

Navigating the Ethical Frontier: Governance Strategies in Artificial Intelligence: A Comprehensive Review

Mohamed Elsabbagh^{1*}

^{1*}Capitol Technology University, 11301 Springfield Rd, Laurel, MD 20708, USA

DOI: <https://doi.org/10.56293/IJASR.2024.6023>

IJASR 2024
VOLUME 7
ISSUE 4 JULY – AUGUST

ISSN: 2581-7876

Abstract: Artificial intelligence has evolved since its debut in 1950, resulting in widespread usage across a variety of sectors. This increased dependence on AI has highlighted ethical issues, emphasizing the importance of strong governance to enable responsible research and deployment. This review investigates the ethical issues and governance options surrounding artificial intelligence (AI), with a focus on its influence on community security in the United Arab Emirates. Additionally, it investigates AI ethics, compatibility, and intricacy in the setting of community security using a comprehensive review of 10 studies. The findings emphasize the need to resolve privacy issues and the impact of government regulations and laws on AI governance. The review underlines how important it is to create tailored governance structures that maintain ethical norms in AI applications both inside and outside of the United Arab Emirates and strike an appropriate balance between innovation and security. To guarantee that AI technology benefits society while limiting possible threats, it is crucial that we actively tackle these ethical and governance problems as AI continues to evolve.

Keywords: Artificial Intelligence, Governance, Privacy, Ethics, Digital Technology

1. Introduction:

The concept of Artificial Intelligence was initially proposed in the year 1950 with computer scientist Alan Turing claimed that machines demonstrate intelligent behavior (Kaul et al., 2020). However, the name “Artificial Intelligence” was originally developed in 1956 at a conference that took place at Dartmouth College which marks the beginning of a new digital era (Li, 2024). Artificial Intelligence has advanced greatly since then, owing to technological advancements, the rising need for automation, the growth of data-driven decision-making, the spread of digital devices, and major investment in R&D. It has quickly grown from a science fiction notion to a transformational force in a variety of sectors, changing the way we live and work. As Artificial Intelligence technologies evolve, concerns about its ethical usage, accountability, and societal effect have grown more apparent.

The increasing usage of digital technology has led to broad acceptance of Artificial Intelligence across several areas of society. Artificial Intelligence, particularly embodied AI in robots as well as machine learning techniques, has the potential to enhance economic, and social well-being, and human rights protection in a wide range of circumstances (Feijóo et al., 2020). It is also being used in critical areas like healthcare and humanitarian aid to everyday operations like Siri, Alexa, or Google Assistant (Brill et al., 2022). However, worries concerning potential misconduct and irregular activities have also surfaced, emphasizing the need to be successful.

Artificial Intelligence is being applied in a wide range of industries, including software and mobile technologies, financial markets, healthcare, education, detection and forecasting, and more (Sun & Medaglia, 2019). Artificial Intelligence algorithms have been created in the detection and forecasting domain to anticipate forest parameters, assess rainfall patterns, and estimate petroleum use (Waqas et al., 2023). Artificial Intelligence is being utilized in education to enhance the curriculum in radiology, and in the world of finance, AI algorithms have been implemented to evaluate vast volumes of data. AI-powered clinical assistance systems are employed in medicine to treat patients with lung cancer (Bidzińska & Szurowska, 2023). Mobile games are programmed using AI algorithms in software and mobile technologies, demonstrating the broad application of Artificial Intelligence in a variety of sectors. By 2035, the financial services sector is projected to make the most substantial contribution to the UAE’s economy through artificial intelligence, amounting to approximately \$37 billion (Statista, 2022).

In the Era of Sustainable Development, artificial intelligence is changing government policy, business, and corporate practices. Technologies like deep learning and robots are resolving cognitive issues related to human intellect, which is transforming society and the economy. Concerns about economic inequality, employment displacement, and existential risks are raised by the rapid development of AI. Scientists like Dr. Eric Horvitz, however, contend that AI will impact society in both beneficial and detrimental ways, underscoring the necessity of responsible development and control (Goralski & Tan, 2020). The use of AI is accelerating beyond the reach of regulatory and legal structures, emphasizing the necessity of proactive governance measures. Global issues like poverty and the deterioration of the environment can be addressed by AI, but unregulated growth might make the inequality currently existing worse. AI-powered agriculture projects and intelligent water management systems are examples of projects that show how AI can enhance people's lives (Goralski & Tan, 2020). The promise of AI to improve lifestyles and support sustainable development is demonstrated by efforts like intelligent water management systems or AI-powered agriculture.

Despite Artificial Intelligence's immense potential, ethical concerns have surfaced as a major obstacle. Biases, transparency, and accountability are the major ethical considerations in Artificial Intelligence, with algorithmic and data biases offering unique challenges (Coeckelbergh, 2020). Algorithmic bias arises when AI systems display discriminating behavior, which frequently reflects the biases existing in the data that was utilized for training them (Ntoutsis et al., 2020). Data bias is the existence of skewed or inaccurate information, which leads to biased results. Providing that AI systems are equitable, open, and responsible is critical to addressing these ethical concerns. Governance techniques are essential for tackling these ethical concerns. Ethical frameworks can guide the appropriate utilization of Artificial Intelligence, whereas laws can guarantee that AI systems adhere to ethical norms and legal constraints.

