Virtual Ecosystems and the Metaverse

Guido Trujillo Valdiviezo[1], Lino Rolando Rodríguez Alegre[2], Rosario del Pilar López Padilla[3], Roger Orlando Lujan Ruiz[4]

Abstract

A documentary review was carried out on the production and publication of research papers related to the study of the variables Virtual Ecosystems and Metaverses. 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 period 20 22-2023, achieving the identification of 21 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 5 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 Virtual Ecosystems and the Metaverse was Engineering with 9 published documents, and the Type of Publication most used during the period indicated above was theConference Articles with 57% of the total scientific production.

Keywords: *Virtual ecosystems, metaverses.*

1. Introduction

Technological advances and increasing human interaction in the digital world have led to the emergence of concepts such as virtual ecosystems and the metaverse. These ideas are revolutionizing the way we relate to and experience reality online. Virtual ecosystems are online environments in which users interact with each other and with digital elements, creating a dynamic virtual community. These platforms can be social networks, online video games, virtual reality environments, among others. In virtual ecosystems, users can communicate, share content, collaborate and participate in joint activities, creating an interactive and constantly evolving digital experience.

On the other hand, the metaverse represents a step beyond individual virtual ecosystems. It refers to a shared, three-dimensional digital environment that encompasses multiple online platforms and experiences. In the metaverse, users can immerse themselves in a virtual world, interact with avatars, explore digital scenarios, and engage in social, economic, and cultural activities. It is a space in which virtual reality, augmented reality

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[1] Universidad César Vallejo, Lima, Perú

[2] Universidad Nacional Faustino Sánchez Carrión, Huacho, Perú

[3] Universidad César Vallejo, Lima, Perú

[4] Universidad Nacional Mayor de San Marcos, Lima, Perú

and other immersive technologies converge, providing a more immersive and complete experience.

The idea of the metaverse has gained momentum in recent times, with large technology and entertainment industry companies exploring its potential. A future is envisioned in which the metaverse becomes a new paradigm of online interaction, with applications in fields such as video games, education, e-commerce and remote work. However, there are still challenges and aspects to consider in terms of technology, security, privacy and regulation, before the metaverse becomes a fully integrated reality in our lives. In conclusion, virtual ecosystems and the metaverse are fascinating concepts that are transforming the way we relate to the digital world. Virtual ecosystems allow us to interact and collaborate online, while the metaverse offers us the possibility to immerse ourselves in a shared and three-dimensional digital environment. Both concepts promise an exciting and possibility future in the digital age. 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 Virtual Ecosystems and Metaverses. Like this. As the description of the position of certain authors affiliated with institutions, during the period between the years 20 22 and 2023.

2. General Objective

Analyze from a bibliometric and bibliographic perspective, the elaboration of works on Virtual Ecosystems and the Metaverse published in high impact journals indexed in the Scopus database during the period 2022 and first semester of 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 Virtual Ecosystems and the Metaverse.
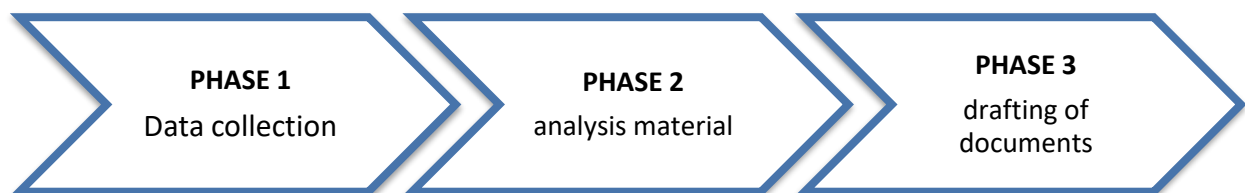
3.1. Methodological design

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 21 publications were obtained from the choice of the following filters:

TITLE-ABS- TITLE-ABS-KEY (virtual AND ecosystems, AND metaverses) AND (EXCLUDE (PUBYEAR , 2014))

