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Research paper

Ethical Challenges in The Development and Implementation of Artificial Intelligence and Emerging Technologies

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Abstract

The purpose of the study is to examine the moral contradictions arising in the context of the development of new technologies, with a focus on ethical aspects and possible consequences of their application. Methods of analysis, synthesis, generalization, and systematisation are used to achieve this goal. As a result of the study, it is established that the integration of artificial intelligence into various fields, such as the construction industry, healthcare, and finance, leads to substantial progress in efficiency and effectiveness. However, this progress is accompanied by complex ethical issues such as data privacy, bias, and job displacement. The need to consider ethical principles and social consequences is becoming increasingly important to ensure the responsible use of artificial intelligence and mitigate its potential risks. Solving ethical dilemmas requires the active interaction of various stakeholders and the development of reliable principles based on public values. In general, the adoption of new technologies should be based on a balanced approach that considers their advantages and potential negative consequences in the context of public welfare.

Keywords: *Artificial Intelligence; Machine Learning; Moral Aspects; Social Consequences; Social Values.*

1. Introduction

With the rapid development of new technologies, it is becoming increasingly important to examine the moral dilemmas that accompany this process. Issues of ethics and fair use of technologies such as artificial intelligence (AI) and biotechnology require careful analysis to develop appropriate regulatory and ethical frameworks. Understanding these dilemmas will help ensure responsible and balanced implementation of new technologies in society.

A study by the authors Bang & Park (2022) examines the concept of Metaverse as a simulation environment combining virtual and real worlds, allowing for economic, social, and cultural activities. Authors also discuss the ethics of the Metaverse for sustainability and user experience Metaverse for increasing user engagement. Park & Kwon (2024) developed and evaluated an AI educational programme for high school students in the free semester system in South Korea. The programme focused on the social impact of AI, ethics, and practical application in technology education. Researcher's results showed a substantial increase in students' interest in technology, their career aspirations, and an understanding of the social impact of AI and its effectiveness. The authors analysed the effectiveness of integrating AI into education for developing technological skills and finding a career.

A study by Hwang et al. (2021) was devoted to the development and implementation of science, technology, engineering, art, and math projects aimed at teaching ethics using deepfake applications based on AI technology. By revamping the elementary school curriculum and integrating tests to measure awareness of information ethics, the project aimed to address issues such as copyright and cyber violence. Kanemitsu (2021) provides a comprehensive overview of the evolution of engineering ethics education in Japan over the past two decades due to the continuous development of technology. Considering the growing public interest in the ethical implications of new technologies such as AI and genome editing, the paper of author emphasises the importance of addressing macro-level issues and adopting a forward-looking approach in engineering ethics education.

In their study, the authors Kazim & Koshiyama (2021) provide a comprehensive overview of the ethics of AI, its positioning in the broader context of digital ethics, and a discussion of its conceptual foundations, historical roots, modern approaches, and implications for engineering practice. The review highlights the importance of addressing ethical issues related to AI technologies and emphasises the interdisciplinary nature of the field. In general, the paper contributes to the understanding of complex ethical aspects related to the development of AI. Munn (2023) highlights the limitations and shortcomings of existing ethical AI principles, emphasising their controversial nature, isolation from industry practice, and lack of control mechanisms. The discrepancy between high ethical ideals and the practical implementation of

AI technologies, especially in solving problems of racial, social, and environmental harm, is emphasised. In general, the study calls for a reassessment of approaches to ensuring AI fairness that go beyond ethical recommendations.
The papers presented above cover a wide range of ethical issues related to the application of new technologies, such as AI and virtual reality, in various spheres of life. However, in the reviewed studies, insufficient attention to certain aspects, such as the ethics of data use, issues of democratic responsibility, and the impact on social justice, was identified. Based on this, the purpose of this study is to explore the ethical aspects associated with the development of new technologies, with special attention to ethics and the consequences of their use.

