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Ethical Norms in AI-Driven Innovation: A Systematic Review of Global Research Perspectives

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Abstract: Artificial intelligence (AI) is rapidly becoming a key driver of organizational innovation. Its swift adoption has accelerated the development of broadly applicable ethical frameworks. As a result, significant questions regarding responsibility, fairness, and sustainability have emerged. This paper analyzes the ethical governance of AI-driven innovation through a systematic literature review of 36 peer-reviewed articles published between 2016 and 2025. The study identifies five main ethical challenges across different sectors and regions: algorithmic bias, transparency, data protection, responsibility, and sustainability. It highlights notable differences in ethical priorities between Western and non-Western perspectives, particularly within sectors such as healthcare, education, and human resources. Moreover, the research reveals a modest but growing integration of ethical AI principles with Environmental, Social, and Governance (ESG) models. This indicates both conceptual alignment and operational gaps. While ESG offers a promising framework for embedding ethical standards into innovation ecosystems, its practical implementation remains inconsistent. This work provides a multi-dimensional mapping of the ethical landscape in AI innovation and offers strategic recommendations to align technological advancement with sustainable, human-centered governance.

Keywords: AI-driven innovation; ethical norms; ESG; algorithmic bias; transparency; data protection

1. Introduction

Academic interest in the notion that artificial intelligence (AI) and machine learning may replace human roles, dominate workplace functions, and transform existing organizational processes has been steadily increasing. The central argument is that, given certain constraints in human information processing, AI can deliver higher quality, greater efficiency, and better outcomes than human professionals [1]. In this context, AI is driving innovation across various areas of business—from product development to leadership practices—while also presenting both opportunities and challenges that organizations must navigate. For instance, AI enables businesses to analyze vast volumes of data to support product development. This data-driven approach helps identify customer needs and market trends, thereby fostering innovative products that meet consumer expectations [2].

AI is reshaping the creative ecosystem by enhancing analytical capabilities, enabling rapid experimentation, and empowering companies to respond swiftly to market changes. Current research highlights the diverse ways in which AI supports creativity. Through big data technologies, AI allows firms to manage and analyze massive datasets, enabling the development of personalized goods and services and thereby enhancing competitiveness. Moreover, AI-powered predictive analytics expand opportunities for research and development, helping companies more effectively design new business models, services, and products [3]. AI also transforms creative

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decision-making. By automating tasks such as pattern recognition and data processing, it accelerates the development and testing of new ideas, products, and processes. AI allows companies to overcome the limitations of human-centered design processes, increasing scalability, design breadth, and organizational agility. These capabilities are critical for fast-moving, innovation-driven firms. While AI supports user-centered, abductive, and iterative design processes, it also automates many of their tasks. This suggests that AI does not replace design principles, but rather reshapes how they are applied [4].

However, the widespread use of AI across sectors raises several ethical concerns that must be addressed to ensure responsible innovation. While many ethical guidelines exist to help developers use AI responsibly, these principles are sometimes overlooked. Economic rationality often takes precedence over ethical considerations, leading developers to ignore the human values these guidelines aim to protect. Ethical frameworks emphasize human autonomy and caution against reducing individuals to mere data subjects—yet many AI systems disregard users' personal circumstances [5]. Balancing the potential of AI with its risks and limitations raises further ethical challenges. This requires a careful assessment of AI design and deployment to ensure that benefits outweigh social harms. AI ethics provides normative guidance for the development and use of AI technologies. Defining ethical standards and accountability is especially critical when addressing harm—specifically, determining who is responsible for the outcomes of AI systems. Ethical AI-driven innovation depends on clearly defined responsibilities [6].

AI systems must be designed to be transparent and accountable. Users should understand how AI systems make decisions, and developers and organizations must be held accountable for their impacts. Issues of fairness and bias are central to ethical AI. Since AI systems can inadvertently reinforce biases present in training data, these must be addressed to ensure fairness across domains such as employment, law enforcement, and healthcare. Emotional and psychological considerations are also essential, especially in empathetic applications such as mental health services and customer support. AI must be able to recognize and respond appropriately to human emotions [7].

Although significant progress has been made in developing ethical frameworks, their integration into innovation processes remains limited and inconsistent. More importantly, the literature at the intersection of ethical AI and Environmental, Social, and Governance (ESG) considerations remains fragmented and underdeveloped. This fragmentation reveals a critical gap in understanding how ethical AI principles are conceptualized, operationalized, and systematically aligned with ESG frameworks in the context of innovation. Ethical AI refers to the development and deployment of AI systems in ways that uphold core values such as fairness, transparency, accountability, and human-centeredness [8]. These principles are essential for mitigating algorithmic bias, safeguarding privacy, and preventing unintended harm. As AI increasingly drives innovation across sectors, integrating ethical AI with ESG frameworks is not only relevant but also necessary for advancing sustainable and responsible development. In particular, ethical AI strengthens governance structures by promoting inclusion, transparency, and explainability, while also contributing to improved environmental outcomes through more informed and optimized decision-making processes [9]. Emerging initiatives, such as the AI ESG Protocol, provide structured mechanisms for assessing and communicating the ESG implications of AI systems [10]. Embedding ethical principles into AI design and implementation can therefore enhance stakeholder trust while strengthening organizational resilience to legal and reputational risks [11].

Despite these advancements, the current body of research remains limited in several respects. In particular, there is no comprehensive and systematic synthesis of how ethical concerns in AI-driven innovation are defined, categorized, and addressed across industries, cultural contexts, and geopolitical regions. Existing studies tend to be fragmented, context-specific, or conceptually narrow, which constrains the development of an integrated and comparative understanding. Furthermore, the weak integration of ethical AI principles with broader ESG frameworks represents a significant and underexplored research frontier. This fragmentation underscores the need to consolidate and critically examine the existing literature to build a more coherent and cumulative knowledge base.

