(REVIEW ARTICLE)

# Ethical frameworks for AI in healthcare entrepreneurship: A theoretical examination of challenges and approaches

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## Abstract

This theoretical examination explores the challenges and approaches to establishing ethical frameworks for the integration of artificial intelligence (AI) in healthcare entrepreneurship. As AI technologies continue to advance, their applications in healthcare hold immense potential for improving patient outcomes and driving innovation. However, ethical considerations are paramount to ensure the responsible and equitable deployment of AI-driven solutions. This paper delves into key ethical dimensions including privacy and data security, bias and fairness, accountability and transparency, and patient autonomy and consent. It identifies challenges such as technological limitations, regulatory complexities, and organizational barriers that impede the implementation of ethical frameworks. Additionally, it proposes approaches including collaborative governance models, ethical design practices, and continuous monitoring and evaluation to address these challenges. Through case studies and examples, the paper illustrates successful implementations of ethical frameworks in AI healthcare startups, highlighting lessons learned and their impact on patient outcomes and trust. Ultimately, this examination underscores the critical importance of ethical considerations in shaping the future of AI in healthcare entrepreneurship and provides insights for researchers, practitioners, and policymakers navigating this rapidly evolving landscape.

**Keywords:** Ethical Frameworks; AI; Healthcare; Entrepreneurship; Theoretical Examination; Challenges and Approaches

## 1    Introduction

The integration of artificial intelligence (AI) in healthcare entrepreneurship represents a groundbreaking intersection of technology, innovation, and healthcare delivery (Osasona et al., 2024). AI has the potential to revolutionize various aspects of healthcare, from diagnosis and treatment to patient management and administrative tasks. In recent years, AI-powered solutions have gained significant traction within the healthcare industry due to their ability to analyze vast amounts of medical data, identify patterns, and generate insights that can inform clinical decision-making (Panesar, 2019). Within the realm of healthcare entrepreneurship, startups and companies are leveraging AI technologies to develop innovative products and services aimed at addressing various healthcare challenges (Okem et al., 2023). These may include predictive analytics for disease prevention, personalized treatment recommendations, streamlining administrative processes, and enhancing patient engagement. The proliferation of AI in healthcare entrepreneurship has ushered in a wave of innovation, promising improved efficiency, effectiveness, and accessibility of healthcare services. However, the rapid advancement and adoption of AI in healthcare also raise complex ethical considerations and challenges (Kelly et al., 2019). These range from concerns about patient privacy and data security to issues of algorithmic bias, transparency, and accountability. As AI systems become increasingly integrated into healthcare delivery, it becomes imperative to establish robust ethical frameworks to guide their development, deployment, and use. Ethical frameworks serve as guiding principles and standards that govern the ethical conduct and decision-making

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of individuals, organizations, and industries (Odonkor et al., 2023). In the context of AI in healthcare entrepreneurship, ethical frameworks play a crucial role in ensuring that AI technologies are developed and deployed in a responsible, equitable, and socially beneficial manner. Ethical frameworks help safeguard patient rights, including privacy, autonomy, and dignity, amidst the collection, processing, and utilization of sensitive health data by AI systems. By promoting fairness, transparency, and accountability, ethical frameworks aid in mitigating algorithmic bias and discrimination, thus ensuring that AI-driven healthcare solutions are equitable and inclusive. Ethical frameworks foster trust and confidence among patients, healthcare providers, regulators, and other stakeholders by demonstrating a commitment to ethical principles and values in the development and deployment of AI technologies (Burr and Leslie, 2023). Ethical frameworks provide a basis for regulatory compliance and adherence to legal and ethical standards, thereby reducing the risk of legal liability and regulatory sanctions for healthcare entrepreneurs and organizations (Kaggwa et al., 2024). By integrating ethical considerations into the design and implementation of AI healthcare solutions, ethical frameworks contribute to the long-term sustainability and societal acceptance of AI technologies in healthcare.

The purpose of this examination is to delve into the ethical dimensions, challenges, and approaches associated with the integration of AI in healthcare entrepreneurship. Identify and explore key ethical considerations arising from the use of AI in healthcare entrepreneurship, including privacy, bias, accountability, and patient autonomy. Examine the challenges and barriers that hinder the implementation of ethical frameworks in AI healthcare entrepreneurship, such as technological limitations, regulatory complexities, and organizational resistance. Propose and discuss approaches, strategies, and best practices for addressing ethical challenges and promoting the responsible development and deployment of AI-driven healthcare solutions. Provide insights, recommendations, and implications for researchers, practitioners, policymakers, and stakeholders involved in the design, development, regulation, and adoption of AI technologies in healthcare entrepreneurship (Farayola et al., 2023). By critically examining these issues, this examination seeks to contribute to the ongoing discourse on the ethical implications of AI in healthcare entrepreneurship and provide guidance for navigating the ethical complexities inherent in this rapidly evolving field.

