The challenges and opportunities for ethics in generative artificial intelligence in the digital age

Gabriel Silva-Atencio

Escuela de Ingeniería Informática, Universidad Latinoamericana de Ciencia y Tecnología (ULACIT), San José, Costa Rica. gsilvaa468@ulacit.ed.cr

Abstract
Generative Artificial Intelligence (GenAI) emerged as a prominent tool in early 2023, renowned for its capability to generate unique texts and images from minimal input. Despite its growing popularity, the ethical implications of this technology remain under-explored. This study aimed to examine the ethical dimensions of GenAI, particularly focusing on the guidelines necessary during the lifecycle of the algorithms that drive it. We employed a qualitative, non-experimental, descriptive, and exploratory methodology. A comprehensive bibliometric analysis encompassed one hundred and fifty bibliographic references. The analysis highlighted significant concerns regarding algorithmic discrimination, justice, data privacy, and the inherent risks associated with this nascent technology. The findings reveal a pressing need for robust protocols to govern the development of GenAI applications to mitigate risks such as algorithmic bias and privacy breaches. Without such frameworks, the broader social and economic impacts of GenAI pose substantial challenges. This paper concludes by discussing the profound ethical implications of digital platforms driven by Generative Artificial Intelligence.

Keywords: project management; generative artificial intelligence; algorithmic discrimination; ethical implications; algorithmic justice.

Retos y oportunidades de la ética en la inteligencia artificial generativa en la era digital

Resumen
La Inteligencia Artificial Generativa (GenAI) surgió como una herramienta destacada a principios de 2023, famosa por su capacidad para generar textos e imágenes únicos a partir de entradas mínimas. A pesar de su creciente popularidad, las implicaciones éticas de esta tecnología siguen siendo poco exploradas. Este estudio pretende examinar las dimensiones éticas de la GenAI, centrándose especialmente en las directrices necesarias durante el ciclo de vida de los algoritmos que la impulsan. Se empleó una metodología cualitativa, no experimental, descriptiva y exploratoria. Se llevó a cabo un análisis bibliométrico exhaustivo que abarcó ciento cincuenta referencias bibliográficas. El análisis puso de manifiesto preocupaciones significativas en relación con la discriminación algorítmica, la justicia, la privacidad de los datos y los riesgos inherentes asociados a esta tecnología naciente. Los resultados revelan una necesidad acuciante de protocolos sólidos que rijan el desarrollo de aplicaciones GenAI para mitigar riesgos como el sesgo algorítmico y las violaciones de la privacidad. En ausencia de tales marcos, los impactos sociales y económicos más amplios de GenAI plantean desafíos sustanciales. Este documento concluye debatiendo las profundas implicaciones éticas de las plataformas digitales impulsadas por la Inteligencia Artificial Generativa.

Palabras clave: gestión de proyectos; inteligencia artificial generativa; discriminación algorítmica; implicaciones éticas; justicia algorítmica.

1 Introduction

In a world where Artificial Intelligence (AI) has made significant advancements in diverse fields such as medicine, customer service, and government decision-making, it has also empowered an even more promising domain: Generative Artificial Intelligence (GenAI). This article delves into this vibrant area, aiming to explore its rapid growth and the complex ethical implications that evolve alongside it.

While AI has demonstrated its ability to enhance productivity and efficiency across various industries, the ethical dimensions have increasingly come to the forefront,

as shown in prior research. Algorithmic discrimination has been observed in personnel selection systems, credit algorithms, and criminal justice systems. Moreover, data privacy concerns have escalated due to the improper collection and processing of personal information. Additionally, issues related to transparency and accountability have emerged concerning the autonomous decisions made by these systems.

Despite growing awareness of these ethical challenges, a significant gap remains between conceptual design and practical solutions implementation. This leads to a pivotal question addressed in this research: How can we effectively conceptualize, design, implement, and enforce ethical guidelines in the algorithms that power GenAI?

To address this question, the study undertook a bibliometric review of one hundred and fifty research articles focused on ethics in GenAI. The findings highlight the prevalence of algorithmic discrimination and ethical biases, underscoring the necessity to integrate ethical considerations throughout the lifecycle of mathematical algorithms.

Imagine a scenario where an AI-driven decision determines your professional or financial future. In today's environment, where AI is reshaping sectors from healthcare to public administration, GenAI emerges as a particularly challenging field. This analysis explores the swift expansion and the ethical complexities that accompany it. Addressing these ethical dilemmas has become increasingly vital, highlighted by global instances of algorithmic discrimination and privacy violations.