In response to these limitations, this study makes a distinct scholarly contribution by conducting a systematic review of the global literature on AI ethics within the context of innovation. The primary motivation stems from the fragmented and uneven nature of existing research, which has yet to be consolidated into a coherent and comprehensive framework. While prior studies have examined specific aspects of ethical AI, ESG considerations, or domain-specific applications, an integrative analysis that synthesizes these perspectives across sectors, regions, and theoretical traditions remains lacking.

Unlike prior work, which often focuses on isolated dimensions or specific applications, this study integrates diverse perspectives to identify key sectoral and regional differences, recurring thematic patterns, underlying theoretical approaches, and governance models that remain underexplored. In doing so, it addresses the absence of a unified and systematically organized body of knowledge that can support both academic inquiry and practical implementation in rapidly evolving innovation ecosystems.

Given the rapid integration of AI into innovation ecosystems and the increasingly complex ethical, social, and governance challenges associated with this transition, there is a pressing need to move beyond fragmented insights toward a more holistic understanding of the field. Accordingly, this study systematically synthesizes international research on the ethical dimensions of AI-driven innovation to clarify conceptual developments, identify research gaps, and provide a structured foundation for future studies. In doing so, it advances the field by offering a more comprehensive, comparative, and up-to-date synthesis of how ethical AI and ESG considerations intersect within innovation contexts. The objectives are to examine how ethical standards are interpreted, implemented, and enforced across industries and regions, and to assess their alignment with ESG principles. This comprehensive review aims to answer the following research questions:

(1) What are the predominant ethical concerns in the use of AI for innovation?
(2) How are AI ethics conceptualized and categorized in innovation-related research?
(3) In what ways do AI ethics intersect with Environmental, Social, and Governance (ESG) frameworks?
(4) What conceptual and empirical gaps exist in the current literature, and what are the implications for future research and policy-making?

By synthesizing fragmented global perspectives, this review not only maps the current discourse on ethical AI but also provides strategic recommendations for aligning technological innovation with sustainable and responsible governance.

2. Materials and Methods

The widespread use of artificial intelligence (AI) has raised critical concerns regarding ethical challenges. Therefore, a comprehensive systematic literature review (SLR) is essential to ensure that all aspects of ethical considerations in AI-driven innovation are adequately addressed. Researchers argue that SLRs offer greater objectivity than narrative literature reviews. This objectivity is necessary to ensure that conclusions are based on thorough and unbiased assessments of the literature, thereby enhancing the credibility of the research. The systematic approach allows for the extraction of comprehensive findings through a meticulous, transparent, and replicable process. Such reproducibility enables other researchers to follow the same methodology and validate the findings [3].

A thorough review can identify current ethical trends in AI-driven innovation and highlight the challenges organizations face when implementing AI systems. This is particularly valuable for professionals navigating the complexities of innovation management in the digital era. By synthesizing diverse perspectives and research findings, a comprehensive literature review provides a deeper understanding of the topic. This broad approach is crucial for developing effective strategies to manage innovation in firms that increasingly rely on AI technologies. Furthermore, the results of an SLR enrich the existing body of knowledge and offer direction for future research. Through synthesizing current scholarship, it is possible to identify areas requiring further investigation, especially in relation to AI's growing influence on innovation [1].

To address the identified research questions, we conducted a systematic literature review. SLRs aim to collect all relevant studies on a specific topic in order to present an objective and balanced summary of the available knowledge [12]. Initially, researchers independently gathered materials for cross-validation. After jointly reviewing a few articles, the team established inclusion and exclusion criteria and then divided the workload, maintaining consistent communication throughout the data collection phase. Ambiguous or debatable articles were discussed collectively to reach a consensus [13]. The review utilized two widely adopted academic databases—Google Scholar and Scopus. Scopus, being the largest peer-reviewed literature database, was selected as the primary source, particularly because it features a more extensive range of publications in business and management compared to Google Scholar. This selection reduced the risk of overlooking relevant studies [14]. Nevertheless, Google Scholar was also used as a supplementary source due to its broad coverage and utility [15]. The search strategy was designed to answer four core research questions (see Figure 1).

The first phase of the screening process involved identifying potentially relevant articles. To ensure a comprehensive review, no specific publication time frame was imposed. Prior to the search, explicit inclusion and exclusion criteria were established. The literature search was conducted using the Scopus, Web of Science, and IEEE Xplore databases. A combination of keywords, such as "ethical AI", "AI governance", "AI and ESG", "responsible AI innovation", and "AI ethics frameworks", was employed and refined using Boolean operators (AND, OR) to optimize the search strategy. The initial search focused on studies whose titles and/or abstracts explicitly addressed ethics in AI-driven innovation, yielding a total of 71 articles. In the subsequent screening phase, duplicate records were removed, and the remaining articles were evaluated based on their titles, abstracts,

and journal sources to assess relevance and quality. As a result, 50 articles were retained for full-text review, while 21 were excluded due to irrelevance to the research scope.

