

Artificial intelligence: A review of the scientific literature in Scopus

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ABSTRACT

Artificial intelligence (AI) has revolutionized conventional work methods in all areas of knowledge. The aim of this study is to analyze the current state of research in this field. To this end, a systematic review was carried out with a bibliometric approach that included analysis of the distribution of scientific production by year, the most relevant sources, Bradford's Law to identify the main sources, the most prominent authors, Lotka's Law to analyze the productivity of authors and the author's "h" index. Through the review of the scientific literature available in the Scopus database, 609 relevant results were identified, of which 414 were articles in Spanish. A total of 205 articles were selected as the final publication of the study and 113 of them were open access. The empirical studies demonstrate that AI presents both opportunities and ethical and social challenges, especially in areas such as health, communication, law and artistic practices. In healthcare, AI can improve patients' quality of life. In journalism, AI streamlines the production of objective news and helps reduce misinformation, although it also poses ethical and professional challenges. In the field of law, AI offers opportunities to improve efficiency in judicial decision-making and legal work, but it also brings ethical and legal considerations. It is therefore essential to strike a balance between harnessing the benefits of AI and protecting rights, privacy and ethics in each of these fields, in order to maximize its potential for the benefit of society.

Keywords: Intelligence artificial, health and artificial intelligence, law and artificial intelligence, communication and artificial intelligence.

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1. Introduction

Artificial Intelligence (AI) has emerged as a field of study and application of great significance in engineering. With advancements in technology, AI has become a powerful tool that enables engineers to solve complex problems, automate processes, and optimize systems. AI techniques, such as machine learning, deep learning, and natural language processing, have opened up new possibilities for engineers to enhance efficiency, improve decision-making, and drive innovation across various engineering disciplines.

The use of AI in engineering spans a wide range of applications. In manufacturing, AI-powered systems can optimize production processes, predict equipment failures, and enable predictive maintenance, leading to increased productivity and reduced downtime. In transportation and logistics, AI algorithms can optimize routes, manage inventory, and enhance supply chain operations [1]. In energy systems, AI can be used to optimize

power generation and distribution, improve energy efficiency, and enable smart grid management. Moreover, AI has found significant utility in fields such as robotics, aerospace, civil engineering, and biomedical engineering. In robotics, AI enables machines to perceive their environment, make intelligent decisions, and perform complex tasks autonomously. In aerospace, AI can enhance flight control systems, improve navigation and guidance, and enable autonomous flight capabilities. In civil engineering, AI can aid in designing and optimizing infrastructure, managing traffic systems, and predicting structural performance. In biomedical engineering, AI techniques are employed in medical imaging, drug discovery, personalized medicine, and healthcare analytics. The integration of AI in engineering not only enhances operational efficiency but also enables engineers to tackle increasingly complex challenges. AI systems can analyze vast amounts of data, detect patterns, and make predictions that would be difficult or time-consuming for humans to accomplish alone. AI algorithms can also learn from data, adapt to changing circumstances, and continuously improve their performance, allowing engineers to develop more innovative and optimized solutions. The search for understanding the nature and things in themselves has been a constant theme in human history. Greek philosophers attributed truth and the reason for metaphysical questions to cosmological elements. Through language, humans have tried to understand reality. However, while the language used in Artificial Intelligence (AI) is based on mathematical logic and focuses on efficiency and precision, the language of metaphysics seeks to understand the nature of reality and human existence, while the language of faith seeks a deeper understanding of the relationship between God and human beings. Although these languages have different approaches and objectives, Leach, and Ramos point out that there is an interconnection between them, and AI can be seen as a tool to explore metaphysical and theological questions [2, 3]. In a study by Afanador and Parés (2019), the exploration of current organ design practices in transpecies society is highlighted, and how these developments are transforming the understanding of what a human body is [4]. Additionally, studies by Mina (2019) address the use of big data and artificial intelligence in future patient management and the need for a clear strategy to implement these technologies and how they can improve healthcare. While the challenges and limitations that need to be addressed are highlighted, the potential of big data and artificial intelligence to transform healthcare and improve outcomes for patients is emphasized. It is important to involve experts in the field and collect and analyze large amounts of data to achieve this. The application of artificial intelligence (AI) and big data in the fight against the COVID-19 pandemic is a topic of great relevance. In this context, it is crucial to ensure the protection of privacy and personal data. The processing speed offered by AI and big data are valuable tools for predicting the spread of the virus, identifying possible treatments, and developing technological solutions to monitor public health [3, 5]. In the field of healthcare, the use of artificial intelligence (AI) is being explored and its impact on the relationship between doctors and patients. The benefits of artificial intelligence in healthcare efficiency, such as reducing waiting times and improving access to healthcare services, as well as the accuracy of diagnosis, aiding in the identification of pathologies and diseases, and allowing for earlier and more precise detection, are highlighted. Additionally, artificial intelligence can contribute to personalized treatment by identifying tailored treatments based on individual patient characteristics, enhancing their effectiveness. However, the impact on the doctor-patient relationship is also addressed, and recommendations are made to improve the integration of artificial intelligence in healthcare, including the training of healthcare professionals and maintaining a patient-centered approach [6]. The use of artificial intelligence (AI) in different fields, such as healthcare, is being researched to improve people's quality of life. The use of AI in therapy for patients with dementia can improve their care and well-being, but ethical and social challenges have also been identified. In the fight against the COVID-19 pandemic, AI and big data are valuable tools for predicting the spread of the virus and developing technological solutions to monitor public health, but it is important to ensure the protection of privacy and personal data. In the field of healthcare, AI can improve the efficiency and accuracy of diagnosis, as well as the personalization of treatment, but potential impacts on the doctor-patient relationship need to be addressed. Overall, the ethical and social challenges of AI need to be explored and addressed to effectively and ethically use these emerging technologies. In the field of communication, the study by Ufarte and Manfredi (2019) highlights the ability of AI to generate journalistic content quickly and efficiently, allowing journalists to focus on higher-value tasks [7]. Furthermore, it emphasizes the importance of the structure of algorithms and