This document aims to dissect the fundamental ethical challenges associated with GenAI, providing a detailed and nuanced examination of its broader implications. It seeks to bridge the gap between ethical theory and practical application, posing an essential question: How can we ensure that the transition from theoretical concepts to practical ethical norms in AI promotes a fair and just future?

Through a comprehensive bibliometric review of one hundred and fifty studies, this work not only underscores the widespread issues of bias and algorithmic discrimination but also emphasizes the critical need to incorporate ethical considerations throughout the entire algorithmic lifecycle. We propose a detailed strategy for embedding ethical practices from the initial design to the final implementation of these systems.

The objective of this article is to make a substantial contribution to both academic and professional dialogues, establishing a robust framework for ethical practices in artificial intelligence. It will explore theoretical foundations, analyze relevant case studies, and provide actionable recommendations. This approach aims to clarify the direction of the analysis and enhance the understanding and application of its conclusions.

Moving forward, it is crucial to ensure that the discourse remains accessible and free from unnecessary jargon, enabling a broad audience to comprehend and engage with the topic. The significance of this research lies in its potential to illuminate current and future ethical challenges in artificial intelligence, thus paving the way for responsible and ethically aware innovation.

2 Literature review

By exploring the historical evolution of ethics in AI, it is possible to understand how concerns in the development and perception over time, mark significant milestones in their intersection [1]. In its early years, between 1950 and 1960, discussions were limited, as the focus was on the technical aspects and potential of this technology. However, as systems became more sophisticated (1970s - 1980s), it enabled autonomous decision-making, and concerns about accountability and transparency emerged, the main emphasis being how machines handled ethical issues [2].

Thus, in 1990, the first codes for AI research were created. This marked a more significant moral awareness in the design of algorithms and systems, with privacy as a central concern. With the massification of the Internet and big data analytics, the discussions focused on the protection of personal information and its respective use [3]. Since 2010, algorithmic discrimination stood out as a significant ethical concern, as cases arose in systems that perpetuated segregation in areas such as criminal justice and access to financial credit. This led to using technology with a renewed focus, based on equity and algorithmic justice. This, in turn, has triggered a debate in different sectors, concerning the ethical responsibility of GenAI in society [4].

As a result of this evolution, accountability frameworks and transparency mechanisms are being developed to address emerging challenges. History shows how concerns have evolved in the ever-changing technology world [5].

The role of ethics in AI is its responsible application to the development of computer systems life cycle, which requires a full understanding of some key aspects, to ensure their proper use [6].

Pérez-Ragone [7] study establishes the concept of algorithmic justice as the need to ensure that mathematical models do not perpetuate or amplify prejudices or discrimination in their results, an important aspect to consider when designing impartial and equitable systems, thereby avoiding discrimination. Niebla-Zatarain and García-Feregrino [8] highlight the role of privacy, which includes ensuring adequate procedures in the collection, use, and disposal in an ethical, legal, and responsible manner. Besides, these measures must include the implementation of appropriate measures to ensure their protection.

It added to the above transparency, as it outlines the ability to understand computer systems and decision-making, facilitating access to information and personal data, being a fundamental pillar for its development over time [9]. Terrones-Rodríguez [10] raises the role of reality, as it involves determining who is responsible when computer systems make mistakes or cause damage. This implies the assignment of roles and responsibilities among developers, operators, and users, along with the ability to be accountable for harmful algorithmic decisions, to ensure a timely response.

Therefore, ethics in AI seeks to apply moral principles to technology to ensure that its development and use are socially responsible, as the design and application in computer systems are the gateways to address the concepts of algorithmic justice, privacy, and transparency [11].

The impact of AI encompasses multiple dimensions. Labor automation has emerged as one of the most notable aspects, revolutionizing how companies perform repetitive and redundant tasks, and enhancing operational efficiency. However, it raises concerns about job losses and the need for labor transition to new fields of work [12]. Also, autonomous decision-making has played a role in resolving crucial issues, from medical diagnoses to urban traffic management. However, it has generated debate about the transparency of decisions and the assignment of responsibility in case of errors [13].

Security (data privacy) is a primary concern due to the central role they play in the operation of this technology. Despite extracting valuable information from the data, it has channeled a series of questions toward the protection of vulnerabilities [14]. Therefore, fairness and algorithmic biases represent significant challenges in this field, as computer systems can inherit biases in training data, leading to discriminatory decisions, highlighting a pressing need to ensure fairness and algorithmic justice in its development [15].

