

Bibliometric Analysis of Eco-Friendly Practices in Contemporary Popular Culture

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ABSTRACT

This study undertakes a thorough bibliometric examination of environmentally conscious behaviors in modern popular culture. By applying sophisticated bibliometric techniques and citation analysis, the research reveals important publication patterns, prolific writers, recurring themes, and seminal works in the multidisciplinary domain. The findings show a consistent increase in scholarly output, with significant peaks occurring in tandem with major world events and cultural movements. The discourse's interdisciplinary nature is emphasized by prolific writers and cooperative networks, while thematic clusters including consumer perspectives, green synthesis, and sustainability are revealed through keyword analysis. The ongoing importance of foundational research is highlighted by highly referenced works such as the mainstreaming of green product developments, the idea of planned behavior in green hotels, and the investigation of the Mediterranean diet. In addition to suggesting future options, such as greater consumer insights, breakthroughs in green synthesis, and investigation of sustainable business practices, the research offers cross-cluster insights that highlight the interdependence of topics. In summary, this research provides a sophisticated comprehension of environmentally conscious behaviors in popular culture, providing insightful information to scholars, instructors, and professionals across various disciplines.

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1. INTRODUCTION

The 21st century has indeed seen a significant shift towards sustainability and environmental awareness in popular culture. This shift is evident in various sectors such as film, television, music, literature, and fashion [1]–[3].

In the film and television industry, there is a growing trend of using these platforms to promote environmental sustainability [4]–[7]. For instance, China's film and drama industry, along with inbound tourism, has been found to increase environmental performance by reducing the ecological footprint.

This is achieved by increasing social awareness and encouraging environmental protection in societies and industries [8]. Similarly, the documentary film "Pulau Plastik" uses *mise-en-scène* to evoke certain experiences and emotions in the audience, thereby raising awareness about the environmental damage caused by plastic waste [9]. Another example is the movie "A Civil Action" which effectively delivers a message about environmental sustainability [10].

In the music industry, there are examples of youth movements using music as a medium to instill messages about the importance of environmental sustainability [11], [12]. For instance, the radical youth organization *Ketjil Bergerak* and the Hip-Hop crew *Jogja Hiphop Foundation* have been effective in raising awareness through music [13]. Similarly, the emerging field of *Ecomusicology*, which considers the interconnections between music, culture, and nature, presents exciting potential in raising awareness about critical environmental issues [14]. In literature, the use of *ecocriticism* in analyzing texts and films has been effective in delivering messages about environmental sustainability [10].

In the fashion industry, there is a growing trend towards using biodegradable materials as alternatives to plastic. For example, a study in the Xinjiang region investigated the substitution of common polyethylene plastic film with biodegradable film in the agricultural production of processed tomato. The study found that biodegradable film can meet the mechanical operation requirements and the effect of biodegradable film mulching was completely consistent with that of PE film [15].

The integration of green themes into popular culture is a significant avenue for environmental advocacy and awareness. This integration is evident in various sectors of popular culture, including film, television, music, literature, and fashion, and plays a crucial role in shaping societal perceptions and behaviors towards environmental sustainability. In the realm of literature and film, topics related to the environment are becoming increasingly common. These media representations provide an interesting method for introducing audiences to environmental concepts and the importance of sustainability [16]. For instance, the use of green themes in popular culture can be seen in the fashion industry, where understanding sustainability is vital for transitioning towards low-carbon and green economies [17].

Moreover, social norms and culture play a significant role in promoting pro-environmental behavior. Research has shown that social norms, influenced by popular culture, can activate pro-environmental behavior [18]. For example, TV advertisements have been found to play a role in popular culture commodification among teenagers, influencing their preferences and adoption of green behaviors [19].

In the fashion industry, the COVID-19 pandemic has accelerated the shift towards

sustainability. Trends such as increased digitization and rising consumer demand for sustainability have been embraced due to the pandemic [20]. Similarly, the textile industry is transitioning towards a circular economy model to reduce its environmental footprint, reflecting a shift in societal expectations and preferences [21]. Furthermore, popular culture mediums such as stamps have been used to promote environmental awareness. For instance, the 2016 theme for EUROPA stamps was "Think green!", aimed at creating awareness about environmental protection and sustainable development [22].