## 1.1    Ethical considerations in ai for healthcare entrepreneurship

Patient confidentiality is a fundamental ethical principle in healthcare that protects the privacy of patient information (Ayinla et al., 2024). With the adoption of AI technologies in healthcare entrepreneurship, there is a growing concern about the security and confidentiality of patient data. AI systems often require access to large volumes of sensitive health data to train algorithms and generate insights (Eboigbe et al., 2023). However, maintaining patient confidentiality becomes paramount to prevent unauthorized access, misuse, or breaches of sensitive health information. Healthcare entrepreneurs must implement robust security measures, such as encryption, access controls, and data anonymization, to safeguard patient confidentiality and comply with healthcare privacy regulations, such as the Health Insurance Portability and Accountability Act (HIPAA) in the United States (Silva and Soto, 2022). Data protection laws and regulations govern the collection, processing, and storage of personal data, including health information, to ensure individuals' privacy rights are upheld. In the context of AI in healthcare entrepreneurship, entrepreneurs must navigate a complex landscape of data protection laws and regulations, such as the General Data Protection Regulation (GDPR) in the European Union and the Health Information Technology for Economic and Clinical Health (HITECH) Act in the United States. Compliance with these regulations requires healthcare entrepreneurs to implement privacy-by-design principles, conduct privacy impact assessments, and obtain explicit consent from patients for the collection and use of their health data. Failure to comply with data protection laws can result in legal penalties, reputational damage, and loss of trust among patients and stakeholders. Algorithmic bias refers to systematic errors or unfairness in AI algorithms that result in discriminatory outcomes, particularly concerning race, gender, ethnicity, or socioeconomic status. In healthcare, algorithmic bias can have serious consequences, leading to disparities in diagnosis, treatment, and access to care (Eboigbe et al., 2023). Healthcare entrepreneurs must be vigilant in identifying and mitigating algorithmic bias in their AI systems by employing diverse and representative datasets, conducting bias audits, and employing bias mitigation techniques, such as fairness-aware algorithms and algorithmic transparency measures. Ensuring fairness in AI systems involves designing and deploying AI algorithms that produce equitable and unbiased outcomes across different demographic groups. Fairness can be achieved through various approaches, such as fairness-aware machine learning techniques, fairness metrics, and algorithmic transparency (Adewusi et al., 2024). Healthcare entrepreneurs should prioritize fairness in the development and deployment of AI systems, taking into account ethical considerations and societal values to promote equitable healthcare delivery and mitigate disparities. Accountability in AI healthcare entrepreneurship entails identifying and allocating responsibility for AI-driven decision-making processes. While AI systems can augment clinical decision-making and improve healthcare outcomes, they also raise questions about accountability and liability in the event of errors, biases, or adverse outcomes. Healthcare entrepreneurs must establish clear lines of accountability for AI decision-making, outlining the roles and responsibilities of developers, healthcare providers, regulators, and other stakeholders. Additionally, mechanisms for recourse and redress should be

implemented to address instances of AI-related harm or malpractice. Transparency is essential for promoting trust and understanding in AI-driven healthcare systems (Adelekan et al., 2024). Healthcare entrepreneurs should strive to enhance transparency by providing insights into the workings of AI algorithms, including their inputs, outputs, decision-making processes, and potential biases. Transparent AI systems enable healthcare providers and patients to assess the reliability, accuracy, and fairness of AI-driven recommendations and decisions. Transparency measures may include algorithmic explainability techniques, model documentation, and disclosure of data sources and processing methods. Informed consent is a foundational principle of medical ethics that requires patients to be fully informed about the risks, benefits, and alternatives of medical interventions before providing consent. In the context of AI-driven healthcare, obtaining informed consent becomes more complex due to the opaque nature of AI algorithms and the potential for unforeseen risks and outcomes. Healthcare entrepreneurs must ensure that patients are adequately informed about the use of AI technologies in their care, including the purposes, limitations, and implications of AI-driven interventions. This may require educational initiatives, consent forms tailored to AI applications, and mechanisms for patients to opt-out or withdraw consent. Patient autonomy emphasizes the importance of involving patients in decisions about their healthcare and respecting their preferences, values, and goals (Olorunsogo et al., 2024). In AI-driven healthcare entrepreneurship, patient involvement in decision-making processes becomes critical to promoting shared decision-making and patient-centered care. Healthcare entrepreneurs should empower patients to participate actively in decisions related to the use of AI technologies in their care, providing them with access to information, tools, and support to make informed choices (Odonkor et al., 2024). Patient feedback and preferences should be integrated into the design and development of AI-driven healthcare solutions to ensure alignment with patient needs and preferences. Ethical considerations surrounding privacy, bias, accountability, and patient autonomy are paramount in guiding the responsible development and deployment of AI technologies in healthcare entrepreneurship. By addressing these ethical challenges, healthcare entrepreneurs can uphold the highest standards of ethical conduct, promote trust and confidence among patients and stakeholders, and harness the transformative potential of AI to improve healthcare delivery and outcomes (Odonkor et al., 2024).