▪   Published documents whose study variables are related to the study of Virtual Ecosystems and the Metaverse.
▪   No limit of countries.
▪   No publication area limit.
▪   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.
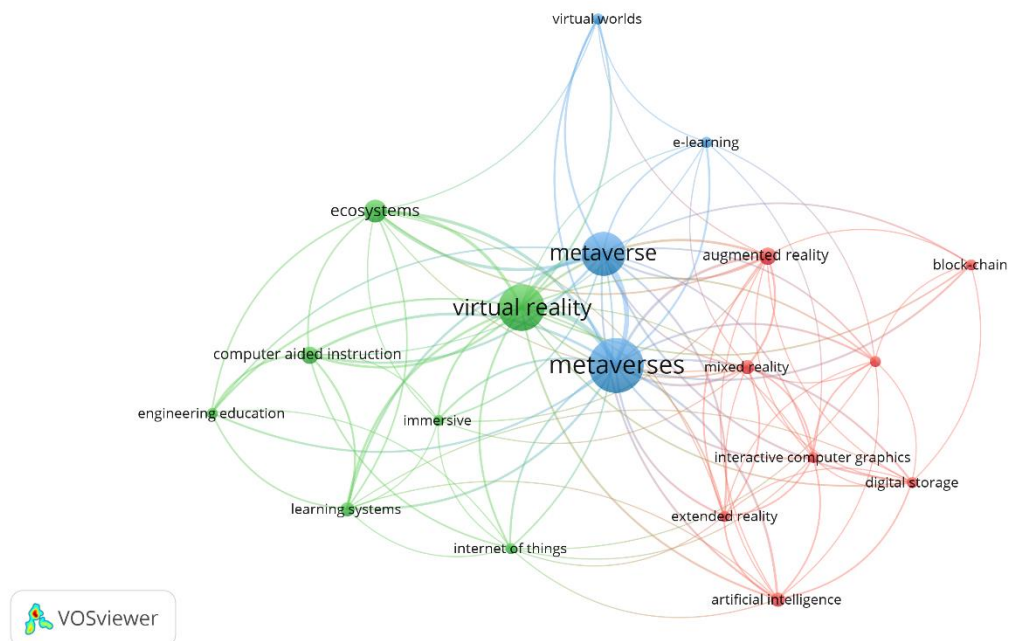

Figure 2. Co-occurrence of words

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

Metaverses 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. Virtual Reality is also among the most frequently used variables, associated with variables such as Artificial Intelligence, Ecosystems. From the above, it is striking that virtual ecosystems and the metaverse are concepts related to human interaction and digital reality. Although there is some overlap between the two terms, they refer to distinct but interrelated concepts. A virtual ecosystem is an online environment that simulates a complex system of interactions between different users and digital elements. It can be a social media platform, an online video game or any other digital space in which users interact with each other and with the virtual environment. The metaverse, on the other hand, is a broader concept and refers to a shared three-dimensional digital environment encompassing multiple virtual ecosystems. In the metaverse, users can interact with avatars, objects, and virtual environments, and participate in social, economic, and cultural activities.

4.2 Distribution of scientific production by country of origin

Figure 3 shows how scientific production is distributed according to the nationality of the authors.
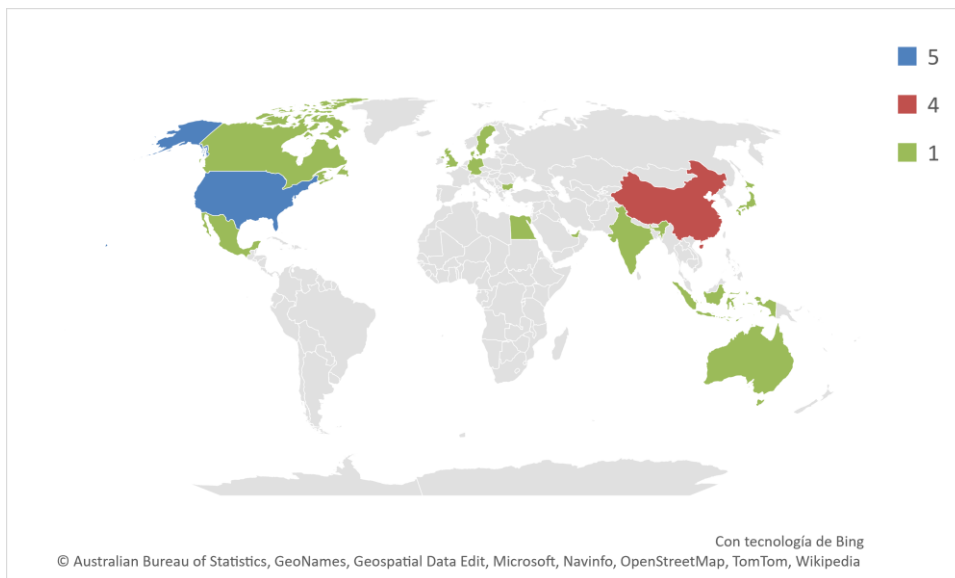

Figure 3. Distribution of scientific production by country of origin.