2. Page layout

The analysis method used in this study was predominantly qualitative. This approach allowed for an in-depth investigation of the various aspects of AI applications in different industries, focusing on ethical challenges, potential benefits, and the development of strategies for responsible use. By synthesizing data from various sources, including studies, reports, expert opinions, and practical examples, the analysis method aimed to identify key trends, challenges, and patterns rather than quantify data. The method facilitated the formulation of recommendations and strategies for managing risks and ensuring responsible AI use, as well as the identification of promising areas for further research.
The synthesis method was used to combine data and analytical conclusions from various sources such as studies, reports, expert opinions, and practical examples of AI applications. This method allowed identifying common trends and patterns, key problems, and challenges faced by organisations when implementing AI. The synthesis method also contributed to the development of an integrated approach to solving ethical and social issues related to the use of AI technologies. Using this method allowed for formulating recommendations and strategies for effective risk management and ensuring responsible use of AI in various fields. It also contributed to the identification of best practices and principles that can be applied to maximise the benefits and mitigate negative consequences when integrating and using AI in various sectors of the economy and society.
Using the generalisation method, the results of the study and data analysis were brought together to highlight the main conclusions and trends in the application of AI in various fields. This method allowed identifying common characteristics of ethical problems and challenges and highlighting key aspects that require attention when developing strategies to solve these problems. In addition, using the generalisation method, recommendations and principles of action were formulated to ensure the responsible use of AI by ethical norms and social expectations. The generalisation method also contributed to the identification of promising areas for the development of research in the field of ethics of AI, and the identification of key areas for further investigation and the development of effective solutions aimed at promoting the sustainable and responsible development of AI technologies.
Using the method of systematisation, data on ethical issues related to the use of AI in various fields were organised and classified. This method allowed the information to be structured, highlighting the main categories of ethical issues and dilemmas. Also, with the help of systematisation, the interrelationships between various aspects of ethical problems were established, which contributed to a deeper understanding of their essence and consequences. This facilitated the analysis of data and the development of recommendations for managing these problems in the context of using AI. The systematisation method also helped to identify gaps in existing approaches to ethical issues in the field of AI, form the basis for further research and the development of effective strategies to solve these problems.

3. Results

Since the early 2010s, technological progress has undergone a substantial transformation, characterised by the proliferation of innovative solutions in various fields. New technologies cover a wide range of scientific and engineering fields: from AI and machine learning to biotechnology, quantum computing, and blockchain systems. These achievements have catalysed substantial paradigm shifts in industries such as healthcare, finance, transportation, communications, and beyond.
AI is the cornerstone of modern technological innovations, manifesting itself in complex algorithms capable of making complex decisions, recognising images, and working autonomously (Yermolenko et al. 2024). Machine learning algorithms, a type of AI, allow systems to iteratively learn from data and improve performance without explicit programming (Konurbayeva et al. 2015; Shults et al. 2023). This capability finds applications in various fields, including image and speech recognition, natural language processing, predictive analytics, and personalised recommendation systems. Biotechnology represents another frontier of technological progress, using the knowledge of biology, genetics, and bioinformatics to revolutionise healthcare, agriculture, and environmental sustainability. Developments in gene editing technologies, such as clustered regularly interspaced short palindromic repeats associated protein 9, provide unprecedented accuracy and efficiency of genetic material modification, which is important for the treatment of diseases (Sharma et al. 2021). Quantum computing, although at an early stage, promises transformative computing power beyond the limitations of classical computing architectures. Using the principles of quantum mechanics, quantum computers use quantum bits (qubits) to perform calculations exponentially faster than their classical counterparts (Dorozhynskyi 2023). This potential provides breakthroughs in cryptography, optimisation problems, simulation in materials science, and drug discovery. Blockchain technology, originally conceived as the basic infrastructure for cryptocurrencies such as Bitcoin, has evolved into a decentralised and transparent accounting system, applications of which go beyond financial transactions (Khalegi et al. 2024; Hoxha et al. 2025). By providing secure and immutable data recording, blockchain facilitates trusted peer-to-peer interaction, smart contracts, supply chain management, digital identity verification, and voting systems.
These new technologies, among other things, reflect a dynamic environment of innovation that promotes social progress and economic growth. Their integration into various sectors highlights the need for strict ethical standards and public discussion to ensure responsible use and mitigation of potential risks and ethical dilemmas. The use of AI has become widespread in many sectors, revolutionising the way tasks are performed, decisions are made, and problems are solved (Pidpalyi 2024; Uludag 2023). AI, characterised by the simulation of human intelligence processes using machines, includes a wide range of methods, including machine learning, natural language processing, computer vision, and robotics. In the healthcare sector, the use of AI opens a wide range of prospects for improving patient care, optimising clinical workflows, and advancing medical research (Yin et al. 2021). Machine learning algorithms analyse huge amounts of patient data to help diagnose diseases, predict treatment outcomes, and personalise therapeutic interventions (Pavlova et al. 2024; Panasiuk et al. 2023). Natural language processing facilitates the extraction of valuable information from unstructured clinical records, research papers, and patient records, providing more efficient information retrieval and knowledge synthesis. In addition, robotic technologies complement surgical procedures, rehabilitation therapy, and patient care services, empowering healthcare professionals and improving patient outcomes.
In finance, AI algorithms play an important role in algorithmic trading, risk management, fraud detection, and customer service automation (Kolodiziev et al. 2021; Bisenovna et al. 2024). Machine learning models analyse market data to identify trading patterns, predict asset