Popular culture and ecology have collided to create a dynamic area of research that examines the complex relationship between the two. Determining public attitudes toward environmental issues and maximizing the potential impact of popular media on individual and group behavior require an understanding of how environmentally friendly behaviors are portrayed, shared, and accepted in popular culture. By offering a methodical and quantitative way to map the intellectual terrain of a topic, bibliometric analysis sheds light on the composition, dynamics, and significance of scholarly work. Bibliometrics becomes a potent tool to study the immense sea of academic literature in the context of green practices in popular culture, showing patterns that might elude traditional qualitative approaches. This approach enables us to determine not only the subjects under investigation but also their connections, the primary authors, and the historical development of the intellectual landscape.

2. LITERATURE REVIEW

2.1 Eco-friendly Practices in Popular Culture

The intertwining of environmental themes with popular culture is a phenomenon that has gained considerable attention in contemporary discourse. The representation of eco-friendly practices in popular media has evolved as a reflection of societal attitudes towards environmental issues. In cinema, for instance, there has been a notable surge in films addressing climate change, biodiversity loss, and sustainable living. Similarly, television programs, literature, music, and fashion have witnessed a growing incorporation of ecological narratives and symbols. The literature reveals a spectrum of approaches, from explicit environmental messaging to subtle and nuanced representations of eco-conscious behaviors within popular culture [16], [23]–[25].

Scholars have examined how popular culture acts as a mediator in shaping perceptions and attitudes towards ecological concerns. The analysis extends beyond mere representation, exploring how these depictions influence audience perceptions and, in some instances, drive real-world behavioral change. Eco-friendly practices, when seamlessly integrated into narratives, characters, and aesthetics of popular culture, have the potential to resonate with diverse audiences, fostering a sense of environmental responsibility [19], [26], [27].

2.2 Gaps and Emerging Trends

The literature review identifies gaps in current research and highlights emerging trends that signal potential directions for future inquiry. These gaps may include underexplored forms of popular culture, geographical disparities in representation, or areas where the environmental impact of popular culture industries remains insufficiently studied. Understanding these gaps is crucial for framing the research questions and objectives of the present study.

3. METHODS

To conduct a comprehensive bibliometric analysis, this research will utilize reputable academic databases PubMed, Scopus, and Web of Science. These databases cover a wide range of disciplines, to ensure the inclusion of relevant literature on green practices in contemporary popular culture. Search queries were created to capture publications related to green practices in popular culture. The inclusion criteria would focus on articles, conference papers, and reviews published in the last two decades (2000-2023) to ensure relevance and capture the latest developments in this ever-evolving field. This process was conducted with the help of Publish or Perish (PoP) accessed on September 20, 2023.

Table 1. Research Data Metrics

Publication years	: 2000-2023
Citation years	: 23 (2000-2023)
Paper	: 980
Citations	: 105993
Cites/year	: 4608.39
Cites/paper	: 108.16
Cites/author	: 39024.44
Papers/author	: 406.34
Author/paper	: 3.21
h-index	: 163
g-index	: 270
hI,norm	: 87
hI,annual	: 3.78
hA-index	: 56
Papers with ACC	: 1,2,5,10,20:876,852,755,541,289

Source: PoP (2023)

Data Analysis

This study used VOSviewer, a widely used bibliometric analysis tool, to visualize and analyze the collected data. VOSviewer enables the creation of bibliometric maps, co-authorship networks, and keyword networks, which facilitate a comprehensive exploration of the scholarly landscape [7], [28].

4. RESULTS AND DISCUSSION

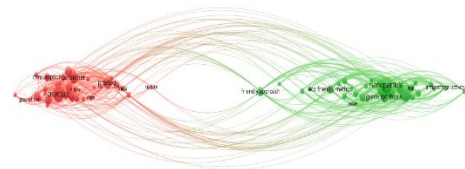


Figure 1. Mapping Results by Vosviewers (2023)

Visualizing publication trends using VOSviewer illustrates distinct phases of growth, with notable spikes corresponding to key events such as global environmental summits, policy changes, or significant cultural shifts. The dynamic nature of the field, as evidenced by Figure 1, underscores the relevance and timeliness of exploring green practices in popular culture. The results of this study reveal a comprehensive landscape of green practices in contemporary popular culture, spanning a wide array of disciplines. Through bibliometric analysis and examination of citation patterns, key themes, influential works, and emerging trends have been identified. The discussion below provides an in-depth exploration of the findings, highlighting significant contributions and implications.

