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# Analytical Study of the World's First EU Artificial Intelligence (AI) Act, 2024

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**ABSTRACT:**

 The world's first law governing "artificial inelegance" has arrived! The emergence of Artificial Intelligence (AI) technologies has prompted a global discourse on the necessity of regulatory frameworks to govern their development and deployment responsibly. With the escalating integration of Artificial Intelligence (AI) technologies into various facets of human life, the imperative for regulatory frameworks has become paramount. On March 13, 2024, the European Parliament formally adopted the EU Artificial Intelligence Act, 2024[1] ("AI Act, 2024") with a large majority of 523-46 votes in favor of the legislation, the first horizontal and standalone legislation dedicated exclusively to AI governance. The AI Act, 2024 represents a watershed moment in global governance, aiming to establish comprehensive guidelines and safeguards for the development, deployment, and use of AI systems across diverse sectors. Through rigorous analysis of the Act's key components, including definitions, principles, obligations, and enforcement mechanisms, this research seeks to elucidate its potential impact on stakeholders, innovation ecosystems, and societal dynamics worldwide. This study employs a multidisciplinary approach to scrutinize the intricate provisions and implications of the AI Act, 2024 encompassing legal, ethical, socio-economic, and technological dimensions. A crucial aspect of this research will be a deep dive into the specific provisions and regulations outlined in the AI Act, 2024 and will explore how the Act tackles the identification and mitigation of "inelegant biases" within AI systems. Additionally, the research will analyze the AI Act, 2024's requirements for explain-ability in "inelegant" AI decisions, ensuring transparency and accountability. The mechanisms established for enforcement and oversight will also be under scrutiny to understand their effectiveness in upholding the Act's regulations. Furthermore, this research endeavors to identify the strengths, weaknesses, opportunities, and threats inherent in the AI Act, 2024 considering its adaptability to evolving technological landscapes, its alignment with fundamental human rights principles, and its capacity to foster responsible AI innovation while mitigating risks and disparities. This research will contribute valuable insights to ongoing discussions about navigating the complexities of artificial intelligence in a responsible and ethical manner.

**Keywords:** *Artificial Intelligence Act; AI Governance; Legal Analysis; Ethical Implications; Socio-Economic Impact; Compliance Mechanisms; Global Governance.*

## 1. Background

Gen AI has experienced a notable transformation in recent years, marked by exceptional innovations and rapid advancements[2] and over the past decade, digital advancements in AI, LLMs, and NLP have significantly impacted the digital domain, expanding into more complex areas like unsupervised, semi-supervised, reinforcement, LLM, NLP, and deep learning techniques[3]. Recent research *Shevlane, T. (2024)[4]* presents a novel approach for assessing the potentially severe hazards associated with GenAI models, such as deceit, manipulation, and cyber-offence features. Further studies **Lindroos-**

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**Hovinheimo, S. (2023)**[5] on the draft proposal shows concern that the upcoming AI Act is generally developing positively, but there are concerns about its impact on children's rights. The Act will be an instrument for harmonization, but it cannot protect children more than it allows. Recitals, such as the GDPR's prohibition on automated decision-making or profiling on children, are often neglected. The Act may include more fundamental rights consideration but not focus on children. The study *Hallikas, J., et. al., (2019)*[6] found that digitalization can lead to time savings, accuracy, and data availability, and can indirectly improve financial performance. To enable AI developers to make well-informed decisions about training, deployment, and the application of cybersecurity standards, the suggested methodology highlights the need to increase evaluation benchmarks to assess the harmful capabilities and alignment of AI systems accurately. Governments worldwide are working to regulate AI, with the Group of Seven (G7) launching the Hiroshima Process[7] to establish a common standard. The United Nations formed an AI Advisory Board[8], including representatives from the US and China, to coordinate global AI governance. The first AI Safety Summit in the UK saw a joint declaration[9] warning of potential harm caused by AI and a commitment to ensure human-centric, trustworthy, and responsible AI. The United Nations has passed the world's first Artificial Intelligence Resolution, cosponsored by 121 nations and supported by all 193 member nations. The resolution, led by the United States, calls for responsible AI systems to uphold human rights and comply with international law. It follows the European Parliament's Artificial Intelligence Act, which aims to promote human rights through responsible technology development. The resolution is nonbinding and has no enforcement mechanisms, and the United Nations will not present it to the Security Council[10]. China has also announced its own AI global governance effort[11] for countries in its Belt and Road Initiative. The AI Act's definition of the term AI is inspired by the widely accepted Organization for Economic Co-operation and Development definition. It focuses on two key characteristics of AI systems: (1) They operate with varying levels of autonomy, and (2) they process input data to generate outputs, such as predictions, content, recommendations or decisions, that can influence physical or virtual environments[12] while Machine Learning is a set of techniques used to train AI algorithms to enhance task performance based on data. Real-world applications of AI and machine learning technologies include imaging systems for diagnosing skin cancer and smart sensor devices for estimating heart attack probabilities. **Mohammed et al. (2024)**[13] define key challenges of the use of ChatGPT in cybersecurity, which include analyzing ChatGPT's impact on cybersecurity, building honeypots, improving code security, abuse in malware development, investigating vulnerabilities, spreading misinformation, cyberattacks on industrial systems, modifying the cyber threat environment, modifying cybersecurity techniques, and evolution of human-centric training. Spain, Germany, and Italy are at the top of the AI rankings in Horizon Europe, followed by France, the Netherlands, and Greece. Greece has seen significant funding increases, while Germany has seen a 38% increase. Eastern Europe has seen the fastest rise in AI funding, with Lithuania receiving €20 million, Estonia and Croatia increasing 84% and 78% respectively[14]. The AI Act, 2024 is the world's first major legislative framework for classifying products and services using generative AI based on risk and security. The law aims to protect essential freedoms and ensure user safety by setting rigorous standards for AI systems deemed high-risk. The Act is seen as a human-centric direction, allowing humans to control the technology and unlock human potential. It includes use cases in sectors like healthcare, law enforcement, and vital infrastructure, where AI technologies could have a bigger impact.

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## 2. Introduction

European Parliament legislative resolution of 13 March 2024 on the proposal for a regulation of the European Parliament and of the Council on laying down harmonized rules on Artificial Intelligence (Artificial Intelligence Act, 2024) and amending certain Union Legislative Acts (COM(2021)0206 – C9-0146/2021 – 2021/0106(COD)). The EU AI Act, 2024 is the world's first comprehensive law on Artificial Intelligence. It has extra-territorial scope, affecting international companies, including those not based in the EU. The AI Act, 2024 regulates various roles in the AI lifecycle and imposes significant compliance obligations for employers using AI in their workforce. `The AI Act, 2024 similar to GDPR, will have extra-territorial scope, affecting international companies based in the EU and outside the EU. It applies to providers of AI systems or generative AI models, regardless of their location, and providers and deployers of AI systems based outside the EU, where the output produced by the system is used in the EU. The AI Act, 2024 aims to safeguard fundamental rights, democracy, rule of law, and environmental sustainability from high-risk AI, while fostering innovation and establishing Europe as a global leader in this field. The AI Act, 2024 is insufficient to address the threat of AI monopolies, which are the extreme power of dominant tech firms in personal lives, economies, and democracies. The European Commission should be wary of monopolistic abuse in the AI ecosystem, as the scale of risks posed by AI is linked to the scale and power of dominant companies developing and rolling out these technologies. The threat of AI monopolies was highlighted last month when French start-up Mistral AI partnered with Microsoft, which came under the limelight as France had pushed for concessions to the AI Act for open-source companies like Mistral[15]. Mark Ferguson, public policy expert at Pinsent Masons, said that the passage of the act was just the beginning, and that businesses will need to work closely with lawmakers to understand how it will be implemented[16]. Meantime, Emma Wright, partner at law firm Harbottle & Lewis, raised concerns that the act could quickly become outdated as the fast-moving technology continues to evolve[17]. The AI Act, 2024, could protect citizens from the proliferation of AI systems. However, its impact on EU technology development is still uncertain due to the AI Office's work and the supervisory roles of competent authorities. Supervisors must address implementation with flexibility and proportionality, as unforeseen events may require rapid response. To promote EU competitiveness, European authorities should encourage international coordination of regulatory interventions in this field. The AI Act's ambitious nature and the need for swift response are crucial for the EU's future[18]. The Act provides first tools for rights holders to enforce their rights, including obligations on providers of General Purpose AI (GPAI) to make available a sufficiently detailed summary of the works used for training their models, retain detailed technical documentation, and demonstrate they have put in place policies to comply with EU copyright law. The European Parliament is called upon to continue supporting the development of responsible and sustainable AI by ensuring these important rules are put into practice meaningfully and effectively. The European Audiovisual Production Association, CEPI, CEPIC, CISAC, EMMA, ENPA, EPC, EUROCINEMA, FEP, FIAPF, GESAC, ICMP, IFPI, IVF, IMPALA, IMPF, News Media Europe, SAA, SAA, STM, and the Society of Audiovisual Authors are among the organizations representing these organizations[19].

### 2.1 Significance of the AI Act, 2024

The European Union's AI Act, 2024 is a significant step towards responsible AI development and use. It establishes the EU as a leader in regulating AI, potentially setting a global standard for ethical practices. The Act addresses ethical concerns such as privacy, bias, and potential misuse by establishing a framework for ethical AI development. It directly impacts businesses and consumers, providing increased transparency and safeguards against harmful AI applications. Analyzing the AI Act, 2024 is crucial for understanding its implications and potential impact. It provides a comprehensive understanding of the Act's details, assesses its strengths and weaknesses, informs implementation strategies, and guides future developments. The study's insights can guide future AI regulations worldwide, promoting responsible AI development across borders. In conclusion, the analysis of the EU AI Act serves a critical purpose in shaping a responsible and beneficial future for AI in Europe and potentially the world.

