



THE ROLE OF CHATGPT IN PROMOTING SUSTAINABLE DEVELOPMENT: APPLICATIONS AND PERSPECTIVES IN ENVIRONMENTAL AND SOCIAL DECISION-MAKING

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Summary

A documentary review was carried out on the production and publication of research papers related to the study of the variables ChatGPT and Environment. The purpose of the bibliometric analysis proposed in this document was to know the main characteristics of the volume of publications registered in the Scopus database during the year 2023, achieving the identification of 41 publications. The information provided by this platform was organized through graphs and figures categorizing the information by Year of Publication, Country of Origin, Area of Knowledge and Type of Publication. Once these characteristics have been described, the position of different authors towards the proposed theme is referenced through a qualitative analysis. Among the main findings made through this research, it is found that the United States with 11 publications was the country with the highest scientific production registered in the name of authors affiliated with institutions in that country. The Area of Knowledge that made the greatest contribution to the construction of bibliographic material referring to the study of Technological Ecosystems, Innovation and Sustainability, was Social Sciences with 22 published documents, and the Type of Publication most used during the period indicated above were Journal Articles with 59% of the total scientific production.

Keywords: ChatGPT, Environment, Society, Decision Making, Sustainable Development.

1. INTRODUCTION

In the rapidly changing technological world, artificial intelligence has become a powerful tool that has the potential to shape every aspect of our lives, including decision-making processes related to environmental and social environments. One of the pioneers of AI-driven progress, ChatGPT, an innovative language model developed by OpenAI, plays a key role in promoting sustainable perspectives in environmental and social decision-making. Sustainable development is a global imperative because it aims to meet the needs of the present without compromising the ability of future generations to meet their own needs. This holistic approach aims to strike a balance between economic progress, social welfare and environmental protection. This is where ChatGPT can make a big difference.

ChatGPT is an artificial intelligence language model capable of analyzing large amounts of data, extracting information from multiple sources, and generating coherent responses to complex issues. This unique capability makes it an invaluable resource for providing knowledge on sustainable development practices and the link between environmental and social issues. By providing accurate

and up-to-date information on environmental issues such as climate change, biodiversity loss and resource depletion, ChatGPT enables individuals, organizations and policymakers to make informed decisions about the long-term consequences of their actions. This facilitates the integration of sustainability principles into their strategies and policies.

In addition, ChatGPT can act as a bridge to facilitate communication and collaboration between stakeholders with different backgrounds and experiences. By facilitating dialogue between scientists, policymakers, businesses, civil society and citizens, ChatGPT can help build consensus on the complex challenges of sustainable development, creating inclusive and effective solutions. In environmental and social decision-making, the potential of AI-powered tools like ChatGPT also lies in scenario modeling and predictive analytics. By modeling different scenarios and their possible outcomes, policymakers can assess the risks and benefits of different policy options, thereby increasing society's resilience and adaptability to future challenges.

However, while ChatGPT has great potential, potential limitations need to be recognized and addressed, such as bias in training data or the risk of oversimplifying complex issues. Transparency and continuous improvement in the development of artificial intelligence models are fundamental to ensure their responsible and ethical use to promote sustainable development. For this reason, this article seeks to describe the main characteristics of the compendium of publications indexed in the Scopus database related to the variables ChatGPT and Environment, as well. As the description of the position of certain authors affiliated with institutions, during the period 2023.

2. GENERAL OBJECTIVE

Analyze from a bibliometric and bibliographic perspective, the elaboration and publication of research works in high-impact journals indexed in the Scopus database on the variables ChatGPT and Environment, during the year 2023.

3. METHODOLOGY

This article is carried out through a mixed orientation research that combines the quantitative and qualitative method.

On the one hand, a quantitative analysis of the information selected in Scopus is carried out under a bibliometric approach of the scientific production corresponding to the study of ChatGPT and Environment.

A qualitative perspective, examples of some research works published in the area of study indicated above, starting from a bibliographic approach that allows to describe the position of different authors towards the proposed topic. It is important to note that the entire search was performed through Scopus, managing to establish the parameters referenced in *Figure 1*.