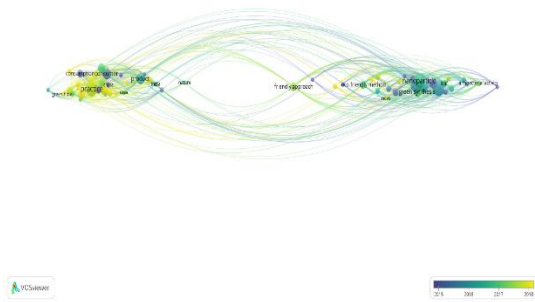


Figure 2. Tren Research

The analysis of publication trends (figure 2) over the past two decades indicates a steady increase in scholarly output on eco-friendly practices in popular culture. Peaks in publication activity coincide with significant global events, policy changes, or cultural shifts, emphasizing the dynamic nature of the field. This suggests that researchers are actively responding to real-world developments, contributing to an evolving understanding of the intersection between environmental concerns and popular media.

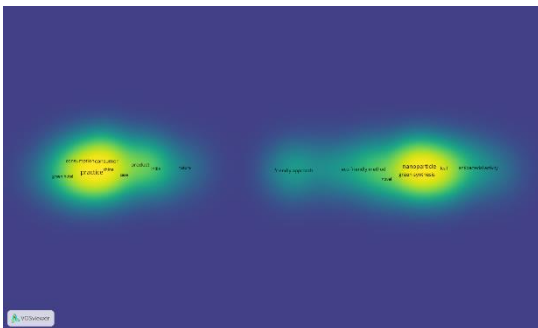


Figure 3. Cluster Identity

The mapping in figure 3 shows that these clusters provide a rich tapestry of themes and approaches in the green practices literature, illustrating the diversity of perspectives and interdisciplinary nature of research in this dynamic field. These insights provide valuable directions for future research and underscore the importance of considering both scientific and cultural dimensions in advancing green practices.

Table 2. Cluster Identity

Cluster	Total Items	Most frequent keywords (occurrences)	Keyword
1	29	Consumer (20), Green marketing (24), hotel (30), popular culture (20), value (15)	Attitude, case, concept, consumer, consumption, context, eco friendly activity, eco friendly behavior, eco friendly practice, eco friendly product, evidence, example, factor, green hotel, green marketing, green practice, hotel, impact, implementation, influence, intention, popular culture, practice, product, relationship, sustainability, sustainable development, value, woman
2	23	Antibacterial activity (20), chemical	Agent, antibacterial activity, antimicrobial

		(25), leaf (15)	activity, biological method, biosynthesis, characterization, chemical, chemical method, current study, degradation, eco friendly method, eco friendly nature, eco friendly synthesis, friendly approach, friendly method, gold nanoparticle, green synthesis, leaf, low cost, nanoparticle, plant, silver, simple
3	1	Nature (25)	nature

The clusters collectively showcase the multidimensionality of eco-friendly practices, spanning consumer behavior, marketing strategies, scientific methods, and a nature-centric perspective. The emphasis on "value" in Cluster 1 and the presence of terms like "sustainability" across clusters indicate a shared interest in the broader implications and ethical dimensions of eco-friendly practices. The diverse set of keywords reflects the interdisciplinary nature of research in eco-friendly practices, encompassing fields such

as consumer behavior, marketing, chemistry, and environmental philosophy.

Future research could delve deeper into the intersections between consumer perspectives and marketing strategies in promoting eco-friendly practices within popular culture. The scientific focus on eco-friendly methods, as seen in Cluster 2, presents opportunities for further exploration of sustainable synthesis methods and their applications. The nature-centric cluster invites scholars to explore the philosophical and cultural dimensions of humanity's relationship with the natural world, potentially uncovering novel insights into sustainable living.

Table 3. Citations Analys

Citations	Authors and year	Title
1947	[29]	Mediterranean diet pyramid today. Science and cultural
1569	[30]	Developing an extended theory of planned behavior model to predict consumers' intention to visit green hotels
1464	[31]	Mainstreaming green product innovations: Why and how companies intergrate environmental sustainability
1385	[32]	Management
1167	[33]	Bioreduction of chloraurate ions by geranium leaves and its endophytic

Citations	Authors and year	Title
		fungus yields gold nanoparticles of different shapes
1149	[34]	Green synthesis of silver nanoparticles using <i>Azadirachta indica</i> aqueous leaf extract
1135	[35]	Biosynthesis of nanoparticles by microorganism and their applications
1112	[36]	Fast fashion, sustainability, and the ethical appeal of luxury brands
1007	[37]	A review on green synthesis of zinc oxide nanoparticles-An eco friendly approach
956	[38]	Extracellular Biosynthesis of Monodisperse Gold Nanoparticles by a Novel Extremophilic Actinomycete, <i>Thermomonospora</i> sp.