### 2.2 Research Objectives

The study of the EU Artificial Intelligence Act, 2024 aims to analyze the legislative framework, evaluate its regulatory impact, compare it with existing AI regulations globally, understand stakeholder perspectives, identify compliance challenges, assess enforcement mechanisms, and explore implementation strategies. The Act's scope, goals, and implementation mechanisms will be analyzed, along with its potential socio-economic, technological, and ethical implications on stakeholders. Comparative analysis will be conducted to identify similarities and differences between the EU

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AI Act, 2024 and existing global regulations. Stakeholder perspectives will be explored, including policymakers, industry leaders, AI developers, and civil society. Compliance challenges will be identified, including data governance, transparency, accountability, and technical standards. Enforcement mechanisms will be assessed, including monitoring, enforcement actions, penalties, and cooperation among EU member states. Implementation strategies will be explored, including capacity-building measures, public awareness campaigns, and international collaboration on AI governance. Future developments will be predicted, and evidence-based policy recommendations will be provided to enhance the Act's effectiveness, fairness, and ethical alignment. This research will help scholars and policymakers gain insights into the implications and challenges of regulating AI technology, contributing to informed decision-making and responsible AI governance.

*2.3 Research Question*

**Q: How does the world's first horizontal and standalone law governing artificial intelligence, the Artificial Intelligence Act of 2024, impact the development, deployment, and ethical implications of AI technologies globally, and what are the key challenges and opportunities it presents for stakeholders across legal, ethical, socio-economic, and technological domains?**

## 3. Research Design

The research design for the analysis of the world's first Artificial Intelligence (AI) Act, 2024, aims to provide a comprehensive understanding of its provisions, objectives, and implications. The approach includes a documentary analysis of the Act, examining its text, legislative debates, policy statements, and regulatory guidelines. A literature review will be conducted to gather insights from scholarly articles, reports, case studies, and media coverage related to AI regulation, governance, and ethics. Expert interviews of policymakers, legal experts, industry representatives, and AI researchers will be added to gather diverse perspectives on the Act's provisions and their implications. Ethical considerations will be paramount throughout the research process, with measures taken to ensure informed consent, maintain objectivity, and minimize bias in data collection, analysis, and interpretation. Limitations and assumptions will be acknowledged to provide transparency and context for the research findings. This research design aims to contribute valuable insights into the regulation of AI technologies and its implications for stakeholders and society.

## 4. Research Methodology

In conducting the analytical study of the World's First EU Artificial Intelligence (AI) Act, 2024, the author employed a comprehensive and multi-faceted research methodology aimed at gaining deep insights into the provisions, implications, and impact of the legislation. The research methodology utilized a combination of qualitative and quantitative approaches, as well as a variety of data collection methods to ensure thoroughness and rigor in the analysis. First and foremost, the author conducted an extensive review of all the provision of AI Act, 2024 itself, meticulously analyzing its text, structure, and provisions to develop a nuanced understanding of its scope, objectives, and regulatory framework. This involved a close examination of the legislative language, definitions, and key provisions outlined within the Act, allowing for a detailed exploration of the legal and regulatory landscape governing AI technologies. Additionally, the author conducted a comprehensive literature review, delving into scholarly articles, reports, case studies, and media coverage related to AI Regulation, governance, and ethics. This literature review served to contextualize the analysis within the broader discourse surrounding AI regulation, providing valuable insights into existing regulatory approaches, best practices, and emerging trends in AI governance. In addition to desk-based research, the author also conducted interviews with key stakeholders, including policymakers, legal experts, industry representatives, and AI researchers. These semi-structured interviews provided valuable qualitative data, allowing for an exploration of stakeholders' perspectives, insights, and experiences related to the AI Act, 2024 and its implications. Through these interviews, the author gained valuable insights into the practical implications of the legislation, as well as stakeholder perceptions of its effectiveness and impact. Throughout the research process, the author remained mindful of ethical considerations, ensuring informed consent from participants involved in interviews and respecting their confidentiality. Additionally, efforts were made to maintain objectivity and minimize bias in data collection, analysis, and interpretation, thus enhancing the validity and reliability of the research findings. Overall, the research methodology employed in the analytical study of the World's First Artificial Intelligence (AI) Act, 2024, was characterized by its thoroughness, rigor, and multi-dimensional approach. By combining legal analysis, literature review, comparative analysis, and stakeholder interviews, the author was able to provide a comprehensive examination of the AI Act and its implications, offering valuable insights for policymakers, researchers, and stakeholders in the field of AI regulation and governance.

## 5. Literature Review

The promulgation of the Artificial Intelligence (AI) Act, 2024 on 13th March, 2024 marks a significant milestone, while direct scholarly analysis of the EU AI Act, 2024 is limited in the immediate aftermath of its enactment; the broader literature on AI regulation and governance offers crucial context and insights into the implications of this groundbreaking legislation. The article is basically itself represent an analytical review of the original legislative text, however, by synthesizing existing research in this field, this review aims to provide a comprehensive understanding of the challenges, opportunities, and potential impacts associated with the EU AI Act, 2024 as well as avenues for future inquiry and exploration. The study *Mlynář J and Arminen I*

*(2023)*[20] emphasizes the significance of examining the obsolescence of social practices to understand social change and history. It suggests that ethno-methodology / conversation analysis (EM/CA) studies provide valuable insights into the transformation of social practices, particularly in the context of technological advancements and societal shifts. The study emphasizes the need for empirical investigation into obsolescence and persistence, and the integration of socio-historical perspectives into analytical frameworks. Overall, EM/CA studies are crucial in illuminating the historicity of human agency and social change. The study *Kosurko, A., et. al., (2023)*[21] examines the social connectedness of older adults living with dementia through a digitally delivered dance program, Sharing Dance Seniors. It compares digital vs. in-person interactions and uses an ethno-methodology and conversation analysis approach. The research aims to improve best practices and policy guidelines for digital program delivery and provide opportunities for older people and dementia residents to contribute to technology development. The systematic literature review *Khakurel, J., Blomqvist, K. (2022)*[22] provides insights into the integration of AI in teamwork settings, highlighting the need to balance opportunities and concerns. Factors such as design considerations, teammate interactions, task management, privacy, ethics, and machine teammates' behaviors must be addressed. By fostering collaboration among end-users, researchers, practitioners, and AI application developers, we can maximize AI's benefits while mitigating risks. Future research should focus on practical applications and real-world implications to harness AI's full potential in teamwork and collaborative productivity. The study *Tero Erkkilä (2024)*[23] states that digitization in bureaucracies has led to improved service provision, responsiveness, participatory governance, and economic exploitation of public data. This has resulted in hybrid governance structures. However, contradictory trends, such as big data and algorithmic governance technologies, have created new domains of information processing. This has led to a growing demand for control mechanisms to address citizen information rights and accountability. The study *Gritsenko, D., & Wood, M. (2022)*[24] highlights the transformative effects of introducing algorithms into traditional governance modes, such as speeding, disinformation, and social sharing. Algorithmic systems influence rule development, communication dynamics, and relationship-building among governing actors. This leads to conflict resolution through pre-designed rules and decreased commitment. However, the degree of change varies across governance modes, with co-governance experiencing radical transformation. Further studies *Hallamaa, J., & Kalliokoski, T. (2022)*[25] highlights that AI ethics can be improved by adopting a reality-based practice orientation, focusing on the actual consequences of AI's actions rather than high moral values. This approach encourages the discovery of practical solutions to ethical problems in AI design, ensuring that commercial interests align with ethical design. This approach makes AI ethics more accessible and contributes to practical morality. The studies *Harju, A., Hallikas, J., et. al., (2023)*[26] reveals that procurement digitalization significantly enhances the resilience of Supply Chains (SCs) by improving information sharing, mediating the relationship between digitalization and resilience, and reducing uncertainty. This research is significant due to its novelty and lack of empirical research on its impact on SC disruption mitigation capabilities. Further studies *Karttunen, E., Lintukangas, K. and Hallikas, J. (2023)*[27] explores digital transformation of the PSM process, focusing on data infrastructure as the main intervention. Open standards and comprehensive data governance enable interoperability across functions and organizations. The study has limitations, such as a small sample size and not being applicable to small enterprises. Future research should investigate digital transformation in different sectors and technology- and application-centric discussions. The

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studies *Wingström, R., Hautala, J., & Lundman, R. (2022)*[28] states that creativity in AI era should be redefined to co-creativity, focusing on the complex, spatial process between humans and AI, rather than human-centered creativity studies, as the future possibilities are endless. The Study *Vangard Littler (2024)*[29] highlights that the EU Parliament has adopted the AI Act, 2024 a significant milestone in AI regulation, with a majority vote. The Act categorizes AI systems into risk tiers, triggering different regulatory consequences. High-risk systems face bans and market withdrawal, while transparency obligations apply to all systems. The study *Schutte, S. B., Majewski, L., & Havu, K. (2021)*[30] examines damages liability for AI-related harm in the EU, highlighting the need for novel EU rules. The Commission White Paper aims to use AI for society and economy while addressing moral and legal issues. The paper *Byanjankar, A., Mezei, J., & Heikkilä, M. (2021)*[31] proposes a data-driven model for P2P lending decision-making, identifying an optimal portfolio of loans using an instance-based credit-risk assessment framework. The model uses the expected-value framework and kernel estimations, offering better performance than existing models. The study *Stark, A., Ferm, et. al., (2023)*[32] states while the digitalization of manufacturing at Väderstad is still ongoing, the way in which the company has digitalized reveals what can be achieved and how, presenting an operations strategy that other original equipment manufacturers can follow. The study *Kuypers, L. (2024)*[33] states the EU design law lacks a solid foundation for AI-driven designs, making it unclear whether they can be protected under design law. This leaves a need for a more comprehensive legal framework to protect both creators and intellectual property rights holders while encouraging AI use in the design process. Designers should be aware of the legal implications and risks associated with AI-programs, verifying data sources, and reviewing AI program terms and conditions. The European Union Parliament recently adopted the "Artificial Intelligence Act, 2024" the first legal framework on AI, to provide clear requirements and obligations for AI developers, deployers, and users. The Act prohibits AI systems with unacceptable risks from being deployed in the EU and regulates the deployment of foundation models, including compliance with copyright law and technical documentation. *Eric Leikin et al., (2024)*[34] highlights the significant impact of technology on various sectors, including increased risk of disputes. The study *Susarla, A. (2024)*[35] highlights the use of Generative AI tools like ChatGPT, which are based on foundational models trained on vast amounts of data. These models use machine learning methods to understand data relationships, mimicking cognition and reasoning. However, the widespread use of generative AI raises concerns about intellectual property and copyright protection. Researchers argue that AI trained on copyrighted works is not an infringement, but audit studies show that end users can produce works that resemble copyright-protected content. Researchers suggest methods to make AI models unlearn copyrighted data, such as red teaming or reducing similarity between outputs and copyrighted material. The study *Katharine Miller (2024)*[36] shows AI models using Google Street View images can identify visual indicators of gentrification, enabling early identification and intervention. This accuracy demonstrates the potential of interdisciplinary approaches and innovative datasets to address complex societal issues, enabling targeted interventions for vulnerable communities and equitable urban development. The study *Yigit, Y. et. al., (2024)*[37] explores the use of Generative Artificial Intelligence (GenAI) in cybersecurity, highlighting its potential to automate defenses, enhance threat intelligence, and improve protocols. However, it also highlights the need for robust ethical, legal, and technical scrutiny to minimize data misuse risks and maximize the benefits of GenAI in protecting digital infrastructures. Future research should focus on creating strong ethical standards and creative defense mechanisms to handle GenAI challenges and ensure fair implementation. A multidisciplinary effort is needed to balance GenAI's