## 2    Challenges in implementing ethical frameworks

One of the primary challenges in implementing ethical frameworks for AI in healthcare entrepreneurship is ensuring the accuracy and reliability of AI algorithms. AI algorithms rely on vast amounts of data to learn patterns and make predictions, but they are susceptible to biases, errors, and inaccuracies, which can compromise patient care and safety. Healthcare entrepreneurs must address these challenges by rigorously validating and testing AI algorithms using diverse and representative datasets. Additionally, continuous monitoring and evaluation are essential to identify and mitigate algorithmic errors and ensure the ongoing accuracy and reliability of AI-driven healthcare solutions (Odili et L., 2024). Another challenge lies in the interpretability of AI-driven decisions, particularly in complex healthcare settings where decisions have significant consequences for patient outcomes. AI algorithms often operate as "black boxes," making it difficult for healthcare providers and patients to understand the rationale behind AI-driven recommendations or decisions. Lack of interpretability can undermine trust, hinder clinical adoption, and impede accountability in AI-driven healthcare. Healthcare entrepreneurs must prioritize interpretability by developing explainable AI techniques, visualization tools, and decision support systems that enable healthcare providers and patients to understand and trust AI-driven recommendations (Nembe et al., 2024). Compliance with healthcare regulations presents a significant challenge for healthcare entrepreneurs developing AI-driven solutions. Healthcare regulations, such as HIPAA in the United States and GDPR in the European Union, impose strict requirements for the protection of patient privacy, security, and confidentiality. Ensuring compliance with these regulations requires healthcare entrepreneurs to implement robust data protection measures, conduct privacy impact assessments, and adhere to data governance principles. Failure to comply with healthcare regulations can result in severe penalties, legal liabilities, and reputational damage for healthcare entrepreneurs and organizations. Liability and accountability are complex legal issues that arise in the context of AI-driven healthcare (Adewusi, et al., 2024). Determining responsibility for errors, biases, or adverse outcomes resulting from AI-driven decisions can be challenging due to the distributed nature of decision-making processes involving multiple stakeholders, including developers, healthcare providers, and patients. Healthcare entrepreneurs may face legal challenges related to product liability, medical malpractice, and negligence if AI-driven systems fail to perform as intended or cause harm to patients. Clarifying liability frameworks and establishing mechanisms for accountability are essential to address these legal challenges and ensure patient safety and trust in AI-driven healthcare. Resistance to change within healthcare systems presents a significant organizational barrier to implementing ethical frameworks for AI in healthcare entrepreneurship. Healthcare organizations are often entrenched in traditional practices and may exhibit resistance to adopting new technologies and workflows, including AI-driven solutions. Resistance to change may stem from concerns about job displacement, loss of autonomy, or perceived threats to professional expertise. Healthcare entrepreneurs must engage stakeholders, including healthcare providers, administrators, and patients, in the design, development, and implementation of AI-driven solutions to address resistance to change effectively (Ramos, 2024). Providing education, training, and incentives can help foster a culture

of innovation and acceptance of AI in healthcare. Resource constraints, including financial, technological, and human resources, pose significant challenges to implementing ethical frameworks for AI in healthcare entrepreneurship (Adefemi et al., 2023). Developing and deploying AI-driven solutions requires substantial investments in infrastructure, talent, and expertise, which may be beyond the reach of many healthcare startups and organizations, particularly those operating in resource-constrained settings. Additionally, ongoing maintenance, monitoring, and updates are essential to ensure the effectiveness and ethical compliance of AI-driven healthcare solutions, further exacerbating resource constraints (Olorunsogo et al., 2024). Healthcare entrepreneurs must explore creative funding models, partnerships, and collaboration opportunities to overcome resource constraints and prioritize ethical considerations in the development and implementation of AI-driven healthcare solutions. Overcoming the challenges associated with implementing ethical frameworks for AI in healthcare entrepreneurship requires a multifaceted approach that addresses technological, regulatory, legal, and organizational barriers (Ette et al., 2021). By proactively addressing these challenges, healthcare entrepreneurs can foster trust, promote ethical conduct, and harness the transformative potential of AI to improve healthcare delivery and outcomes while upholding the highest standards of patient safety and ethical integrity.

