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GREEN TRANSFORMATION IN MANAGEMENT: A BIBLIOMETRIC ANALYSIS ON GREEN LEADERSHIP AND SUSTAINABILITY

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Abstract

This study provides a systematic examination of the concepts of green leadership and sustainability, which represent two key pillars of green transformation in management, by employing a bibliometric approach. A dataset consisting of 469 publications obtained from the Web of Science (WoS) database was analyzed using VOSviewer, including co-authorship, citation, and keyword co-occurrence analyses. The results show a notable increase in publication activity, particularly after 2020. Concepts such as sustainability, ethical leadership, and responsible leadership appear as central themes within the literature. In addition, the findings suggest that authors with the highest citation counts are not always located at the core of collaboration networks, indicating different structural patterns within the research field. From the perspective of the Resource-Based View, green leadership can be interpreted as a strategic organizational capability that supports the development of competitive advantage. Overall, the study indicates that research on green leadership and sustainability has become increasingly interdisciplinary and has experienced considerable growth in recent years.

Keywords: Green Transformation, Green Leadership, Sustainability, Ethical Leadership, Responsible Leadership

Introduction

The intensifying environmental pressures of the 21st century—ranging from climate change and biodiversity loss to unchecked industrialization—have necessitated a shift toward sustainable decision-making frameworks. This transition has repositioned sustainability not merely as an ecological concern, but as a core strategic mandate for both governments and corporate entities, moving well beyond the scope of traditional management. Green transformation has not only aimed to improve environmental performance but has also become a multifaceted process by making organizational transformation and green leadership practices indispensable factors for organizations (Aydınoğlu, 2025). Central to this paradigm shift is the

concept of 'green leadership.' This model transcends traditional management by embedding ecological consciousness and sustainability directly into the core organizational DNA, effectively aligning environmental stewardship with high-level operational performance.. Research in the literature on sustainable leadership and green leadership shows that these approaches have positive effects on employee behavior and support green innovation processes in organizations (Nie et al., 2025).

According to academic studies conducted after 2020, green leadership initiatives have focused on key issues such as developing business strategies aligned with sustainable development goals, integrating environmental management systems, and improving corporate sustainability performance (Tran, 2023; Nie et al, 2025; Ak et al., 2025; Elkhweildi, Vetbuje, Alzubi & Aljuhmani, 2025; Ismail, 2025). These studies highlight that sustainable leadership is not a static concept, but a multifaceted framework encompassing strategic vision, mentoring, persuasion, adaptability, and collaborative action to ensure long-term sustainability (Namboga, Asa, Nautwima & Johannes, 2025).

A bibliometric analysis of green leadership reveals a significant increase in the number of publications in this field, particularly since 2020 (Aydınoğlu, 2025).

Examining the role of green leadership and its contributions to sustainability—as part of the green transformation in management—through bibliometric analysis is a critical requirement for both academic and applied studies (Shah et al., 2020; Mete, 2025; Çiftçi & Gürsel, 2025; Wang, Aslam, Mushtaq, Liaqat & Asmi, 2025). However, most existing bibliometric studies fail to provide a detailed explanation of interdisciplinary interactions, sectoral differences, and conceptual clustering (de Klerk et al., 2023; Aydınoğlu, 2025; Battal & Yılmaz, 2025).

The acceleration of green transformation processes in management has increased its transformative impact on leadership approaches, and as a result, the concepts of green leadership and sustainability have become a central focus of academic research. Nevertheless, while scholarly interest in this area has surged, the resulting literature remains scattered across various disciplines, lacking a unified and comprehensive synthesis This situation points to a significant gap in clarifying the conceptual boundaries of the field and identifying key research topics. The aim of this study is to examine academic output on green transformation in management, green leadership, and sustainability using bibliometric analysis methods, thereby revealing the thematic structure of the literature, global collaboration networks, and prominent research clusters. The importance of this study lies in providing a holistic perspective on the rapidly growing but conceptually complex literature on green leadership. This research aims to

strengthen the theoretical foundation by demonstrating interdisciplinary knowledge flow and intellectual collaboration networks through bibliometric mapping. From an application perspective, the study offers a roadmap for organizations and managers undergoing green transformation to define strategic leadership models aligned with global trends. Furthermore, it offers a distinctive perspective by harmonizing theoretical insights with operational realities, thereby illuminating how leadership acts as a fundamental driver in advancing the sustainable development agenda.