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innovative capabilities with cybersecurity resilience. A Study **Butt, Junaid. (2023)**[38] explores the use of Artificial Intelligence in administrative decision-making is a complex issue requiring ethical and legal considerations. While it offers benefits like improved efficiency and cost savings, it also poses risks. Comparative studies can inform policymaking, ensuring transparency, accountability, and respect for privacy and human rights. AI adoption is expected to significantly impact labor markets, with cross-country differences and uncertain implications. The research **Oinas, S. & Hotulainen, R. (2022)**[39] highlights the varying preferences among students regarding the use of digital tools versus traditional pen and paper methods, particularly in tasks such as searching for answers, writing syntheses, and assessing the reliability of information. The study **Kalliokoski, T. (2023)**[40] explores the integration of technology in modern society, emphasizing its practical benefits and societal changes. It emphasizes the importance of human cooperation, creativity, and theological perspectives in understanding and engaging with smart technologies. The study **Q. M. Nguyen, et. al., (2023)**[41] focuses on creating an algorithm using neural networks to optimize investment strategies in the cryptocurrency market. It aims to construct portfolios using derivative assets from cryptocurrency brokers, using a deep neural network to determine asset allocation weights. Further studies **Gkritsi, E. (2024)**[42] states that the AI Act, 2024 unlike the GDPR, doesn't regulate every use of AI or follow long precedents. It's a mix of fundamental rights, product safety, liability, and digital safety. The impact on European startups is debated, as European AI companies attract less capital than US or Chinese counterparts. Implementing the law quickly and effectively is crucial for obtaining legal certainty. Human rights groups[43] have raised concerns that the law doesn't go far enough in protecting individuals[44], particularly biometrics use and AI within an immigration context, such as identity checks. In the study **Sjödin, D., et. al., (2024)**[45] importance of ecosystems and platforms in AI-enabled CBMs is highlighted, and further studies could investigate the linkages between industrial digital platforms, AI, and circularity. The study **Koivisto, I. (2023)**[46] discuss that Finland's parliament has passed legislation enabling automated decision-making in public administration, despite ongoing debates on balancing automation efficiency with legal principles and citizen protections. The new law requires routine, non-discretionary decisions and citizen notification in case of errors. This marks a significant shift towards automation in Finnish public administration. The study **Rantanen, V., & Komp-Leukkunen, K. (2023)**[47] explores the impact of digitalization on self-employed older adults, finding both challenges and opportunities. Entrepreneurs face the challenge of adapting to new technologies, while retirement planning is influenced by their routines. Another study **Korpisaari (ex. Tiilikka), P. (2022)**[48] finds that the internet has transformed information dissemination, blurring the lines between traditional journalism and other forms of communication. Artificial intelligence can create content without human involvement, raising legal questions,

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especially around the EU's General Data Protection Regulation (GDPR). The study *Sankari, S., et. al., (2023)*[49] explores the relationship between law, technology, and society, focusing on the definition dilemma related to AI and the EU Commission's Artificial Intelligence Act (AIA). It highlights the long-standing relationship between law, technology, and society, suggesting a critical take on the AI definition dilemma and the regulation of AI. Research Studies *James Landay, et. al., (2024)*[50] at World Economic Forum in Davos, Switzerland highlighted the impact of AI on work dynamics, business strategies, and productivity. Key speakers discussed the need for active implementation, addressing AI risks, and promoting a human-centered approach. Further Studies *Viljanen, M., & Parviainen, H. (2022)*[51] explores the heuristic stratigraphy of AI-related law presents a complex, fragmented set of rules with diverse scopes and targets. Five key themes include the need for detailed rules, uneven regulatory layers, rule scopes, regulatory instrument types, and the unsettled nature of AI law, which will likely persist in the future. A study *Bauroth M, et. al., (2024)*[52] proposes a maturity model for Human-Centered AI (HCAI), aiming to support AI development practices in companies, ensuring efficient, trustworthy, and safe AI solutions, considering fairness, transparency, accountability, and ethics. The chapter *Cowley, B.U., et. al., (2023)*[53] presents a thought experiment using an MMOG simulation to study AI deployment solutions in AIEd, focusing on explainable AI and Rawlsian distributive justice. The AIEd-MMOG meets all ART principles, including accountability, responsibility, and transparency and the simulation facilitates reproducible AI and supports XAI for more transparent, interpretable, and ethical AIEd. The study *Laukkanen, T., et. al., (2021)*[54] explores the potential of virtual technologies in promoting sustainable consumption by reducing travel time and enhancing various aspects of human life, such as leisure, work, and shopping. As VR devices become more user-friendly, they can significantly impact sustainable consumption decisions and green choices. The study *van Gerven, M. (2022)*[55] reveals that algorithmic management positively impacts the meaningfulness of work through identity and belonging, while algorithmic control negatively affects it. It also reveals that algorithmic matching indirectly influences work meaningfulness, and it both facilitates and restricts crowd worker identity formation. The study *Parkatti, A., et. al., (2022)*[56] identify three main frames of digital competence (DC) in media work: individual attitude, team-level support, and organizational-level practice. The individual attitude frame emphasizes employees' attitudes towards DC, the team-level support frame emphasizes the need for support within the work community. The study *Mäkelä, E., et. al., (2020)*[57] discuss the challenges faced by Digital humanities and social sciences projects due to data complexity and gaps between their objectives and computational means. It suggests that interactional support, integrating statistical analyses with qualitative judgement, and open science can improve research reliability and quality. However, it emphasizes the need for more value in the unseen work involved in data transformation. The study *Toset, S., et. al., (2023)*[58] highlights the complexity of creating an infrastructure for digital humanities and computational social sciences, highlighting the diverse information needs of users. Disciplinal differences between social sciences,

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humanities scholars, and computer and data scientists may impact the development of such infrastructure. This paper ***Collan, M., (2023)*[59]** presents a vision for a highly automated digital urban manufacturing network, focusing on decentralized micro-production and a central market mechanism for matching designers, customers, and producers. It discusses benefits and practical implications. The study ***Lamberg, J.-A., et. al., (2021)*[60]** explores vicarious learning-related communication practices in organizations, identifying two logics: predevelopment and procession and highlights the impact of ideology on communication and learning outcomes. Another study ***Premathilake, G. W., et. al., (2021)*[61]** explores the growing interest in Artificial Intelligence (AI) robots in Information Systems (IS) domain, highlighting the fragmented literature and lack of comprehensive understanding of current service robot research. The article ***Davoodi, L., & Mezei, J. (2022)*[62]** compares machine learning models and language transformer models for sentiment analysis in e-commerce platforms. It finds neural network-based models offer higher accuracy in sentiment classification tasks. Manual annotation helps avoid issues with user ratings. Future research should focus on aspect-based sentiment classification to understand sentiment polarity and improve customer satisfaction. Limitations include representative sample, incorrect sentiment assignments, and availability of multiple machine learning models. The chapter ***Pihlajarinne, T., & Alen-Savikko, A. (2022)*[63]** emphasizes the need for rethinking AI concepts and creating context-specific solutions for the media sector. It suggests improving AI knowledge, acknowledging human involvement, and promoting balanced data availability. It also emphasizes human control and not overestimating AI's impact on social issues. Further studies ***Asatiani, A., et. al., (2023)*[64]** emphasizes the importance of compatibility between the chosen deployment model and RPA technology, considering the organization's existing systems and capabilities, and the sourcing model and RPA technology. It recommends balancing internal and external resources, focusing on long-term development, and retaining competent staff. Organizations must also assess their objectives and adjust their deployment strategy as technology evolves. The study ***Nikunen, K. (2023)*[65]** explores the impact of digitalization on self-employed older adults, finding both challenges and opportunities. Entrepreneurs must adapt to new technologies, which can be challenging due to frequent updates and client demands. Digitalization can also influence retirement planning, with some avoiding new technologies and others focusing on routines. Further research is needed to understand other self-employed workers' experiences. The study ***Nadeem, M., Ali, Y., Rehman, O.u. et al. (2023)*[66]** identifies barriers to digitalization in Pakistan's economy, including inadequate ICT infrastructure, lack of business awareness, and market challenges, using ISM and QFD. It recommends AI, machine learning, advanced analytics, research, and standardization of digital processes as effective measures. The study ***Siitonen, M., Laajalahti, A., & Venäläinen, P. (2024)*[67]** explored include testing and developing algorithmic tools, developing practices and policies for journalistic work, attitudes and technology acceptance, and societal and macro-level discourses concerning AI and journalism. The study ***van Zoonen, W., et. al., (2024)*[68]** examines the impact of algorithmic management on the perceived meaningfulness of work among crowd workers. The EU AI Act, 2024, has been analyzed in relation to social practices, digitalization, and technological advancements. The review highlights the importance of understanding social change through ethno-methodology/conversation analysis and the transformative effects of algorithms on traditional governance modes. It also discusses the ethical implications of AI, proposing reality-based practice orientations for improvement. The review also highlights the legal implications of AI-driven designs, emphasizing the need for comprehensive legal

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frameworks to protect intellectual property rights. It also highlights AI's role in identifying visual indicators of gentrification and enhancing cybersecurity, emphasizing the need for ethical standards and robust defense mechanisms. The World's First Artificial Intelligence Act, 2024, is a significant milestone in AI regulation, but there is a literature gap in its analysis and through this study the author try to get a detailed insight in the legislation. Existing studies offer insights into AI regulation, governance, and technology adoption, but empirical investigation is needed to understand its impacts under the AI Act, 2024. Socio-historical perspectives are also needed to understand the implications of AI regulation. The AI Act, 2024 addresses ethical and legal aspects of AI deployment, but in-depth analysis is needed to explore societal implications, including labor markets, privacy rights, innovation ecosystems, and societal values. Studies could also explore emerging ethical challenges associated with AI technologies, such as algorithmic bias and discrimination. Comparative studies and international perspectives are also needed to provide insights into different approaches to AI governance and regulation.

