role of renewable energy investment in tackling climate change concerns: Environmental policies for achieving SDG-13. *Sustainable development*, 31(3), 1888-1901. <https://doi.org/10.1002/sd.2491>
- İstanbul Gelişim Üniversitesi. (2025, 2 Temmuz). *Sürdürülebilir kalkınma hedefleri nedir, neden insanlık için önemlidir?* İGÜ Blog. <https://gelisim.edu.tr/tr/gelisim-blog-icerik-surdurulebilir-kalkinma-hedefleri-nedir-neden-insanlik-icin-onemlidir>
- Kartal, M. T., Mukhtarov, S., Depren, Ö., Ayhan, F., & Ulussever, T. (2025). How Can SDG-13 Be Achieved by Energy, Environment, and Economy-Related Policies? Evidence From Five Leading Emerging Countries. *Sustainable development*, 33(4), 5110–5133 <https://doi.org/10.1002/sd.3391>
- Khan, K. A., Alshahari, E. A., Akhayere, E., Kavaz, D., & Adebayo, T. S. (2024). Climate policy uncertainty and renewable energy consumption at crossroads: Designing SDG policies for the United States. *International Journal of Sustainable Development & World Ecology*, 31(5), 593-610. <https://doi.org/10.1080/13504509.2024.2304614>
- Khan, K. A., Subhan, M., Tiwari, S., Anser, M. K., & Destek, M. A. (2025). Impacts of natural resources and technological innovation on SDG achievement of OECD countries: How does democracy and globalization behave? *Technology in Society*, 81, 102778. <https://doi.org/10.1016/j.techsoc.2024.102778>
- Koçulu, A. (2025). Promoting Sustainable Life Through Global Citizenship-Oriented Educational Approaches: Comparison of Learn–Think–Act Approach-Based and Lecture-Based SDG Instructions on the Development of Students’ Sustainability Consciousness. *Sustainability*, 17(20), 9026. <https://doi.org/10.3390/su17209026>
- Koçulu, A., & Topçu, M. S. (2024). Development and implementation of a sustainable development goals (SDGs) unit: Exploration of middle school students’ SDG knowledge. *Sustainability*, 16(2), 581. <https://doi.org/10.3390/su16020581>
- Koff, H., Challenger, A., Ros Cuellar, J., Aguilar Orea, R., & Lara Lopez, M. d. S. (2023). How green are our laws? Presenting a normative coherence for sustainable development methodology. *Environmental Policy and Governance*, 33(1), 90-109. <https://doi.org/10.1002/eet.1998>
- Leal Filho, W., Vidal, D. G., Chen, C., Petrova, M., Dinis, M. A. P., Yang, P.,...Sharifi, A. (2022). An assessment of requirements in investments, new technologies, and infrastructures to achieve the SDGs. *Environmental Sciences Europe*, 34(1), 1-17. <https://doi.org/10.1186/s12302-022-00629-9>
- Lusseau, D., & Mancini, F. (2019). Income-based variation in Sustainable Development Goal interaction networks. *Nature Sustainability*, 2(3), 242-247. <https://doi.org/10.1038/s41893-019-0231-4>
- Lyu, Z., Lanre Ibrahim, R., Alomair, A., & Al Naim, A. S. (2025). Fossil Fuels, Clean Cooking Energy, and Health Inequality in Sub-Saharan Africa: Distribution-Sensitive Evidence for SDG-Linked Transitions. *Sustainable development*, 34(S2), 1348-1373. <https://doi.org/10.1002/sd.70395>
- Mbanda, V., & Fourie, W. (2020). The 2030 Agenda and coherent national development policy: In dialogue with South African policymakers on Policy Coherence for Sustainable Development. *Sustainable Development*, 28(4), 751-758. <https://doi.org/10.1002/sd.2025>
- Munir, S., Anser, M. K., Khan, A. W., Alam, M. S., Aamir, A., & Zaman, K. (2025). Powering the transition: geoscientific insights and policy levers for global renewable energy investment, pricing reforms and decarbonization pathways towards SDG 7 and SDG 13. *Future Business Journal*, 11(1), 275. <https://doi.org/10.1186/s43093-025-00695-4>
- Nilsson, M., Chisholm, E., Griggs, D., Howden-Chapman, P., McCollum, D., Messerli, P., . . . Stafford-Smith, M. (2018). Mapping interactions between the sustainable development goals: lessons learned and ways forward. *Sustainability Science*, 13(6), 1489-1503. <https://doi.org/10.1007/s11625-018-0604-z>
- Onifade, S. T., Erdoğan, S., Alagöz, M., & Bekun, F. V. (2021). Renewables as a pathway to environmental sustainability targets in the era of trade liberalization: empirical evidence from Turkey and the Caspian countries. *Environmental Science and Pollution Research*, 28(31), 41663-41674. <https://doi.org/10.1007/s11356-021-13684-1>
- Organisation for Economic Cooperation and Development (2016) Measuring distance to the SDGs targets: a pilot assessment of where OECD countries stand. *Organisation for Economic Cooperation and Development*, Paris