To diversify its economy away from reliance on oil, the United Arab Emirates is proactively establishing itself as a leader in the field of artificial intelligence. According to projections, with substantial expenditures in AI technology, the UAE's GDP might benefit from AI up to 96 billion US dollars by 2030, representing 13.6% of total GDP (Babiker, 2023). This significant economic effect highlights how crucial AI is to the UAE's economic growth.

The United Arab Emirates (UAE) has embarked on a transformative journey with Artificial Intelligence (AI) at its core, driven by the visionary leadership of His Highness Sheikh Mohammed bin Rashid Al Maktoum. Since the launch of the UAE's Artificial Intelligence Strategy in 2017, the country has been actively integrating AI into various sectors to position itself as a global leader in AI adoption and innovation (Al Darwish, 2021). This strategic initiative is underscored by the establishment of an independent ministry dedicated to the UAE's AI Strategy, highlighting the government's commitment to leveraging AI for economic growth, efficiency improvements, and workforce development.

AI is seen as a catalyst for economic diversification and job creation in the UAE, with the government aiming to enhance project performance, drive positive economic outcomes, and reduce reliance on expatriate workers (Crupi & Schilirò, 2023). By focusing on AI, the UAE is not only aiming to improve operational efficiency but also reshape the labor market and population dynamics in the country. The strategic focus on AI is part of a broader vision to drive sustainable development and economic prosperity through cutting-edge technologies (Rane, 2023). Moreover, AI presents vast economic opportunities across various sectors in the UAE. From enhancing product quality to reducing operational costs, AI is poised to revolutionize how businesses and government entities operate. The government's efforts to promote awareness about AI among leaders, managers, and employees are paving the way for the widespread adoption of AI technologies to drive innovation and service excellence.

Artificial Intelligence (AI) technology is advancing at a rapid pace, but the United Arab Emirates (UAE) lacks extensive ethical frameworks and policies to deal with the ethical issues it raises. Due to this disparity, there have been cases of unjust outcomes, privacy violations, and an absence of transparency in AI systems in the UAE. The purpose of this review is to thoroughly examine the moral dilemmas raised by AI in the United Arab Emirates and offer possible responses. By examining the ethical aspects of AI technology in the setting of the United Arab Emirates, the review aims to support the creation of ethical frameworks particular to the country that can lead to the responsible application of this technology.

2. Methodology

The review examined the ethical issues surrounding AI technology applications in various sectors through a comprehensive literature analysis. It uses a multi-stage approach, identifying academic sources, extracting relevant studies, organizing them, and assessing them individually and collectively. The findings provide insights into the UAE government's current regulation and its effectiveness in resolving ethical concerns and propose provisions for new policies to strengthen the UAE's AI regulatory framework. To fully address this issue, the approach that includes database collecting techniques and strategic search criteria can be utilized as shown in Table 1:

Table 1: Search Strategies

S. no	Search Strategies
1.	("AI in different sectors") AND ("Ethical concerns of AI") AND ("Governance strategies for AI") AND ("AI in UAE") AND ("AI and privacy concerns") AND ("Impact of AI on UAE's economy")
2.	("Ethical concerns of AI in UAE") AND ("AI initiatives in UAE") AND ("Data privacy issues in AI") AND ("Biases and fairness in AI") AND ("Transparency and accountability in AI")
3.	("AI governance frameworks") AND ("Laws of UAE for biases and fairness") AND ("International data protection laws") AND ("Laws for ethical concerns")

Table 2: Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Studies that explore governance frameworks, policies, or guidelines related to AI ethics were included.	Studies that do not explore governance frameworks, policies, or guidelines related to AI ethics were excluded.
Information related to the UAE was included.	Information not related to the UAE was excluded.
Studies that provide insights into how AI affects society, notably in terms of accountability, fairness, and transparency.	Studies that do not provide any ethical concerns were excluded.
Studies that are about the keywords from the title were included.	Studies that are not about the keywords from the title were excluded.

Table 2 demonstrates the inclusion and exclusion criteria for evaluation of the literature on AI ethics and governance, as well as within the UAE context. It specifies the types of research to be included, such as studies concerned with frameworks of governance and societal effects as well as the criteria for exclusion, i.e. lack of involvement or moral considerations. Primarily, it is a compass for narrowing a vast array of applicable literature to focus on in the review. Whereas, the article selection for the review is displayed in Table 3.