3.1. Methodological design

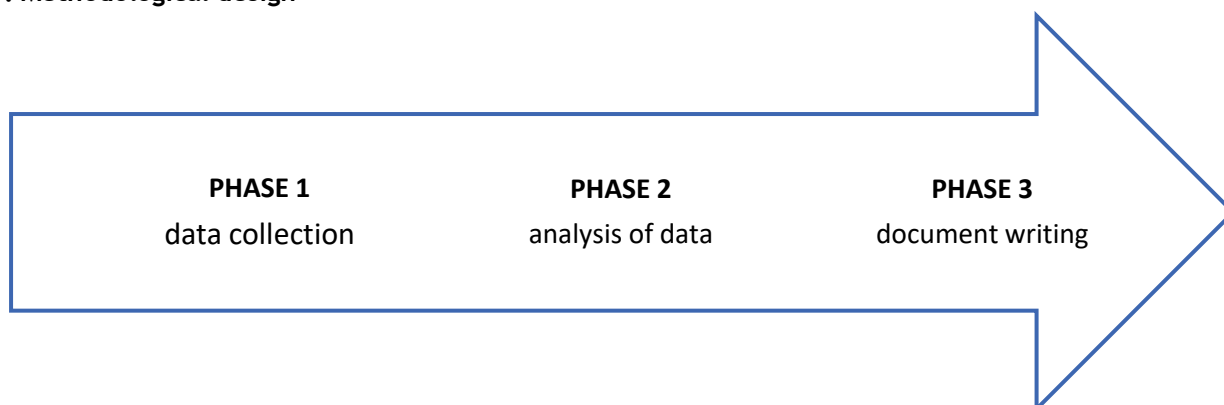


Figure 1. Methodological design

Source: Authors.

3.1.1 Phase 1: Data collection

Data collection was executed from the Search tool on the Scopus website, where 41 publications were obtained from the choice of the following filters:

- TITLE-ABS-KEY (chatgpt, AND environment)
- Published documents whose study variables are related to the study of Technological Ecosystems, Innovation and Sustainability.
- Limited to the year 2023.
- Without distinction of country of origin.
- Without distinction of area of knowledge.
- Regardless of type of publication.

3.1.2 Phase 2: Construction of analysis material

The information collected in Scopus during the previous phase is organized and subsequently classified by graphs, figures and tables as follows:

- Co-occurrence of words.
- Country of origin of the publication.
- Area of knowledge.
- Type of publication.

3.1.3 Phase 3: Drafting of conclusions and outcome document

In this phase, we proceed with the analysis of the results previously yielded resulting in the determination of conclusions and, consequently, the obtaining of the final document.

4. RESULTS

4.1 Co-occurrence of words

Figure 2 shows the co-occurrence of keywords found in the publications identified in the Scopus database.

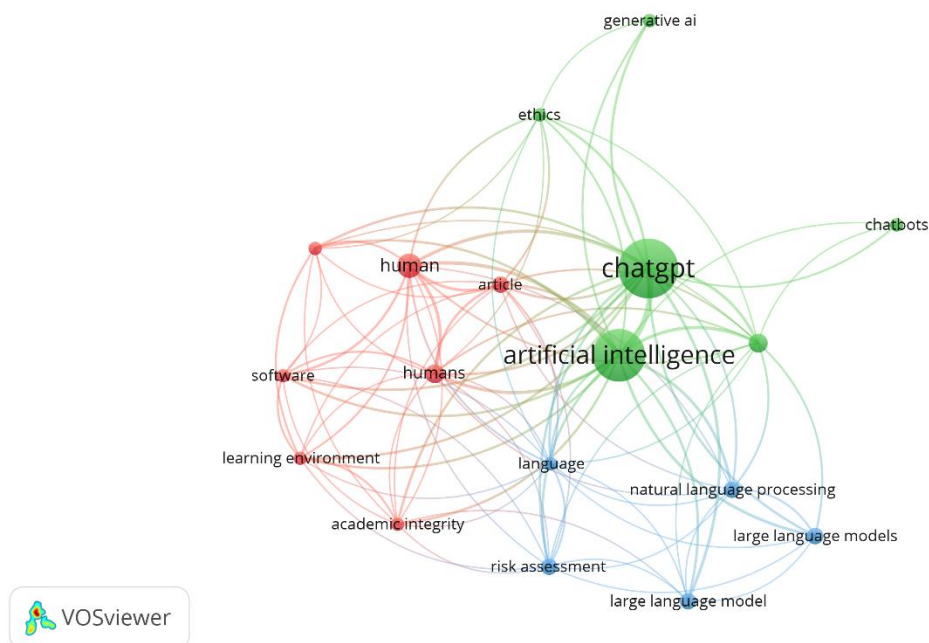


Figure 2. Co-occurrence of words

Source: Own elaboration (2023); based on data exported from Scopus.