Education has undergone significant transformations with the popularization of online courses, virtual tutoring systems, and adaptive and generative learning tools, such as ChatGPT. These innovations have expanded access to education, but they continue to pose challenges related to the quality of online education and equal access opportunities [16]. Technology raises broader ethical and social responsibility issues. Developers and regulators face the challenge of ensuring ethical and responsible use for the benefit of society, understanding that this is essential to addressing such challenges [17].

Algorithmic discrimination is a topic that deserves closer examination, as its implications significantly affect diverse groups of people. A deeper examination reveals specific cases where AI systems have demonstrated the ability to perpetuate entrenched societal biases and discrimination. These are abstract and translate into tangible impacts on the daily lives of individuals and entire communities [18].

A concrete example can be seen in personnel selection processes. When algorithms are trained with historical data that reflect gender or racial biases in hiring decisions, they learn to replicate and perpetuate such biases, resulting in unfair discrimination against candidates from certain groups, which undermines employment equity and diversity in the workplace [19]. In the field of criminal justice, algorithmic discrimination also manifests itself. For example, probation or sentencing can show biases based on historical data, denoting unequal treatment for different ethnic or social groups. This leads to devastating consequences for those affected by these decisions, as well as the perception of justice in society [16].

Addressing these problems requires a thorough understanding of how biases develop in mathematical algorithms. Hence, it is indispensable to mitigate and eliminate them effectively, occasioning a detailed examination of training data, application of correction techniques, and promotion of policies that foster fairness and algorithmic justice, along with a constant commitment to continuous improvement and accountability, ensuring that computer systems are fair and equitable for all members of society [20].

Tucker [21] highlights that data privacy leaves an unresolved concern about the procedures of collection, use, and disposition, which is an issue of great concern in today's society, particularly with the widespread GenAI through platforms, becoming an unresolved concern at the time of this study, based on the protection of the privacy rights of individuals when using AI in everyday life.

The collection of massive data has become a common practice in the digital era, where different disruptive technologies allow feeding the mathematical algorithms for processing in an accelerated way. This becomes an industrial maquila, where the criteria for information security are relegated to the background. This is a shared feeling among users, since their data may be at risk due to the lack of a procedure, standard, or legislation to ensure that it is not shared without their consent [22]. In addition, online data collection, as with GenAI, through interactions in social networks, Internet browsing, and financial transactions, has raised concerns about the exposure of user information [23].

Therefore, it is essential to implement effective regulations, encourage responsible data collection and storage protocols, use international best practices, including consent policies and security measures, and focus on the privacy of individuals as a fundamental principle in the design of AI-based solutions. This must be done in conjunction with the promotion of education and public awareness of the importance of data privacy [24].

When analyzing the ethical implications, AI autonomous decision-making highlights crucial issues that influence society [25]. Independent decision-making has the potential to affect people's lives profoundly and significantly. For example, in health care, it can be used to identify diseases, choose treatments, or predict a patient's diagnosis, and these decisions can have a direct impact on people's health and well-being, which requires meticulous ethical consideration [26].

Furthermore, allocating resources, such as distributing funds for health care or granting loans, is often based on automated decisions supported by mathematical algorithms, thus affecting equity, and accountability [17]. Autonomous decision-making must guarantee transparency since the development and implementation of these algorithms are complex processes as they are based on data processing rather than on people's understanding. Therefore, it is necessary to propose a method that guarantees that decisions are transparent and easy to transmit [27].

Consequences in autonomous decision-making require a balance between efficiency and ethics. This involves not only ensuring that arrangements are fair and beneficial to people, but also considering how ethical values can be programmed into systems, and how accountability can be established in the event of detrimental decisions. The intersection of ethics and technology is a critical area, demanding deep reflection and a practical regulatory framework, to guide development and implementation ethically and responsibly [28].

The exploration of codes of ethics and guidelines reveals a diverse panorama of efforts aimed at promoting the responsible use of this technology in society [29]. For example, with the European Union (EU) guidelines, critical

orientations are raised in the High-Level Expert Group (HLEG) report, where fundamental principles, such as the application of the requirement of logic, are highlighted so that AI can explain its decisions clearly, ensuring informed decision-making [30].

The Association for Artificial Intelligence (AAI) emphasizes using this technology to benefit humanity. This is applicable in various areas, including autonomous vehicle systems, where the need to comply with traffic regulations that ensure public safety is stressed [31]. Google AI ethical guidelines published for the development of AI state their commitment to fairness and reduction of algorithmic bias. In practice, this is reflected in the continuous improvement of content recommendation systems, avoiding the promotion of harmful or misleading information, which is essential for maintaining the trust of users and the integrity of the platform [32].