Table 3: Article Selection

S. no	Author	Journal/Dissertation	Year	Findings
1.	Khaled Abdo Saif Almuraqab, Dr. Rawhi Alrae, Dr. Nasser A. Saif Almuraqab	Journal of Namibian Studies	2023	The article aims to advance e-commerce in the UAE and globally by addressing cybercrime, ethical AI challenges, fraudulent activities,

				and general sector regulation through the development, legislation, and implementation of regulations and policies.
2.	Fatma Khamis Al Badi, Khawla Ali Alhosani, Fauzia Jabeen, Agata Stachowicz-Stanusch, Nazia Shehzad and Wolfgang AMANN	The Journal of Business Perspective	2021	The study highlights accuracy, privacy, and security as key challenges for AI adoption in the UAE's healthcare sector, emphasizing the need for attention to bias, discrimination, and technology vendor practices.
3.	Stefan Larsson, Fredrick Heintz	Internet Policy Review	2020	The study examines transparency in artificial intelligence (AI) from socio-legal and computer scientific viewpoints, emphasizing its multifaceted nature and its importance in AI governance and regulatory debates. It also mentions challenges such as the "black box" perception.
4.	Mohanad Halaweh	Journal of Artificial Intelligence Research	2018	The paper discusses the UAE's adoption of Artificial Intelligence (AI) in the form of Gov. 3.0, highlighting its positive impacts on society, businesses, organizations, and the AI industry. It also recommends the AI Ministry and Ministry of Education to prepare for AI integration in various sectors.
5.	WASSIM EL ASMAR	The British University in Dubai	2022	The study investigates the impact of AI-powered digital educational platforms on students' learning and teachers' practice in a private high school in Dubai, focusing on the relevance and effectiveness of AI in education.
6.	Rusul Abduljabbar, Hussein Dia, Sohani Liyanage, and Saeed Asadi Bagloee	Sustainability	2019	This article discusses the applications of AI in transportation, including autonomous vehicles, public transport, and traffic management, highlighting its role in addressing challenges like increasing travel demand and CO2 emissions. It also mentions challenges such as the "black box" perception of neural networks and potential bias in training data.

7.	Prof. Dr. Lilian Mitrou	Artificial Intelligence and Cognitive Services: Is the General Data Protection Regulation (GDPR) 'Artificial Intelligence-Proof'	2018	This article examines whether the General Data Protection Regulation (GDPR) is suitable for regulating Artificial Intelligence (AI). It discusses how AI processes personal data, the GDPR's application to AI, and how AI impacts data protection principles and ethics.
8.	Fahad Khaled Alkhalidi and Suad Altaei	The Fourth Industrial Revolution: Implementation of Artificial Intelligence for Growing Business Success	2021	The study examines the UAE's successful integration of artificial intelligence (AI) into various sectors, highlighting its role in economic growth, job creation, and societal development. It also suggests strategies for other Gulf countries to leverage AI for similar benefits.
9.	Daiju Ueda, Taichi Kakinuma, Shohei Fujita, Koji Kamagata, Yasutaka Fushimi, Rintaro Ito, Yusuke Matsui, Taiki Nozaki, Takeshi Nakaura, Noriyuki Fujima, Fuminari Tatsugami, Masahiro Yanagawa, Kenji Hirata, Akira Yamada, Takahiro Tsuboyama, Mariko Kawamura, Tomoyuki Fujioka, Shinji Naganawa	Japanese Journal of Radiology	2024	This study explores the challenges of fairness in integrating artificial intelligence (AI) into clinical practice, focusing on biases and discrimination. It emphasizes the need for cooperation among stakeholders to ensure equitable AI integration in healthcare.
10.	Eirini Ntoutsis, Pavlos Fafalios, Ujwal Gadiraju, Vasileios Iosifidis, Wolfgang Nejd, Maria-Esther Vidal, Salvatore Ruggieri, Franco Turini, Symeon Papadopoulos, Emmanouil Krasanakis, Ioannis Kompatsiaris, Katharina Kinder-Kurlanda, Claudia Wagner, Fariba Karimi, Miriam Fernandez, Harith Alani, Bettina Berendt, Tina Kruegel, Christian Heinze,	Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery	2020	This study explores the issue of bias in AI-based decision-making systems, focusing on healthcare. It emphasizes the need to embed ethical and legal principles in AI design to ensure social good and discusses technical challenges, solutions, and future research directions in addressing bias.

	Klaus Broelemann, Gjergji Kasneci, Thanassis Tiropanis, Steffen Staab			
--	--	--	--	--

3. Discussion:

In the UAE, Artificial Intelligence is quickly changing several industries, including government services, healthcare, banking, and transportation. The government of the UAE has embraced AI with an initiative to boost productivity and improve services. Dubai, for example, intends to be completely AI-powered by 2031 (Vij & Rizwan, 2022). AI is being utilized in banking for identifying fraud and customer service, in healthcare for better diagnosis and treatment preparation, in transportation for controlling traffic and automated vehicles, and in government organizations for process optimization and improved citizen experiences (Abduljabbar et al., 2019; Al Badi et al., 2022; Mytnyk et al., 2023).