bots used in news production, as they must ensure informative quality and adapt to the needs of different media and audiences. Additionally, some of the ethical and professional challenges arising from the use of AI in journalism, such as the need for transparency in news production and the responsibility of journalists in overseeing and correcting AI-generated content, are addressed. Another study on artificial intelligence and journalism highlights how AI is transforming the news production process and how journalists are using these tools to enhance their work. However, ethical challenges and concerns regarding accuracy and impartiality in the use of AI in journalism are discussed. Therefore, the growing importance of AI in journalism and its implications for journalistic practice and ethics is evident [8]. In another area, AI has proved to be of great help in sports news production and information documentation. In the case of "BeSoccer," the automation of repetitive tasks has allowed journalists to devote more time to research and provide more value in their work. However, limitations still exist in AI's ability to understand context and emotion in sports. Additionally, AI has changed the way translators work, requiring them to adapt to technological changes to remain competitive in today's market. Topics such as translation quality and speed, as well as the impact of AI on the translation job market, are discussed, emphasizing the importance of training and developing skills in the use of technological tools for translators [9, 10]. In the legal field, AI has also been applied to advise judges and prosecutors in decision-making, as in the case of "Prometea," the first AI in Latin America in this field [11]. While there are great challenges and opportunities in implementing AI in the justice system, it is also important to address ethical concerns related to privacy and data security. To ensure that the application of AI in justice is beneficial, adequate regulation and consideration of the human perspective in decision-making are necessary. In one study, the potential application of artificial intelligence and blockchain technology to improve private contract law is analyzed. It discusses how these technological tools can reduce costs, increase accuracy and security, adapt to changes, and make private contract law more accessible. However, the ethical and legal challenges that may arise from the use of these technologies are also addressed [12]. The application of AI in labor law practice discusses how technology can improve efficiency in legal work, but also analyzes the risks associated with excessive dependence on artificial intelligence. The need for adequate regulation and a clear understanding of the ethical and professional implications of using AI in legal practice is highlighted [13]. The importance of online Alternative Dispute Resolution (ADR) systems and their ability to provide a faster, more efficient, and cost-effective solution for resolving conflicts compared to the traditional judicial system is emphasized. They offer a detailed insight into the application of AI in online ADR systems and their potential to alleviate the burden on the justice system. However, the challenges and limitations that need to be addressed to ensure their effectiveness and societal acceptance are also identified [14]. In recent studies on AI, the importance of its incorporation in legal education to improve the academic performance of law students, promote critical thinking, and research culture is highlighted [15]. The authors argue that AI should be used as a complementary tool in legal education and not as a replacement for teachers. Furthermore, they suggest that incorporating AI into the law student's educational process is feasible. Another study explores some philosophical and legal considerations regarding artificial intelligence, particularly the regulation of AI and technological surveillance. It highlights the application of AI systems in various areas of social life, raising dilemmas and challenges that need to be considered in terms of interests and principles. Additionally, it emphasizes the need to reflect on the relationships between law, politics, and technological surveillance in the AI era [16]. The study on the possibility of applying artificial intelligence in judicial decisions and armed conflicts analyzes the application of AI both in the field of law, especially in judicial decision-making, and in the context of armed conflicts. The study discusses the feasibility and usefulness of implementing artificial intelligence, as well as the possible consequences of its use in legal decision-making. Furthermore, the ethical and legal limits of using artificial intelligence in armed conflicts are examined, highlighting three fundamental aspects to consider when evaluating its use: legal, technical, and ethical aspects [17, 18]. Similarly, experiences of AI through a semi-automatic system analyze the jurisprudence of the Inter-American Court and examine political rights in the American Convention on Human Rights, identifying four conventional areas of political rights that include the right to be elected, equal opportunities in access to and stability in public office, the right to participate in public affairs, and limitations on political rights [19]. The contributions of Parra and Concha (2021) analyze the

challenges posed by artificial intelligence (AI) to legal systems. The authors argue that AI is causing a profound transformation of our society, and its intensive use in complex activities and everyday situations has given rise to legal relationships not contemplated in our normative frameworks. The application of AI in justice and labor law can improve the efficiency in legal work, but also presents ethical and legal challenges that need to be addressed. Furthermore, AI and blockchain technology can enhance private contract law, although their ethical and legal implications must be considered. Regarding legal education, the importance of incorporating AI as a complementary tool to enhance law students' academic performance is emphasized. On the other hand, it is essential to reflect on the relationships between law, politics, and technological surveillance in the AI era. In conclusion, it provides a useful overview of the challenges posed by AI to legal systems and highlights the need to adapt legal frameworks to the ongoing technological transformation in our society. Another fundamental issue is that although AI has the ability to formalize legal reasoning and legal interpretation, it cannot resolve material issues regarding what is the correct response to a new case, and it cannot decide between alternative interpretative hypotheses. Additionally, AI needs the assistance of programmers to uncover and assess human problems, limiting its ability to meet the demands of practical reasoning in law. In general, it is argued that although AI can be a useful tool for the analysis and management of large amounts of legal information, it cannot replace the role of the legal expert in interpreting norms and applying them to specific cases.

2. Methods

A comprehensive qualitative methodology was utilized, consisting of a meticulous systematic review of 70 articles that were published in reputable indexed journals. Among the selected articles, 26 were sourced from the Web of Science (WOS) database, while 19 were retrieved from Scopus. The remaining 25 articles were chosen based on their relevance to the specific categorical concept, employing a convenience sampling approach [20, 21, 22]. In January 2023, a meticulous quantitative analysis was conducted, encompassing a thorough examination of scientific production by leveraging the extensive databases of Web of Science and Scopus. This analysis employed a bibliometric approach, enabling the retrieval of valuable data associated with the terms of interest, namely "pedagogical AND leadership." By employing bibliometrics, a method renowned for its ability to measure and quantify abstract constructs, insights into research fields and epistemological positions were obtained, allowing for a comprehensive understanding of the boundaries of knowledge [23]. The documentary analysis focused primarily on reviewing existing scientific literature, while the qualitative perspective enabled the elucidation of diverse author perspectives, thus establishing the current state of the art in the field.