The United Nations for Education, Sciences, and Culture (UNESCO) AI principles propose a global orientation for its use, highlighting gender equality and cultural diversity as customer service chatbots. These translate into efforts to avoid the creation or perpetuation of gender stereotypes, promoting equity, and respect for diversity [33]. As previously expressed, this illustrates how codes of ethics and guidelines in the field of AI are not mere abstract statements but have a concrete impact in various areas and applications.

Ethics in algorithm research and development needs to ensure the responsibly and to benefit the common good [34]. Therefore, exploring integrity, which spans data collection and presentation, requires intellectual honesty to preserve the necessary trust in the short-, medium--, and long-term fields [35].

To this end, biases in the inquiry processes become a fundamental element. This may arise in selecting data, formulating research questions, and interpreting results [36]. Then, transparency and reproducibility emerge. The first is the relationship between methods and results, which is a fundamental principle in ethics. This includes providing access to data, source code, and details of experimental procedures to reproduce the results, which contributes to building trust and ensuring verifiability in AI [37].

Likewise, ethics in data collection for AI model training involves privacy considerations and informed consent, and anonymity must be guaranteed when necessary [38]. Now, in the development process, designers must incorporate ethical considerations from the beginning to ensure the principles of fairness, transparency, and accountability [39]. Therefore, before implementing applications in society, it is essential to carry out an ethical impact assessment, which involves analyzing how AI may affect different segments of the population, biases, and how users' privacy will be protected.

In the year 2022, AI attracted significant attention and admiration with the emergence of GenAI through ChatGPT technology, with debates focused on its advantages, ethical aspects, drawbacks, and limitations. This discussion involved various stakeholders, such as academics, politicians, mass media, experts and non-experts in the area, and global business leaders [40].

ChatGPT is nothing more than a Large Linguistic Model (LLM) based on pre-trained transformers, hence the origin of its name (Generative Pre-trained Transformer (GPT)). This application has achieved extraordinary performance in tasks associated with natural language processing [41]. The model has the capacity, with over 175 billion parameters, which has allowed it to deal with a variety of thematic and generate congruent, coherent, and informative answers [42].

Currently, ChatGPT is the most popular application to generate conversations with the capacity to integrate into Chatbots. These chatbots provide various queries from a company's users or customers, allowing organizations to automate their organizational processes and optimize the production factors of goods and services, along with real-time resolution of complex problems and improvement of customer experience, thus achieving a competitive advantage as part of the digital strategy [43].

Another application of ChatGPT is the generation of high-quality, consistent, and focused content on a particular topic. This is helpful for companies seeking the creation of topics, philosophical endeavors, or creation of tasks in an automated fashion [44]. Additionally, the model allows for text classification to be matched with pre-labeled data that allows for accurate classification of different classes or segments of data. This, in turn, enables monitoring, analysis, and understanding of the opinions and trends of the public, being useful for areas [45].

This GenAI model is undoubtedly a fantastic technology for increasing corporate productivity, as it has a wide variety of technology solutions, and certainly goes beyond text editing or note-taking.

Although ChatGPT is GenAI LLMs, e.g.: Jasper, Google's Apprentice Bard, Replika, Meta's OPT (Open Pretrained Transformer), Palm, Bloom, Character.ai (forthcoming), Chinchilla, Chatsonic, ELSA Speak, Sparrow, Megatron, DialoGPT, Perplexity, and Playground [46]. All these applications take as a principle the use of ML, to achieve the understanding of behavioral patterns of the data obtained in real-time, and to produce information as accurate as possible to what the user expects [47].

However, not everything is as it seems, since like other disruptive technologies, ChatGPT has its dark side; this is mainly inherited from philosophical aspects and discussions in society about the interference and impact of AI in the development of the business sector, one of the relevant issues being the possible ethical biases of the technology [48, 49].

The challenge of ChatGPT, like any AI technology based on virtual assistants (chatbots), is that it cannot be used as an authoritative source of information because the contents and data are not necessarily obtained from reliable Internet sources. This creates misinformation, which can be used by individuals or companies for commercial or malicious purposes [50]. Consequently, dependence on data is a drawback, since there is no criterion to validate whether the information is accurate or authentic, not to mention that if the data is scarce or nonexistent, it cannot respond [51].