However, the fast adoption of AI generates ethical problems, including privacy, algorithm prejudice, and its effect on jobs. As a result, there is an increasing demand for thorough ethical frameworks and rules governing the implementation of AI in the UAE. To address these issues, the government has established the UAE AI Ethics Council, which will guarantee that AI technologies are created and utilized responsibly and ethically. The UAE has become the first country to nominate a State Minister for Artificial Intelligence (AI), ushering in a new age of digital governance named Gov. 3.0 (Halaweh, 2018).

The UAE AI Ministry was founded in October 2017 to compete on a worldwide scale in the development and implementation of AI tools, programs, and systems (Al Badi et al., 2022). The short-term goal is to improve government performance, output, and efficiency at all levels and fields, to implement an integrated smart digital system capable of overcoming challenges and providing quick and efficient solutions, to position the UAE as a leader in AI investment across multiple sectors, and to create an entirely novel, vibrant marketplace with significant economic significance. The government of the United Arab Emirates launched several AI projects and efforts before deciding to establish an AI ministry. AI systems and applications are already in use in the UAE across several industries, including banking, water and energy, security and police departments, and others. The "One Million Arab Coders Initiative" and the "AI and Robotics Award for Good" in the United Arab Emirates are two more AI projects (Halaweh, 2018).

The establishment of the AI Ministry and the transition to the third generation of digital government will have impacts that include a rise in employment, higher income from the sale and production of AI, and a change from the industrial to the digital economies (Halaweh, 2018). As more nations realize how crucial AI is to creating intelligent governments and contemporary, technology-based cities, they may also create AI ministries or launch related projects. Global earnings from AI are predicted to rise, as is the market for AI systems and applications worldwide.

In the UAE, artificial intelligence (AI) is revolutionizing the healthcare industry by lowering costs and enhancing patient outcomes. Machine learning is being used by organizations such as the Dubai Health Authority (DHA) to improve diagnosis and address growing demand in the area. The goal of the UAE AI plan is to invest in AI at the highest pace globally (Sharfi, 2021). AI initiatives are being used to save healthcare costs and enhance patient outcomes. One example of this is IBM Watson. With its ability to solve biological issues, AI is also having a big impact on medicine (Ahuja, 2019).

AI systems are particularly good at predictive analytics, which involves using socioeconomic or predictive data to forecast hospitalization and death rates. However, because predictive analytics involves enormous data sets, implementation might be difficult. For disorders like heart attacks to be effectively predicted and treated, daily monitoring is essential. Health monitoring helps the aging population and enhances quality of life (Sun et al., 2023).

3.1 Artificial Intelligence in Different Sectors of UAE:

In the United Arab Emirates (UAE), artificial intelligence is quickly changing several industries, particularly healthcare, energy, education, and e-commerce. AI is being utilized in the healthcare industry to enhance patient outcomes, treatment planning, and diagnosis. Machine learning is being used by organizations such as the Dubai Health Authority (DHA) to improve diagnosis and address growing demand in the area. The UAE AI policy intends to invest in AI at the highest pace in the world, with the healthcare industry anticipated to gain greatly from it.

Artificial Intelligence (AI) is proving to be a valuable tool in the energy industry as it helps with production level optimization, business innovation, and alignment with overall corporate strategy. The UAE government is eager to use AI's advantages to further its energy objectives. According to estimates, artificial intelligence (AI) has made a considerable contribution to the UAE's energy industry and holds great promise for future improvements in the design and administration of energy systems (Almarashda et al., 2021).

Artificial Intelligence (AI) is transforming education by increasing student access to instructional content through digital devices and systems. Learning experiences are becoming more personalized because of AI-powered educational systems, which let students learn at their speed and ease. The UAE Ministry of Education is aggressively pushing the application of AI in the classroom to improve the atmosphere for learning and encourage students' growth as self-sufficient learners (Al Darayseh, 2023; EL ASMAR, 2022).

Artificial Intelligence is being utilized responsibly in the e-commerce industry to improve company outcomes and consumer experiences. AI technology has been embraced by the UAE's e-commerce sector to encourage online sales of products and services. To guarantee the ethical acceptance and deployment of AI in e-commerce, there are still issues about data security and privacy that must be resolved (Almuraqab et al., 2023).

Overall, AI is having a substantial impact on numerous industries in the UAE, resulting in increased efficiency, creativity, and competitiveness. The UAE government's deliberate strategy for AI adoption and regulation offers an excellent instance for other countries eager to reap the advantages of AI while minimizing its risks.

3.2 Ethical Concerns of Artificial Intelligence:

Artificial Intelligence is leading the technological revolution aiming to provide solutions and ease in different domains all around the world, particularly UAE. Yet, some ethical implications have to be addressed before AI completely revolutionizes the industries. With the implementation of AI in different industries such as healthcare, education, and tourism increasing, the concerns regarding privacy, transparency, accountability, biases, and decision-making also increase (Nassar & Kamal, 2021).