2.1. Procedure and selection search

The present study was conducted following the PRISMA 2020 statement and establishing inclusion and exclusion criteria. To achieve this, an advanced search was conducted using Boolean operators (TITLE-ABS-KEY ("artificial intelligence") AND (LIMIT-TO (LANGUAGE, "Spanish")) AND (LIMIT-TO (OA, "all")) AND (LIMIT-TO (PUBSTAGE, "final")) AND (LIMIT-TO (SRCTYPE, "j")) AND (LIMIT-TO (DOCTYPE, "ar"))) to apply methodological filters. The Scopus database was used to identify relevant results, covering the entire publication history by year, with the aim of analyzing its evolution. A total of 609 relevant results were identified in the Scopus database. Out of these, 414 articles were written in the Spanish language. 205 articles were selected as the final publication for the study, considering their publication status. Additionally, 202 articles were classified according to their source type, and 160 articles were classified according to their document type. It was found that 113 of the identified articles were open access, indicating that they are available to the public without payment restrictions. Furthermore, bibliometric indicators were applied to analyze scientific production, such as the distribution of articles by year of publication, the most relevant sources used, the Bradford Law to identify the main sources, the most relevant authors, the Lotka Law to analyze author productivity, and the author's "h-index". It is important to highlight that these data and results are based on the analysis conducted in the Scopus database, following the established search criteria and methodological filters.

These results provide relevant information about the evolution and characteristics of articles related to artificial intelligence in the Spanish language within the context of the study.

Table 1. Selection of search parameters in the Scopus database

Criteria	Scopus
Results	609
Spanish language	414
Final publication status	205
Source type: Journal	202
Document type: Articles	160
All Open Access	113

Note. Datos suministrados de las BD en fecha 15/03/2023

Next, in Figure 1, the review process applying the PRISMA 2020 statement is detailed.

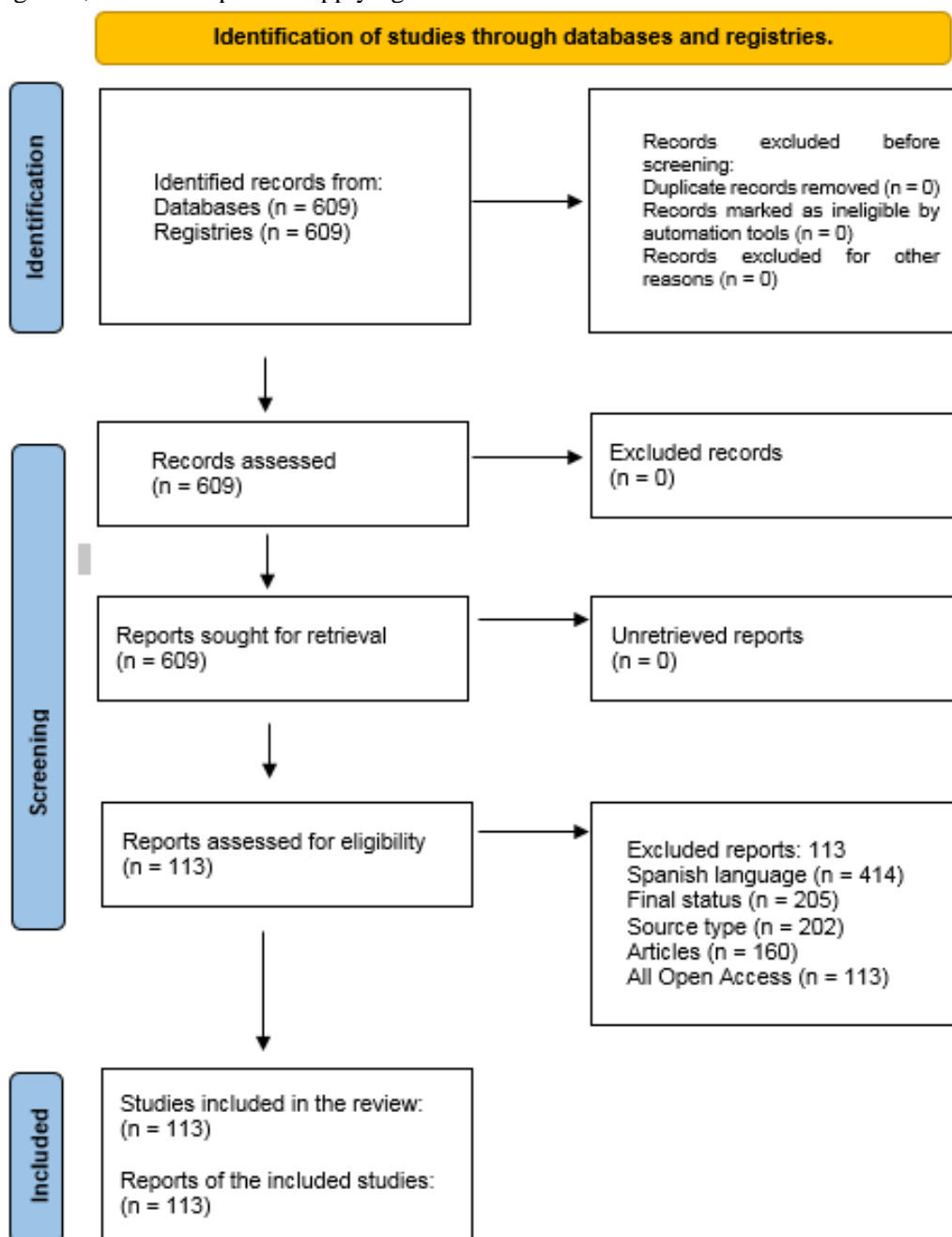


Figure 1. PRISMA 2020 flow diagram for new systematic reviews which included searches of databases and registers only