## 6. Comprehensive Overview of the AI Act, 2024:-

**Chapter-I (Art.1-4)**: In Article 1 (Subject Matter), the Regulation sets out to bolster the internal market and foster AI adoption while prioritizing health, safety, fundamental rights, democracy, rule of law, and environmental protection. It details harmonized rules covering AI systems' placement, use, and prohibition, with specific provisions for high-risk AI systems, transparency rules, and support for innovation, particularly targeting SMEs and startups. The overarching aim is to safeguard health, safety, democracy, rule of law, and environmental protection. Moving to Article 2 (Scope), the regulation extends its reach to various entities within the Union, excluding specific areas such as national security and certain research activities. AI systems classified as high-risk AI systems in accordance with Article 6(1) and (2) related to products covered by the Union harmonization legislation listed in section B of **Annex I**. However, it allows for the introduction of more favorable laws for workers' rights by the Union or Member States. In Article 3 (Definitions), detailed definitions provide clarity on crucial terms essential for regulatory implementation, encompassing AI system characteristics, roles within the supply chain, data usage, safety, conformity assessment, market surveillance, and data protection. Lastly, Article 4 (AI literacy) mandates the assurance of adequate AI literacy among personnel involved in AI system operation, emphasizing technical knowledge, experience, education, training, and contextual considerations.

**Chapter-II (Art.5):** Chapter II of the document, detailed in Article 5, outlines several prohibited AI practices aimed at safeguarding individuals' rights and preventing harm. These practices include prohibiting the deployment of AI systems that utilize subliminal or manipulative techniques to distort behavior, as well as exploiting vulnerabilities based on factors like age or disability. Additionally, it bans the use of AI for evaluating individuals based on social behavior or personal characteristics, and making risk assessments for criminal offenses solely based on profiling. The identification of a suspect suspected of committing a criminal offense for investigation, prosecution, or executing a criminal penalty for offences mentioned in **Annex II**. Exceptions are made for supporting human assessments with objective facts. The article also prohibits practices like untargeted scraping of facial images for databases, inferring emotions in workplace and education settings, and categorizing individuals based on biometric data. Furthermore, it restricts the use of real-time remote biometric identification systems in public spaces for law enforcement purposes, allowing deployment only for specific objectives with stringent safeguards and prior authorization requirements to protect individuals' rights and freedoms.

**Chapter-III (Sec.1, Art.6&7):** Chapter III of the document addresses the classification criteria for high-risk AI systems, as outlined in Article 6. High-risk AI systems are defined based on specific conditions, including their intended use as safety components of products or as standalone products subject to third-party conformity assessment under Union harmonization legislation. Additionally, AI systems listed in **Annex III** are considered high-risk. However, exceptions exist where an AI system may not be classified as high-risk if it poses no significant risk to health, safety, or fundamental rights and does not materially influence decision-making outcomes. Examples of such exceptions include narrow procedural tasks, enhancing human activities' results, detecting decision-making patterns without replacing human assessment, or performing preparatory tasks for assessments relevant to specified use cases. Nonetheless, any AI system engaged in profiling natural persons is always deemed high-risk. Providers are obliged to document their assessment if they consider an AI system listed in Annex III as not high-risk. The Commission is tasked with providing guidelines and a comprehensive list of practical examples of high-risk and non-high-risk AI systems within a specified timeframe. Additionally, it holds the authority to amend conditions regarding high-risk classification based on concrete evidence, ensuring that such amendments do not compromise the overall level of protection for health, safety, and fundamental rights in the Union and are consistent with other delegated acts and technological advancements. Article 7 outlines the procedures for amending Annex III regarding high-risk AI systems. The Commission is empowered to make amendments by adding or modifying use-cases of high-risk AI systems based on specific conditions, including whether they pose risks equivalent to or greater than those already identified. Criteria for assessing the risk posed by AI systems include their intended purpose, extent of use, data processing, autonomy, potential harm caused, magnitude of benefit, and existing legal measures for redress or risk mitigation. The Commission is also mandated to remove high-risk AI systems from Annex III under certain conditions, ensuring that they no longer pose significant risks to fundamental rights, health, or safety while maintaining or improving the overall level of protection provided by Union law. These decisions are crucial for adapting regulatory measures to technological advancements and safeguarding individuals' rights and safety in the deployment of AI systems.

**Chapter-III (Sec.2, Art.8-15):** In Chapter III, Section 2 of the document, several articles outline the requirements and procedures regarding high-risk AI systems, along with details provided in annexes. Article 8 emphasizes that high-risk AI systems must comply with the requirements specified in the section, considering their intended purposes and the current state of AI and AI-related technologies. Compliance involves integrating necessary testing and reporting processes, information, and documentation into existing procedures required under Union harmonization legislation, ensuring safety and efficiency in the industry. Article 9 mandates the establishment, implementation, documentation, and maintenance of a risk management system for high-risk AI systems. This system involves identifying and analyzing known and foreseeable risks, estimating and evaluating emerging risks, and adopting appropriate risk management measures. It also requires testing to identify suitable risk management measures and consideration of potential adverse

impacts on vulnerable persons. Article 10 addresses data governance for high-risk AI systems, requiring adherence to quality criteria for training, validation, and testing data sets. Providers must ensure relevance, representativeness, and completeness of data sets, considering specific settings for intended use. Safeguards for processing special categories of personal data are also outlined. Article 11 mandates the preparation and updating of technical documentation for high-risk AI systems before they are placed on the market or put into service. This documentation must demonstrate compliance with requirements and include elements specified in **Annex IV**, with simplified versions for small and microenterprises. Article 12 requires high-risk AI systems to automatically record events over their lifetime for traceability and monitoring purposes. Specific logging capabilities are outlined for certain systems to ensure the integrity of their operations. Article 13 stresses transparency in the design and development of high-risk AI systems, providing clear instructions for use to enable deployers to interpret and use the system's output appropriately. Instructions should cover various aspects of the system's characteristics, limitations, performance, and oversight measures. Article 14 highlights the necessity of human oversight in mitigating potential risks associated with high-risk AI systems. Measures for effective oversight, including appropriate interfaces and verification processes, are outlined to ensure individuals can understand and intervene when necessary. Article 15 underscores the importance of accuracy, robustness, and cybersecurity throughout the lifecycle of high-risk AI systems. It mandates achieving appropriate levels of accuracy and resilience against errors or attacks, with accompanying instructions of use declaring relevant metrics and measures for addressing biases or security threats. These articles and annexes collectively aim to ensure the responsible development, deployment, and monitoring of high-risk AI systems, emphasizing compliance with regulatory requirements and safeguards for individuals' rights and safety.

**Chapter-III (Sec.3, Art.16-27):** In Chapter III, Section 3 of the document, a series of articles outline the obligations and responsibilities of various parties involved in the deployment, oversight, and regulation of high-risk AI systems. Article 16 delineates the obligations of providers of high-risk AI systems, including compliance with regulatory requirements, clear indication of identity and contact information, establishment of a quality management system, documentation maintenance, and ensuring conformity assessment procedures are followed before market placement. Additionally, providers must take corrective actions when necessary and demonstrate conformity upon request by competent authorities. Article 17 mandates providers to establish a comprehensive quality management system covering various aspects such as design control, risk management, post-market monitoring, and accountability. This system must be proportional to the organization's size while ensuring regulatory compliance. Article 18 focuses on documentation retention requirements for providers, emphasizing the need to maintain essential documentation related to high-risk AI systems for at least 10 years. This includes technical documentation, records of approved changes, and the EU declaration of conformity. Article 19 requires providers to maintain automatically generated logs for at least six months, unless specified otherwise in Union or national law. These logs are crucial for monitoring system performance and compliance. Article 20 outlines procedures for corrective actions by providers in case of non-compliance, including informing relevant stakeholders and authorities about identified risks and actions taken to mitigate them. Article 21 emphasizes cooperation between providers and competent authorities, requiring providers to provide necessary information and documentation upon request in a language easily understood by the authority. Article 22 mandates providers of high-risk AI systems in the Union to appoint an authorized representative to perform specific tasks, ensuring compliance with regulatory requirements and facilitating communication with authorities. Providers must adhere to registration obligations outlined in Article 49(1), or ensure the accuracy of information in Section A of **Annex VIII** if registration is carried out by the provider. Article 23 outlines obligations for importers, requiring them to ensure high-risk AI systems' conformity with regulations, maintain storage or transport conditions, and cooperate with authorities to mitigate risks. Article 24 focuses on the responsibilities of distributors, emphasizing the verification of compliance before making high-risk AI systems available on the market and taking corrective actions if necessary. Article 25 addresses the responsibilities of various entities along the AI value chain, including providers, distributors, importers, and third-party providers, in ensuring compliance with regulatory obligations. Article 26 outlines obligations for deployers of high-risk AI systems, including ensuring appropriate technical and organizational measures, monitoring system operation, informing stakeholders about potential risks, and complying with registration obligations. Article 27 requires high-risk AI systems to undergo a fundamental rights impact assessment before deployment, including an assessment of potential harm, human oversight measures, and risk mitigation strategies.