prices, and optimise investment portfolios (Tleubayev et al. 2024). Natural language processing allows you to analyse sentiment in news articles and social media feeds to gauge market sentiment and make informed investment decisions (Kunduru 2023). In addition, chatbots and AI-based virtual assistants optimise customer interaction by providing personalised financial advice, account management, and support services. In the field of transportation, AI technologies are the foundation of the development of autonomous vehicles, traffic management systems, and predictive maintenance solutions (Ginters et al. 2018; Berestovenko 2024). Machine learning algorithms process vehicle and infrastructure sensor data to navigate difficult environments, detect obstacles, and make real-time driving decisions (Kryvoruchko et al. 2021; Akhmet et al. 2025). Computer vision systems allow recognizing objects, identifying traffic lanes, and tracking pedestrians, increasing the safety and efficiency of transport networks. Moreover, AI-based preventive maintenance algorithms analyse vehicle and infrastructure sensor data to anticipate equipment failures, optimise maintenance schedules, and minimise downtime (Iyer 2021).

The integration of AI into academic writing raises several deep ethical questions (Kullolli 2024; Chyzhykova 2024). Firstly, this is a question of transparency and authorship: as AI-generated content becomes more widespread, providing clarity about the origin and contribution of such content becomes imperative. In addition, the emergence of AI in academic literature forces a review of the traditional role of the researcher. With the advent of AI systems capable of synthesising vast amounts of information and creating coherent narratives, the focus may shift from simply concluding formulating pressing questions and gathering knowledge. Examining the situation in publishing houses publishing peer-reviewed studies, it can be noted that attitudes towards AI integration vary substantially. While some publishers take a cautious approach, preferring to prohibit or restrict the use of AI-generated content, others advocate transparency through mandatory disclosure of information about AI participation. Some take a more balanced position, recognizing the potential benefits of AI while agreeing on the need for oversight (Jabotinsky & Sarel 2023).

Ethical issues in the field of AI are multifaceted and constantly evolving, covering a wide range of complex issues affecting various aspects of society and human interaction (Vasenko & Dudar, 2024; Kotsur, 2024). One of the most notable ethical dilemmas involves the biases and fairness inherent in AI systems, which can inadvertently perpetuate or even exacerbate existing biases present in the data they are trained on. This raises concerns about the fairness and equity of AI-based decision-making processes, especially in areas such as hiring, crediting, and law enforcement. Privacy represents another ethical frontier, as the proliferation of AI-based surveillance technologies raises questions about the balance between privacy rights and security interests. The widespread use of facial recognition and biometric tracking systems, for example, is sparking discussions about the extent to which privacy should be violated for the sake of public safety. Autonomy and control pose serious ethical challenges as AI systems become increasingly autonomous and capable of making decisions without human intervention. Questions about accountability and responsibility arise when AI systems make serious mistakes (Ivashkevych 2023).

Displacement of jobs is becoming an urgent problem as AI and automation technologies disrupt traditional employment markets and exacerbate socio-economic inequality. Ensuring the equitable distribution of the benefits of AI-driven economic growth while mitigating the negative effects of job displacement requires careful discussion and policy intervention. Data management and ownership pose ethical dilemmas related to the collection, storage, and use of huge amounts of data by AI systems (Yevseiev et al. 2021). Questions about personal rights, consent, and privacy protection highlight the importance of ethical data management practices to protect against the exploitation and misuse of personal information. Addressing these ethical issues requires the joint efforts of various stakeholders, including policy makers, technologists, ethicists, and civil society organisations. Developing and adhering to sound ethical principles and a regulatory framework is crucial to ensure that AI technologies serve the collective good and support fundamental human values (Petrushka 2022).