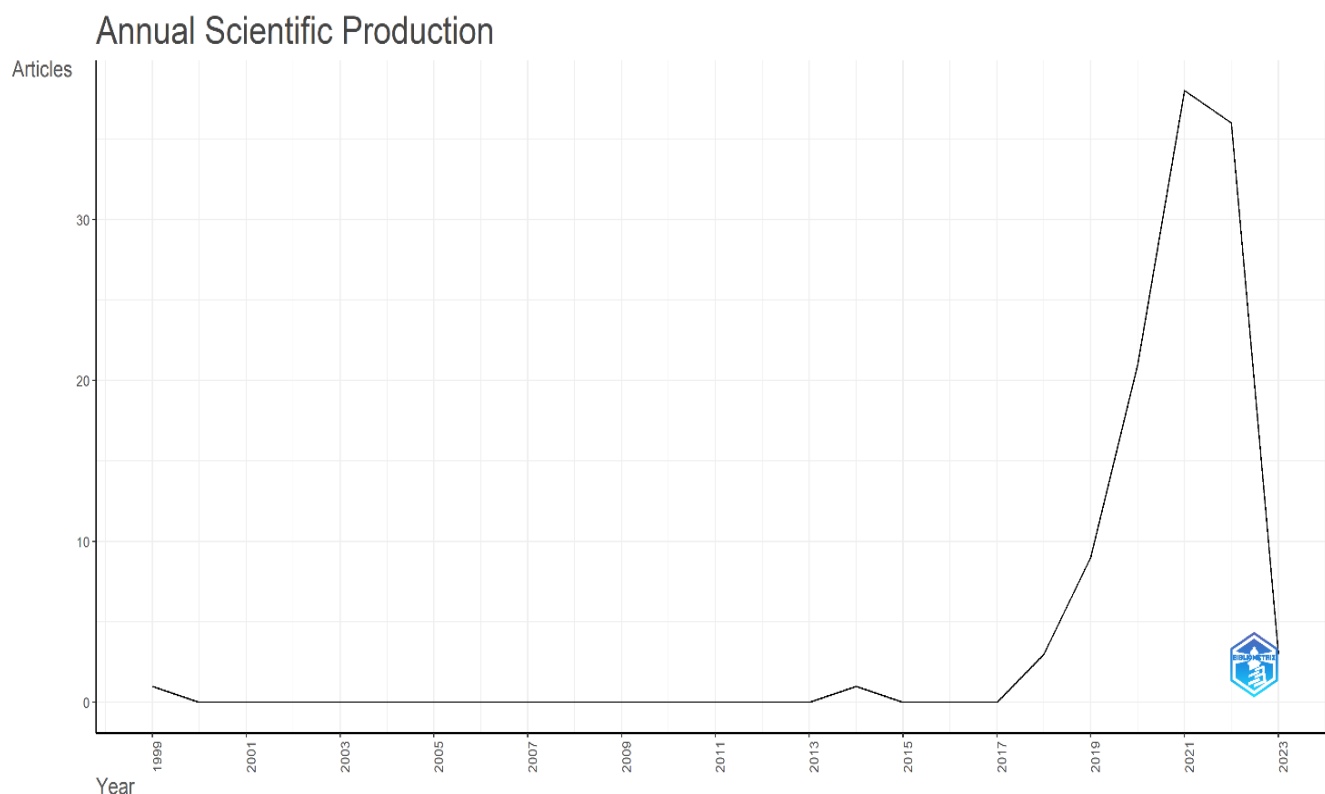


Figure 2. Distribution of scientific production by year of publication. Metadata provided from Scopus database through R Language - Bibliometrix (15/03/2023)

Figure 2 displays the scientific production on artificial intelligence in the Scopus database, represented by the number of articles published over a 25-year period. It can be observed that scientific production has significantly increased in the last few decades, with a notable rise starting from the year 2018. The year 1999 marks the beginning of scientific production on artificial intelligence, with only one article published. In the following years until 2014, there were no publications in the Scopus database on artificial intelligence, except for one article in 2014. From 2018 onwards, there is an upward trend in scientific production on artificial intelligence, with 3 articles published in that year, 9 in 2019, 21 in 2020, 38 in 2021, and 36 in 2022. It is interesting to note that although 2023 is not yet complete, there are already 3 articles published in the first quarter in the Scopus database on artificial intelligence. The scientific production on AI has experienced a significant increase in recent years, indicating a growing interest and activity in the field of artificial intelligence within the scientific community. This translates into greater knowledge and advancements in the field of artificial intelligence. In this regard, the analyzed table highlights the importance and increasing impact of artificial intelligence in the scientific community, suggesting that its development and application will continue to be the subject of research and advancement in the future.

Table 2. The most relevant sources

Sources	Articles
Arbor	7
Journal of Internet, Law, and Politics	7
Professional Information	5
Chilean Journal of Law and Technology	5
Transnational Law Notebooks	4
Doxa Communication	3
Austral Law Journal	3
Latin Journal of Social Communication	3
Sociology and Technoscience	3
Design Themes	3

Table 3. Local impact of sources. Metadata provided by Scopus databases using the R language - Bibliometrix application (15/03/2023)

Year	Arbor	Journal of Internet, Law, and Politics	Information Professional	Chilean Journal of Law and Technology	Transnational Law Notebooks
1999	1	0	0	0	0
2000	1	0	0	0	0
2001	1	0	0	0	0
2002	1	0	0	0	0
2003	1	0	0	0	0
2004	1	0	0	0	0
2005	1	0	0	0	0
2006	1	0	0	0	0
2007	1	0	0	0	0
2008	1	0	0	0	0
2009	1	0	0	0	0
2010	1	0	0	0	0
2011	1	0	0	0	0
2012	1	0	0	0	0
2013	1	0	0	0	0
2014	1	0	0	0	0
2015	1	0	0	0	0
2016	1	0	0	0	0
2017	1	0	0	0	0
2018	1	0	0	0	0
2019	1	0	0	1	0
2020	2	4	2	1	1
2021	6	5	4	5	2
2022	7	7	5	5	4
2023	7	7	5	5	4

Several trends can be observed: the journal "Arbor" and "Revista de Internet, Derecho y Política" have the highest number of published articles, with 7 each. They are followed by "Profesional de la Información," "Revista Chilena de Derecho y Tecnología," and "Cuadernos de Derecho Transnacional" with 5, 5, and 4 published articles, respectively. The remaining journals have between 3 and 1 article published in the analyzed period. In this sense, it can be inferred that these journals are important for research on AI and could be useful for literature review in future research work. However, it is important to note that the number of articles published in a journal does not necessarily reflect its quality or impact in the scientific community. All the journals focus on the intersection between artificial intelligence and different disciplines such as law, social communication, sociology, technology, and technoscience. Most of the journals have few publications on this topic, with a maximum of 7 and a minimum of 3, with Arbor and Revista de Internet, Derecho y Política having the most publications.