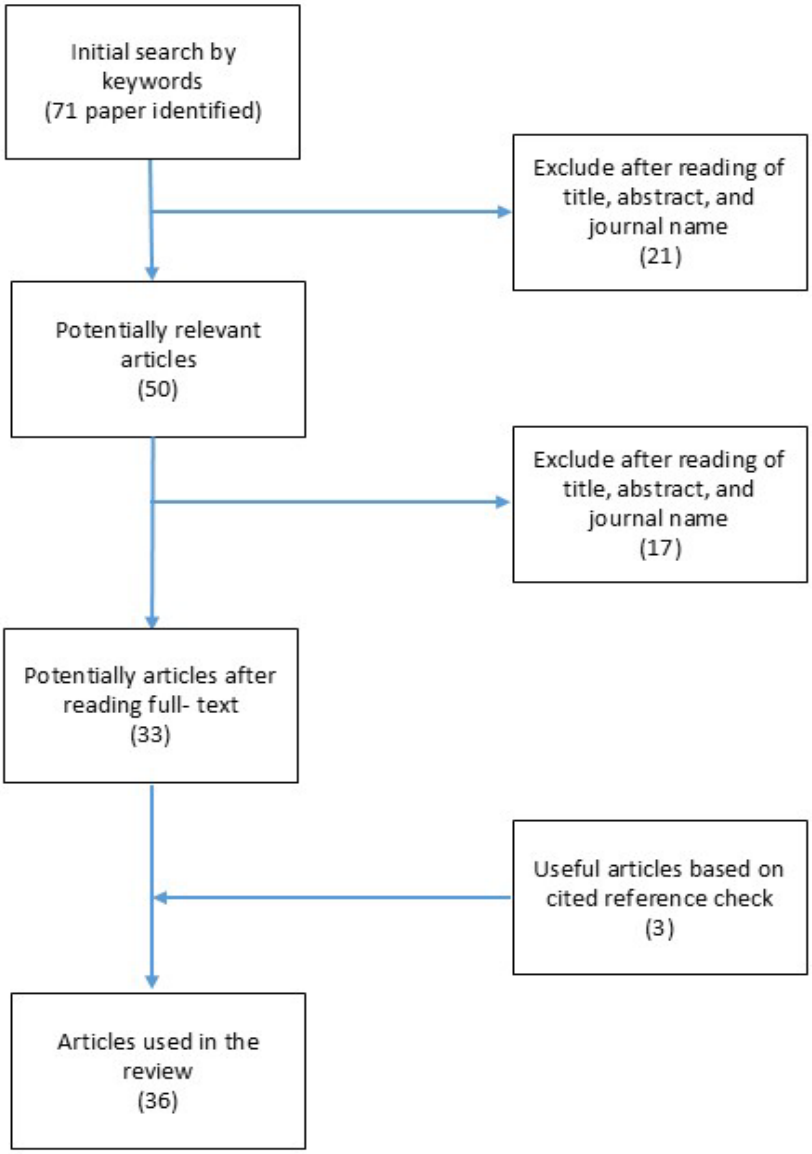

Figure 1. The search strategy for this literature review. Source: Authors.

In the next stage, a qualitative content analysis was conducted on the selected studies. Each article was examined in detail to determine whether it explicitly addressed ethical principles in the context of AI-driven innovation. Only studies meeting this criterion were included in the final synthesis, resulting in 33 articles. To further enhance the comprehensiveness of the review, a backward reference search was performed by examining the reference lists of the selected studies, leading to the identification and inclusion of three additional relevant articles. Ultimately, the final dataset consisted of 36 peer-reviewed articles. This multi-stage screening and selection process ensured that the included studies were both relevant and aligned with the objective of systematically analyzing ethical considerations in AI-driven innovation.

This final dataset reflects a diverse and interdisciplinary collection of scholarly contributions. These articles were published in leading journals across fields such as artificial intelligence, ethics, healthcare, education, law, and technology management. Table 1 presents the distribution of reviewed articles by journal. Notably, AI and Ethics and AI & Society accounted for the largest number of publications, indicating a concentrated focus on ethical issues within these platforms. Other journals, including Science and Engineering Ethics, Ethics and Information Technology, and Technological Forecasting and Social Change, also contributed multiple articles, reflecting the widespread academic interest in ethical standards for AI-driven innovation. The diversity of journals illustrates both the cross-sectoral importance of ethical considerations and the growing scholarly engagement with the implications of AI for business, governance, and society.

Table 1. Journals publishing ethics in AI-driven innovation research.

Journal	Count of Publication
Digital Society	1
The Journal of Ethics	1
AI	1
AI & SOCIETY	4
AI and Ethics	5
AI and Ethics	3
Asian Journal of Law and Society	1
BMC Medical Ethics	2
Ethics and Information Technology	2
Ethics and Information Technology	1
Front. Comput	1
Front. Psychol	1
International Journal of Artificial Intelligence in Education	1
International Journal of Human–Computer Interaction	1
Journal of Dental Research	1
Journal of Responsible Technology	1
Minds and Machines	1
Nature machine intelligence	1
Research-Technology Management	1
Science and Engineering Ethics	2
Technological Forecasting & Social Change	1
Technovation	1
Telecommunications Policy	1
The American Journal of Pathology	1
Grand Total	**36**

3. Data Analysis and Findings

This comprehensive literature review analyzed 36 peer-reviewed publications published between 2016 and 2025, sourced from reputable databases such as Scopus and Google Scholar. Key articles include "Artificial Intelligence and Innovation Management" by Haefner et al. [1], published in Technological Forecasting & Social Change, and "Ethics & AI: A Systematic Review on Ethical Concerns" by Li et al. [16], which explore ethical frameworks governing AI-driven innovation across different sectors and regions. Ethical perspectives vary by region, with notable studies representing the United States [17], the European Union [18], and China [19]. Other studies take a broader, global viewpoint, such as Anderson and Anderson [20].

The reviewed literature spans a wide range of industries, including healthcare [21], technology [22], education [23], automotive [24], and human resources [25]. This diversity underscores the complexity of AI ethics, which must account for innovation across both business and societal domains. This review was guided by four core research questions:

(1) What are the primary ethical issues in the use of AI for innovation? For example, Mariani et al. [3] examine bias and transparency in manufacturing and healthcare, while Munn [26] evaluates fairness in technological systems.
(2) How do existing studies classify and conceptualize AI ethics within innovation contexts? This includes the principle-based approach of Jobin et al. [27] and the design-oriented framework proposed by Craigon et al. [28].
(3) How do AI ethics intersect with Environmental, Social, and Governance (ESG) principles? This is explored in studies such as Morley et al. [29] on sustainability in technology and Dennis and Aizenberg [25] on ethical employment practices.
(4) What are the key research gaps? For instance, Hickok [30] highlights the inadequacies in prevailing ethical frameworks.

These questions enabled a structured and holistic synthesis of the selected literature, helping to define the ethical landscape of AI-driven innovation based on the full set of 36 papers.

Findings were derived using a multi-step analytical method that included thematic coding, regional and sectoral classification, and evaluation of theoretical frameworks. Regional analysis revealed, for example, a Western emphasis on transparency [31], compared to a global emphasis on societal values [32]. Thematic coding surfaced recurring concerns such as privacy [33] and accountability [34]. Sector-specific analysis revealed unique challenges, such as patient safety in healthcare [35] and the risk of dehumanization in human resources [25].