- Ozili, P. K., & Iorember, P. T. (2024). Financial stability and sustainable development. *International Journal of Finance & Economics*, 29(3), 2620-2646. <https://doi.org/10.1002/ijfe.2803>
- Parmaksız, H. (2025). Ajan yapay zekâ: Otonom sistemler, sürdürülebilir etki ve akademik evrim için çok boyutlu bir çerçeve. *Sürdürülebilirlik, Yönetim & Ekonomi Dergisi*, 1(2), 105-128.
- Reverte, C. (2022). The importance of institutional differences among countries in SDGs achievement: A cross-country empirical study. *Sustainable Development*, 30(6), 1882-1899. <https://doi.org/10.1002/sd.2354>
- Sachs, J. D., Schmidt-Traub, G., Mazzucato, M., Messner, D., Nakicenovic, N., & Rockström, J. (2019). Six transformations to achieve the sustainable development goals. *Nature Sustainability*, 2(9), 805-814. <https://doi.org/10.1038/s41893-019-0352-9>
- Seçmen, S., & Ibrahim, F. A. (2025). Rethinking sustainable development goals (SDG) for floating slums in African coastal settings: Makoko community in Nigeria. *Cities*, 159, 105751. <https://doi.org/10.1016/j.cities.2025.105751>
- Siar, S. (2023). The challenges and approaches of measuring research impact and influence on public policy making. *Public Administration and Policy*, 26(2), 169-183. <https://doi.org/10.1108/pap-05-2022-0046>
- Singh, S., & Ru, J. (2023). Goals of sustainable infrastructure, industry, and innovation: a review and future agenda for research. *Environmental Science and Pollution Research*, 30(11), 28446-28458. <https://doi.org/10.1007/s11356-023-25281-5>
- Song, J., & Jang, C. H. (2023). Unpacking the sustainable development goals (SDGs) interlinkages: A semantic network analysis of the SDGs targets. *Sustainable Development*, 31(4), 2784-2796. <https://doi.org/10.1002/sd.2547>
- Strezov, V., Evans, A., & Evans, T. J. (2017). Assessment of the economic, social and environmental dimensions of the indicators for sustainable development. *Sustainable Development*, 25(3), 242-253. <https://doi.org/10.1002/sd.1649>
- Swain, R. B., & Ranganathan, S. (2021). Modeling interlinkages between sustainable development goals using network analysis. *World development*, 138, 105136. <https://doi.org/10.1016/j.worlddev.2020.105136>
- Trane, M., Marelli, L., Siragusa, A., Pollo, R., & Lombardi, P. (2023). Progress by research to achieve the sustainable development goals in the EU: a systematic literature review. *Sustainability*, 15(9), 7055. <https://doi.org/10.3390/su15097055>
- United Nations. (2000). *United Nations Millennium Declaration* (A/RES/55/2). United Nations. <https://www.ohchr.org/en/instruments-mechanisms/instruments/united-nations-millennium-declaration>
- United Nations. (2015). *Transforming our world: The 2030 Agenda for Sustainable Development* (A/RES/70/1). United Nations. [https://www.un.org/ga/search/view\\_doc.asp?symbol=A/RES/70/1&Lang=E](https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E)
- Wang, Q., Li, Y., Pata, U. K., & Li, R. (2025). Artificial intelligence and global carbon inequality: Addressing the challenges and opportunities for SDG 10, SDG 12, and SDG 13. *Geoscience Frontiers*, 16(4), 102072. <https://doi.org/10.1016/j.gsf.2025.102072>
- Velazquez, L. (2025). Higher Education Institutions as Leverage for Backing up SMEs' Efforts to Meet SDG 9. *Sustainability*, 17(10), 4665. <https://doi.org/10.3390/su17104665>
- Verma, R., Kumar, A., Mashroofa, M. M., & Gupta, N. (2025). A comprehensive bibliometric analysis of research trends in sustainable inclusive economic growth within the SDG 8 framework from 2015 to 2025 using Biblioshiny and VOSviewer. *Discover Sustainability*, 6(1), 1221. <https://doi.org/10.1007/s43621-025-02124-6>
- World Commission on Environment and Development. (1987). *Our common future*. Available online: <https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf> (accessed on 21 December 2025).
- Yadav, A., Krishankumar, R., Ravichandran, K. S., & Ecer, F. (2025). Analyzing Barriers to Discrimination Mitigation for Women's Empowerment to Achieve SDG 5–Gender Equality. *Sustainable development*. 34(S2), 757–777 <https://doi.org/10.1002/sd.70356>
- Yap, S., Shan Lee, H., & Xin Liew, P. (2023). The role of financial inclusion in achieving financerelated sustainable development goals (SDGs): a cross-country analysis. *Economic research-Ekonomska istraživanja*, 36(3). <https://doi.org/10.1080/1331677x.2023.2212028>
- Yılmaz, G., & Adak, N. (2025). Transforming organizational culture: The first gender equality plan of Akdeniz University in Turkey. *Social Inclusion*, 13. <https://doi.org/10.17645/si.9979>
- Yildiz, D., & Markoc, I. (2025). From Simplicity to Sustainability: Structuring Minimalist Housing with SDG Metrics. *Sustainability*, 17(20), 9232. <https://doi.org/10.3390/su17209232>
- Yüncü, V. (2025). Deconstructing SDG Performance for Strategic Insight: Quantitative Insights from Türkiye and European Countries. *Management Theory and Studies for Rural Business and Infrastructure Development*, 47(3), 361-369. <https://doi.org/10.15544/mts.2025.29>
- Xiao, H., Liu, Y., & Ren, J. (2023). Synergies and trade-offs across sustainable development goals: A novel method incorporating indirect interactions analysis. *Sustainable Development*, 31(2), 1135-1148. <https://doi.org/10.1002/sd.2446>

Xu, S., & Gao, H. (2025). Navigating Research Frontiers in China's Rural Planning: A Bibliometric Analysis of Sustainable Development. *Sustainability*, 17(1), 340. <https://doi.org/10.3390/su17010340>

Zeigermann, U. (2018). Governing sustainable development through 'policy coherence'? The production and circulation of knowledge in the EU and the OECD. *European Journal of Sustainable Development*, 7(1), 133-133. <https://doi.org/10.14207/ejsd.2018.v7n1p133>

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