Conceptual Framework

In this section, the core concepts of the study—green transformation, green leadership, and sustainability—are conceptually examined in light of existing approaches in the literature, in order to facilitate a more accurate interpretation of the bibliometric analysis findings.

Green Transformation

The primary factor behind the emergence of the green transformation is the ecological problems and global warming that arose with industrialization and increased fossil fuel consumption. The melting of glaciers, rising sea levels, and natural disasters due to climate change pose serious threats to future generations (Zileli, 2025). Because of the risks and uncertainties brought about by climate change, sustainable consumption and production have become a necessity for all economic sectors (Mete, 2025). This necessity initiated the green transformation process.

"The inception of the global green transition can be traced back to 1994, marked by the formal adoption of the United Nations Framework Convention on Climate Change. This landmark agreement, endorsed by 194 nations, laid the foundational infrastructure for international climate policy. This agreement aimed to prevent greenhouse gas concentrations from reaching dangerous levels. The environmental policy landscape reached a new milestone in 2005 with the implementation of the Kyoto Protocol. This international treaty specifically targeted industrialized nations, mandating a 5% reduction in greenhouse gas emissions relative to historical levels.. The Paris Agreement, adopted in 2015, allowed countries to set their own emission reduction targets. "The primary objective of this agreement is to mitigate climate change by constraining the rise in global average temperatures. It strives to maintain warming well below 2°C relative to pre-industrial benchmarks, while actively pursuing more ambitious measures to cap the increase at 1.5°C. In this context, the European Union Green Deal entered into force in 2019. New growth strategies for a sustainable economy have been determined within the framework of this agreement (Zileli, 2025; Çiftçi et al., 2025).

The green transformation is a comprehensive approach that involves restructuring economic activities to ensure a sustainable future, ranging from the use of natural resources to the development of environmentally friendly technologies (Zileli, 2025). This concept refers to a shift in mindset across many areas, from the use of environmentally friendly production methods and raw material selection to more efficient energy use, waste management, and product lifecycle management. The green transformation is based on a three-pronged balance that simultaneously considers economic development, environmental protection, and social equality (Çiftçi et al., 2025). At the industrial level, this transformation aims to be used as a tool to accelerate clean technologies in order to increase resource efficiency and reduce emissions (Mete, 2025).

Green Transformation in Management

The concept of green management first emerged in the 1990s as "corporate environmentalism" and became widespread globally in the 2000s. An examination of academic studies conducted in Türkiye reveals an increasing interest in sustainable leadership and green management, with research intensifying during the years 2022-2023 (Battal et al., 2025). Recent research has highlighted theories such as "Contagion Theory" and "Social Change Theory" as key approaches to shaping employee engagement in sustainable business practices (Tran, 2023).

Green transformation in management refers to the "Green Management" approach, which enables organizations to eliminate environmental pressures in their production processes and operate in line with their goals by prioritizing the environment. In green management, the main goal is to use the organization's natural resources in the most effective way, prevent waste, achieve savings, and protect the ecological balance by considering the environment in all corporate processes (Battal et al., 2025). "Green leadership, defined by its commitment to eco-centric initiatives, acts as a transformative force that galvanizes the workforce. By fostering an environment of shared ecological values, this approach inspires personnel to align their individual efforts with the organization’s overarching sustainability objectives.. Organizations can also use human resources management (HRM) to effectively formulate and develop environmentally friendly policies (Tran, 2023).

Green management is directly linked to sustainability; because a business's efforts to reduce waste, take on social responsibility, and gain a competitive advantage through sustainability aim to balance environmental, economic, and social factors. This process ensures long-term environmental protection and increases the efficient use of resources, while also contributing to the sustainable growth of the business (Battal et al., 2025).

Green Leadership

"The conceptual rise of green leadership serves as a direct strategic antidote to the environmental decay and resource scarcity that have intensified in the post-industrial era. It represents a paradigm shift in governance, acknowledging that industrial legacy must now be balanced with ecological stewardship. Ecological problems such as population growth, increasing consumption, resource depletion, environmental pollution, and climate change; the necessity for businesses to ensure not only economic but also environmental sustainability; increasing social/legal pressures regarding environmental sustainability; and the need for leaders to manage these strategies in organizations that want to achieve energy savings have all given rise to the concept of green leadership (Özbey, 2024; Turan Torun, 2023).