Artificial Intelligence was the most frequently used keyword within the studies identified through the execution of Phase 1 of the Methodological Design proposed for the development of this article. Chatgpt is also among the most frequently used variables, associated with variables such as Software, Language Management, Sustainability, Academic Intelligence Language Model. From the above, it is

striking that one of the main advantages of using ChatGPT in sustainable development decision-making is its ability to process large amounts of information and consider multiple variables simultaneously. Allowing to identify the possible trade-offs and synergies between environmental, social and economic objectives, helping policy makers to develop comprehensive and balanced policies. However, it should be recognized that while ChatGPT can be a valuable tool, it is not a panacea. Ethical considerations and potential biases in AI algorithms should be strictly considered to ensure fair and equitable outcomes. Moreover, the use of this artificial intelligence should complement human experience and judgment, not replace them entirely.

4.2 Distribution of scientific production by country of origin

Figure 3 shows how scientific production is distributed according to the country of origin of the institutions to which the authors are affiliated.

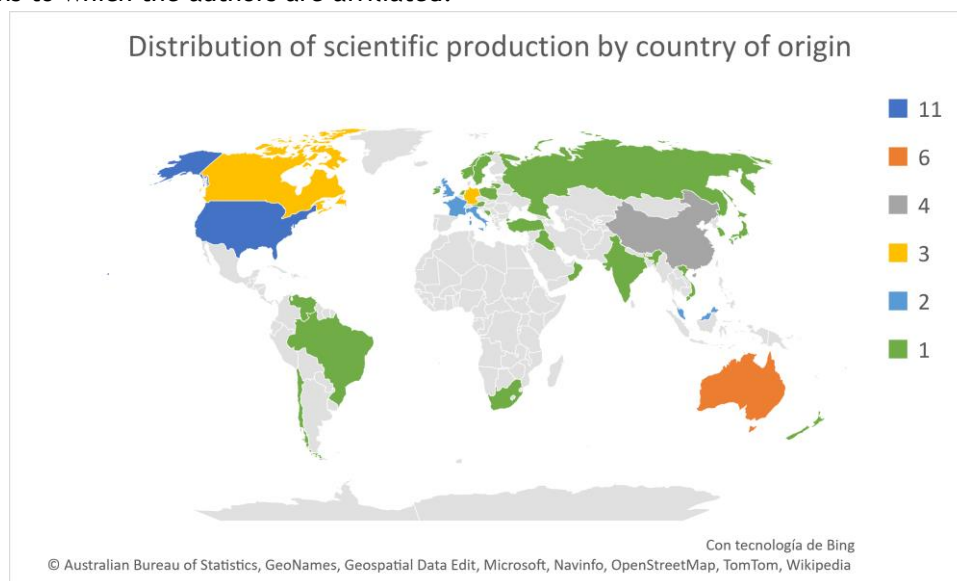


Figure 3. Distribution of scientific production by country of origin.

Source: Own elaboration (2023); based on data provided by Scopus.

Within the distribution of scientific production by country of origin, records from institutions were taken into account, establishing the United States, as the country of that community, with the highest number of publications indexed in Scopus during the period 2023, with a total of 11 publications in total. In second place, Australia with 6 scientific papers, and China ranking third presenting to the scientific community, with a total of 4 papers among which is the article entitled "A perspective on the synergistic potential of artificial intelligence and product-based learning strategies in education with bio-based materials" this article aims to propose innovative strategies, as learning methods based on GPT (Generative Pre-trained Transformer) artificial intelligence (Generative Pre-trained Transformer) text generation models, to modify the focus of a Materials Chemical Engineering course from non-sustainable materials to sustainable materials, with the aim of addressing the critical challenges of our society. This approach aims to achieve two objectives: first, to enable students to actively engage with raw materials and solve real-world challenges, and second, to foster creativity and entrepreneurial skills by providing them with the necessary tools to conduct brainstorming sessions and develop procedures following scientific principles. Incorporating circular bioeconomy concepts such as renewable resources, waste reduction and resource efficiency into the curriculum provides a framework for students to understand the environmental, social and economic implications in Chemical Engineering. It also enables them to make informed decisions within the framework of the circular bioeconomy, benefiting society by promoting the development and adoption of sustainable technologies and practices. (Marquez, 2023)

4.3 Distribution of scientific production by area of knowledge

Figure 4 shows the distribution of the elaboration of scientific publications from the area of knowledge through which the different research methodologies are implemented.