Theoretical comparisons included contrasting approaches like the dignitarian model [36] and stakeholder-centered frameworks [37].

This multi-dimensional approach reveals both convergence—such as a near-universal concern about bias—and divergence, such as differing ethical priorities: autonomy is emphasized more in Chinese studies [16], whereas fairness is prioritized in U.S.-based analyses [17]. Collectively, these 36 studies offer a strong foundation for understanding the global ethical dynamics of AI innovation and their implications for organizational decision-making and future research.

The temporal scope of the review, ranging from foundational works like Etzioni and Etzioni [24] on ethics in the automotive sector to forward-looking studies like Willem et al. [38] on embedded ethics in healthcare, illustrates how AI ethics discourse has evolved over nearly a decade. The inclusion of highly regarded journals such as AI and Ethics (e.g., [26,39,40]), AI & Society (e.g., [17,34,41]), and Science and Engineering Ethics (e.g., [38,42]) ensures academic rigor. Geographical diversity—from studies in Spain and Australia [26] to those in India and Egypt [33]—further enhances the global perspective of the review. This systematic review not only synthesizes existing knowledge but also underscores the intricate and context-sensitive nature of ethical standards in AI-driven innovation. It sets the stage for a deeper exploration of recurring themes, theoretical frameworks, and outstanding research gaps.

3.1. Predominant Ethical Concerns in AI-Driven Innovation

The review identified a broad spectrum of ethical challenges, with five themes dominating the literature:

3.1.1. Bias and Fairness (28 Articles, 77.8%)

The review identified a broad spectrum of ethical challenges, with five themes dominating the literature. Among them, bias and fairness emerged as the most frequently discussed ethical concerns, cited in 28 of the 36 articles (77.8%). Their indispensable role in shaping the ethical discourse around AI is consistently emphasized. These issues highlight the inherent difficulties in ensuring that AI systems produce fair and equitable outcomes. Whether stemming from unrepresentative training data, flawed algorithmic design, or human error, bias—regardless of its origin—can lead to discriminatory outcomes and exacerbate social inequality.

This concern is addressed across multiple sectors, including healthcare, education, and technology. Further investigations in the literature shed light on the mechanisms through which bias operates and the contexts in which fairness is compromised. For instance, AI models trained on non-representative datasets may disproportionately misclassify individuals from underrepresented groups, such as ethnic minorities or women, in regions including the European Union, the United States, and China. Li et al. [16] highlight that bias in disease diagnosis poses a significant challenge in healthcare systems. Similarly, Chauhan and Gullapalli [43] note that biased algorithms in pathology can lead to diagnostic inaccuracies, ultimately undermining trust in AI-assisted medical practice. These findings align with broader ethical concerns, emphasizing the importance of ensuring equal treatment across demographic groups as a fundamental principle of responsible innovation.

Comparable issues are observed in the education sector. Holmes et al. [23] investigate fairness in AI-assisted grading systems and raise critical questions about the validity of automated assessment tools. Their study demonstrates how such systems may unfairly penalize students from diverse linguistic or socioeconomic backgrounds due to underlying training data biases. In the field of technology and software engineering, Munn [26], analyzing cases from Australia and Spain, criticizes the persistence of systemic bias in AI applications across the tech industry. He argues that without robust fairness mechanisms, AI systems risk reinforcing societal inequalities. Mariani et al. [3] echo this concern, documenting the prevalence of algorithmic bias across sectors including manufacturing, healthcare, and services in countries such as the United States, China, Italy, Germany, and the United Kingdom.

Beyond these sectoral examples, the literature underscores the multifaceted and cross-sectoral nature of bias and fairness. Bleher and Braun [42], in a global study, examine how bias in AI-driven hiring systems can advantage specific groups over others, thus raising questions about organizational justice. In the UK, Dennis and Aizenberg [25] focus specifically on biased recruitment practices in human resources, finding that insufficient attention to fairness can undermine workforce diversity and equity. Baum [44] expands the discussion to autonomous vehicles, exploring how bias embedded in decision-making data can impact ethical behavior in next-generation mobility systems. His findings emphasize that fairness must be incorporated into the design phase to avoid representational injustices.

Overall, the prominence of bias and fairness in the reviewed literature reveals increasing recognition of algorithmic discrimination as a systemic and pressing ethical challenge. Haefner et al. [1] frame this issue as a matter of trust, arguing that biased AI systems can erode stakeholder confidence in innovation processes globally.

Similarly, Morley et al. [41] stress that fairness is essential for minimizing harm and preserving social cohesion. Taken together, these 28 studies demonstrate that bias and fairness are not merely technical concerns, but ethical imperatives with far-reaching implications for justice, accountability, and the social legitimacy of AI-driven innovation across countries, cultures, and industries.

3.1.2. Transparency and Explainability (27 Articles, 75%)

Transparency and explainability have become essential ethical components of AI-driven innovation. These concepts were addressed in 27 of the 36 studies (75%), highlighting their central role in fostering trust, ensuring accountability, and enabling effective governance. Transparency refers to the clarity of how AI systems function, what data they are trained on, and how decisions are made. Explainability, on the other hand, means that stakeholders can understand how and why a particular decision was reached. Together, these principles help address the so-called "black box" problem of complex algorithms, where lack of clarity can erode trust and hinder ethical oversight. The literature underscores that transparency and explainability are critical in the early stages of AI deployment, although their application varies significantly across sectors such as healthcare, human resources, dentistry, technology, and education.

In healthcare, clinical acceptance and patient safety heavily rely on transparency and explainability. Arbelaez Ossa et al. [18] underscore the need for explainable AI innovations, noting through qualitative interviews with physicians that mistrust and adoption barriers stem from opaque diagnostic algorithms—unless the decision-making rationale is clearly defined. Mörch et al. [33], examining AI adoption in dentistry across the US, China, India, and other countries, similarly emphasize the necessity of trustworthy and transparent systems. Their findings show that dentists require an understanding of how AI systems operate to ensure diagnostic accuracy and patient safety. Li et al. [16], analyzing cases across the EU, US, and China, further support this view, stating that transparency in medical AI enhances accountability by allowing scrutiny of decision-making in critical clinical settings.