One of the first fundamental studies on the subject of green leadership was done by Egri and Herman (2000). Egri and Herman (2000) found that the values of environmental leaders were more focused on ecology. These leaders tend to embrace change and possess higher motivation and a greater ability to surpass themselves (Zhong et al., 2025). Since 2020, the concept has become even more widespread, and businesses have begun to place greater emphasis on working with green leaders (Özbey, 2024).

Green leadership is a holistic environmental-ethical leadership approach that transforms employee behavior and restructures organizational culture based on sustainability, while also encompassing strategic decisions shaped by environmental awareness (Aydınoğlu, 2025). Green leadership has proven critical for organizations to achieve their green governance and sustainable development goals (Tuna, Akbaş Tuna, Taşdağıtıcı, Aldoğan Şenol, 2025). Adopting practices aimed at environmental sustainability not only benefits the entire community but can also have positive impacts on the organization and its stakeholders (Khan, Saqib, Abbasi, Mikhaylov, Pinter, 2023). As a result, senior executives have begun to integrate environmental awareness into business planning and operations and to implement environmentally friendly policies (Zhong et al., 2025). In short, green leadership refers to leadership attitudes and behaviors that integrate green practices into organizational vision, policies, and goals, inspire, guide, motivate employees, and set and monitor environmental performance targets (Tuna et al., 2025).

Green leadership has a broad scope and an interdisciplinary nature, encompassing fields such as business economics, public administration, psychology, and education (Zhong et al., 2025).

Types of Green Leadership

Green leadership has been associated with different leadership styles or addressed from different perspectives in the literature. In the literature, green leadership is generally examined together with the following subtypes.

a. Green Transformational Leadership: Green transformational leadership is an environmentally focused version of traditional transformational leadership and is one of the most frequently discussed types of green leadership in the literatüre (Chen & Chang, 2013; Mittal & Dhar, 2016; Singh, Del Giudice, Chierici & Graziano, 2020). Green transformational leadership is defined as the behavior of leaders who motivate their followers to achieve environmental goals, inspire them to surpass expected environmental performance levels, and encourage their employees to act beyond their own personal interests (Turan Torun, 2023). A green transformation leader influences employee behavior and serves as a role model. It increases employees' environmental awareness, creates a sustainability vision within the organization, and encourages employees to exhibit environmentally friendly behaviors (Zhong et al., 2025). The concept of Green Transformational Leadership is addressed in four fundamental dimensions (Özbey, 2024).

Idealized Effect: A transformational leader should inspire admiration for their commitment to sustainable goals and serve as a role model for their employees.

Inspirational Motivation: A transformational leader should motivate employees to transcend their individual interests and achieve environmental goals.

Intellectual Stimulation: "Transformational leadership necessitates fostering a proactive mindset among staff, prompting them to critically analyze ecological challenges and pioneer innovative mitigation strategies. By doing so, leaders convert environmental concerns into actionable organizational intelligence.

Personalized Attention: A transformational leader should show interest in employees' thoughts and needs regarding the environment, unlocking their potential and helping them develop their skills.

b. Environmentally Specific Ethical Leadership: Leaders should demonstrate behaviors that integrate environmental responsibilities with ethical principles. Environmentally specific ethical leadership establishes clear expectations for environmental protection, communicates these expectations consistently, and provides a strong behavioral framework for employees by rewarding environmentally conscious behavior. This type of leadership can be explained with three concepts. These (Elkhweildi el al., 2025):

Moral Role Model: An ethical leader sets an example for employees by demonstrating environmentally conscious and ethical behavior.

Communication: An ethical leader explains environmental values and the importance of sustainability to employees, clarifies ethical standards related to these, and thus strengthens communication with employees.

Reinforcement: Ethical leadership contributes to the development of communication skills by modelling ways of conveying sustainability-oriented and ethical messages through empathy, transparency, and respectful dialogue.

According to Social Learning Theory, employees tend to develop behaviors by observing the actions and attitudes demonstrated by their leaders. When leaders display ethical and environmentally responsible conduct, employees are more likely to adopt similar behaviors. Such leadership practices can enhance employee performance by strengthening both their work commitment and their communication abilities (Elkhweildi et al., 2025).

c. Green Servant Leadership: Green servant leaders aim to cultivate 'servants' with green values who will contribute to the sustainability of the organization and society, and provide these individuals with resources such as support, empowerment, and feedback (Yavuzarslan & Şalvarcı Türeli, 2025). Based on this definition, this type of leadership can be explained using three concepts (Zhong et al., 2025):

Service Orientation: The leader sees themselves as a "servant" rather than a "manager." A leader's priority is service to nature and society.