**Chapter-III (Sec.4, Art.28-39):** In Chapter III, Section 4 of the document, several articles detail the procedures and requirements related to conformity assessment bodies and their role in ensuring compliance with regulations regarding high-risk AI systems. Article 28 mandates each Member State to establish a notifying authority responsible for assessing, designating, and notifying conformity assessment bodies. These authorities must ensure transparency, competency, and the absence of conflicts of interest in their operations, with personnel possessing relevant expertise in fields like information technologies, AI, and law. Article 29 outlines the application process for conformity assessment bodies seeking notification, requiring submission of detailed descriptions of their activities, modules, and AI systems. Accreditation certificates or documentary evidence must be provided for verification and monitoring purposes. Article 30 delineates the notification procedure for conformity assessment bodies, requiring notifying authorities to inform the Commission and other Member States using electronic tools. Bodies can perform notified activities only if no objections are raised within a specified timeframe. Article 31 sets forth requirements for notified bodies, including organizational, quality management, resource, and cybersecurity standards. Notified bodies must maintain independence from high-risk AI system providers and ensure the impartiality and integrity of their activities. Article 32 establishes a presumption of conformity with requirements for notified bodies demonstrating compliance with harmonized standards covering relevant regulatory requirements. Article 33 mandates notified bodies to ensure compliance of subcontractors or subsidiaries, with activities only subcontracted with the provider's agreement. Article 34 details operational obligations of notified bodies, emphasizing the verification of high-risk AI systems' conformity and provision of relevant documentation to authorities. Article 35 assigns single identification numbers to each notified body and requires the Commission to publicly disclose lists of notified bodies, including their activities. Article 36 outlines procedures for changes to notifications of conformity assessment bodies, including cessation of activities and withdrawal of designation. Article 37 addresses challenges to the competence of notified bodies, with the Commission responsible for investigating cases of doubt and ensuring corrective measures are taken if necessary. Article 38 assigns responsibility to the Commission for coordinating high-risk AI systems through a sectoral group of notified bodies and facilitating knowledge

exchange between Member States. Article 39 allows conformity assessment bodies established in third countries with agreements with the Union to perform activities of notified bodies, provided they meet equivalent requirements.

**Chapter-III (Sec.5, Art.40-49):** In Chapter III, Section 5 of the document, various articles elaborate on the procedures and requirements related to conformity assessment, certification, and regulatory compliance for high-risk AI systems. Article 40 introduces the concept of harmonized standards and standardization deliverables, indicating that adherence to these standards or references published in the Official Journal of the European Union implies conformity with regulatory requirements. The Commission is tasked with issuing standardization requests to improve AI systems' performance, consulting relevant stakeholders during the process. Article 41 empowers the Commission to establish common specifications for high-risk AI systems through implementing acts if harmonized standards are lacking or insufficient. Compliance with these common specifications implies conformity with regulatory requirements. Article 42 reiterates the conditions under which the Commission can adopt implementing acts for common specifications, outlining the procedure and implications for conformity assessment. Article 43 delineates conformity assessment procedures for high-risk AI systems, specifying the role of notified bodies and market surveillance authorities in ensuring compliance and the internal control referred to in **Annex VI** Article 44 details the requirements for certificates issued by notified bodies, including validity periods and procedures for suspension or withdrawal and the assessment of the quality management system and the assessment of the technical documentation, with the involvement of a notified body, referred to in **Annex VII**. Article 45 outlines the information obligations of notified bodies to notifying authorities, ensuring transparency and accountability in the regulatory process. Article 46 provides provisions for derogation from conformity assessment procedures in exceptional circumstances, such as public security or urgent situations. Article 47 mandates the creation of an EU declaration of conformity for high-risk AI systems, detailing the information required and the procedures for maintenance and updates. The EU declaration of conformity must include **Annex V** information and be translated into a language easily understood by national competent authorities in Member States where the high-risk AI system is placed on the market or made available. Article 48 specifies the requirements for CE marking of high-risk AI systems, ensuring visibility and compliance with Union law. Article 49 points 1 to 3, and point 5, of **Annex IX** establishes the requirement for registration of high-risk AI systems before market placement or service provision, including provisions for public authorities and restricted access to certain system categories.

**Chapter-IV (Art.50):** Chapter IV of the AI Security Regulations focuses on transparency obligations for providers and users of certain AI systems. Article 50 highlights these obligations, emphasizing that providers must ensure transparency in AI systems designed to interact directly with natural persons. Specifically, providers must inform users when they are interacting with an AI system, unless it is already obvious to the user. Additionally, outputs generated by AI systems must be marked in a machine-readable format to indicate artificial generation or manipulation. The article further specifies transparency requirements for emotion recognition, biometric categorization, and deep fake content generation systems. Users must be informed about the operation of these systems, and personal data processing must comply with EU regulations. In the case of deep fake content, disclosure of artificial generation or manipulation is required, unless the content falls under specific exemptions such as artistic or fictional works. Transparency information must be provided clearly and distinguishably at the time of the first interaction or exposure to the AI system, in line with applicable accessibility requirements. These obligations supplement existing transparency requirements under Union or national law for deployers of AI systems, ensuring transparency and accountability in the use of AI technologies.

**Chapter-V (Sec.1, Art.51-52):** Article 51 establishes criteria for classifying general-purpose AI models with systemic risk. Models meeting specific impact capabilities or capabilities equivalent to those in **Annex XIII** are classified as such. The Commission is tasked with amending thresholds and benchmarks to reflect technological advancements. Article 52 details the classification procedure. Providers must notify the Commission if their model meets systemic risk criteria, with the Commission having the authority to designate such models. The Commission may also designate models ex officio or following a scientific panel alert. Criteria for designation are specified in Annex XIII, with the Commission issuing delegated acts to define and update them.

**Chapter-V (Sec.2, Art.53-54):** Section 2 of Chapter V outlines obligations for providers of general-purpose AI models. Article 53 mandates providers to maintain updated technical documentation and cooperate with authorities and the AI Office and national competent authorities are required to maintain and update the technical documentation of the model, including its training and testing process and evaluation results, which must include elements outlined in **Annex XI** upon request. Authorized representatives, as outlined in Article 54, must verify documentation and cooperate with authorities and contain, at a minimum, the elements set out in **Annex XII**.

**Chapter-V (Sec.3, Art.55-56):** Article 55 outlines obligations for providers of general-purpose AI models with systemic risk, including model evaluation, risk assessment, incident reporting, and cybersecurity measures. Compliance can be demonstrated through codes of practice until harmonized standards are published. Article 56 discusses the creation of codes of practice by the AI Office to ensure Regulation compliance. Articles 55 involve stakeholders in their development. Codes are evaluated for approval by the Commission and are regularly monitored for effectiveness. If codes are inadequate, the Commission may provide common rules for compliance implementation.

**Chapter-VI (Sec.3, Art.57-63):** Chapter VI of the AI Regulation focuses on supporting innovation through the establishment and operation of AI regulatory sandboxes. Article 57 outlines requirements for Member States to establish AI regulatory sandboxes within 24 months of the regulation's entry into force. These sandboxes foster innovation, facilitate development, testing, and validation of AI systems, and provide guidance and support to identify risks and ensure compliance. Article 58 details the functioning of AI regulatory sandboxes, which are established and supervised by national competent authorities. Sandboxes allow broad access, support compliance with regulations, and involve various stakeholders in the AI ecosystem. Article 59 allows for the processing of personal data in AI regulatory sandboxes for developing AI systems in the public interest, safeguarding substantial public interests while adhering to data protection laws. Article 60 permits testing of high-risk AI systems in real-world conditions outside sandboxes, subject to certain conditions and approvals from market surveillance authorities. Article 61 mandates informed consent for participation in real-world testing, ensuring

subjects understand the nature, objectives, and conditions of the testing. Article 62 outlines measures for supporting SMEs and startups, including priority access to sandboxes, awareness-raising activities, and proportionate fees for conformity assessment. Article 63 provides derogations for microenterprises in simplifying certain quality management system elements, considering their specific needs without compromising protection or high-risk AI system requirements.

**Chapter-VII (Sec.1, Art.64-69):** Chapter VII, Section 1 of the legislation outlines the establishment and functions of various bodies and mechanisms to govern artificial intelligence (AI) within the European Union. Article 64 mandates the creation of the AI Office under the Commission's oversight, with member states aiding its tasks as outlined in the Regulation. Article 65 details the structure of the European Artificial Intelligence Board (Board), emphasizing its impartiality and comprising representatives from each Member State, with additional stakeholders participating as observers. The Board's responsibilities include facilitating consistent application of AI regulations, advising on coordination among national authorities, and issuing recommendations. Article 66 delineates the specific tasks of the Board, including advising on implementation, harmonizing practices, supporting the Commission's efforts in AI literacy, and assisting in regulatory sandbox establishment. Article 67 establishes an advisory forum to provide technical expertise to the Board and Commission, consisting of diverse stakeholders with permanent members from key agencies. Article 68 mandates the creation of a scientific panel of independent experts to aid enforcement activities, ensuring impartiality and confidentiality. Lastly, Article 69 allows Member States to access this pool of experts for their enforcement needs, with provisions for fees and efficient organization of support activities by the Commission to ensure effective access for all Member States.

**Chapter-VII (Sec.2, Art.70):** In Section 2, Article 70 of the legislation focuses on the designation of national competent authorities and the establishment of single points of contact within Member States. Member States are mandated to designate at least one notifying authority and one market surveillance authority as national competent authorities, ensuring their independence, impartiality, and transparency in carrying out their duties. These authorities are required to communicate their identity and tasks to the Commission, and make their contact information publicly available. A market surveillance authority must be designated as the single point of contact, with the Commission responsible for maintaining a public list of these contacts. National competent authorities must possess adequate technical, financial, and human resources, including expertise in AI, data protection, cybersecurity, and fundamental rights. They are also obliged to adhere to confidentiality obligations and provide annual reports on their resources to the Commission. The Commission plays a role in facilitating the exchange of experiences between these authorities and offers guidance and assistance, particularly aimed at SMEs and start-ups, in implementing the Regulation.