Similarly, ChatGPT is a recent technology that is still in the process of development and evolution. It has been

criticized for its ambiguities and inaccuracies as it produces texts that seem plausible and convincing but contain errors or lack meaning, causing what is known in LLMs as "hallucination." In addition, there are no references or citations to obtain information, so it is not ideal to use this chatbot alone for research or electronic tracking [52].

GenAI-generated LLMs can also give rise to abuses due to how they use Internet information. A biased or discriminatory response could upset some people, requiring careful review of all content [53]. Therefore, many organizations, schools, and countries have banned it since they are concerned about copyright infringement and privacy laws, along with the possible replacement of services currently provided by humans, such as customer service, where the lack of advice may raise ethical issues for the company.

As GenAI continues to make headlines, we must be careful about the technology we adopt. In the coming years, investment priorities will shift so that ethics, privacy, and compliance teams will rely even more heavily on security teams to ensure their privacy controls comply with new regulations. GenAI may or may not fit into this plan. In either case, analysts must weigh the pros and cons of the interface and determine whether it is genuinely worth the integration risk.

3   Research methodology

In the context of this study, a methodology that amalgamates a narrative and critical literature review with an exploratory and descriptive qualitative approach was implemented. The objective was a detailed analysis of the ethical aspects of GenAI, focusing on the guidelines to be followed during the life cycle of the mathematical algorithms that constitute it.

As a starting point, a narrative and critical review of previously existing literature in the field of ethics in GenAI was carried out, to elaborate a solid conceptual framework based on previous research [54]. The methodology was supported by a deductive line of reasoning to structure the proposal of this study logically and productively. Consequently, it allowed a deep dive into the ethical aspects of GenAI and the emerging trends in this field, focusing on the coexistence and evolution of ethics and technology, based on the approaches cited [55].

For this purpose, a bibliometric review of scientific articles between the period of 2017 to 2023 was conducted, and from here one hundred and fifty bibliographic references related to the topic of the study were selected. The selection of these sources was based on the expert judgment of the researchers, who evaluated the relevance of the articles to the current research.

Subsequently, the documentary review was conducted through searches in electronic databases, such as Web of Science, Emerald, Scopus, Science Direct, and EBSCO host, and consultation of websites of recognized authors in the field. These were carried out in Spanish and English, using specific search criteria, incorporating keywords such as "generative artificial intelligence," "GenAI," and "ethics."

Table 1.
Matrix of contrasting findings.

Database	Search Criteria
Web of Science, Emerald, Scopus, Science Direct, EBSCO host and Internet Sites in English	"Generative artificial intelligence" + "GenAI" + "Ethics" + "articles only"
Web of Science, Emerald, Scopus, Science Direct, EBSCO host and Internet Sites in Spanish	"Inteligencia artificial generativa" +" GenAI" + "ética" + "solo artículos"

Source: Own elaboration.

Once the sources had been compiled, a contrast matrix was constructed to record the sources identified according to the databases (see Table 1). Subsequently, the data were centralized, identifying relevant descriptors such as impact, discrimination, data, privacy, and decisions.

Upon compiling all relevant information, the identification, triangulation, and inferring of the characteristics and factors that define the ethical phenomenon in Generative Artificial Intelligence (GenAI) were carried out. Additionally, an attempt was made to discern the evolutionary trends of ethics in AI, recognizing them as challenges and opportunities in the digital era.

This methodology facilitated the examination of the prevailing controversies, pivotal discussions, and potential threats associated with GenAI. This analysis is strengthened by the contributions of prominent researchers such as Cooper [41], Murugesan and Cherukuri [42], Chintalapati and Pandey [56], Zemankova [57], Budhwar, et al. [58]. These scholars have underscored the growth and diversification of ethical approaches within the field of GenAI, highlighting its dynamic and evolving nature.

4   Results

The term "artificial intelligence" appeared in 95% of the searches conducted. However, when combined with "ethics," this figure decreased to 75% of the results. Conversely, when the terms "generative artificial intelligence" and "GenAI" were paired with "ethics," the results consistently remained at 75%. This consistency underscores the relevance of these terms in scholarly research concerning the ethics of generative artificial intelligence. Additionally, key descriptors such as "impact," "discrimination," "data," "privacy," and "decisions" were frequently encountered. This indicates a state-of-the-art approach to exploring AI ethics that is both comprehensive and multidisciplinary. Table 2 displays the findings categorized by the publication year of articles addressing GenAI and ethics.

Table 2.
Results of the search for the object of study.

Year	Items	Percentage
2017	10	0.37%
2018	14	0.52%
2019	18	0.66%
2020	28	1.03%
2021	55	2.03%
2022	138	5.09%
2023	2450	90.31%

Source: Own elaboration.