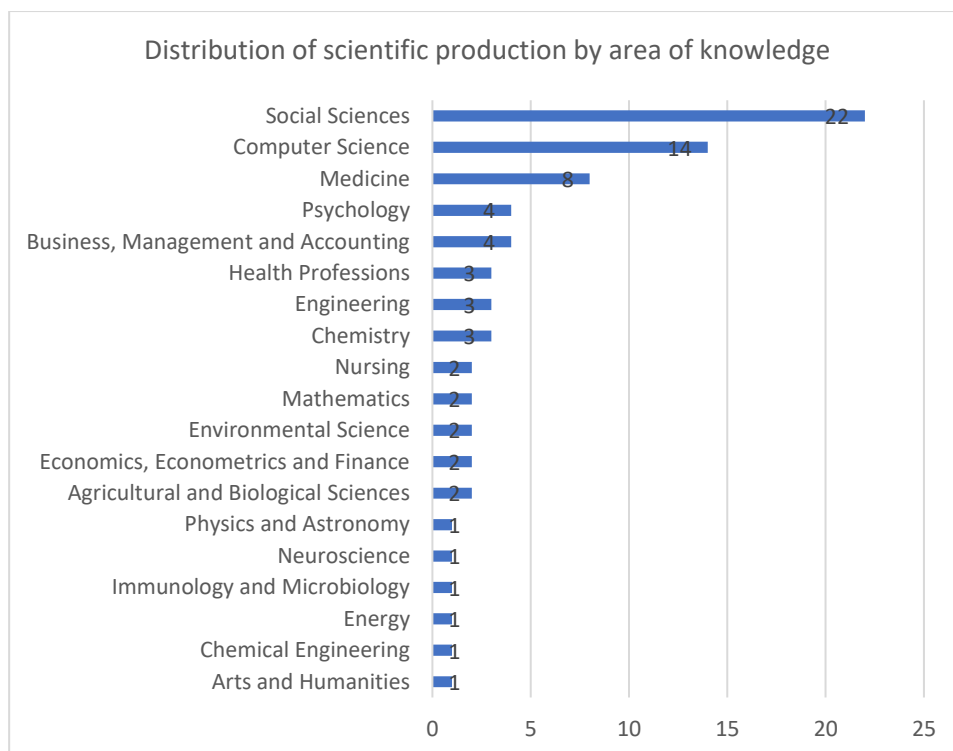


Figure 4. Distribution of scientific production by area of knowledge.

Source: Own elaboration (2023); based on data provided by Scopus

Social Sciences was the area of knowledge with the highest number of publications registered in Scopus with a total of 22 documents that have based their methodologies ChatGPT and Environment. In second place, Computer Science with 14 articles and Medicine in third place with 8. The above can be explained thanks to the contribution and study of different branches, the article with the greatest impact was registered by the Social Sciences area entitled "Generative artificial intelligence as a new context for management theories: analysis of ChatGPT" The main purpose of this paper is to examine how generative Artificial Intelligence (AI), like ChatGPT, it can serve as a new context for management theories and concepts. Design/methodology/approach: The paper presents analyses of selected management theories on decision making, knowledge management, customer service, human resource management and administrative tasks and explains what may change after the adoption of generative AI. Findings: The paper indicates that it is necessary to study some management theories and concepts in the generative AI environment that can influence management work at the strategic, functional and administrative levels. Research limitations/implications: This article is an opinion piece and does not refer to empirical data. It formulates some conclusions for future empirical research studies. Originality/value: the article analyzes selected management theories in a new technological environment. The paper also provides insight into the functions of generative AI that are useful in understanding and overcoming how new technology can change organizations and management. (Korzynski, 2023)

4.4 Type of publication

In the following graph, you will observe the distribution of the bibliographic finding according to the type of publication made by each of the authors found in Scopus.