In the human resources sector, transparency serves as a safeguard against unethical practices in workforce management. Dennis and Aizenberg [25] examine explainability in AI-driven recruitment and warn that opaque systems can obscure discriminatory decisions—such as biased candidate selection—thus undermining fairness and employee trust. This aligns with McCausland [31], who links transparency to governance in IT, education, and business management, arguing that transparent AI helps organizations align innovation with ethical and regulatory standards. Morley et al. [41] echo this perspective, asserting that transparency is a foundational element of accountability across sectors.

However, several studies also point out systemic challenges. Mariani et al. [3] describe transparency as a persistent concern across production, healthcare, and service industries, warning that opaque AI decision-making can lead to inefficiencies and ethical violations. In education, Holmes et al. [23] advocate for transparent AI grading systems to ensure that students and educators understand assessment criteria, thereby fostering accountability. Jobin et al. [27] position explainability as a core ethical principle, particularly in healthcare and transportation, arguing that stakeholders must be able to interrogate and challenge AI decisions to ensure justice.

The emphasis on transparency and explainability reflects a broader ethical mandate: to make AI systems understandable and empower users. Dignum [37] globally links these principles to trust and stakeholder engagement, particularly in sectors such as transportation and public safety. In contrast, Bleher and Braun [42] caution that without explainability, the impacts of AI on employment remain opaque and unaccountable. Zhou and Chen [34] connect transparency to data governance in public services and healthcare, advocating for collaborative frameworks that improve the legibility and oversight of AI systems. Collectively, these 27 studies demonstrate that transparency and explainability are not merely technical attributes, but ethical cornerstones—essential for aligning AI-driven innovation with societal values, regulatory frameworks, and organizational integrity in diverse global contexts.

3.1.3. Privacy and Data Protection (26 Articles, 72.2%)

Privacy and data protection emerged as prevalent ethical concerns in AI-driven innovation, referenced in 26 of the 36 articles (72.2%), highlighting their crucial role in safeguarding individual rights and fostering trust in AI systems. Privacy refers to the right to control personal information and prevent unauthorized access. Data protection, in contrast, entails the legal and technical mechanisms that secure data against theft, misuse, or exploitation. These principles jointly address risks associated with AI's use of large datasets, where the collection, storage, and processing of sensitive information can lead to privacy violations, expose vulnerabilities, and complicate regulatory compliance. The literature underscores these issues across multiple sectors—including

automotive, multinational corporations, education, and technology—demonstrating their global significance and sector-specific complexities.

In the automotive sector, privacy concerns are tightly linked to the data-intensive nature of AI systems. Etzioni and Etzioni [24] analyze autonomous vehicles, noting that continuous collection of geolocation, behavioral, and vehicle performance data poses substantial privacy risks. They argue that without robust data protection measures, such systems could facilitate surveillance or unauthorized profiling, undermining user autonomy. Similarly, Cañas [45] discusses ethical dilemmas in automotive and robotics contexts, emphasizing that privacy breaches may erode trust both at the individual and community levels within AI-driven innovation.

Multinational corporations encounter comparable challenges, particularly in data-intensive industries such as agriculture and technology. Attard-Frost et al. [39] adopt a global perspective, highlighting data security as a foundational element of ethical AI deployment. Their study identifies vulnerabilities in corporate AI systems—such as those in precision agriculture or technology platforms—where insufficient protection of customer or operational data could lead to breaches with extensive economic and reputational impacts. Morley et al. [29] reinforce this viewpoint in the technology sector, framing privacy as a governance imperative essential for maintaining data integrity and stakeholder confidence across international operations.

The education sector further illustrates the critical importance of privacy and data protection. Zhu et al. [19] investigate generative AI use in educational contexts, highlighting risks to the confidentiality of student data. They stress that AI systems managing personal data—such as learning behaviors or assessment records—require stringent safeguards to prevent misuse, a challenge intensified by China's distinct data governance framework [19]. Holmes et al. [23] advocate for global enforcement of data protection to avoid unintended consequences such as profiling or exploitation of vulnerable student groups, emphasizing the universal relevance of these concerns.

Additional studies expand the scope of privacy and data protection issues. Choung et al. [17] link privacy to governance in the AI sector, arguing that transparent data protection policies are essential for accountability and public trust within innovation ecosystems. Mörch et al. [33] highlight privacy concerns in dental AI diagnostics, where the sensitivity of patient data necessitates rigorous protection to comply with ethical and legal standards. Li et al. [16] connect privacy with patient autonomy in healthcare, noting that opaque data practices undermine informed consent.

The prominence of privacy and data protection in these 26 articles indicates a global consensus regarding their ethical significance. Jobin et al. [27] consider privacy a fundamental ethical principle, comparable to justice, while Morley et al. [41] associate it with non-maleficence, emphasizing the necessity of harm prevention through secure data management. Collectively, these studies demonstrate that privacy and data protection are not merely technical challenges but moral imperatives influencing individual rights, corporate accountability, and societal acceptance of AI-driven innovation across diverse sectors and regions.

3.1.4. Accountability and Responsibility (24 Articles, 66.7%)

Accountability and responsibility were identified as key ethical considerations in AI-driven innovation, appearing in 24 of the 36 studies (66.7%), underscoring their critical role in ensuring that AI technologies operate in accordance with ethical, legal, and societal standards. Accountability refers to the process by which individuals, groups, or AI systems are held answerable for their actions, decisions, and resulting consequences. This typically requires clear identification of who is accountable and who holds authority. Responsibility, closely related, encompasses the moral and practical duties of stakeholders—such as developers, deployers, and regulators—to design, implement, and monitor AI systems in ways that align with ethical norms and minimize harm. These principles work in tandem to address challenges posed by fully or partially autonomous AI systems, where distributed agency complicates the attribution of accountability. The literature highlights the significance of accountability and responsibility across multiple sectors—including healthcare, technology, transportation, and public safety—reflecting both global priorities and context-specific applications.