Sustainable Value: These leaders follow a path that makes environmental goals a part of the organizational culture, supports environmental innovation, and focuses on generating sustainable long-term value.

Development Support: Provides resources and supports employee development to help them achieve green goals.

d. Responsible Leadership: Responsible leadership involves ethical decision-making, building trust, promoting sustainable development, and making choices with environmental awareness. Responsible leadership represents a leadership style in which leaders build stakeholder relationships, address theoretical gaps, and tackle practical leadership challenges (Ak et al., 2025). Responsible leadership is not independent of other leadership theories; rather, it interacts with them. Responsible leadership is an interactive, not a static, dialogue process. This process builds upon qualities such as reputation, effective citizenship, and accountability, striving to achieve outcomes such as responsible corporate citizenship, balancing stakeholder needs, and long-term sustainability (de Klerk et al., 2023). The extent to which employees internalize and respond to ecological concerns is a critical determinant of an organization’s overall environmental trajectory. Consequently, fostering 'Organizational Citizenship Behavior

Towards the Environment' (OCBE) has become essential. By promoting such discretionary, pro-environmental actions that extend beyond formal job descriptions, organizations can more effectively translate their sustainability commitments into tangible global development outcomes.. Responsible leaders increase employee engagement in "Organizational Citizenship Behavior toward the Environment" (OCBE) through both direct and indirect means (Wang et al., 2025).

Green Leadership and Sustainability

Although frequent changes in the Earth's climate since the 1970s, the impact of global warming on the planet, and increasing pollution are cause for concern, it is still not possible to bring this environmental degradation under control. The National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration (NOAA) have stated that the planet has reached its highest temperature in recent decades, and that this is due to human activities (Shah et al., 2020). Businesses also have a significant impact on this ecological degradation. In particular, dynamic market demands, stakeholder pressures, and operating with limited resources have pushed businesses towards inadequate environmentally friendly technologies (Adomako & Tran, 2022). Inefficient and wasteful use of resources by businesses also creates negative environmental problems (Ismail, 2025). Therefore, businesses have focused on aligning their environmental footprint practices with the Sustainable Development Goals and have begun integrating these efforts into every unit of the organization.

Recently, the Resource-Based View (RBV) concept for green organizational performance has been frequently mentioned in the literatüre (Hart, 1995). RBV argues that an organization can have a sustainable competitive advantage if it controls valuable, scarce, inimitable, and irreplaceable resources (Barney, 1991). This approach explains how competitive advantage is influenced by environmental factors and strategic management decisions. RBV also states that sustainable competitive advantage can be achieved through effective leadership in addressing environmental issues (Hart vd., 2011). In line with this view, the concept of green leadership has emerged. Green management refers to introducing new green creative innovations and following green colors for sustainable development (Chen et al., 2013). Green leaders exhibit green behaviors that motivate and inspire their employees to achieve environmental goals and continue to strive beyond their capabilities for improved environmental performance (Shah et al., 2020).

Method

Within the methodological framework of the study, academic publications in the fields of green transformation, green leadership, and sustainability were obtained from the Web of

Science database; these publications were examined through bibliometric analysis using VOSviewer software.

Academics use bibliometric analysis for a variety of reasons, including uncovering emerging trends in article and journal performance, collaboration patterns, and research components, and exploring the intellectual structure of a particular field within the existing literature (Donthu, Kumar, Mukherjee, Pandey & Lim, 2021). The significant increase in academic output on green transformation, green leadership, and sustainability in recent years has made this bibliometric analysis necessary. This analysis aims to examine the evolution of the concepts of green transformation, green leadership, and sustainability in academic literature over time by showing the increasing trends in the number of publications and citation densities in the literature. Particularly through keyword analysis and citation networks, it clearly identifies elements such as the relationships between research topics, which themes are dominant in the literature, and which researchers have taken a leading role.