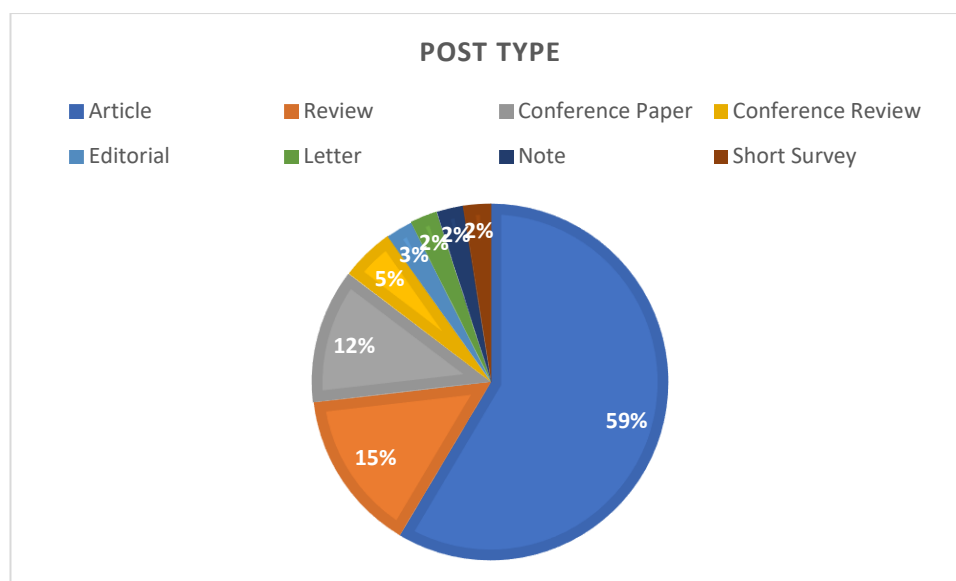


Figure 5. Type of publication.

Source: Own elaboration (2023); based on data provided by Scopus.

The type of publication most frequently used by the researchers referenced in the body of this document was entitled Journal Articles with 59% of the total production identified for analysis, followed by Journal with 15%. Session Paper are part of this classification, representing 12% of the research papers published during the period 2017-2022 in journals indexed in Scopus. In this last category, the one entitled "What is the impact of ChatGPT on education? A Quick Review of the Literature" this journal aims to enrich our understanding of ChatGPT's capabilities across subject domains, how it can be used in education, and potential issues raised by researchers during the first three months of its launch (i.e. December 2022 to February 2023). A search of the relevant databases and Google Scholar yielded 50 articles for content analysis (i.e. open coding, axial coding, and selective coding). The findings of this review suggest that ChatGPT performance varied across subject domains, from outstanding (e.g. economics) and satisfactory (e.g. programming) to unsatisfactory (e.g. mathematics). Although ChatGPT has the potential to serve as an assistant for instructors (e.g., to generate course materials and provide suggestions) and as a virtual tutor for students (e.g., to answer questions and facilitate collaboration), there were challenges associated with its use (e.g., generating incorrect or false information and bypassing plagiarism detectors). Immediate action should be taken to update evaluation methods and institutional policies in schools and universities. Instructor training and student education are also essential to respond to ChatGPT's impact on the educational environment. (Lo, 2023)

5. CONCLUSIONS

Through the bibliometric analysis carried out in the present research work, it was established that the United States was the country with the largest number of records published for the variables ChatGPT and Environment. with a total of 11 publications in Scopus database. In the same way, it was established that the application of theories framed in the area of Social Sciences, were the most frequently used in the measurement of the impact generated by the role of ChatGPT in the promotion of sustainable perspectives in environmental and social decision-making. It is undoubtedly important and promising. As a versatile conversational agent powered by artificial intelligence, ChatGPT can change the way we solve complex global problems by providing valuable insights, facilitating discussions, and helping decision makers develop comprehensive and inclusive strategies. By integrating ChatGPT into the environmental decision-making process, we can use its ability to analyze large datasets, monitor ecosystems, and identify potential threats, helping to develop evidence-based policies to maintain the health of the planet. In addition, its ability to engage local communities and understand different perspectives makes it an invaluable tool for addressing social


equity issues and ensuring that the benefits of sustainable development reach all sectors of society. In addressing the complex challenges of the twenty-first century, ChatGPT's potential to increase our awareness, foster dialogue, and positive environmental and social change is undeniable. By using this technology responsibly and working together towards sustainable development, we can create a more sustainable, just and prosperous world for current and future generations. As we continue to explore the possibilities offered by artificial intelligence, we must remember that its true value lies in how we use it to advance our collective efforts to achieve a sustainable and prosperous future for all.

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