Table 3.
Scientific studies identified.

Type of study	Items	Percentage
Literature review	68	45.59%
Case studies	54	36.15%
Empirical	27	18.26%

Source: Own elaboration.

Table 4.
Relevant findings in the literature review.

Topic	Number of matches	Percentage
Data privacy	220	24.58%
Discrimination	160	17.88%
Risk	140	15.64%
Decision making	120	13.41%
Impact on the common good	90	10.06%
Potential biases	98	10.95%
Rights and values	67	7.49%

Source: Own elaboration.

Table 5.
Relevant findings in empirical studies.

Topic	Number of matches	Percentage
Exposure	230	31.59%
Veracity of the data	160	21.98%
Accuracy	123	16.90%
Legal implications	110	15.11%
Governance	105	14.42%

Source: Own elaboration.

As illustrated in Table 2, the focus of the study on the ethical implications of generative artificial intelligence (GenAI) gained significant traction in 2023, accounting for 90.31% of the relevant literature. This surge in interest was primarily fueled by the commercial success of ChatGPT, developed by OpenAI [40,43,52,59-61]. During our detailed review, guided by the expert judgment of our researchers, only scientific studies from 2023 were selected. This decision was based on the contemporaneity and pertinence of the guidelines, as well as the direct linkage between the design and application stages of mathematical algorithms in GenAI and ethics. Consequently, the pool of studies was narrowed to one hundred and fifty.

It is noteworthy that before 2023, no unified reference framework for conducting these studies existed, leading each study to devise its methodological approach, drawing on prior knowledge, experience, and expertise. However, the emergence of the ChatGPT application provided a clear roadmap for subsequent studies, serving as an additional criterion for our selection process. Table 3 presents a summary of the selected studies, illustrating the standard methods for identifying patterns and emerging trends in the application of ethics within GenAI.

Table 3 shows that three significant categories have taken off during 2023, whose details are analyzed as follows:

1 This category is the most representative in the sample. Upon reviewing in detail, the contents of the studies, by counting words and phrases, the following became evident (see Table 4):

The analysis underscores that the foremost concern among the studies, with 24.58% focus, is the protection of data privacy on Generative Artificial Intelligence (GenAI) platforms. Following closely, with 17.88%, is an examination of the methods used to encode mathematical algorithms and their influence on business decision-making processes, which itself ranks fourth with a focus of 13.41%. The third most prevalent issue is the risks associated with the adoption of this emergent technology and its potential impacts on business continuity. Conversely, issues concerning the common good, potential biases, and the rights and values impacted by GenAI received comparatively less attention in the studies reviewed.

Given that GenAI only surged in popularity in 2023, both the academic and business sectors are still in the early stages of comprehending and integrating these technologies. This nascent familiarity could explain the low emphasis on these broader societal issues in the selected studies.

Lindebaum, Vesa and Den-Hond [28], Marjanovic, Cecez-Kecmanovic and Vidgen [62], point out a significant gap: the absence of comprehensive frameworks within GenAI platforms. Such frameworks are critical for developing a clear roadmap that guides the ethical use of technology throughout the lifecycle of mathematical algorithms, with a particular focus on addressing discrimination, ensuring algorithmic fairness, and mitigating ethical biases.

2. Empirical studies (54 studies, 36.15%): This category suggests the generation of field studies to collect more data and empirical evidence to demonstrate the impact of GenAI and ethics as a phenomenon in modern society. Table 5 presents the findings obtained in this category.

In the empirical studies, the level of exposure (31.59%) and the veracity (21.98%) of the data when using GenAI technology stand out. Then, on a second level of importance, accuracy (16.90%), legal implications (15.11%), and governance (14.42%) stand out. Consequently, the results suggest that at the time of the study, the trend in science sought to understand the capabilities and benefits that GenAI could offer, leaving the regulatory and management aspects behind, with the lowest level of interest to be addressed in scientific research.

Murugesan and Cherukuri [42], Langevin, et al. [63], Mannuru, et al. [64] identified GenAI's ability to create unrealistic and unstable data structures, requiring the creation of specific designs to correct these flaws, an area that requires a better definition for its use. When using productive AI to document the following procedures, it is a primordial aspect.

3. Case studies (27 studies, 18.26%): In third place is the comprehensive understanding of uses, applications, experiences, and lessons learned in the field surrounding GenAI and ethics. These have been documented for academic and scientific purposes (see Table 6).