In healthcare, accountability and responsibility are essential for managing the risks and liabilities associated with AI deployment. Willem et al. [38] adopt a global perspective, emphasizing liability frameworks for AI healthcare tools. They argue that without explicit accountability mechanisms, errors in AI-driven diagnostics or treatment recommendations—especially those affecting patient safety—cannot be properly identified or rectified, posing ethical and legal challenges for healthcare professionals and institutions [38]. Corfmat et al. [21] similarly highlight the importance of responsibility and liability in AI healthcare systems, stressing the need for assessment and oversight to ensure accountability aligns with patient welfare and professional standards.

In the technology sector, these principles are emphasized as foundational to trustworthy innovation. Hallamaa and Kalliokoski [22] investigate trustworthiness in technology, stating that accountability requires robust

guidelines and frameworks to allocate responsibility for AI outcomes, particularly in high-stakes domains such as cybersecurity and data management. They underline the ethical necessity of human oversight to connect AI autonomy with developer accountability [22]. Similarly, Morley et al. [29] identify accountability as a global governance mechanism in the technology sector, advocating for transparent processes that hold organizations responsible for data breaches or algorithmic errors.

Transportation and public safety further extend the scope of accountability and responsibility to societal impacts. Dignum [37] takes a global view, advocating for stakeholder engagement as a means to ensure accountability in AI systems deployed in transportation, public safety, and entertainment. Engaging diverse stakeholders—including regulators, users, and developers—clarifies accountability and fosters trust, especially in autonomous decision-making contexts [37]. This aligns with Baum [44], who examines accountability in autonomous vehicles worldwide, noting that addressing ethical challenges (such as attributing blame in accidents) requires a combination of societal norms and explicit liability frameworks.

Additional studies further enrich this theme's complexity. McCausland [31] links accountability to governance in IT and education, emphasizing organizational responsibility in ethical AI adoption. Morley et al. [41] frame accountability as a safeguard against harm, connecting it to fairness and transparency across sectors. In human resources, Dennis and Aizenberg [25] explore accountability in recruitment algorithms, arguing that organizations must uphold responsibility for biased outcomes to maintain workforce equity. Zhou and Chen [34] associate responsibility with stakeholder collaboration in public services and healthcare, reinforcing its role in ethical AI implementation.

The prevalence of accountability and responsibility across these 24 articles underscores their role as ethical cornerstones in AI-driven innovation. Jobin et al. [27] list responsibility as a fundamental ethical principle alongside privacy, while Bleher and Braun [42] caution that without accountability, the societal and employment impacts of AI remain unchecked. Taken together, these studies demonstrate that accountability and responsibility are not merely procedural obligations but essential ethical imperatives, crucial for embedding AI systems within legal frameworks, societal expectations, and organizational integrity across diverse global and industrial contexts.

3.1.5. Sustainability (12 Articles, 33.3%)

Bringing in 12 of the 36 publications (33.3%), sustainability has emerged as a commonly understudied ethical concern in AI-driven innovation. Its importance is growing as scholars worldwide seek sustainable technological development. Sustainability refers to the long-term impacts AI systems have on the environment, society, and future generations under current conditions. It calls for cautious resource use, protection of the planet, and balancing innovation with the responsibility to future generations. Sustainability considers long-term effects such as carbon emissions, energy consumption, and the capacity to support resilient social systems. Highlighting its complexity and alignment with key ethical and political frameworks, the literature addresses sustainability across multiple domains including technology, food, education, and medicine.

In the food industry, sustainability is closely linked to environmental impact. Craigon et al. [28] examine AI applications in agriculture and food production, noting that while AI can optimize resource use (e.g., precision farming), it also consumes significant energy and emits greenhouse gases. The study advocates for designing sustainable AI to reduce these environmental impacts, harmonizing innovation with ecological stewardship [28]. This environmental approach aligns with Morley et al. [29], who analyze the IT sector globally and emphasize sustainability as a key governance issue. They highlight the tech industry's reliance on data centers and hardware manufacturing, urging measures to mitigate environmental damage and promote circular economy principles [29].

Sustainability is further extended to social and technological dimensions. Zhu et al. [19] investigate sustainable AI practices in education, emphasizing their potential to foster long-term equity and accessibility. They suggest AI systems should be designed to minimize digital divides and ensure enduring benefits for diverse student populations, reflecting a social sustainability perspective [19]. Conversely, Bleher and Braun [42] connect sustainability to broader societal impacts across industries, arguing that unchecked AI expansion risks accelerating resource depletion and social instability. They call for comprehensive ethical frameworks that integrate environmental and socioeconomic factors [42].

Additional research broadens the scope of sustainability. In healthcare, Willem et al. [38] address environmental sustainability by considering the ecological footprint of AI-driven medical technologies, such as CT scans, alongside patient welfare. Furthermore, Attard-Frost et al. [39] frame sustainability as a corporate responsibility for international agriculture and tech corporations, emphasizing the need to balance profit with planetary health. Sustainability is also identified as an emerging ethical principle linked to non-maleficence and long-term well-being in healthcare and transportation [27].

Previous studies portray sustainability as an evolving concern with both challenges and opportunities. McCausland [31] highlights environmental considerations in IT and education, advocating for AI systems that reduce energy consumption and electronic waste. Zhou and Chen [34] associate sustainability with human and social factors in public services and healthcare, proposing that ethical AI should support resilient communities. Mariani et al. [3] note environmental impacts as a concern in manufacturing and service industries across the US, China, and Europe, while Li et al. [16] emphasize sustainability as a unifying goal in global healthcare contexts. Overall, sustainability is framed as an ethical imperative that transcends quick technical fixes, requiring deliberate integration of environmental, social, and long-term considerations into AI innovation.