The ethical aspects of genetic engineering include a wide range of complex issues affecting the fundamental principles of human dignity, autonomy, and social welfare. At the heart of these considerations is the question of how to responsibly use the potential of genetic technologies while mitigating potential harm and upholding ethical values. One of the key ethical issues is related to the sanctity of human life, especially at the embryonic stage. According to some religious and philosophical views, human embryos have inherent dignity and should not be manipulated or destroyed for research purposes. This raises the question of the ethical permissibility of practices such as cloning and editing of the germ line when embryos are modified or destroyed in pursuit of scientific achievements (Babale & Atoi, 2021).

The principle of informed consent also occupies an important place in the discussions around genetic engineering. Given the potential long-term effects of genetic interventions, it is important to ensure that people are fully informed about the risks, benefits, and consequences of genetic treatment. This becomes particularly difficult when the people affected cannot give consent, such as in germline editing or the treatment of unborn children. Access and equity represent additional ethical considerations in genetic engineering. There is concern that genetic technologies may exacerbate existing social inequalities by widening the gap between those who can afford genetic improvements and those who cannot. There is also a risk that genetic interventions may disproportionately benefit privileged segments of the population, further reinforcing social inequality. In addition, questions about the unintended consequences of genetic manipulation and the possibility of harm emphasise the need for careful approaches and constant monitoring of genetic technologies. Ensuring the safety and effectiveness of genetic therapies and assessing their long-term impact on society requires reliable ethical oversight and a regulatory framework.

The integration of AI into the construction industry has led to substantial progress in various aspects of construction processes. AI technologies offer innovative solutions to improve the efficiency, productivity, and safety of construction projects – from project planning to design optimisation. However, along with these advantages, there are ethical dilemmas that need to be addressed. Table 1 provides an overview of modern AI applications in construction, indicating their descriptions and related ethical dilemmas. By exploring these applications and the ethical challenges they pose, stakeholders will be able to make informed decisions about the responsible integration and use of AI in the construction sector.

In general, the widespread adoption of AI technologies in various fields highlights their transformative potential in stimulating innovation, increasing efficiency, and improving decision-making processes. However, as AI continues to evolve, it is crucial to consider ethical considerations, regulatory concerns, and social implications to ensure responsible and fair implementation. Ethical issues related to AI and big data technologies give rise to complex moral dilemmas that require careful consideration and control. The ethical framework, based on centuries-old philosophical analysis and modern thinking, offers structured approaches to solving these problems and making responsible decisions in the context of AI and big data. Table 2 provides an overview of some of the most influential ethical concepts and their applications in the field of AI and big data. By understanding and applying these ethical frameworks, organisations, developers, and policy makers will be able to navigate the complex ethical situation associated with AI and big data more clearly and consciously.

Table 1: AI in construction

Current use of AI in construction	Description	Ethical dilemmas
Planning and control	AI optimises project planning and analysis, identifies risks, and adjusts schedules depending on various parameters.	Privacy issues related to data collection and storage. Bias in making algorithmic decisions that affect the stakeholders of the project.
Design optimisation	AI generates and optimises building designs, considering such factors as aesthetics and structural integrity.	Ownership and authorship of projects created by AI. The potential displacement of human designers.
Analysis of claims	The AI analyses construction disputes and claims, identifying delays and responsibilities of the parties involved.	Lack of transparency in the AI decision-making process. Issues of fairness, bias, transparency, accountability, confidentiality, and data protection.
Forecasting the environmental impact	AI predicts the environmental impact of buildings based on energy consumption, water consumption, and waste generation.	The accuracy and reliability of AI forecasts.
Security monitoring	AI-based systems monitor the safety of construction sites, identifying hazards and unsafe behaviour.	Privacy concerns related to surveillance on construction sites. Potential misuse of AI data to monitor worker behaviour.
Supply chain management	AI optimises supply chain processes by predicting demand for materials and optimising purchases.	Fairness and transparency of decisions made in the supply chain using AI.

Source: compiled by the authors based on Arroyo et al. (2021).