## 3    Approaches to addressing ethical challenges

Multi-stakeholder partnerships involve collaboration among diverse stakeholders, including healthcare providers, researchers, policymakers, industry representatives, patients, and advocacy groups, to develop and implement ethical frameworks for AI in healthcare entrepreneurship (Loban et al., 2021). By bringing together diverse perspectives and expertise, multi-stakeholder partnerships can facilitate consensus-building, knowledge sharing, and collective decision-making on ethical issues (Ehimuan et al., 2024). These partnerships can serve as forums for discussing ethical dilemmas, identifying best practices, and developing guidelines and standards for ethical conduct in AI-driven healthcare. Healthcare entrepreneurs can actively engage in multi-stakeholder partnerships to ensure that their AI-driven solutions align with ethical principles and address the needs and concerns of all stakeholders. Ethical review boards play a crucial role in evaluating and overseeing the ethical implications of AI-driven healthcare projects and initiatives (Akunne and Etele, 2021). These boards, composed of experts in bioethics, law, medicine, and other relevant fields, review research proposals, protocols, and applications involving AI technologies to ensure compliance with ethical principles and regulatory requirements. Ethical review boards provide independent oversight, guidance, and ethical scrutiny, helping to identify and mitigate potential risks and ethical concerns before AI-driven healthcare solutions are deployed in clinical settings (Murphy et al., 2021). Healthcare entrepreneurs should seek input and approval from ethical review boards as part of their ethical governance framework to demonstrate their commitment to ethical conduct and responsible innovation. Ethical design and development practices involve integrating ethical considerations into the entire lifecycle of AI development, from ideation and design to deployment and maintenance. This approach entails conducting ethical impact assessments, stakeholder consultations, and risk analyses to identify and address potential ethical implications of AI-driven healthcare solutions (Adekanmbi et al., 2024). Healthcare entrepreneurs should adopt frameworks, such as the IEEE Ethically Aligned Design, that provide guidelines and principles for incorporating ethics into AI development processes. By embedding ethics into the design and development of AI systems, healthcare entrepreneurs can proactively mitigate ethical risks and ensure that their solutions align with societal values and ethical standards. Bias mitigation techniques aim to identify and mitigate biases in AI algorithms to ensure fairness, equity, and inclusivity in healthcare entrepreneurship. These techniques include data preprocessing methods, algorithmic adjustments, and fairness-aware machine learning approaches that mitigate biases based on race, gender, ethnicity, or other protected characteristics (Adekanmbi et al., 2024). Healthcare entrepreneurs should employ diverse and representative datasets, conduct bias audits, and validate AI algorithms to detect and address biases throughout the development lifecycle. Additionally, transparency measures, such as bias impact assessments and fairness metrics, can help healthcare entrepreneurs assess and mitigate biases in AI-driven healthcare solutions, promoting trust and confidence among patients and stakeholders (Nasir et al., 2024). Continuous monitoring of AI systems post-deployment is essential to assess their performance, effectiveness, and ethical compliance in real-world healthcare settings. Healthcare entrepreneurs should implement monitoring mechanisms, such as feedback loops, performance metrics, and error tracking systems, to monitor the behavior and outcomes of AI-driven healthcare solutions over time (Dozie et al., 2024). By monitoring AI systems continuously, healthcare entrepreneurs can identify and address emerging issues, adapt to changing circumstances, and ensure that their solutions continue to meet ethical standards and deliver positive outcomes for patients and stakeholders. Regular ethical audits and assessments involve evaluating the ethical implications of AI-driven healthcare solutions through systematic reviews, audits, and assessments conducted by independent experts or internal review teams (Obijuru et al., 2024). These audits assess compliance with ethical frameworks, regulatory requirements, and best practices, identify areas for improvement, and recommend corrective actions to address ethical concerns. Healthcare entrepreneurs should conduct regular ethical audits and assessments of their AI-driven healthcare solutions, involving stakeholders, such as patients, healthcare providers, ethicists, and regulators, to ensure ongoing ethical compliance and accountability (Odilibe et al., 2024). By proactively identifying and

addressing ethical challenges, healthcare entrepreneurs can enhance the trustworthiness, credibility, and societal acceptance of AI-driven healthcare solutions. By adopting collaborative governance models, ethical design and development practices, and continuous monitoring and evaluation approaches, healthcare entrepreneurs can effectively address ethical challenges associated with AI in healthcare entrepreneurship. These approaches enable healthcare entrepreneurs to navigate complex ethical landscapes, foster stakeholder engagement, and uphold the highest standards of ethical conduct and responsible innovation in AI-driven healthcare (Wahab and Nor, 2023).

## 4    Case studies and examples

In recent years, several AI healthcare startups have successfully implemented ethical frameworks to guide the development and deployment of their AI-driven solutions, demonstrating a commitment to responsible innovation and ethical conduct (Konda, 2022). One notable example is Zebra Medical Vision, an Israeli startup that specializes in AI-powered medical imaging analysis. Zebra Medical Vision has developed algorithms for detecting various medical conditions, such as fractures, tumors, and cardiovascular diseases, from medical imaging data, including X-rays, CT scans, and MRIs (Petryshak, 2021). Zebra Medical Vision has implemented robust ethical frameworks to address privacy, bias, transparency, and accountability concerns associated with its AI-driven solutions. The company prioritizes patient privacy by adhering to stringent data protection measures and compliance with regulatory requirements, such as GDPR and HIPAA. Additionally, Zebra Medical Vision employs bias mitigation techniques, such as diverse dataset curation and algorithmic fairness assessments, to ensure that its AI algorithms produce equitable and unbiased results across different patient populations (Santosh and Gaur, 2022). Zebra Medical Vision emphasizes transparency by providing healthcare providers with detailed insights into the workings of its AI algorithms, including explanations of diagnostic outputs and underlying decision-making processes. The company also collaborates with healthcare organizations and regulatory authorities to establish clear lines of accountability and mechanisms for addressing ethical concerns. By implementing ethical frameworks, Zebra Medical Vision has gained recognition for its commitment to ethical conduct and responsible innovation in AI-driven healthcare (Gaillard, 2023). The company's success highlights the importance of integrating ethical considerations into the development and deployment of AI-driven healthcare solutions to promote trust, transparency, and patient safety (Petryshak, 2021).