Although cited less frequently (33.3%) than issues like bias or privacy, sustainability's presence across diverse contexts signals its growing relevance. These studies affirm that sustainability is not merely an operational challenge but a normative concern with significant implications for ethical governance, corporate responsibility, and aligning AI innovation with global sustainability objectives, such as those outlined in the United Nations Sustainable Development Goals framework.

3.2. Additional Concerns Include Trust, Autonomy

Apart from essential topics, the literature emphasizes several ethical issues that, although less frequently discussed, are nonetheless vital to the ethical landscape of AI-driven innovation. These include trust (11 articles, 30.6%), autonomy (10 articles, 27.8%), and safety/security (9 articles, 25%). Context strongly shapes these concerns, with geographical differences and industry-specific goals pointing in varying directions. Trust reflects the confidence that individuals, organizations, and society place in AI systems—confidence that enables these systems to function successfully, ethically, and freely. Autonomy concerns people's continued ability to make decisions and act independently, even as AI progresses toward greater independence, encouraging reflection on the balance of human agency and AI influence. Safety and security encompass protection from harm, addressing both physical and digital risks. Together, these issues highlight broader moral challenges arising from AI use across multiple domains.

Eleven articles identify trust as a fundamental theme for AI's effectiveness and acceptance. For example, Li et al. [16] argue that biased or opaque systems in healthcare erode trust and hinder adoption, making trust essential for patient and physician reliance on AI diagnostics. Similarly, Borenstein and Howard [46] observe that transparency and accountability are prerequisites for stakeholder acceptance of AI in academic and government contexts. Choung et al. [17] link trust to data governance, contending that ethical violations such as privacy breaches undermine public confidence in innovation ecosystems. Haefner et al. [1] emphasize trust as a cross-industry issue, noting its decline in manufacturing and service sectors when AI systems lack fairness and explainability.

Ten articles address autonomy, highlighting concerns about human agency in AI-mediated environments. Robles Carrillo [32] examines human autonomy in banking and entertainment sectors across developed countries and the Islamic world, warning that AI-driven decisions—such as automated loan approvals or content curation—may reduce individual control unless balanced by human oversight. In healthcare, Corfmat et al. [21] stress that AI technologies overriding clinical judgment could threaten professional independence and patient consent. Holmes et al. [23] underscore autonomy in educational settings, cautioning that AI grading systems that do not allow contestation could restrict student agency. Extending this concern to automotive contexts, Etzioni and Etzioni [24] discuss how autonomous vehicles must reconcile programmed ethics with human decision-making during crises. Collectively, these studies frame autonomy as a crucial ethical safeguard against AI overreach [24].

Safety and security, discussed in nine articles, encompass both physical and digital risks posed by AI systems. Corfmat et al. [21] emphasize cybersecurity vulnerabilities in AI healthcare tools, warning that data breaches could expose patient records or disrupt care delivery. Prioritizing patient safety, Etzioni and Etzioni [35] highlight that diagnostic errors by AI—such as misidentifying diseases—pose direct risks if not mitigated by rigorous safety protocols. Supporting this, Arbelaez Ossa et al. [18] advocate for safety-by-design principles in healthcare AI to prevent unintended harm. Beyond healthcare, Hallamaa and Kalliokoski [22] address security in technology, emphasizing that AI-driven cybersecurity solutions themselves must be robust to avoid exploitation. In contrast, Dennis and Aizenberg [25] focus on dehumanization rather than physical safety in human resources, highlighting ethical risks posed by AI recruitment tools that reduce human interaction to impersonal metrics.

The variation of these concerns across studies highlights their context-dependent relevance. Healthcare emphasizes patient safety and trust [16,21,35], while HR focuses on dehumanization and autonomy, reflecting workforce dynamics [25]. Technology and automotive sectors, reliant on complex, user-facing systems, intertwine trust, autonomy, and security [22,24]. Collectively, the literature demonstrates that trust, autonomy, and

safety/security are not peripheral concerns but integral ethical dimensions shaping the legitimacy and human-centeredness of AI innovation across industries and global contexts [17,36,37].

3.3. Intersection with ESG Principles

ESG concepts intersect with AI ethics in 15 publications (41.7%), providing a lens through which innovation can be aligned with broader corporate and societal goals. Twelve papers explicitly address sustainability, such as the food industry linking AI to environmental sustainability in the US and Europe [28], and the IT sector emphasizing global ecological impacts. Although still underexplored, pathology is connected to AI implementation with regard to environmental consequences [43]. Issues of fairness, inclusion, and social well-being also emerge prominently [17,23,46]. Reflecting workplace equity concerns, Dennis and Aizenberg [25] link social aspects to bias and dehumanization in human resources, thereby connecting social dimensions to HR. Governance themes such as transparency, responsibility, and regulation are addressed by Attard-Frost et al. [39], Hickok [30], and McCausland [31]. Morley et al. [41] emphasize non-maleficence and responsibility across sectors. While education [19] and automotive [47] focus more narrowly on social and governance issues with less emphasis on environmental factors, healthcare [21] and technology [22] demonstrate strong ESG integration. This suggests that diverse domains hold significant, yet underutilized, potential for ESG to serve as a unifying framework.

4. Discussion and Contributions

This comprehensive study conducts global research across multiple sectors and academic frameworks to enhance understanding of the complex ethical landscape of AI-driven innovation. By analyzing 36 peer-reviewed articles, five key ethical components were identified that define the ethical governance of artificial intelligence: responsibility and accountability; fairness and bias; openness and explainability; privacy and data protection; and sustainability. One major contribution of this review is its organization of the important ethical issues commonly observed across various sectors. Rising in 77.8% of the examined studies (e.g., [3,23,42]), bias and justice were the most prevalent topics. Particularly in sectors like healthcare [16] and human resources [25], these studies demonstrate how biased algorithms and data allow AI systems to perpetuate structural inequalities. However, the context shapes the extent and nature of these ethical dilemmas. For example, recruiting algorithms risk demographic bias [25], whereas bias in AI-based diagnoses could lead to fatal misdiagnoses [24,43]. This underscores why specialized ethical frameworks are preferable to universal, one-size-fits-all solutions.