Data and Analysis

While various bibliometric analysis software programs are employed in studies on green transformation, green leadership, and sustainability, this research utilizes VOSviewer because it provides practical analytical capabilities and enables clear and effective visualization for users. VOSviewer is software that offers comprehensive analysis capabilities for revealing conceptual shifts, research trends, and interdisciplinary relationships in the scientific literature. In particular, VOSviewer's multidimensional visualization capabilities, which allow for the mapping of co-authorship structures, keyword co-occurrence patterns, and citation relationships, support its widespread use in bibliometric studies. In this respect, the software makes significant contributions to the systematic, holistic, and in-depth examination of datasets belonging to the green transformation, green leadership, and sustainability literature.

The research data source consists of publications obtained from the Web of Science (WoS) database. Web of Science is a database that stands out in terms of publication quality, reliability, and scope, and is widely used in scientific research due to its high indexing standards, advanced search options, and adherence to academic ethical principles. In addition, WoS offers a rich range of publications from different disciplines such as sustainability, management, business, and environmental studies, enabling the analysis of the interdisciplinary nature of green transformation, green leadership, and sustainability. With these characteristics, Web of Science was evaluated as a highly reliable and representative data source in the bibliometric analysis process of the study.

On January 2, 2026, a search using the keywords “green leader*, sustainab-leader*, environment-leader*, eco-leader*, responsible-leader*, ethical-leader*, sustainability, environmental-performance, green-management” with the filter “all fields” yielded the following results: 1 search in 2008, 1 in 2009, 2 in 2010, 6 in 2011, 6 in 2012, 9 in 2013, 5 in 2014, 8 in 2015, 2 in 2016, 10 in 2017, 13 in 2018, 26 in 2019, 30 in 2020, 39 in 2021, 36 in 2022, 47 in 2023, and 86 in 2024. A total of 469 documents were accessed, with 141 published in 2025 and 1 in 2026. Of these documents, 433 are articles and 36 are review articles. 466 of these articles were published in English, 2 in Spanish, and 1 in Korean. Looking at the disciplinary distribution, it is seen that the research is most concentrated in the field of management with 168 articles (35.821%), followed by business administration with 121 articles (25.800%), environmental studies with 101 articles (21.535%), environmental sciences with 97 articles (20.682%), and green sustainable science and technology with 90 articles (19.190%). The bibliographic details and citation parameters of the publications in the dataset were examined using the VOSviewer algorithm. Through the visual networks created, collaborations between researchers, thematic clusters of the topic, and citation relationships were mapped and discussed in detail. This study is based on three fundamental analyses in order to comprehensively present both the social and conceptual structure of the literature. Co-authorship and collaboration analyses were used to map interaction networks and scientific communication channels among researchers, while keyword analysis was used to identify the thematic development and focus areas of the field. These three fundamental analyses have made it possible to analyze the knowledge production processes in the fields of green leadership and sustainability in their simplest form, both in terms of researchers and content.

Findings

The results of the bibliometric analysis conducted in this research are presented in this section.

Co-authorship Analysis

Co-author analysis serves to map the collaborative architecture within the field, highlighting the density of scholarly interactions and identifying the most influential contributors. By applying a threshold of at least one publication and one citation, this study visualized a network map to pinpoint the authors most deeply embedded in the collaborative landscape. Analysis of the names with the highest correlation revealed 22 names clustered together in 6 groups, totaling 53 connections. The most cited authors are, in order: Jennifer I. Robertson with 785 citations, Julian Barling with 782 citations, Thomas Dyllick with 729 citations, Katrin Muff with 660 citations, Annebel H. B. de Hoogh with 441 citations, Deanne

N. den Hartog with 441 citations, Karianne Kalshoven with 441 citations, Talat Islam with 387 citations, Silke Astrid Eisenbeiss with 335 citations, and Abdullah Kaid Al-Swidi with 267 citations. However, the figure indicates that the most frequently cited authors are not always the ones with the strongest collaborative links. For example, although Muhammad Usman does not appear among the most highly cited authors, the analysis shows that she is one of the authors with the highest level of collaboration. This author acts as a "bridge" on the network. If this author were removed from the network, the connection between the groups on the left side (red and blue) and the groups on the right side (green, yellow, turquoise) would be completely severed. This indicates that this author has a very high level of "mediation centrality". She is likely a leading researcher who brings together different disciplines or different universities. This group, which includes writers Muhammad Mustafa Raziq and Gabriel Eweje, is hanging by a thread from the main network. The only connection points to the main structure are via Sharjeel Saleem. This group is probably working on a different topic, but they may have become involved with the main group indirectly through a project. Based on the author names (e.g., Zhang, Huo, Du, and Usman, Ali, Khan), this network likely reflects academic collaborations between researchers or institutions of Chinese and Pakistani origin.