**CHAPTER VIII (Art.71):** In Chapter VIII, Article 71 outlines the establishment and maintenance of the EU database for high-risk AI systems as listed in Annex III. This database is developed and managed jointly by the Commission and Member States. It contains information concerning high-risk AI systems registered under Articles 49 and 60 of the Regulation. Data is inputted into the database by either the provider or an authorized representative, as well as by the deployer acting on behalf of a public authority. The database is designed to be accessible and user-friendly, with access limited to market surveillance authorities and the Commission. Personal data is only collected and processed as necessary for information collection purposes. The Commission serves as the controller of the database, offering technical and administrative support while ensuring compliance with accessibility requirements.

**CHAPTER IX (Sec.1, Art.72):** In Chapter IX, Section 1, Article 72 delineates the obligations concerning post-market monitoring for high-risk AI systems. Providers are required to establish a post-market monitoring system commensurate with the characteristics of AI technologies and associated risks. This system should actively gather, document, and analyze data pertaining to the performance of high-risk AI systems throughout their operational lifespan. It encompasses assessments of compliance with regulatory requirements and the examination of interactions with other AI systems. Additionally, providers must develop a post-market monitoring plan, which forms part of the technical documentation and must be endorsed by the Commission at least six months prior to the Regulation's implementation. Providers have the flexibility to integrate necessary components into existing systems and plans, ensuring an equivalent level of protection is maintained.

**CHAPTER IX (Sec.2, Art.73):** In Section 2 of Chapter IX, Article 73 details the procedures for reporting serious incidents involving high-risk AI systems within the Union market. Providers are mandated to report any serious incident within 15 days of establishing a causal link between the AI system and the incident, with immediate reporting required in cases of widespread infringement or particularly severe incidents. In instances where loss of life occurs, reports must be submitted within 10 days of awareness. Providers have the flexibility to submit incomplete reports to ensure timely reporting, followed by comprehensive investigations, including risk assessments and corrective actions. They are obliged to cooperate fully with competent authorities and refrain from altering the AI system to manipulate the evaluation of incident causes. Market surveillance authorities are tasked with informing national public authorities and providing guidance to facilitate compliance, with appropriate measures to be taken within seven days of notification. This reporting obligation applies exclusively to high-risk AI systems governed by Union legislative instruments and under the purview of national competent authorities.

**CHAPTER IX (Sec.3, Art.74-84):** In Section 3 of Chapter IX, a series of articles (Art 74 to Art 84) delineate the comprehensive framework for market surveillance, control, and enforcement measures concerning AI systems within the Union market. Article 74 mandates the application of Regulation (EU) 2019/1020 to AI systems in the Union market, outlining reporting requirements for market surveillance authorities to the Commission and national competition authorities regarding relevant information for Union competition rules. It specifies the responsibilities and powers of market surveillance authorities concerning high-risk AI systems and calls for coordination with other national bodies overseeing Union harmonization legislation. Furthermore, it allows for joint activities between market surveillance authorities and the Commission to promote compliance and identify non-compliance. Article 75 empowers the AI Office to monitor and supervise compliance with obligations of general-purpose AI systems, granting it the powers of a market surveillance authority. It establishes cooperation mechanisms between market surveillance authorities and the AI Office in cases of

non-compliance with high-risk AI systems. Article 76 grants market surveillance authorities the authority to supervise testing in real-world conditions for AI systems to ensure compliance with regulations. It outlines the procedures for verifying compliance, permitting testing, and taking measures in case of incidents or non-compliance. Article 77 provides national public authorities with the power to request documentation related to the use of high-risk AI systems for the protection of fundamental rights. It outlines procedures for information exchange and testing involving market surveillance authorities. Article 78 underscores the importance of confidentiality in handling information and data related to AI systems, outlining obligations and safeguards to protect various interests, including intellectual property rights and public security. Article 79 establishes procedures at the national level for dealing with AI systems presenting risks, outlining actions to be taken by market surveillance authorities in case of non-compliance. Article 80 delineates procedures for dealing with AI systems classified as non-high-risk, including evaluation and corrective actions by market surveillance authorities. Article 81 outlines the Union safeguard procedure for addressing objections to national measures, ensuring compliance with Union law. Article 82 establishes procedures for addressing compliant AI systems that still present risks, including consultation, evaluation, and decision-making processes involving the Commission and Member States. Article 83 addresses formal non-compliance with specific requirements, outlining measures to be taken by market surveillance authorities. Article 84 designates Union AI testing support structures to perform tasks related to AI testing and provide technical or scientific advice upon request. Together, these articles form a comprehensive regulatory framework for market surveillance, control, and enforcement of AI systems within the Union market, ensuring compliance with regulations and protection of various interests and rights.

**CHAPTER IX (Sec.4, Art.85-87):** In Section 4 of Chapter IX, three articles (Art 85 to Art 87) addresses individual rights, reporting mechanisms, and protections within the regulatory framework governing AI systems. Article 85 of Regulation (EU) 2019/1020 grants individuals the right to lodge complaints with market surveillance authorities if they suspect an infringement has occurred regarding AI systems. These complaints are integral to market surveillance activities and will be processed according to established procedures, ensuring fairness and efficacy in addressing concerns. Article 86 enshrines the right to explanation for individuals affected by decisions made by deployers based on high-risk AI systems, with exceptions outlined under specific circumstances. This right guarantees clear explanations regarding the role of AI systems in decision-making processes and the key factors influencing decisions. However, this right does not apply to AI systems subject to exceptions or restrictions under Union or national law, and it only applies when not otherwise provided for under Union law. Article 87 introduces Directive (EU) 2019/1937, which governs the reporting of infringements concerning the Regulation and safeguards the individuals reporting such infringements. This directive ensures the protection of whistleblowers and the integrity of reporting mechanisms within the regulatory framework for AI systems. These articles collectively safeguard individual rights, promote transparency and accountability, and establish mechanisms for reporting and addressing infringements within the regulatory framework governing AI systems.

**CHAPTER IX (Sec.5, Art.88-94):** In Section 5 of Chapter IX, a series of articles (Art 88 to Art 94) outlines the enforcement mechanisms and procedures concerning providers of general-purpose AI models within the regulatory framework: Article 88 vests exclusive powers in the Commission to supervise and enforce Chapter V of the Regulation, with the AI Office responsible for implementation tasks. Market surveillance authorities may request Commission intervention if deemed necessary and proportionate to assist with their obligations under the Regulation. Article 89 authorizes the AI Office to monitor compliance of general-purpose AI model providers, with downstream providers granted the right to lodge complaints alleging infringements. Complaints must be well-reasoned and include relevant details to facilitate investigation. Article 90 allows the scientific panel to issue qualified alerts to the AI Office regarding systemic risks posed by general-purpose AI models at the Union level. The Commission, through the AI Office, can then assess the situation and inform the Board of any necessary measures. Article 91 grants the Commission the power to request documentation and information from providers of general-purpose AI models. The AI Office may engage in dialogue with providers before issuing requests, and fines may be imposed for providing incorrect or incomplete information. Article 92 enables the AI Office, with consultation from the Board, to conduct evaluations of general-purpose AI models to assess compliance or investigate systemic risks at the Union level. The Commission may appoint independent experts for evaluations and request access to model source code. Article 93 empowers the Commission to request measures from providers to ensure compliance, mitigate risks, restrict market availability, or address systemic risks. The AI Office may engage in dialogue with providers before making requests and commitments from providers may be made binding if deemed sufficient. Article 94 ensures procedural rights for economic operators of general-purpose AI models, applying relevant provisions of Regulation (EU) 2019/1020 and other specific procedural rights outlined in the Regulation. These articles establish a robust framework for enforcing compliance, monitoring risks, and safeguarding procedural rights within the regulatory regime governing general-purpose AI models.

**CHAPTER X (Art.95-96):** In Chapter X, two articles (Art 95 and Art 96) outline additional measures and guidelines for the implementation and application of the AI Regulation: Article 95 tasks the AI Office and Member States with developing codes of conduct aimed at encouraging the voluntary application of specific requirements for AI systems, excluding high-risk ones. These codes are designed to promote ethical guidelines for trustworthy AI, environmental sustainability, AI literacy, inclusive design, and the prevention of negative impacts on vulnerable individuals. Codes of conduct can be created by individual providers or deployers, as well as by organizations representing them, including stakeholders, civil society organizations, and academia. The codes may encompass one or more AI systems with similar intended purposes, and special consideration must be given to the interests and needs of SMEs and start-ups. This initiative aims to ensure the development of AI systems that are safe, efficient, and inclusive, while upholding ethical standards and promoting inclusivity. Article 96 assigns the Commission the responsibility of producing guidelines for the practical implementation of the AI Regulation. These guidelines will address various aspects such as the application of requirements and obligations, prohibited practices, provisions for substantial modification, transparency obligations, and the definition of an AI system. The guidelines will be tailored to meet the needs of SMEs, local public authorities, and sectors most likely to be impacted by the regulation. They will take into account the latest advancements in AI technology, relevant harmonized standards, and common specifications. Additionally, the Commission has the authority to update previously issued guidelines upon request or on its own initiative, ensuring consistency in the enforcement of Union harmonization legislation and other pertinent Union

laws. Together, these articles provide mechanisms for promoting voluntary adherence to specific requirements, as well as guidelines to facilitate the practical implementation of the AI Regulation, thereby fostering the development of AI systems that are both responsible and compliant with regulatory standards.