Despite the successes of AI healthcare startups in implementing ethical frameworks, they also face significant challenges and obstacles along the way (Omaghomi et al., 2024). One common challenge is navigating regulatory complexities and compliance requirements, which vary across different jurisdictions and healthcare settings (Ogugua et al., 2024). Healthcare startups must invest resources in understanding and adhering to applicable regulations, obtaining necessary approvals, and addressing regulatory concerns to ensure ethical compliance and legal liability. Another challenge is addressing algorithmic biases and ensuring fairness in AI-driven healthcare solutions. Healthcare startups must grapple with biases inherent in datasets, algorithms, and decision-making processes, which can perpetuate disparities in healthcare delivery and outcomes (Ogugua et al., 2024). Overcoming biases requires ongoing efforts in data collection, preprocessing, and algorithmic validation to mitigate biases and promote fairness across diverse patient populations. Additionally, healthcare startups must contend with organizational barriers, such as resistance to change and resource constraints, within healthcare systems (Anyanwu et al., 2024). Overcoming resistance to change requires building trust, fostering stakeholder engagement, and demonstrating the value proposition of AI-driven healthcare solutions through pilot projects and evidence-based outcomes. Addressing resource constraints necessitates innovative funding models, strategic partnerships, and resource allocation strategies to support the development and implementation of ethical frameworks. From these challenges, healthcare startups have learned valuable lessons about the importance of collaboration, transparency, and continuous improvement in navigating ethical complexities and ensuring the responsible development and deployment of AI-driven healthcare solutions (Reddy et al., 2020). The successful implementation of ethical frameworks in AI healthcare startups has had a positive impact on patient outcomes and trust in AI-driven healthcare. By prioritizing patient privacy, fairness, transparency, and accountability, healthcare startups have enhanced patient trust and confidence in AI-driven healthcare solutions, leading to increased adoption and acceptance among healthcare providers and patients (Trout, 2016). Ethical frameworks have contributed to improved patient outcomes by ensuring the accuracy, reliability, and safety of AI-driven diagnostic and treatment recommendations. Patients benefit from timely and accurate diagnoses, personalized treatment plans, and better access to healthcare services, resulting in improved health outcomes and quality of life (Wurcel et al., 2019). Furthermore, ethical frameworks have fostered collaboration and trust among healthcare stakeholders, including healthcare providers, researchers, regulators, and patients. By promoting transparency and accountability, ethical frameworks have facilitated open communication, shared decision-making, and mutual respect, leading to stronger partnerships and collaborations in AI-driven healthcare innovation (Anyanwu et al., 2024). The successful implementation of ethical frameworks in AI healthcare startups has demonstrated the transformative potential of AI to revolutionize healthcare delivery and improve patient outcomes while upholding the highest standards of ethical conduct and responsible

innovation. By prioritizing ethics and patient-centricity, healthcare startups have paved the way for a more ethical, equitable, and trustworthy future of AI-driven healthcare (Gaur and Jhanjhi, 2023).

## 5    Conclusion

In this examination, we have explored the ethical considerations, challenges, and approaches associated with the integration of artificial intelligence (AI) in healthcare entrepreneurship. Key findings include the importance of privacy and data security, the need to address algorithmic bias and ensure fairness in AI systems, the significance of accountability and transparency in AI decision-making, and the importance of patient autonomy and consent in AI-driven healthcare. We have discussed various challenges, such as technological limitations, regulatory and legal issues, and organizational barriers, that healthcare entrepreneurs face in implementing ethical frameworks for AI in healthcare entrepreneurship. Looking ahead, several future directions and recommendations emerge for advancing the ethical integration of AI in healthcare entrepreneurship. First, there is a need for continued research and development of ethical guidelines, standards, and best practices tailored to the unique challenges and opportunities of AI in healthcare entrepreneurship. Collaboration among stakeholders, including researchers, practitioners, policymakers, and patients, is essential to develop comprehensive and actionable ethical frameworks that address emerging issues and trends in AI-driven healthcare. Second, there is a need to invest in education and training programs to raise awareness and build capacity among healthcare professionals, entrepreneurs, and regulators on the ethical implications of AI in healthcare entrepreneurship. Training programs should cover topics such as data ethics, algorithmic bias, and responsible AI design and development practices to empower stakeholders to make informed decisions and navigate ethical complexities effectively. There is a need to establish mechanisms for oversight, accountability, and governance to ensure the responsible development and deployment of AI-driven healthcare solutions. Ethical review boards, regulatory frameworks, and industry standards play a crucial role in providing guidance, oversight, and enforcement mechanisms to promote ethical conduct and mitigate risks associated with AI in healthcare entrepreneurship. There is also a need to prioritize patient engagement, empowerment, and advocacy in the design, development, and implementation of AI-driven healthcare solutions. Patients should be involved in decision-making processes, provided with transparency and control over their health data, and empowered to make informed choices about their healthcare preferences and priorities. Ethical considerations are fundamental to shaping the future of AI in healthcare entrepreneurship and ensuring that AI-driven healthcare solutions are developed and deployed in a responsible, equitable, and socially beneficial manner. By prioritizing ethics, healthcare entrepreneurs can build trust, foster collaboration, and promote patient-centered care in AI-driven healthcare. Ethical frameworks serve as guiding principles and standards that uphold the highest values of integrity, fairness, transparency, and accountability in AI-driven healthcare entrepreneurship. The integration of AI in healthcare entrepreneurship holds immense promise for improving healthcare delivery, enhancing patient outcomes, and driving innovation. However, realizing this potential requires a commitment to ethical conduct, regulatory compliance, and stakeholder engagement to address ethical challenges, mitigate risks, and maximize the benefits of AI in healthcare entrepreneurship. Ethical considerations are not merely a regulatory requirement or a moral obligation but a foundational pillar that underpins the future of AI in healthcare entrepreneurship. By embracing ethics as a core value and guiding principle, healthcare entrepreneurs can navigate the complex ethical landscapes of AI-driven healthcare and pave the way for a more ethical, equitable, and sustainable future of healthcare innovation.