The use of Artificial Intelligence raises a serious concern regarding privacy as AI systems frequently utilize large volumes of personal data. For example, the healthcare industry uses AI systems to store large amounts of patient data which can be affected due to ethical concerns. Concerns about possible abuse, data security, and informed permission surface. To guarantee the ethical application of AI, developers must abide by data privacy laws and incorporate privacy-preserving techniques. Furthermore, in the digital era, data security is essential as compromised data can result in identity theft and breaches of privacy (Sharma et al., 2020). Sustaining confidence in AI systems requires taking precautions against data being misused and exploited.

Artificial intelligence (AI) raises ethical concerns regarding bias and fairness, since AI systems may reinforce biases existing in training data, resulting in biased outcomes. For example, a system for facial recognition developed on biased data may demonstrate racial bias, misidentifying people from specific ethnic backgrounds more frequently (Ntoutsis et al., 2020). To tackle these ethical problems, researchers are working on approaches to reduce bias in AI systems, including preparing data to eliminate biases and changing algorithms to guarantee fair decision-making.

For the implementation of AI systems in different industries, it is important to ensure transparency and accountability for ethical morals. The possibility of a black box can be reduced with the help of transparency which will ensure the decision-making process of AI is visible and transparent (Larsson & Heintz, 2020). By ensuring transparency in the system, the stakeholders can evaluate the accountability and fairness of the AI system. For example: transparent and accountable AI systems in the healthcare industry can verify diagnostic AI tools to

provide unbiased and reliable results hence improving overall patient care (Ueda et al., 2024). Ensuring accountability in the AI system is very important in holding parties accountable for the results of the AI system and allowing an alternative for an individual who has been affected by the decisions of AI. Hence, transparency and accountability work together to establish trust in AI systems and ensure ethical practices in the workplace.

3.3 Governance Frameworks for Artificial Intelligence:

There is a necessary need for a governance framework and regulations to protect the rights of the user. The frameworks are required to control risks and increase the benefit of AI technology in different sectors. Laws such as Federal Decree-Law No. 34 of 2023 among other regulations oppose discrimination, hatred, and extremism in the UAE environment (U.AE, 2023). This law stands at the forefront of AI technology and the ethical issues regarding discrimination and fairness. The UAE Ministry of AI and Smart Dubai has taken a soft approach to regulation, concentrating on non-binding principles to encourage ethical and responsible AI research.

General Data Protection Regulation (GDPR), is a well-known framework that protects data on a large scale critical for AI systems, safeguarding from breaches of privacy and identity theft. GDPR aims to ensure transparency, which lets individual understand their data and its uses (Mitrou, 2018). It also ensures accountability, making developers and users liable for any breaches or unfair implications.

BRAIN, a national program for AI exists in UAE which is in charge of collecting resources to meet the country's AI policy objective as well as becoming an international leader in responsible AI use (U.AE, 2021). In 2017, the UAE released its AI strategy accompanied by the "National Artificial Intelligence Strategy 2031" in 2019 which focuses on improving AI governance and encouraging creative AI solutions (AL YAZEEDI, 2021). The policy also seeks to encourage the development of breakthrough AI solutions in the nation as a whole. Furthermore, the UAE created history in 2017 by choosing the world's first AI minister, showcasing its dedication to the advancement of AI technology and administration (Alkhaldi & Altaei, 2021).

Each year, independent regulatory bodies concerned with issues like privacy, freedom of information, and data protection come together to form the International Conference of Data Protection and Privacy Commissioners (ICDPPC). ICDPPC is a global forum where the bodies create and release reliable resolutions and recommendations directed at national and international authorities (ICDPPC, 2019). This assembly plays a crucial role in shaping global privacy and data protection policies and standards, influencing matters that are pertinent to the UAE's AI governance plans and data protection laws.

4. Findings

This review uses information from several research and professional viewpoints to examine the current state of ethical standards, public policy, and regulatory frameworks around artificial intelligence (AI). Artificial intelligence presents a frontier of ethical issues that need to be carefully navigated to ensure ethical development and use. Using information from a range of research and professional viewpoints, this conversation explores the current state of ethical standards, public policy, and regulatory frameworks around artificial intelligence.

To address possible ethical issues associated with AI systems, several businesses have implemented ethical standards. These rules demonstrate a dedication to the creation of ethical AI and are frequently founded on important concepts like responsibility, interpretability, fairness, privacy, and openness. For example, gaining user trust requires transparency, but upholding human rights and avoiding bias need fairness (Aizenberg & Van Den Hoven, 2020). GDPR and other privacy regulations are essential for protecting user data. Additionally, accountability is emphasized, highlighting the necessity of distinct lines of accountability in the creation and application of AI (Regulation, 2018).