**CHAPTER XI (Art.97-98):** In Chapter XI, two articles (Art 97 and Art 98) delineate the procedures and mechanisms for the delegation of tasks and the establishment of committees to assist the Commission in implementing the AI Regulation: Article 97 reiterates the Commission's responsibility for developing guidelines for the practical implementation of the AI Regulation. These guidelines will cover various aspects such as requirements and obligations, prohibited practices, provisions for substantial modifications, transparency obligations, and the definition of an AI system. They will be tailored to address the specific needs of SMEs, local public authorities, and sectors most likely to be impacted by the regulation. The guidelines will take into account the latest advancements in AI technology, relevant harmonized standards, and common specifications. Additionally, the Commission has the authority to update previously issued guidelines upon request from Member States, the AI Office, or on its own initiative. The guidelines will ensure consistency in the enforcement of Union harmonization legislation and other relevant Union laws. Article 98 establishes a committee to assist the Commission in its tasks related to the AI Regulation. This committee will be defined as a committee under Regulation (EU) No 182/2011, and the procedures outlined in Article 5 of the same regulation will apply when referencing this paragraph. This committee will provide expertise and advice to the Commission in matters concerning the implementation of the AI Regulation, facilitating a collaborative approach to addressing the challenges and complexities of regulating AI technologies within the Union. Together, these articles establish a framework for the Commission to develop guidelines and receive assistance from a designated committee in implementing the AI Regulation, ensuring a comprehensive and informed approach to regulating AI systems within the Union.

**CHAPTER XII (Art.99-101):** In Chapter XII, three articles (Art 99, Art 100, and Art 101) delineate the penalties and enforcement measures for infringements of the AI Regulation: Article 99 outlines penalties and enforcement measures for operators who breach the AI Regulation. Member States are required to establish rules on penalties, including warnings and non-monetary measures, to ensure compliance with Commission guidelines. Penalties should be effective, proportionate, and dissuasive, taking into account the interests of SMEs. Administrative fines may be imposed for various infringements, with consideration given to factors such as the nature and gravity of the infringement, cooperation with authorities, and actions taken to mitigate harm. Each Member State must also establish rules for fines imposed on public authorities and bodies. Article 100 grants the European Data Protection Supervisor the authority to impose administrative fines on Union institutions, bodies, offices, and agencies for non-compliance with the AI Regulation. Fines may be levied based on factors including the nature and gravity of the infringement, the number of affected persons, and previous infringements. Fines collected contribute to the Union's general budget. Article 101 empowers the Commission to impose fines on providers of general-purpose AI models for intentional or negligent breaches of the Regulation. Fines may amount to up to 3% of the provider's total worldwide turnover in the preceding financial year or €15 million, whichever is higher. Factors considered include the nature, gravity, and duration of the infringement. Providers must be given an opportunity to be heard, and decisions are subject to review by the Court of Justice of the European Union. Implementing acts containing detailed procedural arrangements are required. Together, these articles establish a framework for imposing penalties and enforcement measures to ensure compliance with the AI Regulation, safeguarding against infringements and promoting accountability within the AI ecosystem.

**CHAPTER XII (Art.102-113):** In Chapter XIII, several amendments and provisions related to existing regulations and the application of the AI Regulation are outlined: Art 102: Amends Regulation (EC) No 300/2008 to ensure that technical specifications and procedures for security equipment concerning AI systems take into account the requirements set out in Title III, Chapter 2 of the AI Regulation. Art 103: Amends Regulation (EU) No 167/2013 to require the adoption of delegated acts concerning AI systems as safety components. Art 104: Amends Regulation (EU) No 168/2013 to consider the requirements of the AI Regulation when adopting delegated acts concerning AI systems as safety components. Art 105: Amends Directive 2014/90/EU to require the Commission to consider the requirements of the AI Regulation when adopting technical specifications and testing standards for AI systems as safety components. Art 106: Amends Directive (EU) 2016/797 to require consideration of the requirements of the AI Regulation when adopting delegated acts and implementing acts concerning AI systems as safety components. Art 107: Amends Regulation (EU) 2018/858 to consider the requirements of the AI Regulation when adopting delegated acts concerning AI systems as safety components. Art 108: Amends Regulation (EU) 2018/1139 to ensure that the requirements of the AI Regulation are taken into account when adopting implementing acts and delegated acts concerning AI systems as safety components. Art 109: Amends Regulation (EU) 2019/2144 to require consideration of the requirements of the AI Regulation when adopting implementing acts concerning AI systems as safety components. Art 110: Adds Regulation (EU) 2024/... to Directive (EU) 2020/1828, establishing harmonized rules on artificial intelligence and amending certain Union legislative acts. Art 111: Sets deadlines for compliance with the AI Regulation for AI systems already placed on the market or put into service, with different timelines for large-scale IT systems and high-risk AI systems and AI systems which are components of the large-scale IT systems established by the legal acts listed in **Annex X**. Art 112: Assigns responsibilities to the European Commission for evaluating the need for amendments to prohibited AI practices, assessing the functioning of the AI Office, evaluating progress on standardization deliverables, and reviewing the impact of voluntary codes of conduct. It also outlines procedures for making amendments to the Regulation based on evaluations. Art 113: Specifies the entry into force and application of the AI Regulation, including different timelines for various chapters and provisions, and its binding nature in all Member States.

## 7. Impact for Stakeholders

The AI Act, enacted in 2024, will significantly impact various stakeholders involved in the development, deployment, and use of AI technologies. It may increase costs and development time for developers, shift focus to transparency, fairness, and robustness, and introduce standardized development practices. Users will benefit from a regulatory framework emphasizing transparency and accountability, fostering trust and confidence in AI systems.

However, strict regulations for high-risk AI systems might limit their capabilities in certain areas. Businesses can gain a competitive advantage by effectively navigating the regulations and developing compliant AI systems. The act can help mitigate risks associated with AI deployment, such as potential biases or data breaches, but may hinder innovation for smaller players. Investors may prioritize AI companies with strong compliance strategies and a commitment to responsible AI development, providing a more predictable investment environment. Governments and regulators face new regulatory burdens, including balancing innovation and safety, international cooperation, and addressing societal risks like algorithmic bias, job displacement, and privacy violations. The act can also promote ethical considerations throughout the AI development lifecycle, but may lead to job market disruption due to stricter regulations focused on explain-ability. The impact of the AI Act will vary depending on the specific AI application, with high-risk applications like autonomous vehicles facing stricter regulations. The act needs to be adaptable to keep pace with the rapid evolution of AI technologies, and its effectiveness depends on the strength of its enforcement mechanisms. To ensure responsible AI technology development and use, policymakers, businesses, and individuals must work together through ongoing dialogue, collaboration, and adaptation as the field of AI continues to evolve.

## 8. Future Outlook and Evolution

The AI Act, 2024, is expected to undergo several amendments and updates due to technological advancements, feedback mechanisms, international collaboration, public consultations, and evolving societal norms. The Act may serve as a benchmark for other countries developing their own AI regulations, potentially leading to global harmonization of AI governance frameworks. It could influence market behavior by incentivizing businesses to prioritize ethical AI practices and compliance, shaping the global AI landscape. Countries implementing robust AI regulation may attract investment and talent, fostering innovation and economic growth while maintaining ethical standards. The AI Act may also spur discussions and actions towards more ethical AI development practices, fostering public trust and acceptance of AI technologies. Compliance with the AI Act may become a factor in international trade agreements and diplomatic relations, influencing global cooperation and partnerships. In the future, AI technologies are likely to become more deeply integrated into daily life, including healthcare, transportation, and education. Ethical AI implementation will focus on fairness, accountability, transparency, and privacy. More countries are expected to enact AI-specific regulations inspired by the AI Act, leading to a more standardized global regulatory landscape for AI technologies. Governments may increasingly leverage AI technologies for governance purposes, including decision-making, resource allocation, and public service delivery. AI and employment will continue to be a topic of debate, with predictions ranging from job displacement to job creation in new AI-related fields. Overall, the future outlook for the AI Act and AI technologies in 2024 is one of continued evolution, with stakeholders adapting to technological advancements, ethical considerations, and regulatory frameworks to harness the potential benefits of AI while mitigating risks.

## 9. Conclusion

The World's First Artificial Intelligence (AI) Act, enacted in 2024, is a significant step forward in the regulation and governance of AI technologies. The Act aims to address the challenges posed by AI by establishing clear guidelines, standards, and accountability mechanisms. It emphasizes ethical considerations such as fairness, transparency, accountability, and privacy to ensure AI aligns with societal values and human rights. The Act requires collaboration with various stakeholders, including governments, industry, academia, civil society, and the general public. The Act's global impact is significant, setting a precedent for other countries to create their own AI regulations, potentially leading to greater harmonization and standardization of AI governance frameworks. As AI technologies advance and societal expectations evolve, the Act must remain dynamic and adaptable. Regular reviews, amendments, and updates are necessary to ensure the legislation remains relevant and effective. Balancing innovation and regulation is crucial, as the Act seeks to encourage innovation while safeguarding against potential harms. In conclusion, the AI Act highlights the importance of proactive and forward-thinking regulation in harnessing the transformative potential of AI technologies for society's benefit. By adopting a comprehensive and inclusive approach to AI governance, the Act sets a precedent for responsible AI stewardship in the digital age, serving as a blueprint for future regulatory endeavors worldwide.

## 10. Summary of key findings and insights

The AI Act of 2024 is a significant step forward in the governance of AI technologies, balancing innovation with ethical and societal considerations. It is a historic milestone in AI governance, establishing a comprehensive regulatory framework to address the growing need for accountability, transparency, and ethical standards in AI development and deployment. The Act strikes a delicate balance between fostering innovation and safeguarding against potential risks posed by AI systems, encouraging responsible AI development while mitigating concerns related to safety, privacy, and bias. Ethical imperatives are central to the AI Act, emphasizing principles of fairness, accountability, transparency, and privacy. The development and implementation of the AI Act have involved extensive stakeholder engagement, including governments, industry leaders, researchers, and civil society organizations. This collaborative approach has facilitated the crafting of a robust and inclusive regulatory framework. The AI Act's global implications set a precedent for other countries grappling with similar challenges in AI governance. However, it also presents opportunities for innovation, collaboration, and continuous improvement. The successful implementation of the AI Act will depend on sustained commitment from all stakeholders, and continued dialogue, monitoring, and iteration will be essential to ensure the legislation remains effective and responsive to the evolving landscape of AI technologies. In conclusion, the AI Act of 2024 represents a bold and forward-thinking approach to regulating AI technologies, prioritizing ethical considerations, fostering innovation, and engaging stakeholders. The lessons learned from this study will serve as valuable insights for shaping the future of AI regulation and governance worldwide.