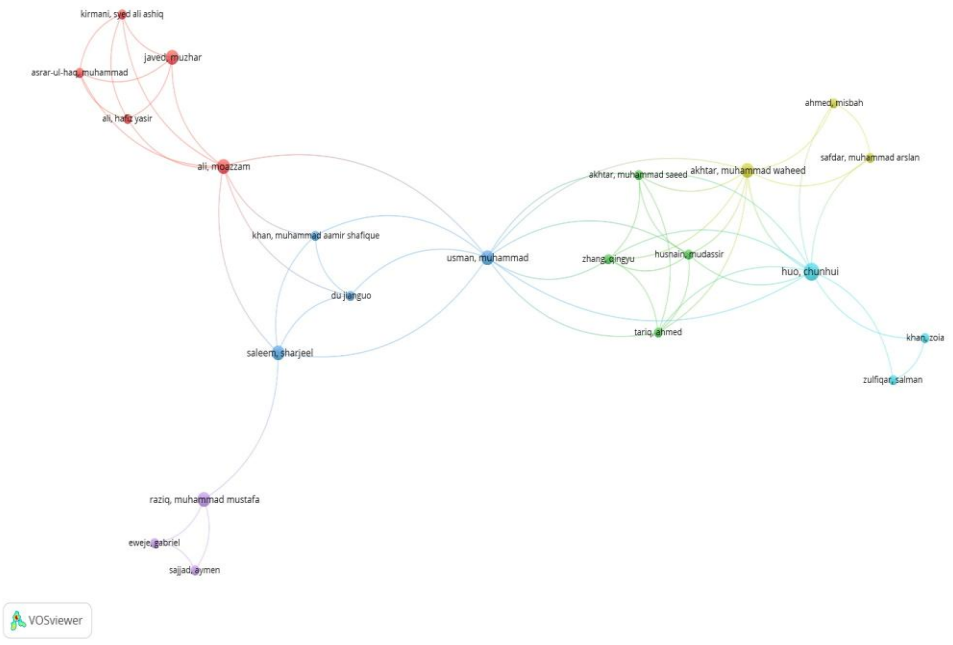

Figure 1: Co-Author Network

In conclusion, the table reveals that researchers with the highest number of citations are not always found in collaborative networks, and that there is not always a linear relationship between academic performance and the intensity of collaborative work. This finding suggests

that while some authors have high individual influence, they tend to exhibit more limited or isolated collaboration within research networks. Furthermore, if this table is to be used for a literature review, reading the works of Muhammad Usman and Chunhui Huo would be a good starting point for understanding the field as a whole.

Author Citation Analysis

In the academic world, author citation analysis is a critical indicator for measuring the impact researchers create and the extent of their contribution to the literature. To examine the citation network, an author citation map was generated by applying the thresholds of at least one publication and one citation. The analysis of 683 linked units resulted in the identification of 24 clusters, with 5,080 connections and a total link strength of 5,394. This analysis shows the extent and manner in which authors cite each other. The aim is to identify the most influential authors in the field, core author groups (clusters), and the interaction and information flow among authors. Each circle on the map represents an author. The larger the circle, the higher the impact (number of citations or publications) of that author in that dataset (e.g., Jennifer, Al Swidi, etc.). It appears that the most cited authors are not necessarily the most prolific authors. Of the most cited authors, only Thomas Dyllick (729 citations and 4 publications) and Katrin Muff (660 citations and 5 publications) are among the top 10 most prolific authors.