Concerns about the ethical implications of AI and incidents like the Tesla autopilot catastrophe have fueled a rapid evolution of the public conversation on AI ethics (Mingsung et al., 2020). The role of media coverage has been noteworthy, since pieces have emphasized ethical concerns and provided helpful suggestions. Although some media may exaggerate the risks posed by AI, overall the narrative has become more serious and critical (Ouchchy et al., 2020). This shows a sophisticated awareness of the possible advantages and disadvantages of artificial intelligence

for society. The establishment of legal frameworks for AI is becoming more popular, and proposals for explicit guidelines to uphold individual rights are being made. The EU's GDPR establishes a priority, yet industry self-regulation is preferred in the USA (Hacker, 2020). On the necessity of government intervention to guarantee the development of ethical AI, there is, nonetheless, growing consensus. Instances such as the Tesla Autopilot incident have emphasized how crucial legislation is to mitigate the hazards associated with AI.

Despite advancements, there are still hurdles to ethical AI development and governance. The public discourse should be more nuanced, with an emphasis on raising public knowledge and stakeholder engagement. Collaboration among ethicists, AI professionals, and legislators is critical for creating complete regulatory frameworks (Ouchchy et al., 2020). Furthermore, tackling challenges like as loss of employment and the digital divide is critical for ensuring that AI serves society as a whole.

The United Arab Emirates (UAE) is fast emerging as the world's leader in artificial intelligence (AI), to reduce dependency on oil and diversify the economy (Crupi & Schilirò, 2023). Through considerable investments in AI technology, the UAE is expected to increase its GDP by as much as 96 billion US dollars by 2030. This significant economic effect highlights the crucial role AI has in the UAE's economic growth (Babiker, 2023). However, as AI expands in the UAE, there is a pressing requirement to address ethical concerns before they deepen. The UAE has welcomed artificial intelligence (AI) as a game-changing technology in several industries, through programs like the UAE AI Strategy 2031 and the creation of the UAE AI Ethics Guidelines. Even while AI has a great deal of opportunity for innovation and economic progress, ethical issues including privacy, biases, and accountability need to be carefully considered (Al-Barakati, 2021). Other countries may learn a lot from the UAE's proactive strategy for AI governance, which includes the establishment of legal frameworks and the encouragement of ethical AI development. The UAE is leading the way in the proper integration of AI into society as a whole guaranteeing that its advantages are achieved while minimizing any hazards, by emphasizing ethical issues and putting strong governance systems in place.

The UAE is dedicated to tackling the ethical issues surrounding AI through international cooperation, as seen by its active engagement in international forums such as the ICDPPC discussed in this review. This interaction emphasizes the understanding that ethical problems in AI are international and seek for collective solutions. Furthermore, the UAE's proactive attitude and creative tactics make its approach to AI governance distinguish. This makes it a model for other countries attempting to negotiate the ethical challenges of AI.

5. Conclusion:

The article underscores the growing demand and impact of AI on digitalized societies, stressing its function in tackling complex issues and pushing advancements in several sectors. The emphasis on ethical and governance frameworks for AI highlights the necessity for responsible AI research and use. Although the discussion covered theoretical material and brought up important issues like bias and fairness, it additionally emphasized how crucial it is to use real-world applications and empirical data to guide policy and decision-making.

As AI evolves, it is critical to promote transparency, accountability, and diversity in its design and implementation. This necessitates collaboration across stakeholders, including government, business, academia, and civil society, to guarantee that AI technologies are created and employed in ways that benefit society as a whole. Furthermore, efforts should be taken to close the digital gap and guarantee that the advantages of AI are available to everyone, even those in underprivileged areas. By accepting these principles, we can realize AI's full promise while reducing its risks, ultimately resulting in a more egalitarian and equitable future for all.

6. Limitations:

- Rapid technological developments in artificial intelligence may exceed present knowledge and legal frameworks.
- The ongoing technological revolution might substantially transform the AI ethics and governance environment, potentially leaving current techniques outdated.

7. Future Recommendations:

- Employ empirical studies and case studies to demonstrate the actual applicability of AI governance structures and ethical standards across several sectors.
- Create and deploy AI governance frameworks that are suited to the UAE and Gulf region's particular needs and settings.
- Work with stakeholders to develop norms and laws that promote fairness, transparency, and accountability in applications of artificial intelligence.

Acknowledgment

N/A

Competing interests

The authors declare no competing interests.

Funding

No funds, grants, or other support was received.