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

Within the distribution of scientific production by country of origin, records from different 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 201 2-2023, with a total of 5 publications in total. Secondly, the United Kingdom with 21 scientific documents among which is the article entitled "Blockchain-based asset service and storage mechanism for the metaverse universe: Metarepo" (Ersoy, 2023) The motivation for the realization of this study are the security problems in the exchange, purchase and sale transactions that are carried out in the virtual universes that have become popular in recent days. Another source of motivation is the anxiety of the owners of the objects to steal, lose and transfer their possessions to another universe in the Metaverse. Blockchain technology, which can store assets on MetaRepo, has been used to address these concerns. In the developed blockchain structure, New User Engine, Transaction Center, Authenticator Engine (Weng) and Repos models have been developed for user interaction, transaction processing and security mechanism. An exemplary

metaverse universe has been designed that includes social activities for the testing and evaluation processes of the proposed MetaRepo approach. MetaRepo communicates from the browser via API. A detailed analysis of the performance of the proposed model has been carried out. As a result, MetaRepo seeks a mechanism for users to communicate with different metaverse universes and platforms without the need for extra verification and security measures within the metaverse universe.

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.
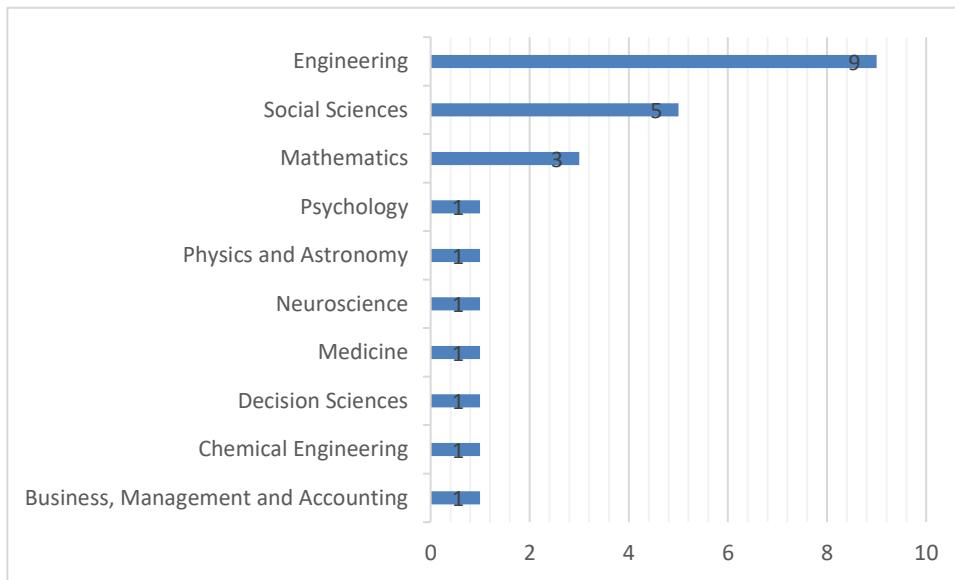

Figure 4. Distribution of scientific production by area of knowledge.

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

Engineering was the area of knowledge with the highest number of publications registered in Scopus with a total of 9 documents that have based their methodologies on the study of virtual ecosystems and the metaverse. In second place, Social Sciences with 5 articles and Mathematics in third place with 3 documents among which is the article entitled "Building an Edu-Metaverse Ecosystem: A New and Innovative Framework " (Wang, 2022) Research on the impact of the Metaverse on education exploded in 2022. Here, we explore learning in the Metaverse and propose a new and innovative theoretical framework by reviewing the literature and synthesizing best practices in the design of Metaverse learning environments. This ecosystem consists of four main hubs: 1) instructional design and performance technology center; 2) knowledge center; 3) Research and Technology Center; and 4) Talent and Training Hub. The factors on the three wheels are common to the four centers: 1) infrastructure, commercial industry and communication; 2) access to technology and equity; and 3) user rights, data security and privacy policy. We believe this framework can help guide emerging research and development on Metaverse applications in education. We also hope that this article can serve as a launching pad for the special issue on the Metaverse and the Future of Education endorsed by the IEEE Education Society.