## Compliance with ethical standards

*Disclosure of conflict of interest*

There is no conflict of interest.

## References

[1]    Adefemi, A., Ukpoju, E.A., Adekoya, O., Abatan, A. and Adegbite, A.O., 2023. Artificial intelligence in environmental health and public safety: A comprehensive review of USA strategies. World Journal of Advanced Research and Reviews, 20(3), pp.1420-1434.

[2]    Adefemi, A., Ukpoju, E.A., Adekoya, O., Abatan, A. and Adegbite, A.O., 2023. Artificial intelligence in environmental health and public safety: A comprehensive review of USA strategies. World Journal of Advanced Research and Reviews, 20(3), pp.1420-1434.

[3]    Adekanmbi, A.O., Ani, E.C., Abatan, A., Izuka, U., Ninduwezuor-Ehiobu, N. and Obaigbena, A., 2024. Assessing the environmental and health impacts of plastic production and recycling. World Journal of Biology Pharmacy and Health Sciences, 17(2), pp.232-241.

[4] Adekanmbi, A.O., Ninduwezuor-Ehiobu, N., Abatan, A., Izuka, U., Ani, E.C. and Obaigbena, A., 2024. Implementing health and safety standards in Offshore Wind Farms.

[5] Adekanmbi, A.O., Ninduwezuor-Ehiobu, N., Izuka, U., Abatan, A., Ani, E.C. and Obaigbena, A., 2024. Assessing the environmental health and safety risks of solar energy production. World Journal of Biology Pharmacy and Health Sciences, 17(2), pp.225-231.

[6] Adelekan, O.A., Adisa, O., Ilugbusi, B.S., Obi, O.C., Awonuga, K.F., Asuzu, O.F. and Ndubuisi, N.L., 2024. EVOLVING TAX COMPLIANCE IN THE DIGITAL ERA: A COMPARATIVE ANALYSIS OF AI-DRIVEN MODELS AND BLOCKCHAIN TECHNOLOGY IN US TAX ADMINISTRATION. Computer Science & IT Research Journal, 5(2), pp.311-335.

[7] Adewusi, A.O., Asuzu, O.F., Olorunsogo, T., Iwuanyanwu, C., Adaga, E. and Daraojimba, D.O., 2024. AI in precision agriculture: A review of technologies for sustainable farming practices.

[8] Adewusi, A.O., Okoli, U.I., Olorunsogo, T., Adaga, E., Daraojimba, D.O. and Obi, O.C., 2024. Artificial intelligence in cybersecurity: Protecting national infrastructure: A USA.

[9] Akunne, L.I. and Etele, V.N., 2021. Occupational Stress as a Predictor of Mental Health Status of Universities Lecturers in South-East Nigeria. Journal of Education and Practice, 12(34), pp.27-33.

[10] Anyanwu, E. C., Arowoogun, J. O., Odilibe, I. P., Akomolafe, O., Onwumere, C., & Ogugua, J. O. (2024). The role of biotechnology in healthcare: A review of global trends.

[11] Anyanwu, E. C., Okongwu, C. C., Olorunsogo, T. O., Ayo-Farai, O., Osasona, F., & Daraojimba, O. D. (2024). ARTIFICIAL INTELLIGENCE IN HEALTHCARE: A REVIEW OF ETHICAL DILEMMAS AND PRACTICAL APPLICATIONS. *International Medical Science Research Journal*, *4*(2), 126-140.

[12] Ayinla, B.S., Amoo, O.O., Atadoga, A., Abrahams, T.O., Osasona, F. and Farayola, O.A., 2024. Ethical AI in practice: Balancing technological advancements with human values. International Journal of Science and Research Archive, 11(1), pp.1311-1326.