8. References

1. Abduljabbar, R., Dia, H., Liyanage, S., & Bagloee, S. A. (2019) Applications of artificial intelligence in transport: An overview. *Sustainability*, 11(1), 189. <https://doi.org/10.3390/su11010189>
2. Ahuja, A. S. (2019) The impact of artificial intelligence in medicine on the future role of the physician. *PeerJ*, 7, e7702. <https://doi.org/10.7717/peerj.7702>
3. Aizenberg, E., & Van Den Hoven, J. (2020) Designing for human rights in AI. *Big Data & Society*, 7(2), 2053951720949566. <https://doi.org/10.1177/2053951720949566>
4. Al-Barakati, A. A. H. (2021) Establishing a Case for Developing a Governance Framework for AI Regulations in the Gulf Cooperation Council Countries. *JKAU Computing and Information Technology Sciences*, 10, 19-35.
5. Al Badi, F. K., Alhosani, K. A., Jabeen, F., Stachowicz-Stanusch, A., Shehzad, N., & Amann, W. (2022) Challenges of AI Adoption in the UAE Healthcare. *Vision*, 26(2), 193-207. <https://doi.org/10.1177/0972262920988398>
6. Al Darayseh, A. (2023) Acceptance of artificial intelligence in teaching science: Science teachers' perspective. *Computers and Education: Artificial Intelligence*, 4, 100132. <https://doi.org/10.1016/j.caeai.2023.100132>
7. Al Darwish, M. A. (2021) The Effect of Artificial Intelligence in Smart Decision-Making in the UAE Government.
8. AL YAZEEDI, A. M. (2021) *An analysis of the forces influencing the implementation of artificial intelligence in the intellectual property sector in UAE* The British University in Dubai (BUiD)].
9. Alkhaldi, F. K., & Altaei, S. (2021) Emirates Leading Experience in Employing Artificial Intelligence. *The Fourth Industrial Revolution: Implementation of Artificial Intelligence for Growing Business Success*, 241-251. https://doi.org/10.1007/978-3-030-62796-6_14
10. Almarashda, H. A. H. A., Baba, I. B., Ramli, A. A., Memon, A. H., & Rahman, I. A. (2021) Human resource management and technology development in artificial intelligence adoption in the UAE energy sector. *Journal of Applied Engineering Sciences*, 11(2), 69-76. DOI: 10.2478/jaes-2021-0010
11. Almuraqab, K. A. S., Alrae, R., & Almuraqab, N. A. S. (2023) Ethical Challenges of Adopting AI and E-commerce in UAE. *Journal of Namibian Studies: History Politics Culture*, 34, 1674-1684.
12. Babiker, A. (2023) Artificial Intelligent in UAE (A Study on the Uses and Attitudes of AI in Media Companies) *International Journal Of Automation And Digital Transformation*, 1(1), 4-8.
13. Bidzińska, J., & Szurowska, E. (2023) See Lung Cancer with an AI. *Cancers*, 15(4), 1321. <https://doi.org/10.3390/cancers15041321>
14. Brill, T. M., Munoz, L., & Miller, R. J. (2022) Siri, Alexa, and other digital assistants: a study of customer satisfaction with artificial intelligence applications. In *The Role of Smart Technologies in Decision Making* (pp. 35-70) Routledge.