On the other hand, this table shows the production of articles related to artificial intelligence over time in five different journals from the Scopus database. Each row represents a year, and each column represents a journal. It can be observed that in the early years, until 2019, there was not much production in any of the journals, with only one publication in each. Starting from 2020, the production increased significantly in all the journals, with a greater increase in "Arbor," "Revista de Internet, Derecho y Política," and "Profesional de la Información." In 2021 and 2022, there was a higher production of articles in all the journals, with a peak in Arbor, which published 7 articles in both years. Cuadernos de Derecho Transnacional remained constant with 4 publications in both years.

Table 3. Bradford's law on central sources. Metadata provided by Scopus databases using the R - Bibliometrix language application (15/03/2023).

SO	Rank	Freq	cumFreq	Zone
Arbor	1	7	7	Zone 1
Journal of Internet, Law, and Politics	2	7	14	Zone 1
Professional de la Informacion	3	5	19	Zone 1
Chilean Journal of Law and Technology	4	5	24	Zone 1
Transnational Law Journal	5	4	28	Zone 1
Doxa Communication	6	3	31	Zone 1
Austral Law Journal	7	3	34	Zone 1
Latin Journal of Social Communication	8	3	37	Zone 1
Sociology and Technoscience	9	3	40	Zone 2
Design Themes	10	3	43	Zone 2

The table presents information about the most frequently cited journals related to the topic of artificial intelligence. The "SO" column contains the journal names, while the "Rank" column displays the rank of the journal based on its citation frequency. The "Freq" column shows the number of times the journal has been cited in relation to the topic, while "cumFreq" displays the cumulative frequency. The last column, "Zone," indicates the classification zone of the journal. From the table, it can be observed that the most cited journals in relation to the topic of artificial intelligence are "Arbor" and "Revista de internet, derecho y política," both in "Zone 1" classification. It is also shown that the top 5 journals in the table are in "Zone 1," while the bottom 5 journals are in "Zone 2." It is important to note that citation frequency does not necessarily reflect the quality or importance of a journal, as it can be influenced by factors such as article availability and accessibility. However, Table 3 is useful for identifying the most relevant journals in the field of artificial intelligence and serves as a starting point for future research. In summary, the deductive analysis of the table reveals that "Arbor" and "Revista de Internet, Derecho y Política" are the journals with the most publications on artificial intelligence in the analyzed period, but it is also important to highlight that the number of publications is not necessarily an indicator of quality or impact in the scientific community.

Table 4. Local impact of the sources. Metadata provided from Scopus databases using R - Bibliometrix Language (15/03/2023)

Element	h_index	g_index	m_index	TC	NP	PY_start
Profesional de la Información	3	5	0.75	28	5	2020
Doxa Communication	2	3	0.4	26	3	2019
Journal of Internet, Law and Politics	2	3	0.5	11	7	2020
Advances in Laboratory Medicine	1	1	0.25	1	2	2020
Arbor	1	2	0.04	5	7	1999
Artnodes	1	1	0.25	1	2	2020
Bid	1	1	0.167	1	1	2018
Urban and Territorial Journal	1	1	0.167	2	1	2018
Comunicar	1	1	1	1	1	2023
Transnational Law Notebooks	1	1	0.25	2	4	2020

Table 4 provides information about research in artificial intelligence and its local impact on the sources. It can be observed that the journal "Profesional de la Información" has the highest h-index, with a value of 3, indicating that at least 3 of its articles have been cited at least 3 times each. On the other hand, the journal "Doxa Comunicación" has a g-index of 3, indicating that the three most cited articles have a total of 3 citations. As for the m-index, which indicates the average number of citations per article, the journal "Comunicar" has the highest value of 1, suggesting that its single article has been highly cited on average, indicating relatively influential publications. The table also presents information about the total citations (TC), number of published articles (NP), and year of publication start (PY_start) for each source. It can be observed that the journal "Profesional de la Información" has the highest number of published articles, with 28 and a TC of 5. On the other hand, the journal "Arbor" has the highest TC, with a value of 7, although it only has 5 published articles and an h-index of 1. Some publications have a low m-index, suggesting a high variability in the number of citations their works receive. Additionally, several publications have a low number of publications (NP), which may affect their overall impact.

Table 5. Most relevant authors. Metadata provided by Scopus databases using the R-Bibliometrix software (15/03/2023)

Authors	Articles	Articles Fractionalized
Fernández	2	2.00
José Dgs	2	2.00
Leal	2	1.50
Rodríguez	2	2.00
Rubio	2	0.67
Ruiz	2	0.83
Sangüesa	2	1.50
Túñez-López	2	1.50
Verdú	2	0.67
Abarca-Álvarez	1	0.33

Table 5 presents information about authors and their contributions in research on artificial intelligence. The authors included in the table have collectively published a total of 20 articles, with each author contributing at least one article. It is notable that five authors, namely Fernández, José DGS, Rodríguez, Sangüesa, and Túñez-López, have each published two articles. Additionally, authors Leal, Rubio, and Sangüesa have a fractional count of 1.50 in the "Fractionalized Articles" column, indicating significant contributions averaging 1.5 articles, possibly as co-authors in multiple works. On the other hand, authors Abarca-Álvarez and Verdú have each published only one article and have fractional counts of 0.33 and 0.67, respectively, suggesting a partial contribution to additional articles. For further details, please refer to Table 7 regarding this matter. Overall, the table demonstrates a balanced distribution of authors and articles in the field of artificial intelligence.