[13] Burr, C., & Leslie, D. (2023). Ethical assurance: a practical approach to the responsible design, development, and deployment of data-driven technologies. *AI and Ethics*, *3*(1), 73-98.

[14] Dozie, U. W., Benjamin, W. I., Innocent, D. C., Anyanwu, E. C., Chukwuocha, U. M., Innocent, R. C., ... & Okorie, M. O. (2024). Knowledge, acceptability and willingness to receive HPV vaccine among women in Owerri municipal Imo state. *Academic Journal of Health Sciences*, *39*(2), 37-45.

[15] Eboigbe, E.O., Farayola, O.A., Olatoye, F.O., Nnabugwu, O.C. and Daraojimba, C., 2023. Business intelligence transformation through AI and data analytics. Engineering Science & Technology Journal, 4(5), pp.285-307.

[16] Eboigbe, E.O., Farayola, O.A., Olatoye, F.O., Nnabugwu, O.C. and Daraojimba, C., 2023. Business intelligence transformation through AI and data analytics. Engineering Science & Technology Journal, 4(5), pp.285-307.

[17] Ehimuan, B., Akindote, O.J., Olorunsogo, T., Anyanwu, A., Olorunsogo, T.O. and Reis, O., 2024. Mental health and social media in the US: A review: Investigating the potential links between online platforms and mental well-being among different age groups. International Journal of Science and Research Archive, 11(1), pp.464-477.

[18] Ette, O.J., Sunday Igboro, B., Donatius, B., Charles Okuofu, A., Madu, U. and Etteh, C.C., 2021. Environmental isotope characteristics of water sources in the Sokoto Basin–an evaluation of the role of meteoric recharge and residence time. Isotopes in Environmental and Health studies, 57(1), pp.82-93.

[19] Farayola, O.A., Abdul, A.A., Irabor, B.O. and Okeleke, E.C., 2023. INNOVATIVE BUSINESS MODELS DRIVEN BY AI TECHNOLOGIES: A REVIEW. Computer Science & IT Research Journal, 4(2), pp.85-110.

[20] Gaillard, N. (2023). Ethical considerations of using artificial intelligence in healthcare.

[21] Gaur, L., & Jhanjhi, N. Z. (Eds.). (2023). *Metaverse Applications for Intelligent Healthcare*. IGI Global.

[22] Kaggwa, S., Eleogu, T.F., Okonkwo, F., Farayola, O.A., Uwaoma, P.U. and Akinoso, A., 2024. AI in Decision Making: Transforming Business Strategies. International Journal of Research and Scientific Innovation, 10(12), pp.423-444.

[23] Kelly, C. J., Karthikesalingam, A., Suleyman, M., Corrado, G., & King, D. (2019). Key challenges for delivering clinical impact with artificial intelligence. *BMC medicine*, *17*, 1-9.

[24] Konda, S. R. (2022). Ethical Considerations in the Development and Deployment of AI-Driven Software Systems. *INTERNATIONAL JOURNAL OF COMPUTER SCIENCE AND TECHNOLOGY*, *6*(3), 86-101.

[25] Loban, E., Scott, C., Lewis, V., & Haggerty, J. (2021). Measuring partnership synergy and functioning: Multi-stakeholder collaboration in primary health care. *PloS One*, *16*(5), e0252299.

[26] Murphy, K., Di Ruggiero, E., Upshur, R., Willison, D. J., Malhotra, N., Cai, J. C., ... & Gibson, J. (2021). Artificial intelligence for good health: a scoping review of the ethics literature. *BMC medical ethics*, *22*, 1-17.

[27] Nasir, S., Khan, R. A., & Bai, S. (2024). Ethical Framework for Harnessing the Power of AI in Healthcare and Beyond. *IEEE Access*, *12*, 31014-31035.

[28] Nembe, J.K., Atadoga, J.O., Mhlongo, N.Z., Falaiye, T., Olubusola, O., Daraojimba, A.I. and Oguejiofor, B.B., 2024. THE ROLE OF ARTIFICIAL INTELLIGENCE IN ENHANCING TAX COMPLIANCE AND FINANCIAL REGULATION. Finance & Accounting Research Journal, 6(2), pp.241-251.

[29] Obijuru, A., Arowoogun, J. O., Onwumere, C., Odilibe, I. P., Anyanwu, E. C., & Daraojimba, A. I. (2024). BIG DATA ANALYTICS IN HEALTHCARE: A REVIEW OF RECENT ADVANCES AND POTENTIAL FOR PERSONALIZED MEDICINE. *International Medical Science Research Journal*, *4*(2), 170-182.

[30] Odili, P.O., Daudu, C.D., Adefemi, A., Ekemezie, I.O. and Usiagu, G.S., 2024. THE IMPACT OF ARTIFICIAL INTELLIGENCE ON RECRUITMENT AND SELECTION PROCESSES IN THE OIL AND GAS INDUSTRY: A REVIEW. Engineering Science & Technology Journal, 5(2), pp.612-638.