Table 2: Ethical framework in AI

Ethical framework	Description	Applications in AI and big data
Utilitarianism	Utilitarianism is based on a consistent approach and focuses on maximising the overall well-being of society. Decision makers assess the cumulative impact of actions on various stakeholders.	Assessment of the impact of AI algorithms and big data technologies on crime rates, public safety, and social welfare. Consideration of the balance between benefits and harms, especially in crime prevention and risk assessment systems.
Deontology	Emphasises moral duty and adherence to generally accepted principles. The priority of individual rights, autonomy, and human dignity.	Respect for the privacy rights, informed consent, and the principles of protection against discrimination in the use of AI and big data. Countering the use of AI systems that violate privacy or manipulate people without their consent.
Ethics of virtue	It focuses on the education of moral character and such virtues as honesty, empathy, and decency. Encourages a culture of responsibility and decency.	Encouraging ethical virtues among AI developers and decision makers to promote responsible innovation and implementation. Emphasising honesty, empathy, and integrity in the design, development, and implementation of AI systems.
Rawlsian justice	It is based on the principles of fairness and equality, and emphasises care for the less well-off members of society.	Ensuring a fair distribution of benefits and mitigating social inequalities in the field of AI and big data. Consideration of the needs and interests of representatives of disadvantaged communities in the decision-making process.
Ethics based on human rights	Fundamental human rights such as privacy, autonomy, and informed consent are separated. Special emphasis is placed on adhering to people's rights with respect to their data and ensuring transparency of data processing methods.	Respect for privacy rights and the principles of informed consent in the collection, processing, and use of data. Ensuring control over the use of data and protection against unauthorised access or misuse.
The ethics of caring	It is based on the value of caring, empathy, and interpersonal relationships in making moral decisions. Calls for prioritising empathy and considering emotional and social impact.	Consideration of the emotional and social impact of AI systems on individuals and communities. The priority of empathy and user well-being in the development and implementation of AI technologies. Promoting responsible AI development practices that foster positive relationships between users and technologies.
Consequentialism	Evaluates actions based on their results and strives for the choice that leads to the greatest overall benefit. It considers the positive and negative consequences, including the risks of bias, discrimination, and harm to society.	Weighing the potential benefits and harms of AI technologies and big data applications. Striving to reduce the potential risks of bias, discrimination, and harm to society. The ratio of short-term benefits to long-term consequences and a broader consideration of the impact of decisions made with the help of AI on society.

Source: compiled by the authors based on Nassar & Kamal (2021).

The development of new technologies often creates complex moral dilemmas that challenge established ethical frameworks. These dilemmas can be caused by various factors, such as the potential impact on humans, society, and the environment, and the ethical responsibility of those involved in the creation and implementation of these technologies. One common moral dilemma is to balance the potential benefits of new technologies, such as increased efficiency or quality of life, with the potential risks and unintended consequences they may bring, such as job cuts or loss of privacy. In addition, issues of equity and access arise as new technologies can exacerbate existing inequalities or create new divisions in society. Ethical considerations also extend to issues such as the handling of data, the protection of human rights, and the long-term sustainability of technological advances. It is necessary to carefully consider ethical principles, stakeholder standpoints, and societal values to ensure responsible and socially beneficial use of new technologies to overcome these moral dilemmas.

4. Discussion

Recent technological innovations, including AI, machine learning, biotechnology, quantum computing, and blockchain, have significantly impacted industries such as healthcare, finance, and transportation. In healthcare, AI optimises diagnoses, predicts treatment outcomes, and personalises therapy, improving patient care. In finance, AI enhances algorithmic trading, risk management, and customer service. In transportation, AI contributes to the development of autonomous vehicles and efficient traffic management. While these technologies improve productivity and service quality, they also raise ethical issues, such as transparency, data protection, bias, and social justice. The ethical frameworks of utilitarianism, deontology, and virtue ethics offer distinct perspectives that can guide responsible technology use, highlighting the importance of careful consideration by developers and organisations.

One of the central issues in the ethical discourse on AI is the attribution of responsibility for harmful or ethically questionable outcomes. Key questions arise: who should be accountable, developers, users, organizations, regulators, or even the systems themselves? Various

models offer frameworks for responsibility allocation. The causal model identifies the direct agent (e.g., a developer's error), while the collective model distributes responsibility across multiple actors involved in the system's design and deployment. The functional delegation model maintains human accountability by distinguishing between decision delegation and control retention. Crucially, the concept of responsible design emphasizes the integration of ethical safeguards such as transparency, bias detection, and explainability into systems from the outset. Institutionally, accountability can be reinforced through corporate ethics committees, independent oversight bodies, and legal instruments. A multi-layered approach combining regulation, ethical engineering, and public involvement ensures AI technologies are deployed responsibly and justly (Martyniuk et al. 2024).