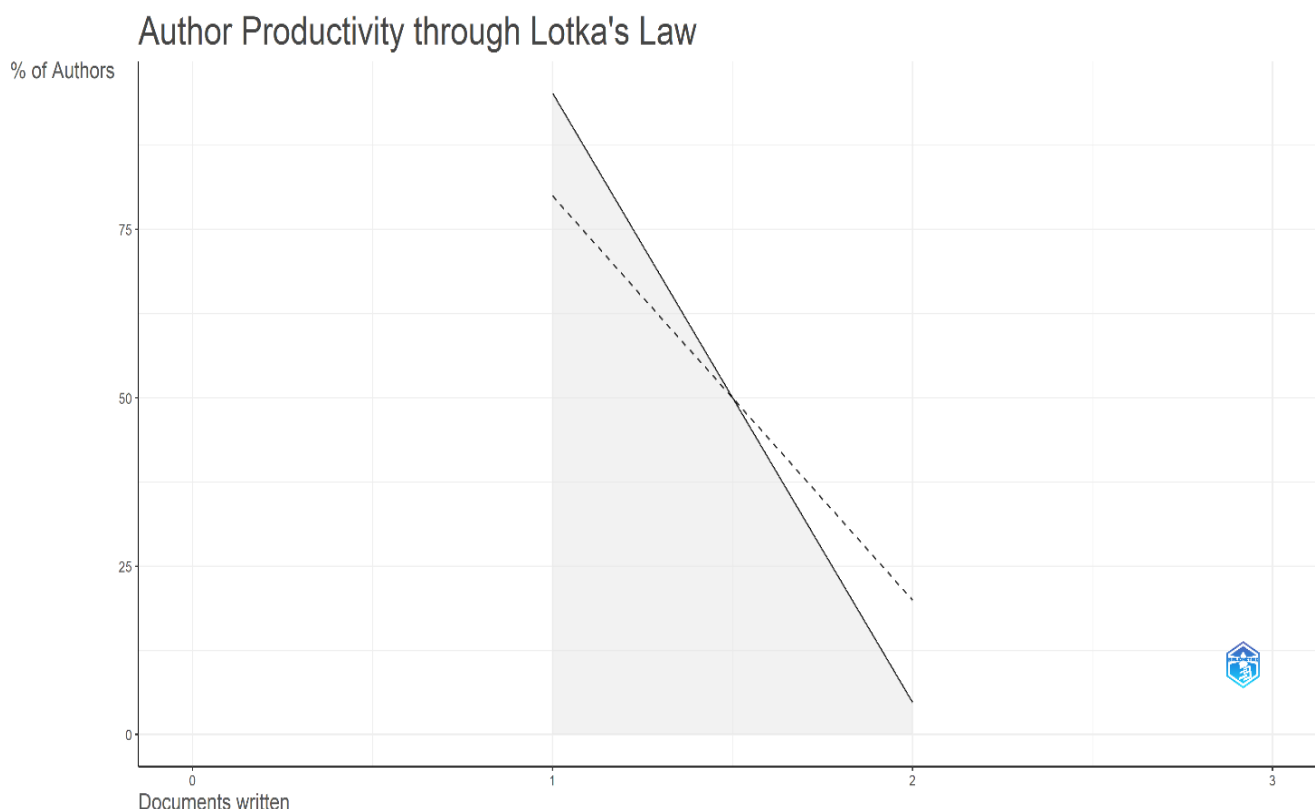


Figure 5. Author Productivity through Lotka's Law. Metadata supplied from Scopus database using R language and Bibliometrix - Lotka's Law (15/03/2023)

Lotka's Law states that the productivity frequency of authors in a specific discipline follows an inverse square distribution, meaning that the number of authors producing a certain number of publications is much smaller than the number of authors producing fewer publications.

In the case of the previous table on research in artificial intelligence, the distribution of authors does not necessarily follow Lotka's Law, as all authors have two publications. However, there is a difference in the proportion of authors contributing to the publications: some authors have a higher proportion of publications (e.g., Fernández, José Dgs, Rodríguez) while others have a lower proportion (e.g., Rubio, Verdú).

Regarding the comparison with Lotka's Law, it can be observed that the proportion of authors contributing to research in artificial intelligence is much more balanced than what Lotka's Law suggests, where the majority of publications are produced by a small number of highly productive authors. Specifically, 95.2% of the documents are written by authors who publish only one document, while 4.8% of the documents are written by authors who publish two documents. This suggests that there is an unequal distribution of productivity among authors in this field, which is consistent with Lotka's Law. Consequently, this could be an indication that research in artificial intelligence is conducted in a more collaborative and less individualistic environment.

Table 6. Distribution of the impact of scientific production by Author

Element	h_index	g_index	m_index	TC	NP	PY_start
Ruiz	2	2	0.5	19	2	2020
Abarca-Álvarez	1	1	0.167	2	1	2018
Alfonseca	1	1	0.1	1	1	2014
Aramburú	1	1	0.5	1	1	2022
Astobiza	1	1	0.333	1	1	2021
Ávila	1	1	0.25	4	1	2020
Baroni	1	1	0.2	3	1	2019
Bazán-Gil	1	1	0.333	2	1	2021
Bordes	1	1	0.25	7	1	2020
Boy-Barreto	1	1	0.333	2	1	2021

Metadata provided by Scopus databases using the R - Bibliometrix language application (15/03/2023).

The table provides information on the local impact of authors in research on artificial intelligence, using different bibliometric metrics. The different metric values are explained as follows:

"h_index": The h-index represents the maximum number of an author's articles that have received at least "h" citations each. A h-index value of 2 means that at least two of the author's articles have been cited at least twice each.