The second important contribution lies in elucidating the connection between ethical standards and ESG guidelines. Although only 41.7% of the papers explicitly mention ESG-related concepts, those that do—especially in healthcare [21], technology [29], and education [19]—highlight the relevance of ESG as a comprehensive framework for governing AI ethically. For instance, studies on precision agriculture and AI infrastructure emphasize environmental sustainability issues; social justice and transparency align closely with the “S” and “G” dimensions of ESG [27,31]. This review therefore builds a normative bridge between the expanding body of AI ethics research and the increasingly popular ESG frameworks embraced by policymakers and corporate leaders.

Third, this study draws attention to a critical divide in the theoretical foundations of AI ethics in innovation contexts. While some research employs principle-based approaches [27], others focus on design ethics [28], stakeholder-centric perspectives [37], or contextual governance [34]. This lack of consensus hinders the development of scalable, interoperable ethical norms across fields. Nevertheless, this diversity presents an opportunity for theoretical pluralism—recognizing that ethical AI governance may require a mix of normative, participatory, and context-specific models depending on sector, geography, and institutional maturity [32,36]. The analysis’s emphasis on regional variations in ethical priorities and regulatory maturity adds further value. Contributions from China, India, and the Islamic world prioritize collective well-being, contextual autonomy, and social harmony [16,32,33], whereas Western studies typically emphasize transparency, legal responsibility, and justice [18,41]. These differences challenge the adoption of universal ethical rules for AI innovation and highlight the importance of culturally grounded ethical values.

Finally, this study offers a valuable roadmap by identifying research gaps with significant theoretical implications for advancing AI ethics and innovation studies. In particular, the findings highlight the limited attention given to organizational and system-level adoption of ethical principles, suggesting that existing conceptual frameworks remain underdeveloped in explaining how ethics is operationalized in real-world innovation processes. While ethical issues are often discussed at a normative level, current theories do not adequately account for how ethical principles are embedded across the AI lifecycle—for instance, through the integration of fairness into algorithm design or the establishment of accountability-driven feedback mechanisms [30,40].

This gap underscores the need to extend existing theoretical models to better capture the translation of abstract ethical principles into concrete technological and organizational practices. Furthermore, the lack of empirical research on the behavior of ethical AI systems in real-world settings—particularly across diverse cultural and legal contexts—limits the generalizability and external validity of current theoretical perspectives. Addressing these gaps contributes to refining and expanding theoretical frameworks by linking normative ethics with applied innovation contexts, thereby advancing a more comprehensive and context-sensitive understanding of ethical AI.

4.1. Limitations and Research Agenda

Although this evaluation is thorough, several limitations must be acknowledged to better understand the results and guide future research. Rather than empirical studies analyzing the implementation of ethical standards in practice, this review primarily compiles theoretical and conceptual literature regarding ethical norms in AI-driven innovation. Little is known about how many works translate moral frameworks or normative guidelines into actual corporate settings [27,37]. The gap between ethical ideals and their practical application limits our ability to assess the effectiveness, complexity, and trade-offs involved in ethical AI governance. Future research could help bridge this gap through field-based studies, corporate case analyses, or mixed-method evaluations examining the interpretation and implementation of ethical values in the design, deployment, and monitoring of AI systems.

Second, although this review covers numerous global regions, the literature remains predominantly Western, focusing especially on North America, Western Europe, and Australia [18,26,41]. This geographic concentration consequently limits the applicability of ethical conclusions by overlooking the impact of socio-cultural, legal, and institutional diversity on AI ethics. Western literature typically emphasizes autonomy, responsibility, and individual rights, while research from non-Western contexts—such as Robles Carrillo [32] and Mörch et al. [33]—highlights communal values, relational ethics, and collective responsibilities. Incorporating perspectives from the Global South, indigenous peoples, and culturally diverse governments is essential for developing pluralistic and globally relevant ethical frameworks for AI advancement.

Although this article highlights the importance of ESG concepts in AI ethics discussions, most of the literature still lacks the operational integration of ESG frameworks. While many studies reference ESG elements like fairness, transparency, or sustainability, few rigorously apply ESG guidelines or investigate how organizations utilize them to assess ethical AI performance (e.g., [25,29]). The absence of robust analytical tools linking corporate responsibility with long-term sustainability goals and AI development characterizes this gap. Future research should aim to develop AI-specific ESG metrics—such as traceability of algorithmic decisions, carbon accounting for computational infrastructure, and justice audits—to ensure that ethical concerns are incorporated into strategic governance rather than remaining idealistic aspirations.

These limitations call for a more grounded and comprehensive research agenda. Future studies should explore how ethical AI principles are applied, challenged, or adapted across different corporate and cultural contexts. Comparative, cross-national, and transdisciplinary approaches would be especially valuable in revealing how ethical governance varies across settings. Furthermore, aligning ethical AI research more closely with ESG frameworks will help establish systems of accountability and promote responsible innovation. Such initiatives transform high-level principles into practical, measurable, and context-sensitive actions that enhance technological progress and the overall well-being of society.

4.2. Conclusions

Emphasizing five fundamental ethical concerns—bias and fairness, transparency, privacy, responsibility, and sustainability—this systematic review offers a comprehensive synthesis of global research on ethical concepts in AI-driven innovation. Although consensus on these principles is growing, their application varies across industries and regions. The findings highlight the importance of aligning ethical guidelines with cultural, institutional, and organizational contexts. Moreover, while ESG principles provide a strong framework for ethical alignment, their integration into AI governance remains nascent. By addressing conceptual gaps and regional disparities, this paper advocates for more empirical, cross-regional, and practice-oriented research. The advancement of ethical AI innovation depends on pragmatic, responsible, and inclusive governance frameworks grounded in real-world applications rather than abstract ideals.

Author Contributions

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The authors declare no conflict of interest.

Use of AI and AI-Assisted Technologies

No AI tools were utilized for this paper.

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