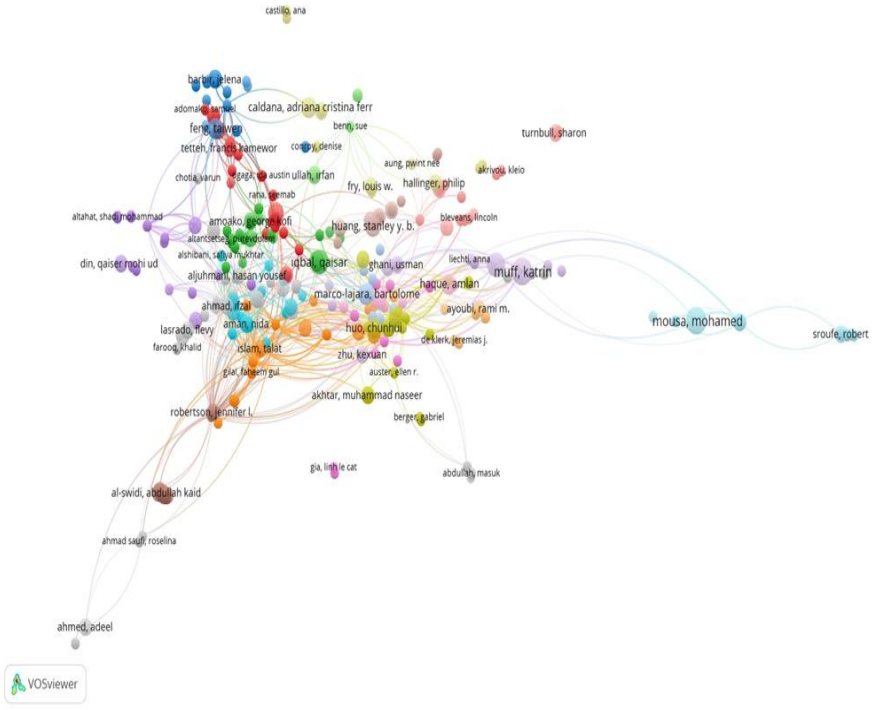

Figure 2: Authors' Citation Network

Citation analysis results indicate the emergence of distinct author clusters in the green leadership and sustainability literature. Authors such as Qaisar Iqbal, in particular, are seen to have high centrality and citation density. These authors form the intellectual core of the field and act as bridges between different research clusters. On the other hand, marginal authors have more limited citation relationships and contribute to emerging sub-themes in the literature. The fact that these authors did not hold a central position in the collaborative networks in the previous analysis further demonstrates that the impact of individual citations does not directly correlate with the structure of the collaborative network.

Keyword Analysis (Co-occurrence of All Keywords)

Keyword analysis provides important insights into the main concepts that shape research on green transformation, green leadership, and sustainability. An examination of the most frequently used keywords shows that sustainability appears most often with 97 occurrences. This is followed by ethical leadership (77), responsible leadership (74), leadership (34), green leadership (29), corporate social responsibility (29), environmental performance (25), sustainable development (23), green human resource management (18), and green transformational leadership (17).

The network analysis included 1,399 related observation units and identified 82 clusters, 5,797 links, and a total link strength of 6,135. The visualization also indicates that three core concepts dominate the network and are positioned near the center of the map, highlighting their central role in the literature.

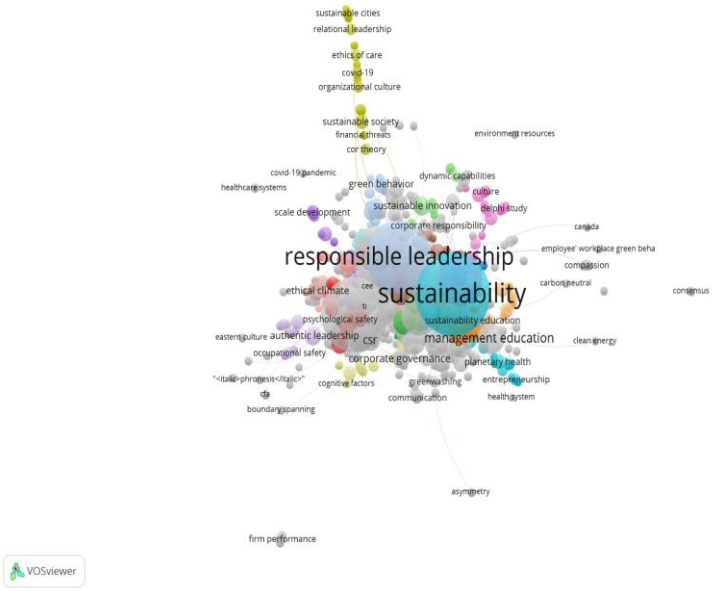

Figure 3: Common Network of Keywords

Sustainability, as the biggest node, is at the heart of the network. This shows that the ultimate focus or overarching concept of all the work is sustainability.