"g_index": The g-index is similar to the h-index, but instead of considering the highest number of articles with at least "h" citations, it considers the highest number of articles with at least "g" citations. A g-index value of 2 means that at least two of the author's articles have been cited at least twice each.

"m_index": The m-index is calculated by dividing the total number of citations of the author by the number of articles they have published. A m-index value of 0.5 means that on average each article of the author has received 0.5 citations.

Regarding the other metrics, "TC" represents the total number of citations received by the author's articles, "NP" indicates the number of articles published by the author, and "PY_start" represents the year of publication of the author's first article. Considering these metrics, it can be said that the author Ruiz MJU has a higher local impact compared to other authors in the table, as they have the highest values of h-index, g-index, and TC. Additionally, they are the author with the highest number of publications (NP=2) and the most recent (PY_start=2020). The other authors have a lower local impact, with lower values of h-index, g-index, and TC, and fewer publications overall. However, some authors like Aramburú have relatively high values of m-index, indicating that their articles have a higher average citation rate compared to other authors [11-56].

Table 7. Most Global Cited Documents. Metadata provided by Scopus database using R - Bibliometrix Language (15/03/2023)

Paper	DOI	Total Citations	TC per Year	Normalized TC
Corvalán, 2018, rev investig const	10.5380/rinc.v5i1.55334	24	4.00	2.67
Castrillón, 2020, form univ	10.4067/S0718-50062020000100093	19	4.75	4.69
Ufarte Ruiz, 2019, doxa comun	10.31921/doxacom.n29a11	16	3.20	4.00
Calvo-Rubio, 2020, prof inf	10.3145/epi.2020.ene.09	13	3.25	3.21
Sánchez, 2020, rev cidob afers int	10.24241/RCAI.2020.124.1.49	12	3.00	2.96
Segarra-Saavedra, 2019, doxa comun	10.31921/doxacom.n29a14	9	1.80	2.25
Salvador, 2020, icono14	10.7195/RI14.V18I1.1434	7	1.75	1.73
Cascón-katchadourian, 2020, prof inf	10.3145/epi.2020.jul.29	7	1.75	1.73
Ruiz, 2021, estud sobre mensaje periodistico	10.5209/ESMP.69708	7	2.33	7.19
Gómez-de-ágredda, 2021, prof inf	10.3145/epi.2021.mar.16	6	2.00	6.16

The table presents the top 10 globally most cited documents, along with their DOI, total number of citations received, citations per year rate, and normalized citation rate. It can be observed that most of the documents have a high citations per year rate, indicating that they are recent and highly impactful works in their respective fields. Additionally, documents with high normalized citation rates, such as those by Castrillón and Ufarte Ruiz, suggest that their impact is significant compared to other works published in the same field and year. Overall, the table represents a sample of the most influential scientific works in their respective areas of research.

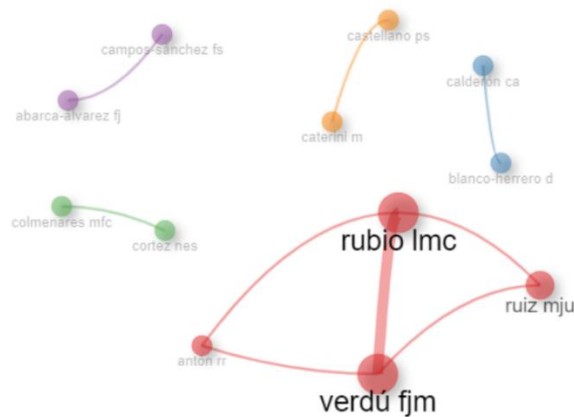


Figure 6. Collaboration network

Table 8. Collaboration network. Metadatos suministrados de las BD Scopus con aplicación del Lenguaje R - Bibliometrix (15/03/2023)

Node	Cluster	Betweenness	Closeness	PageRank
Rubio	1	0.5	0.333333333	0.108187135
Ruiz	1	0	0.25	0.058479532
Verdú	1	0.5	0.333333333	0.108187135
Antón	1	0	0.25	0.058479532
Blanco-Herrero	2	0	1	0.083333333

Node	Cluster	Betweenness	Closeness	PageRank
Calderón	2	0	1	0.083333333
Colmenares	3	0	1	0.083333333
Cortez	3	0	1	0.083333333
Abarca-Álvarez	4	0	1	0.083333333
Campos-Sánchez	4	0	1	0.083333333

Figure 6 provides information about research in artificial intelligence and how authors are grouped into different nodes and clusters based on their betweenness, closeness, and PageRank. The "Node" categories represent the unique identifier of each author in the network, while the "Cluster" category indicates the cluster number to which each author belongs. Furthermore, "Betweenness" measures the number of times an author acts as a bridge in the network, connecting different groups of authors. A high betweenness value indicates that the author is important for the connection between different clusters. "Closeness" measures the average distance between an author and all other authors in the network. A high closeness value indicates that the author is close to other authors in the network. Lastly, "PageRank" measures the importance of an author in the network based on the quantity and quality of incoming links from other authors.

Observing the values in Table 8, it can be said that authors Rubio, Verdú, and Blanco-Herrero are in the same cluster (Cluster 1), as they have the same values for betweenness and closeness, and the highest values for PageRank. This indicates that they are important and well-connected authors in the artificial intelligence network. Authors Ruiz and Antón are in a different cluster (Cluster 1), and although they have low values of betweenness and closeness, they have a relatively high PageRank value. Authors Colmenares, Calderón, Abarca-Álvarez, and Campos-Sánchez have similar values of betweenness, closeness, and PageRank, and they belong to two different clusters (Cluster 2 and Cluster 4). These authors could be considered less connected in the network compared to authors in Cluster 1, but they still have a significant presence in the network.

Overall, Figure 6 and Table 8 provide useful information on how authors are grouped and connected in the artificial intelligence network. However, it is important to note that these metrics only provide a limited measure of the importance and quality of research, and other relevant factors should be considered.