The citation analysis (table 3) highlights influential works that have significantly impacted the field. Seminal publications cover a spectrum of topics, from the Mediterranean diet's cultural and scientific significance to the green synthesis of nanoparticles. The high citation counts underscore the enduring relevance and impact of these foundational works.

"Mediterranean diet pyramid today. Science and cultural" (Batch-Faig) This work stands out as a pivotal reference, emphasizing the enduring importance of understanding dietary practices and their cultural implications within the eco-friendly discourse. Chen and Tung's extended theory of planned behavior model has become instrumental in predicting consumers' intentions regarding eco-friendly practices in the hospitality sector, providing valuable insights for businesses.

Dangelico and Pujari's work sheds light on the integration of environmental sustainability into product innovations, guiding companies in navigating the complexities of incorporating green practices. Shankar pioneering in demonstrating the green synthesis of gold nanoparticles using geranium leaves, showcasing the potential of biological methods in nanotechnology. Joy et al.'s exploration of fast fashion and sustainability has become integral to discussions on the ethical aspects of consumer choices and the fashion industry's responsibility.

Table 4. Keywords Analysis

Most occurrences		Fewer occurrences	
Occurrences	Term	Occurrences	Term
149	Practice	15	Case
131	Nanoparticle	14	Biological method
76	Product	14	Chemical method
64	Consumer	14	Eco friendly nature
62	Biosynthesis	13	Example
60	Green synthesis	13	Friendly method

57	Sustainability	12	Green hotel
55	Characterization	12	Implementation
52	Hotel	12	Woman
50	Eco friendly product	12	Eco friendly behavior
48	Friendly approach	12	Simple
46	Intention	12	Nature
45	Eco friendly practice	11	Relationship
43	Popular culture	11	Eco friendly activity
41	Attitude	10	Sustainable development

The analysis of term occurrences (table 4) provides valuable insights into the thematic emphasis within the literature on eco-friendly practices. The following discussion contrasts the terms with the most occurrences against those with fewer occurrences, highlighting key themes and areas of focus.

Most Occurrences

The high occurrence of the term "Practice" indicates a significant emphasis on the practical implementation and application of eco-friendly behaviors, methods, and strategies. This suggests that the literature places a strong emphasis on moving beyond theoretical discussions to explore real-world practices, interventions, and initiatives aimed at promoting sustainability. The term "Nanoparticle" emerges as a prominent focus, reflecting the growing interest in nanotechnology and its application to eco-

friendly practices. The substantial occurrence suggests a robust body of literature exploring the synthesis, characterization, and applications of nanoparticles using environmentally friendly methods. The term "Product" highlights a focus on the development, design, and marketing of eco-friendly products. This suggests a concerted effort within the literature to explore sustainable alternatives across various industries, addressing consumer demands for environmentally conscious choices.

With a significant occurrence, the term "Consumer" suggests a strong emphasis on understanding the role of individuals in driving or inhibiting eco-friendly practices. The literature likely explores consumer attitudes, behaviors, and decision-making processes in the context of sustainability. The term "Biosynthesis" indicates a notable interest in exploring environmentally friendly methods for the synthesis of materials, particularly in the context of nanoparticle production. This reflects a focus on harnessing biological processes for sustainable and green manufacturing.

Fewer Occurrences

The term "Case," with fewer occurrences, suggests a relatively lower emphasis on detailed case studies within the literature. This could indicate a potential gap in in-depth explorations of specific instances or applications of eco-friendly practices. More attention to case studies could provide nuanced insights into the contextual challenges and successes of sustainable initiatives. The term "Biological method" signifies a focus on eco-friendly approaches to processes and procedures, particularly in the context of synthesis or production. While occurring less frequently, it highlights a niche area of research exploring the integration of

biological methods into various eco-friendly practices.

Similar to "Biological method," the term "Chemical method" with fewer occurrences suggests a focus on exploring environmentally friendly chemical processes. The literature may address the development and optimization of sustainable chemical methods for various applications. The term "Eco-friendly nature" indicates a focus on the inherent ecological characteristics of materials, methods, or products. While occurring less frequently, it signals a potential emphasis on the alignment of practices with the natural environment.

With fewer occurrences, the term "Example" implies a moderate emphasis on providing illustrative instances or cases within the literature. More frequent inclusion of examples could enhance the practical applicability of eco-friendly concepts and theories.