Table 6.
Relevant findings in the case studies

Topic	Number of matches	Percentage
Social implications	95	19.19%
Legal aspects	65	13.13%
A good outcome	70	14.14%
Privacy	88	17.78%
Intellectual property rights	65	13.13%
Potential biases	55	11.11%
Content	57	11.52%

Source: Own elaboration.

The findings from the study are categorized into three main groups: 1) Social implications (19.19%) and data privacy (17.78%), reflecting studies that examine the trends and impacts of technology on society, yet often overlook the ethical repercussions; 2) Positive outcomes (14.14%), legal aspects (13.13%), and intellectual property rights (13.13%), which underscore the impact and legal consequences of GenAI usage, affecting companies, individuals, and society at large; and 3) Content management (11.52%) and potential biases (11.11%), focusing on the ethical implications of mathematical models in content management and the potential for bias in decision-making, highlighting research that documents these issues at an early stage.

Researchers such as Li [48], Wach, et al. [49], Pavlik [51] concur that the rapid spread of GenAI towards the end of 2022 presented significant challenges, primarily due to the absence of practical case studies demonstrating the technology's benefits or impacts. This has led to considerable uncertainty regarding its effective and safe application within society.

In summary, GenAI is heralding a period of potential transformation, enriching society's content landscape and elucidating both the capabilities and limitations of this technology. However, the bibliometric review, combined with insights from recognized authors and expert judgments by researchers, has identified various controversies, threats, shortcomings, and disadvantages associated with the use of GenAI to date. Consequently, the present study has delineated a set of pressing challenges: 1) The urgent need to establish a regulatory framework governing the use of this technology; 2) The necessity for enhanced controls over data quality management to mitigate risks of misinformation, false content, and algorithmic bias; 3) The imperative to develop social surveillance mechanisms to safeguard data privacy; 4) The establishment of rules and regulations aimed at strengthening ethics in mathematical algorithms, promoting the common good, and preventing social manipulation. These findings underscore a significant opportunity for development.

5 Discussions

The findings show the principles and challenges to be followed, given the growing gap between GenAI and ethics, since some aspects require an in-depth approach, to ensure its successful use and to reduce any negative impact.

Among the problems to be addressed is the lack of a regulatory framework. This makes it difficult to establish the basis for ethical conduct, as well as the guidelines by service providers when developing mathematical algorithms for the establishment of legal, moral, professional, social, and other responsibilities and their interrelation, to ensure an integrated, dependable, and secure platform. Wach, et al. [49] underline the need to create optimal and equitable conditions. Abbott and Rothman [65] argue that the lack of regulation can radically affect principles, such as infringement, style protection, and fair use when generating content and protecting copyrights.

Therefore, to build public confidence in this transformative technology, any legislation formulated to regulate and control the activity of AI must be based on the most general lessons regarding the rules applicable to people, machines, and other synthetic decision-making processes.

However, establishing rules and regulations does not guarantee that mathematical algorithms are developed to promote the common good and avoid social manipulation, as part of ethical principles. Mannuru, et al. [64] stress the importance of using GenAI as an inclusive technology solution., rather than deepening existing inequalities, with change as a crucial determinant of growth, even if rules and regulations lag technology.

The problem arises from the lack of best practices in the industry to establish a roadmap for ensuring social equity, data privacy, and unbiased decision-making. This violates the rights and values of individuals in the various autonomous processes used by LLMs based on GenAI. Budhwar, et al. [58] indicate that to mitigate risks of data breaches should prioritize ethical issues, giving priority to data security and privacy as a priority.

Therefore, as part of their business strategy, organizations must accelerate the transformation of their processes to ensure, from a systemic approach, that all components involved in developing mathematical algorithms are considered, thus reducing biases, such as algorithmic discrimination. Budhwar, et al. [58] propose that, to avoid manipulation and the weakening of ethics will be essential to apply responsible ethical AI guidelines.

However, the lack of controls for quality management in GenAI-based technological solutions allows the promotion of misinformation, false content, and algorithmic biases, becoming in industry and science. Budhwar, et al. [58] mention that the AI arms race has accelerated since its launch, creating continuous uncertainty while increasing risks, misinformation, biases, context insensitivity, privacy issues, and ethical dilemmas. Consequently, developing a model based on algorithmic justice, addressing pillars of privacy, transparency, and social responsibility, will be the guiding framework for the ethical approach in this field, allowing for the reduction of discrimination.

All the above, from the perspective of the researchers, are lines of action that should be considered by the companies providing AI technologies. Then they can establish the principles for the development of technological platforms in a way that ensures fairness and reduces algorithmic discrimination.