4.5 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.
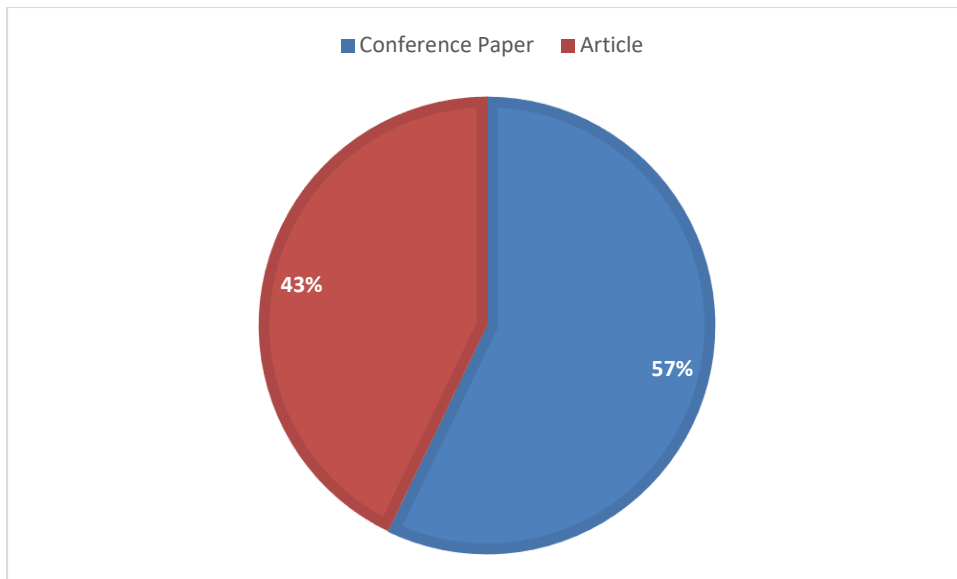
Figure 5. Type of publication.

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 Session Paper with 57% of the total production identified for analysis, followed by Articles with 43% of the research papers published during the period 20 22-202 3 in journals indexed in Scopus. "An Overview of the NISO Plus 2022 Conference: Global Conversations/Global Connections" (Lawlor, 2022) this document aims to provide an overview of some of the highlights of the NISO Plus 2022 Annual Conference that took place virtually from 15-18 February 2022. This was the third conference of its kind and the second to be held in a completely virtual format due to the Pandemic. These conferences are the result of the merger of NISO and the National Federation of Information and Summary Services (NFAIS) in June 2019, replacing the NFAIS Annual Conferences and offering a new, more interactive format. Like last year, there was no general topical topic, but there were topics of interest to everyone working in the information ecosystem, from practical issues of metadata standards and quality to preprints, Wikidata, archiving and digital preservation, Open Science and Open Access. and, ultimately, the globalization of information infrastructure, the metaverse and visions of the future. With speakers and attendees from all over the world and from multiple time zones and continents, it truly was a global conversation!

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 Virtual Ecosystems and the Metaverse. with a total of 5 publications in Scopus database during the period 2022-2023. Based on argumentative analysis, virtual ecosystems and the metaverse represent significant advances in human interaction and digital experience. Virtual ecosystems allow us to connect and collaborate in online environments, creating active and dynamic virtual communities. On the other hand, the metaverse expands this idea by providing a shared, three-dimensional digital environment in which users can immerse themselves, interact and participate in various activities. Both virtual ecosystems and the metaverse have the potential to revolutionize multiple aspects of our lives, from entertainment and games to education, commerce and work. These technologies promise greater immersion, collaboration and online interaction possibilities, opening up a world of opportunities for creativity, connection and development. However, it is important to note that the full development and mass

adoption of virtual ecosystems and the metaverse still face technical, legal, ethical and social challenges. Privacy, security, accessibility and fairness are aspects that must be carefully considered to ensure that these technologies are used in a responsible and beneficial way for all. Ultimately, virtual ecosystems and the metaverse represent an exciting future in which digital reality and human interaction converge in innovative ways. As we move in this direction, it is critical to foster an inclusive, ethical and sustainable approach in the development and use of these technologies to maximize their potential and benefits for society as a whole.

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