Responsible and ethical leadership, two concepts that stand alongside and are almost equal in importance to sustainability, demonstrate the consensus in the literature that "responsible and ethical leadership are the most critical factors in achieving sustainability." It is noteworthy that the concepts of "Higher Education" and "Business Education" are closely linked to "Sustainability". This shows that sustainability and responsible leadership should be treated not only as an area of application, but also as a discipline that needs to be integrated into educational curricula.

Conclusion And Discussion

This study aims to reveal the development dynamics, thematic concentrations, and author collaboration networks of the field by examining the academic literature on green transformation in management, green leadership, and sustainability concepts using bibliometric analysis methods. Analyzing 469 academic publications from the Web of Science database using VOSviewer software shows that research in this field has increased, particularly since 2020. This result demonstrates that green leadership and sustainability have moved beyond being merely an area of environmental awareness and have become a significant element of strategic management literature (Aydınoğlu, 2025; Zhong et al., 2025).

The increase in publication numbers is directly linked to rising environmental pressures worldwide, sustainable development goals, and stakeholder expectations, which are changing management strategies. Particularly in the post-2020 period, the examination of green leadership, responsible leadership, and ethical leadership concepts together reveals that sustainability is perceived not only as a matter of individual leadership behaviors but also as an integrated phenomenon encompassing organizational culture, management, and strategic decision-making processes (Ak et al., 2025; de Klerk et al., 2023). This supports the view in the literature that sustainable leadership is not static, but rather a multifaceted structure that aims to create long-term value, encompassing ethical sensitivity and stakeholder focus (Namboga et al., 2025).

Co-authorship analyses have shown that significant collaborative networks emerge in the areas of green leadership and sustainability. However, it appears that highly cited authors are not always at the center of these networks. This finding indicates that there is no linear relationship between academic impact and collaboration intensity.

As stated in the literature, some researchers accelerate the flow of information and contribute to the development of the field by assuming a connecting role between disciplines

or institutions (Donthu et al., 2021). This situation reveals that the green leadership literature has developed through collective academic interactions.

Author citation analyses indicate that a strong foundation has been established in the field. This foundational framework establishes theoretical reference points for the field, focusing particularly on sustainability, responsible leadership, and ethical leadership, and provides a conceptual foundation for future research. This finding is consistent with previous research emphasizing that green leadership should be assessed not only in terms of environmental performance but also in terms of ethical principles, corporate responsibility, and relationships with stakeholders (Elkhweildi et al., 2025; Ak et al., 2025).

Keyword analysis clearly reveals that sustainability is established as a fundamental overarching concept in the academic literature. The central positioning of the concept of "sustainability" and its strong links to the concepts of "ethical leadership" and "responsible leadership" demonstrate that sustainability is examined within a normative and value-oriented framework in the management literature (Zhong et al., 2025). Furthermore, the strong connection between concepts such as "higher education" and "business education" and sustainability reveals that green leadership should not be limited to organizational practices but should be seen as a competency area that needs to be disseminated through education systems (Battal et al., 2025).

The findings of this inquiry align closely with existing empirical evidence, reinforcing the notion that green leadership serves as a fundamental driver in augmenting an organization’s sustainability trajectory.. From a Resource-Based View (RBV) perspective, environmentally conscious leadership skills are understood to be a rare, hard-to-imitate, and strategically beneficial resource for organizations (Barney, 1991; Hart vd., 2011). In this context, green leadership stands out as a crucial factor for both environmental success and long-term competitiveness and corporate resilience (Chen et al., 2013; Shah et al., 2020).

Nonetheless, certain methodological constraints must be acknowledged. This research relied exclusively on the Web of Science core collection, which naturally precludes the inclusion of scholarly works indexed in alternative repositories such as Scopus. Furthermore, the nature of bibliometric analyses, which focus on numerical relationships, limits the direct examination of the theoretical depth and contextual elements of research (Donthu et al., 2021). Therefore, caution is needed when evaluating the findings for practical applications.

In conclusion, this study offers a holistic overview of the green leadership and sustainability literature, revealing the conceptual framework, development trends, and collaboration networks of the field. For future research, it is recommended to conduct

bibliometric analyses involving multiple databases, to address cultural and sectoral contexts in more detail, and to implement mixed research designs supported by qualitative methods (Zhong et al., 2025; Namboga et al., 2025). From an application perspective, these findings provide valuable guidance for developing sustainability-focused leadership strategies for organizations and managers undergoing green transformation.

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