15. Coeckelbergh, M. (2020) *AI ethics*. Mit Press.
16. Crupi, A., & Schilirò, D. (2023) The UAE Economy and the Path to Diversification and Innovation. *INTERNATIONAL JOURNAL OF BUSINESS MANAGEMENT AND ECONOMIC RESEARCH*, 2286-2300.
17. EL ASMAR, W. (2022) *The Effectiveness of AI-Powered Digital Educational Platforms: Students' Attainment and Teachers' Teaching strategies in a private high school in Dubai* The British University in Dubai (BUiD)].
18. Feijóo, C., Kwon, Y., Bauer, J. M., Bohlin, E., Howell, B., Jain, R., Potgieter, P., Vu, K., Whalley, J., & Xia, J. (2020) Harnessing artificial intelligence (AI) to increase wellbeing for all: The case for a new technology diplomacy. *Telecommunications Policy*, 44(6), 101988. <https://doi.org/10.1016/j.telpol.2020.101988>
19. Goralski, M. A., & Tan, T. K. (2020) Artificial intelligence and sustainable development. *The International Journal of Management Education*, 18(1), 100330. <https://doi.org/10.1016/j.ijme.2019.100330>
20. Hacker, P. (2020) AI regulation in Europe. *Available at SSRN 3556532*. <https://dx.doi.org/10.2139/ssrn.3556532>
21. Halaweh, M. (2018) Artificial intelligence government (Gov. 3.0): the UAE leading model. *Journal of Artificial Intelligence Research*, 62, 269-272. <https://doi.org/10.1613/jair.1.11210>
22. ICDPPC. (2019) *About ICDPPC*. 41st International Conference of Data Protection and Privacy Commissioners. <https://privacyconference2019.info/about/about-icdppc/#:~:text=The%20International%20Conference%20of%20Data,to%20governments%20and%20international%20organisations.>
23. Kaul, V., Enslin, S., & Gross, S. A. (2020) History of artificial intelligence in medicine. *Gastrointestinal endoscopy*, 92(4), 807-812. <https://doi.org/10.1016/j.gie.2020.06.040>
24. Larsson, S., & Heintz, F. (2020) Transparency in artificial intelligence. *Internet Policy Review*, 9(2) DOI: 10.14763/2020.2.1469
25. Li, K. (2024) Shaw and Artificial Intelligence. In *Bernard Shaw, Automata, Robots, and Artificial Intelligence* (pp. 49-67) Springer.
26. Mingsung, C., Qiaoying, C., & You, W. (2020) Research on the Responsibility of Automatic Driving Vehicle Accident. 2020 4th International Seminar on Education, Management and Social Sciences (ISEMSS 2020), <https://doi.org/10.2991/assehr.k.200826.125>
27. Mitrou, L. (2018) Data protection, artificial intelligence and cognitive services: is the general data protection regulation (GDPR) 'artificial intelligence-proof'? *Artificial Intelligence and Cognitive Services: Is the General Data Protection Regulation (GDPR) 'Artificial Intelligence-Proof'*. <https://dx.doi.org/10.2139/ssrn.3386914>
28. Mytnyk, B., Tkachyk, O., Shakhovska, N., Fedushko, S., & Syerov, Y. (2023) Application of Artificial Intelligence for Fraudulent Banking Operations Recognition. *Big Data and Cognitive Computing*, 7(2), 93. <https://doi.org/10.3390/bdcc7020093>
29. Nassar, A., & Kamal, M. (2021) Ethical dilemmas in AI-powered decision-making: a deep dive into big data-driven ethical considerations. *International Journal of Responsible Artificial Intelligence*, 11(8), 1-11.
30. Ntoutsis, E., Fafalios, P., Gadiraju, U., Iosifidis, V., Nejdil, W., Vidal, M. E., Ruggieri, S., Turini, F., Papadopoulos, S., & Krasanakis, E. (2020) Bias in data-driven artificial intelligence systems—An introductory survey. *Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery*, 10(3), e1356. <https://doi.org/10.1002/widm.1356>
31. Ouchchy, L., Coin, A., & Dubljević, V. (2020) AI in the headlines: the portrayal of the ethical issues of artificial intelligence in the media. *AI & SOCIETY*, 35, 927-936. <https://doi.org/10.1007/s00146-020-00965-5>
32. Rane, N. (2023) Integrating leading-edge artificial intelligence (AI), internet of things (IOT), and big data technologies for smart and sustainable architecture, engineering and construction (AEC) industry: Challenges and future directions. *Engineering and Construction (AEC) Industry: Challenges and Future Directions (September 24, 2023)* <https://dx.doi.org/10.2139/ssrn.4616049>
33. Regulation, G. D. P. (2018) General data protection regulation (GDPR) *Intersoft Consulting, Accessed in October, 24(1)*
34. Sharfi, M. (2021) The GCC and global health diplomacy: the new drive towards artificial intelligence. *Artificial Intelligence in the Gulf: Challenges and Opportunities*, 117-139. https://doi.org/10.1007/978-981-16-0771-4_7
35. Sharma, N., Oriaku, E. A., & Oriaku, N. (2020) Cost and effects of data breaches, precautions, and disclosure laws. *International Journal of Emerging Trends in Social Sciences*, 8(1), 33-41. DOI: 10.20448/2001.81.33.41
36. Statista. (2022) *UAE: AI contribution by sector 2035 | Statista*. Statista. <https://www.statista.com/statistics/1244049/uae-ai-contribution-by-sector-2035/>

37. Sun, Q. J., Lai, Q. T., Tang, Z., Tang, X. G., Zhao, X. H., & Roy, V. A. (2023) Advanced Functional Composite Materials toward E-Skin for Health Monitoring and Artificial Intelligence. *Advanced Materials Technologies*, 8(5), 2201088. <https://doi.org/10.1002/admt.202201088>
38. Sun, T. Q., & Medaglia, R. (2019) Mapping the challenges of Artificial Intelligence in the public sector: Evidence from public healthcare. *Government Information Quarterly*, 36(2), 368-383. <https://doi.org/10.1016/j.giq.2018.09.008>
39. U.AE. (2021) *Artificial intelligence in government policies* | *The Official Portal of the UAE Government*. U.AE. <https://u.ae/en/about-the-uae/digital-uae/digital-technology/artificial-intelligence/artificial-intelligence-in-government-policies>
40. U.AE. (2023) *The UAE's law against discrimination, hatred and extremism* | *The Official Portal of the UAE Government*. U.AE. <https://u.ae/en/about-the-uae/culture/tolerance/anti-discriminationanti-hatred-law>
41. Ueda, D., Kakinuma, T., Fujita, S., Kamagata, K., Fushimi, Y., Ito, R., Matsui, Y., Nozaki, T., Nakaura, T., & Fujima, N. (2024) Fairness of artificial intelligence in healthcare: review and recommendations. *Japanese Journal of Radiology*, 42(1), 3-15. <https://doi.org/10.1007/s11604-023-01474-3>
42. Vij, M., & Rizwan, S. A. (2022) Emerging Technologies in Tourism for a Better Experience: The Case of Dubai. *Technology Application in Tourism in Asia: Innovations, Theories and Practices*, 97-107. https://doi.org/10.1007/978-981-16-5461-9_6
43. Waqas, M., Humphries, U. W., Wangwongchai, A., Dechpichai, P., & Ahmad, S. (2023) Potential of Artificial Intelligence-Based Techniques for Rainfall Forecasting in Thailand: A Comprehensive Review. *Water*, 15(16), 2979. <https://doi.org/10.3390/w15162979>