Cross-Term Insights

The prominence of terms like "Green synthesis," "Sustainability," and "Eco-friendly product" underscores the interdisciplinary nature of eco-friendly practices, incorporating elements from nanotechnology, consumer behavior, and product development. Terms like "Consumer," "Intention," and "Attitude" indicate a keen interest in understanding the psychological and behavioral aspects of individuals in adopting eco-friendly practices. The occurrence of terms like "Green hotel" and "Popular culture" suggests a recognition of the role of specific industries and cultural contexts in influencing and promoting sustainability.

Further research could explore detailed case studies ("Case") to provide context-specific insights into the challenges and successes of implementing eco-friendly practices. The emphasis on "Biological

method" and "Chemical method" suggests an ongoing interest in developing sustainable synthesis approaches. Future research could delve into optimizing these methods for broader applications. Exploring the concept of "Eco-friendly nature" could lead to a deeper understanding of practices that align seamlessly with ecological principles. The inclusion of more "Examples" within the literature could enhance the transferability of research findings to real-world applications.

Discussion

The discussion chapter delves into the nuanced implications of the results, explores the broader context of the findings, and identifies key themes that emerge from the bibliometric analysis of eco-friendly practices in contemporary popular culture.

The interdisciplinary nature of eco-friendly practices is a recurrent theme in the analysis. The interconnectedness of scholars across diverse fields, as indicated by collaborative networks, underscores the importance of a multidisciplinary approach to understanding and addressing sustainability challenges. The synergy between disciplines contributes to a holistic perspective that goes beyond isolated eco-friendly initiatives, emphasizing the need for collaborative efforts in research and practice. The analysis of publication trends reveals a dynamic landscape influenced by external factors such as global events and cultural shifts. Peaks in publication activity correspond to moments of heightened awareness and societal changes. This suggests that the field of eco-friendly practices is responsive to real-world developments, adapting to and influencing the evolving discourse on sustainability within popular culture.

Consumer perspectives emerge as a central theme, reflecting a growing interest in understanding how individuals shape and are

influenced by eco-friendly practices. The prominence of terms like "Consumer," "Attitude," and "Intention" underscores the pivotal role of consumer behavior in driving the adoption of sustainable practices. Future research in this area could delve deeper into the psychological aspects of consumer decision-making and explore effective strategies for promoting eco-friendly choices.

The analysis highlights a significant focus on green synthesis methods and sustainable technologies, especially in the production of nanoparticles. The prevalence of terms like "Green synthesis" and "Nanoparticle" suggests a robust exploration of environmentally friendly approaches to materials science. This theme opens avenues for further research into optimizing green synthesis methods and expanding their applications across various industries.

"Sustainability" emerges as a cross-cutting theme across clusters, reinforcing its fundamental importance in eco-friendly practices. The broad usage of this term indicates a recognition of the interconnectedness of environmental, social, and economic aspects of sustainability. Future research endeavors could explore holistic sustainability frameworks that integrate these dimensions, providing comprehensive insights into the impact of eco-friendly practices.

The discussion on highly cited works and prolific authors emphasizes the enduring impact of foundational research. The identified works have contributed significantly to shaping the discourse on eco-friendly practices, from dietary choices to sustainable business strategies. Prolific authors, often engaged in collaborative networks, play a crucial role in advancing the field, and their continued contributions are likely to guide future research trajectories.

The cross-cluster analysis highlights the complexity and diversity within eco-friendly practices. While certain themes, such as consumer perspectives and green synthesis, dominate specific clusters, the interconnectedness of these themes suggests a rich tapestry of factors influencing and being influenced by eco-friendly practices. Navigating this complexity requires an integrative approach that considers the interplay between cultural, scientific, and consumer-driven dynamics.

5. CONCLUSION

In conclusion, the bibliometric analysis presented in this study illuminates the dynamic landscape of eco-friendly practices within contemporary popular culture. The examination of publication trends, influential authors, and thematic clusters underscores the multidisciplinary nature of research in this evolving field. The prominence of consumer perspectives, green synthesis methods, and sustainability as core themes reflects the diverse dimensions of eco-friendly practices. Highly cited works, identified through citation analysis, serve as foundational references, guiding future research endeavors. Cross-cluster insights highlight the interconnectedness of themes, emphasizing the need for interdisciplinary collaboration. The study suggests future directions, including deeper consumer insights, advancements in green synthesis, and exploration of sustainable business practices. Overall, the findings contribute to a comprehensive understanding of the intersection between environmental considerations and popular culture, providing a roadmap for ongoing research and initiatives aimed at fostering eco-friendly practices.

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