5.1. Ethical implications in digital platforms based on generative artificial intelligence

The use of Digital Platforms, GenAI tools like ChatGPT 3.0 to 4.0 (and so on), and Bots for the future depends on

regulation, and regulation depends on education to the people. We need to educate the businesspeople, and the population in schools and universities, and establish rules to avoid troubles or violation of rights of the people in fields like:

1 Promotion of education about data privacy.
2 Autonomous decision-making.
3 Traffic regulations that ensure public safety.
4 Employment equity.
5 Probation or sentencing.
6 Biases in mathematical algorithms.
7 ChatGPT platform bias.
8 Automation machine learning concerns about copyright infringement and privacy laws.

All topics mentioned above need regulation, and country by country is going to be different but we need to establish a standard to be competitive, and sustainable and update the system and dynamic of the policy of regulations based on the:

1 Continuous improvement for integrity.
2 Trust of users.
3 Feedback from users and providers of information.

The most important thing for all the people and institutions involved is to respect the integrity of information, the data privacy and prevent ethical issues with all stakeholders. If we get a world of automatic improvement of information, and respect for the citizens, businesses, schools, universities, and businesspeople, we have advance for the society.

6 Conclusions

The study underscores the growing technological awareness and its profound societal impacts, emphasizing the need to address its implications for the common good. The discussion explored the principles of algorithmic fairness, privacy, transparency, and accountability, noting how these can lead to ethical biases, such as discrimination. These principles are crucial for ensuring ethical and responsible use and serve as foundational guidelines for evaluating the application of technology in various contexts.

The research identified significant ethical challenges in Generative Artificial Intelligence (GenAI), drawing from a review of one hundred and fifty selected scientific articles. Key issues such as algorithmic justice, algorithmic discrimination, and data privacy were highlighted, underscoring the necessity for thoughtful consideration of how technology can contribute equitably and fairly to society. Additionally, autonomous decision-making has emerged as a critical area, with the need for transparency in these processes being paramount to building trust in their adoption.

This research concludes with a call to ongoing action. Ethics in GenAI transcends academic discussion and becomes an ethical and social imperative, demanding engagement from diverse stakeholders, including researchers, developers, entrepreneurs, policymakers, and citizens. An informed dialogue and diligent action are required to ensure that technology inclusively benefits society.

6.1. Recommendations

1 Periodic Updating: Given the rapid development of GenAI and AI, this review should be frequently updated to incorporate new findings and maintain the relevance of the recommendations.
2 Broaden Linguistic and Geographic Scope: To achieve a global understanding of ethics in GenAI, future reviews should include literature in multiple languages and consider perspectives from various global regions.
3 Inclusion of Cross-Sectoral Perspectives: Future research should engage stakeholders from industry, civil society, and other sectors to ensure a balanced and comprehensive viewpoint.
4 Exploration of Practical Solutions: There should be a focus on identifying and developing practical solutions to the ethical challenges posed by GenAI, including the implementation of codes of ethics and guidelines.
5 Interdisciplinary Engagement: Encouraging collaboration among researchers, developers, policymakers, and citizens is crucial for fostering informed discussions and effective actions in the field of GenAI ethics.

Implications: The practical implications of these findings necessitate a shift in the approach to emerging technologies in the digital era. This research will serve as a guide to ensure the success of individuals, companies, and future societal leaders. It provides a roadmap for stakeholders to promote strategies based on informed decision-making and to comprehend the role of technology in safeguarding infrastructure, data, and individuals.

From a theoretical perspective, the implications include advancing research in academia, adding new dimensions to the understanding of processes and procedures in GenAI, and the resilient role of stakeholders in the digital age. This ensures that future research lines are diverse, reflecting the recent, broad, and complex nature of this field of study.

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G. Silva-Atencio, received a BSc. Eng. in Systems Engineering, in 2023. He was honored with the title of Dr. Honoris Causa in Barcelona, Spain, by the Claustro Doctoral A.C. for his academic and professional merits. Additionally, he holds a Doctorate in Business Management (PhD.) from the Instituto Tecnológico de Costa Rica (TEC). He is currently a professor and researcher at Universidad Latinoamericana de Ciencia y Tecnología (ULACIT), TEC, Lead University, and INCAE Business School in the areas of Digital Transformation, Strategy, Project Management, and Disruptive Technologies. He has over 25 years of professional and academic experience at the executive level with global leaders and institutions.
ORCID: 0000-0002-4881-181X