4. Discussion and conclusions

The discussion focuses on four main areas that are predominant in Scopus publications: health, journalism, law, and art and tourism. Artificial intelligence (AI) is used in the field of health to improve the quality of life for patients with dementia by providing personalized therapy and assisting caregivers [27]. It is also employed in accurate diagnosis and treatment personalization. However, ethical and social challenges such as privacy and data protection need to be addressed. AI is also valuable in the fight against the COVID-19 pandemic, enabling virus spread prediction and technological solutions development [5]. It is crucial to maintain a patient-centered approach and train healthcare professionals for appropriate AI integration.

Alongside these opportunities, ethical and social challenges arise that need to be adequately addressed. Privacy and personal data protection are crucial when using AI in the field of health. Additionally, it is important to consider potential impacts on the doctor-patient relationship and ensure that AI implementation is patient-centered and accompanied by proper training of healthcare professionals.

Research in this field has driven the development of innovative technological solutions that can improve the well-being and care of people with dementia, as well as transform healthcare in general. AI and big data have the potential to enhance patient outcomes by enabling earlier and more accurate disease detection and personalized treatments based on individual characteristics.

The use of artificial intelligence (AI) in journalism raises diverse perspectives and challenges. On one hand, the ability of AI to generate journalistic content quickly and efficiently is highlighted, allowing journalists to focus on higher-value tasks. However, ethical and professional challenges such as ensuring transparency in news production and the accountability of journalists in supervising and correcting AI-generated content are also raised [8]. In the context of misinformation, the potential of AI to combat the spread of fake news by supporting

journalists in fact-checking and identifying reliable sources is emphasized [24]. Nevertheless, the risks and ethical challenges associated with the use of AI in this field must also be addressed. Additionally, other areas where AI is transforming journalism, such as sports news production and translation, are mentioned. In these cases, aspects related to quality, speed, contextual adaptation, and impact on the job market are discussed, as well as the need to develop technological skills for professionals.

The implementation of artificial intelligence (AI) in the field of law presents a series of opportunities and challenges that generate debates in the legal community. On one hand, the ability of AI to advise judges and prosecutors in decision-making processes, which can streamline and improve the judicial process, is highlighted [11]. However, ethical concerns related to privacy and data security, as well as ensuring appropriate regulation and consideration of the human perspective in judicial decisions, need to be addressed. In the field of private contract law, the discussion revolves around how the combination of AI and blockchain technology can enhance efficiency, accuracy, and security in the contractual domain [12]. Nevertheless, ethical and legal challenges associated with the use of these technologies are also raised.

In labor law, the analysis focuses on how AI can enhance efficiency in legal work, while also examining the risks of excessive reliance on AI and the need for regulations and a clear understanding of ethical and professional implications. In the field of justice and alternative methods of conflict resolution, the importance of AI-based online platforms in providing faster and more efficient solutions compared to the traditional judicial system is emphasized. However, challenges and limitations need to be addressed to ensure their effectiveness and acceptance by society. Regarding legal education, the potential of AI to improve academic performance of law students and promote critical thinking is highlighted [15]. However, the importance of using AI as a complementary tool rather than a replacement for teachers is also emphasized. Philosophical and legal considerations regarding the regulation and oversight of AI, as well as its application in judicial decision-making and armed conflicts, are discussed. The ethical and legal limits of AI use are identified, and the importance of evaluating legal, technical, and ethical aspects when considering its implementation is emphasized.

The integration of artificial intelligence (AI) into artistic practices raises an interesting debate about the ethical and social implications of its use. On one hand, AI has enabled the development of new methods of identification, classification, and control of data in the artistic field [28]. This can open up new creative possibilities and contribute to the advancement of artistic practices. However, it is also important to consider how this data is used and what implications it has for society. One of the challenges that arise is the increase in false content in images and videos, which has led to the development of a new dual-entry taxonomy to identify and prioritize relevant cases of misinformation. The combination of transparency, education, technology, and regulation is proposed as an effective solution to counteract this issue. However, questions will arise regarding who has the power to define what misinformation is and how regulation is balanced with freedom of expression and artistic creativity.

Another aspect to consider is the legal protection of products generated by AI in the context of intellectual property. This raises current challenges regarding authorship and responsibility. AI can generate original content, but who is the author of that content? Who is responsible if that content infringes copyright or causes harm to others? These questions require deep reflection on legal regulation and how it adapts to technological advances. Additionally, it is important to address the ethical changes that arise in the technological coexistence with the integration of AI. Programming alone cannot solve all the ethical problems that arise. It is necessary to consider the complexity of interactions between AI and society, as well as promote critical reflection on how these technologies are used and how they affect autonomy, creativity, and precarity. Political participation and understanding of ethical changes are crucial for establishing appropriate regulations and practices in this field.

Regarding the bibliometric indicators on the distribution of the impact of scientific production by author, the importance and growing impact of artificial intelligence in the scientific community are highlighted, indicating that research and advancement in this field will continue to be relevant in the future. There is a trend towards an increase in articles related to artificial intelligence in all journals, suggesting a growing interest in the topic within the academic community. It is important to note that this table provides an overview of scientific production on AI in different journals and can be useful for identifying the most important journals in this research field. When comparing with Lotka's law, it can be observed that the proportion of authors contributing to AI research is much more balanced than what Lotka's law suggests, where the majority of publications are

produced by a small number of highly productive authors. This indicates that AI research is conducted in a more collaborative and less individualistic environment. It is important to consider that these metrics only provide a limited measure of the impact and quality of research, and should not be considered in isolation without taking into account other relevant factors. Therefore, it is concluded that there is a great variability in the productivity and impact of authors in the field of artificial intelligence, and the h-index, g-index, and m-index are only a measure of an author's impact and should not be used as the sole measure of their success in the field.

In conclusion, artificial intelligence (AI) presents both opportunities and ethical and social challenges in various fields. In the field of health, AI improves the quality of life for patients and contributes to the fight against the COVID-19 pandemic, but concerns related to privacy and personal data need to be addressed. In journalism, AI can streamline news.

Declaration of competing interest

The authors declare that they have no any known financial or non-financial competing interests in any material discussed in this paper.

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