The ethical challenges in AI and genetic engineering are profound and multifaceted. In AI, key concerns include fairness, confidentiality, autonomy, and control (Khadzhiradieva et al. 2024; Kravchuk et al. 2024). Bias in AI algorithms, which affects decision-making processes, raises significant issues of fairness and equity. The widespread use of AI-based surveillance technologies also challenges privacy rights, balancing security needs with individual freedoms. The autonomy of AI systems calls into question human control and accountability, particularly in the event of errors. In genetic engineering, ethical dilemmas primarily involve the protection of human life, informed consent, access, and fairness (Vasylkivskyi et al. 2023). The manipulation of human embryos and the necessity of fully informing individuals about the risks and benefits of genetic treatment highlight the complexities. Furthermore, concerns exist about the exacerbation of social inequalities and the unequal benefits of genetic technologies. Both fields require collaboration across stakeholders to establish sound ethical guidelines and regulatory frameworks, ensuring a balance between innovation and human values. In construction, AI can improve efficiency but also poses ethical dilemmas, including data privacy, fairness in decision-making, and authorship/ownership of AI-driven designs. Ensuring transparency and impartiality in AI decisions is crucial. To responsibly implement AI, strict ethical standards and regulations must be developed and followed.

AI and genetic engineering present significant ethical challenges. In AI, concerns about fairness, confidentiality, autonomy, and control arise, particularly with algorithmic bias and surveillance technologies. The autonomy of AI systems also raises accountability issues. In genetic engineering, ethical dilemmas focus on human life protection, informed consent, and fairness, especially concerning embryo manipulation and social inequality. Both fields require collaboration to develop ethical guidelines and regulatory frameworks that balance innovation and human values. In construction, AI offers potential benefits but introduces ethical issues such as data privacy, fairness in decision-making, and authorship/ownership of AI-generated designs (Kharchenko et al. 2017; Ivashko et al. 2020). Ensuring transparency and impartiality in AI decisions is crucial. To implement AI responsibly, strict ethical standards must be developed and followed.

A study by Lin-Hi et al. (2023) focuses on the role of ethics in the adoption of new technologies in healthcare, especially using the example of the government's COVID-19 contact tracking application. The authors analyse how various factors, including ethical optimism and perceived government responsibility, influence resistance to the use of such technologies. Compared to this study, the authors N. Lin-Hi et al. focus on a specific technology and its adoption by society in the context of a pandemic. They also introduce new variables related to ethics, which allows for a better understanding of how ethical aspects influence the decision to use technology. This study, on the other hand, covers a wider range of technologies and their ethical aspects in various industries. Both papers highlight the importance of ethics in technological decision-making and show that ethics can serve as a key factor in promoting the adoption of new technologies, ensuring public trust and confidence in their use.

A study by Borenstein & Howard (2021) draws attention to the substantial impact of AI on society and emphasises the need to discuss the complex ethical issues associated with its development and use. The authors propose a review of the training of future developers and AI professionals, considering ethical aspects to increase the benefits of the technology and reduce its potential harm. Compared to this study, they focus more narrowly on the field of education and the implementation of ethics in curricula specialised in AI. Therewith, this study examines a wide range of technologies and their ethical aspects in various industries. Both papers emphasise the importance of discussing ethical issues related to new technologies and introducing appropriate training and approaches to train specialists in this field.

A study by Krijger (2022) proposes to expand the framework of the ethics of AI through critical theory, paying attention to the organisational dimension in the context of AI development and deployment. The author emphasises that, in addition to ethical principles and design, background assumptions and values that influence design processes play a crucial role in operationalising ethics in this area. Compared with this study, which focuses on the consideration of ethical issues and principles in the context of various technologies, the study of the researcher delves into the analysis of organisational aspects, such as background assumptions and values, and their impact on AI development and deployment processes. Both papers emphasise the importance of understanding and considering ethical aspects in the development and use of AI but approach it from different angles, which enriches the general understanding of the problem and allows viewing it from different angles.