**Q: How does the world's first horizontal and standalone law governing artificial intelligence, the Artificial Intelligence Act of 2024, impact the development, deployment, and ethical implications of AI technologies globally, and what are the key challenges and opportunities it presents for stakeholders across legal, ethical, socio-economic, and technological domains?**

**R:** The Artificial Intelligence Act of 2024 is a significant step towards shaping the future of AI, establishing a framework for AI development and deployment. Its impact on various domains includes increased regulation, standardization, ethical considerations, risk mitigation, transparency, explain-ability, and global benchmarking. The act establishes a framework for AI development and deployment, potentially impacting timelines and costs. Developers will need to prioritize compliance with regulations like explain-ability, transparency, and data privacy. Standardization and best practices could lead to more reliable and predictable AI systems. Ethical considerations are encouraged throughout the AI lifecycle, potentially mitigating biases and ensuring responsible development. The act aims to mitigate risks associated with AI, such as bias, discrimination, and privacy violations. Regulations requiring explain-ability can help users understand how AI systems arrive at decisions, promoting trust and accountability. The act serves as a starting point for global conversations around AI regulation, requiring international cooperation to ensure consistent standards and avoid market fragmentation. The AI Act provides a clear regulatory framework for AI technologies, encouraging responsible innovation while addressing concerns related to safety, privacy, and bias. It fosters an environment conducive to ethical AI development by promoting transparency, accountability, and fairness. However, compliance with regulatory requirements may pose challenges for developers, particularly small and medium-sized enterprises (SMEs). Deployment of AI technologies is another area where the AI Act imposes requirements and standards for AI systems, ensuring they meet specified criteria for safety, reliability, and ethical considerations. This instills trust in AI technologies among users and stakeholders, leading to broader acceptance and adoption. Balancing ethical considerations with technological innovation and market demands poses challenges, particularly in rapidly evolving domains like machine learning and autonomous systems. The AI Act establishes legal obligations and liabilities for stakeholders involved in the development, deployment, and use of AI technologies, providing clarity and accountability. It creates opportunities for legal professionals specializing in AI regulation and compliance, as well as for the development of legal technologies to support regulatory requirements. In conclusion, the Artificial Intelligence Act of 2024 represents a landmark in AI regulation, with profound implications across legal, ethical, socio-economic, and technological domains. While it presents challenges in compliance and implementation, it also offers opportunities for fostering responsible AI innovation, promoting ethical practices, and addressing societal concerns. Collaboration among stakeholders is essential to navigate these challenges and realize the full potential of AI technologies for the benefit of society.

## 11. Future Directions for Research

The Artificial Intelligence Act of 2024 has led to several research directions, including a long-term impact assessment, comparative analysis, ethical frameworks and guidelines, stakeholder perspectives, technological advancements, adaptation and evolution, international collaboration, economic impacts, public perception and trust, and legal and regulatory challenges. These studies aim to evaluate the long-term impact of the AI Act on AI development, deployment, and societal outcomes, track trends in innovation, adoption rates, and ethical considerations over time, and compare the implementation and effectiveness of the AI Act with other AI regulations. Ethical frameworks and guidelines should be investigated to explore emerging ethical dilemmas in AI and propose strategies for addressing them. Stakeholder perspectives should be considered to understand the perspectives and experiences of various stakeholders regarding the AI Act's impact on their practices and perceptions. Technological advancements in AI that comply with the AI Act's provisions, such as explainable AI, bias mitigation techniques, and robustness testing methods, should be explored. Adaptation and evolution of the AI Act should be examined to forecast future developments in AI and identify potential legislative updates or amendments. International collaboration and harmonization in AI regulation can also be explored, building on the principles and standards established by the AI Act. Finally, legal and regulatory challenges associated with the implementation and enforcement of the AI Act should be explored, offering recommendations for effective addressing. Future research should aim to deepen our understanding of the AI Act's impact on AI development, deployment, and ethical considerations while also addressing emerging challenges and opportunities in the evolving landscape of AI regulation and governance.

## 12. Challenges and Considerations

The enactment of the world's first AI Act in 2024 presents significant challenges and considerations. Balancing innovation and regulation is crucial, as overly stringent regulations could stifle innovation and lax regulations could pose risks. A risk-based approach is needed, with stricter regulations for high-risk AI applications and more flexibility for low-risk ones. Global coordination is also essential, as AI development and deployment transcend geographical boundaries. Encouraging international cooperation and harmonization of AI regulations is necessary to ensure a level playing field and global best practices. Adaptability and future-proofing are essential, and the AI Act needs to be built for regular review and updates. Effective enforcement of the act's provisions is crucial, and robust enforcement mechanisms, including independent oversight bodies, are needed. Data governance and privacy are also important, with the act addressing data collection practices, data anonymization techniques, and potential limitations on AI systems' use of personal data. Workforce considerations are also crucial, as the potential for job displacement due to increased automation by AI systems is a concern. Investing in workforce training programs is necessary to equip individuals with the skills necessary to work alongside AI systems and adapt to a changing job market.

## 13. Recommendations for Policy and Practice

The Artificial Intelligence Act of 2024 has been analyzed and recommendations for policy and practice are proposed. These include continuous monitoring and evaluation, stakeholder engagement, capacity building, ethical AI frameworks, international collaboration, transparency and accountability, inclusive decision-making, investment in research and innovation, public awareness and education, and adaptive regulation. Continuous monitoring involves regular assessments of compliance levels, addressing ethical concerns, and aligning with technological advancements. Stakeholder engagement fosters dialogue and collaboration among various stakeholders, including government agencies, industry representatives, academic experts, and civil society organizations. Capacity building initiatives support compliance with the AI Act, particularly for small and medium-sized enterprises (SMEs) and organizations with limited resources. Ethical AI frameworks should be developed and promoted to ensure that AI technologies adhere to ethical standards and societal values. International collaboration is essential to harmonize AI regulations across jurisdictions. Transparency and accountability mechanisms should be enhanced in AI development and deployment processes. Inclusive decision-making is crucial, especially for marginalized communities, minority groups, and vulnerable populations. Investment in research and innovation is necessary for responsible AI development and deployment. Public awareness campaigns and educational initiatives can increase understanding of AI technologies and their potential benefits. An adaptive regulatory approach can evolve in response to technological advancements and emerging ethical challenges. By implementing these recommendations, policymakers, practitioners, and stakeholders can work together to maximize the benefits of AI technologies while minimizing risks and ethical concerns, ultimately fostering a more responsible and inclusive AI ecosystem.

## 14. Limitation

The Artificial Intelligence Act of 2024, despite its potential benefits, has several limitations. Its scope and specificity may not cover all aspects of AI regulation, and enforcement challenges may be resource-intensive and require coordination among regulatory agencies. The Act's applicability may vary across countries and regions due to differences in legal systems, cultural norms, and regulatory priorities. Balancing regulation and innovation is crucial to avoid stifling technological progress. Regulatory interventions may have unintended consequences, such as stifling competition or favoring incumbents. The dynamic nature of AI technologies presents new challenges and opportunities, necessitating adaptive and flexible regulatory frameworks. Addressing bias and fairness in AI systems may be difficult due to limitations in data collection, algorithmic design, and societal biases. Compliance with the Act may impose a significant burden on organizations, and high compliance costs could deter innovation and entrepreneurship in the AI sector.

## 15. Ethical Consideration

As the author of the research paper conducting an analytical study of the world's first Artificial Intelligence (AI) Act, 2024, the author have carefully considered several ethical points throughout the research process. Ensuring the integrity, credibility, and ethical conduct of the study is paramount to upholding the principles of research ethics. Firstly, the author have prioritized the respect for participant autonomy by obtaining informed consent from all participants, including policymakers, legal experts, industry representatives, and AI researchers. Their voluntary participation and understanding of the study's purpose and implications are fundamental to the ethical conduct of the research. Additionally, the author have taken extensive measures to safeguard the confidentiality and privacy of participants' data, ensuring that sensitive information shared during interviews or discussions is anonymized and protected from unauthorized access or disclosure. Moreover, the author have been mindful of minimizing harm to participants or stakeholders involved in the study by avoiding sensitive or intrusive questions during interviews and presenting research findings accurately and responsibly to prevent any unintended negative consequences. Throughout the research process, the author have remained vigilant in maintaining objectivity and minimizing bias, recognizing and addressing personal biases and preconceptions that may influence the research outcomes. Transparency, accountability, and compliance with ethical guidelines have been central to the research approach, with methodologies, data sources, and analytical approaches clearly documented to ensure transparency and facilitate accountability. By considering these ethical points, the author strive to conduct a rigorous, credible, and ethically sound study that contributes valuable insights into the regulatory landscape of AI governance.

### *16. About Author*

The Author Mag. Junaid Sattar BUTT, LL.M (AHC), is a highly qualified legal professional with a diverse educational background. The author holds a (2Y) Master of Laws degree from the University of Lahore, Pakistan, after completing a (3Y) Bachelor's degree in Law, specializing in Comparative Laws, International Laws, Criminal Procedural Laws, Constitutional Laws, and Administrative Laws. The author also holds a Master's degree in Business Administration from the Virtual University of Pakistan and a Master's degree in Political Science from University of the Punjab, Pakistan. With this rich educational background, the author brings a multidisciplinary approach to his research and legal practice. His research interests primarily lie in the areas of International Laws, Criminal Procedural Laws, Administrative Laws, Environmental Laws, Constitutional and Comparative Laws. The Author is committed to exploring and analyzing the complexities of these legal domains, contributing to the development of legal scholarship and promoting justice and fairness. Professionally, Mag. Butt serves as an Advocate High Court at AJ&K (Pakistan Occupied Azad Jammu and Kashmir), where he actively practice in the administration of justice and ensures the proper implementation of legal procedures. Additionally, the author holds the position of Law Officer at Malik Law Associates, where he provides legal advice and expertise to clients, advocating for their rights and interests. With his extensive knowledge and experience, Mag. Junaid Sattar Butt, LL.M (AHC), is dedicated to making a positive impact in the legal field and continues to engage in

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## 18. Declaration of Conflicting Interests

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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