[31] Odilibe, I. P., Akomolafe, O., Arowoogun, J. O., Anyanwu, E. C., Onwumere, C., & Ogugua, J. O. (2024). MENTAL HEALTH POLICIES: A COMPARATIVE REVIEW BETWEEN THE USA AND AFRICAN NATIONS. *International Medical Science Research Journal*, *4*(2), 141-157.

[32] Odonkor, B., Kaggwa, S., Uwaoma, P.U., Hassan, A.O. and Farayola, O.A., 2024. The impact of AI on accounting practices: A review: Exploring how artificial intelligence is transforming traditional accounting methods and financial reporting.

[33] Odonkor, B., Kaggwa, S., Uwaoma, P.U., Hassan, A.O. and Farayola, O.A., 2024. The impact of AI on accounting practices: A review: Exploring how artificial intelligence is transforming traditional accounting methods and financial reporting.

[34] Odonkor, B., Kaggwa, S., Uwaoma, P.U., Hassan, A.O. and Farayola, O.A., 2024. Integrating Artificial Intelligence in Accounting: A Quantitative Economic Perspective for the Future of US Financial Markets. Finance & Accounting Research Journal, 6(1), pp.56-78.

[35] Ogugua, J. O., Okongwu, C. C., Akomolafe, O. O., Anyanwu, E. C., & Daraojimba, O. D. (2024). MENTAL HEALTH AND DIGITAL TECHNOLOGY: A PUBLIC HEALTH REVIEW OF CURRENT TRENDS AND RESPONSES. *International Medical Science Research Journal*, *4*(2), 108-125.

[36] Ogugua, J. O., Onwumere, C., Arowoogun, J. O., & Chinyere, E. (2024). Data science in public health: A review of predictive analytics for disease control in the USA and Africa.

[37] Okem, E.S., Ukpoju, E.A., David, A.B. and Olurin, J.O., 2023. ADVANCING INFRASTRUCTURE IN DEVELOPING NATIONS: A SYNTHESIS OF AI INTEGRATION STRATEGIES FOR SMART PAVEMENT ENGIN

[38] Olorunsogo, T.O., Anyanwu, A., Abrahams, T.O., Olorunsogo, T., Ehimuan, B. and Reis, O., 2024. Emerging technologies in public health campaigns: Artificial intelligence and big data. International Journal of Science and Research Archive, 11(1), pp.478-487.

[39] Olorunsogo, T.O., Anyanwu, A., Abrahams, T.O., Olorunsogo, T., Ehimuan, B. and Reis, O., 2024. Emerging technologies in public health campaigns: Artificial intelligence and big data. International Journal of Science and Research Archive, 11(1), pp.478-487.

[40] Omaghomi, T. T., Elufioye, O. A., Akomolafe, O., Anyanwu, E. C., & Daraojimba, A. I. (2024). Health apps and patient engagement: A review of effectiveness and user experience.

[41] Osasona, F., Amoo, O.O., Atadoga, A., Abrahams, T.O., Farayola, O.A. and Ayinla, B.S., 2024. REVIEWING THE ETHICAL IMPLICATIONS OF AI IN DECISION MAKING PROCESSES. International Journal of Management & Entrepreneurship Research, 6(2), pp.322-335.

[42] Panesar, A. (2019). *Machine learning and AI for healthcare* (pp. 1-73). Coventry, UK: Apress.

[43] Petryshak, B. (2021). Building a platform for integration of AI-based algorithms into oncology diagnostic workflow.

[44] Ramos, J. (2024). AI Adoption and Implementation Strategies: Examining The Challenges and Best Practices in Adopting AI Technologies Within Businesses.

[45] Reddy, S., Allan, S., Coghlan, S., & Cooper, P. (2020). A governance model for the application of AI in health care. *Journal of the American Medical Informatics Association*, *27*(3), 491-497.

[46] Santosh, K. C., & Gaur, L. (2022). *Artificial intelligence and machine learning in public healthcare: Opportunities and societal impact*. Springer Nature.

[47] Silva, I., & Soto, M. (2022). Privacy-preserving data sharing in healthcare: An in-depth analysis of big data solutions and regulatory compliance. *International Journal of Applied Health Care Analytics*, *7*(1), 14-23.

[48] Trout, K. E. (2016). The Impact of Electronic Health Records on Healthcare Service Delivery, Patient Safety, and Quality.

[49] Wahab, N. A. B. A., & Nor, R. B. M. (2023). Challenges and Strategies in Data Management and Governance for AI-Based Healthcare Models: Balancing Innovation and Ethical Responsibilities. *AI, IoT and the Fourth Industrial Revolution Review*, *13*(12), 24-32.

[50] Wurcel, V., Cicchetti, A., Garrison, L., Kip, M. M., Koffijberg, H., Kolbe, A., ... & Zamora, B. (2019). The value of diagnostic information in personalised healthcare: a comprehensive concept to facilitate bringing this technology into healthcare systems. *Public health genomics*, *22*(1-2), 8-15.