A study by Diakopoulos & Johnson (2021) focuses on ethical issues related to counterfeiting in the media, especially in the context of the 2020 United States presidential election. They discuss the consequences of counterfeiting on the integrity of social spheres, including elections, and propose strategies to address these issues. Compared to this study, which examined a wide range of technologies and their ethical aspects, the above paper focuses on the specific problem of media fakes and their impact on elections. The authors present eight hypothetical scenarios to analyse ethical issues and discuss strategies to solve the problem. Both studies emphasise the importance of discussing and solving ethical issues related to new technologies, but approach this from different angles.

Nguyen et al. (2023) address the ethics of AI in education (AIE), considering its application in improving the efficiency and quality of student learning. The fact that the development of AI in education is accompanied by an increase in ethical risks, such as the security of personal data and the preservation of student autonomy, is highlighted. The paper aims to explore the global consensus on ethical issues in the field of AIE by analysing the existing policies and guidelines of international organisations. Compared to this study, which focuses on discussing ethical aspects in various industries, the researchers analyse ethical issues specific to the education and application of AI in this field. A set of ethical principles that can serve as a basis for the development and implementation of ethical and reliable educational technology systems was offered by the authors.

In turn, Ishmaev (2021) reviewed self-confident identification based on blockchain technology as an alternative to existing digital identification systems. The researcher emphasises the concept of individual control over personal data related to identification, the ability to choose where to store data, and the ability to provide it for verification. The author highlights that the operationalisation of the concept of "self-confidence" may be attractive, but the lack of moral semantics obscures the key problems and long-term consequences. A deeper examination of the normative content of the concept of "sovereignty" is suggested to identify ethical problems associated with changing the nature of human identity in the context of private data collection. In comparison with this study, which focuses on a wide range of

ethical issues related to the use of new technologies, the one conducted by the researcher delves into the analysis of ethical issues related to self-confident identification and blockchain technology. It offers a critical review of the technical and moral aspects of this concept and highlights the need to consider ethical aspects when developing and implementing such technologies.

The above studies highlight the importance of considering ethical aspects in various fields of application of new technologies such as AI, blockchain, and media. All these papers draw attention to the need to consider moral, social, and legal aspects in the development and implementation of technologies to ensure their responsible use and minimise potential negative consequences. The general trend in all studies is the recognition of the importance of discussing ethical issues in the context of the development and implementation of new technologies. This allows not only identifying potential risks and threats but also developing strategies and recommendations to ensure the ethical and responsible use of technology in a socio-economic context.

This study faced several limitations that may affect the interpretation of its findings. The fast-paced development of AI technologies has made it difficult to capture the most up-to-date trends. The interdisciplinary nature of the topic, spanning ethics, law, and technology, created complexity in synthesising diverse sources. The reliance on secondary data may have limited context-specific insights, and regional differences in ethical standards could affect the generalisability of conclusions. Further empirical research would enhance the practical relevance of the proposed ethical frameworks.

5. Conclusions

The study highlights the key role of new technologies, including artificial intelligence, machine learning, and biotechnology, in the technological progress of various industries such as healthcare, finance, and transportation. In healthcare, these innovations optimise diagnosis, predict treatment outcomes, and improve patient care. In the financial sector, they improve the quality of customer service and optimise investment portfolios. In the transport industry, they contribute to improving safety and efficiency. However, such technological breakthroughs entail serious ethical issues that require strict standards and public discussion to ensure responsible use.

The study points to key ethical issues such as fairness, confidentiality, autonomy, and privacy in the context of artificial intelligence and biotechnology applications. Additionally, the importance of ensuring transparency and openness in the development and application of these technologies so that society can effectively monitor and assess their impact on people's lives and safety was emphasised. An important aspect is to ensure equal access to new technologies to avoid deepening existing social inequalities and ensure their beneficial impact on society in general. The need to develop strict norms and principles to ensure the ethical use of these technologies in various fields was noted. The development and implementation of ethical standards will not only ensure the protection of the rights and interests of all stakeholders but also contribute to improving public confidence in the use of new technologies, which will eventually lead to their wider and more effective application and mitigate concerns about the impartiality and correctness of algorithmic decisions.

Further research may focus on the development of innovative methods to solve the ethical dilemmas associated with the use of artificial intelligence and biotechnology, considering the specific features of various industries to ensure a balance between innovation and the protection of fundamental human values.

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