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Artificial intelligence and the Just Transition to a fully digitalised AI-based global economy and society: Regulatory imperatives

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ABSTRACT

As the world transitions into a fully digitalised society powered by artificial intelligence (AI), there is no doubt that the development and use of AI needs to be regulated. This is precisely because, while AI can bring benefits, it also poses severe challenges to society, including worsening unemployment, inequalities and poverty, challenges which in turn could lead to socio-political supheaval. Discussion of the regulation of AI, both at the international and national level, must be based on a clear conceptual framework, one which helps in identifying norms, values, and principles that the proposed regulatory frameworks should embody. This article proposes that the theory of a just transition should be adapted to help identify these norms, values and principles. The transition to a fully digital world economy needs to be a socially just transformation. This is why the theory of a just transition is an ideal conceptual framework for developing an AI regulatory framework. If applied, the theory would make it justifiable to place the social justice values of job security, equality, meaningful engagement with stakeholders, transparency, accountability, and the protection of human rights at the centre of AI regulatory frameworks.

Keywords: artificial intelligence; algorithms; digital economy; just transition; regulation; social justice

1 INTRODUCTION

The world is in a transition known as the Fourth Industrial Revolution. This transition entails the transformation of the world into fully digitalised economies and societies where decisions are automated and services, provided through machines that operate automatically and independently of humans. Artificial intelligence (AI) is a catalyst for this transition, the impact of which is both still unfolding and understudied.

Yet, in spite of the benefits promised by this transition, it is apparent that the world may be heading towards a global socio-political crisis characterised by worsening unemployment and, in turn, increased poverty, worsening inequalities, and widespread insecurity. This is chiefly because AI can diminish the traditional roles of the human being in decision-making processes and the economy. For example, at the core of the digital transformation is the adoption of autonomous production methodologies that are powered by AI to carry out tasks intelligently while focusing on increasing efficiency and productivity and reducing the cost of employment. As a result, it is estimated that 47 per cent of existing professions will be eliminated by the time society is fully powered by AI.[1]

Together with the threats posed to human rights, this has led to growing calls for the regulation of AI at the international and domestic level.[2] Recently, in 2021, the African Commission on Human and People's Rights (ACHPR) adopted a resolution in which it noted as follows:

> Recognising that while AI companies, as well as organisations and businesses that use artificial intelligence technologies, robotics, and other new and emerging technologies, have a significant impact on human rights protection in Africa, there

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1 See ILO "Generative AI and jobs: A Refined Global Index of Occupational Exposure" 140 (2025) *International Labour Organisation* available at https://www.ilo.org/publications/generative-ai-and-jobs-refined-global-index-occupational-exposure (accessed 13 February 2026). See also Brougham D & Haar J "Smart technology, artificial intelligence, robotics, and algorithms: Employees' perceptions of our future workplace" (2018) 24(2) *Journal of Management and Organisation* 239 at 240.

2 African Commission on Human and Peoples' Rights (ACHPR) ACHPR/Resolution 473 (EXT.OS/ XXXI) 2021 available at https://achpr.au.int/en/adopted-resolutions/473-resolution-need-undertake-study-human-and-peoples-rights-and-art (accessed 28 February 2024). See also Ncube C et al. "Policy and legal recommendations to tackling the challenges and seizing the opportunities of artificial intelligence in Africa" in Ncube C et al. (eds) *Artificial intelligence and the law in Africa* Durban: LexisNexis (2023) 351.

> is no comprehensive framework governing their operations to ensure that they comply with human rights obligations on the continent.[3]

The ACHPR called on state parties "to work towards a comprehensive legal and ethical governance framework for artificial intelligence technologies, robotics, and other new and emerging technologies so as to ensure compliance with the African Charter and other regional treaties".[4]

In this article, I grapple with the question of how AI can be regulated to leverage its benefits while addressing the challenges that arise from its adoption. Admittedly, I am not the first scholar to grapple with this question.[5] However, the nuance I bring to this discussion is that proposals for the regulation of AI must be based on a clear conceptual framework the scope of which is adequate to address the nature of the challenges posed by AI. Some of the current proposals on AI regulation lack a clear conceptual framework, while others are based on a strictly human rights approach,[6] which I criticise as inadequate. I propose that the theory of a just transition can be adapted and utilised as a conceptual framework for identifying values and principles that AI regulatory frameworks should embody to ensure that the transition of the world into an entirely digitalised society is achieved in a way which is socially just.

As will be explained below, a socially just transition refers (in this context) to the idea that the transformation towards a fully digitalised AI-based world economy should not create or worsen inequalities but safeguard as well as address the socio-economic needs of vulnerable groups in society.[7] To set the context for this argument, I now turn to discuss the contemporary meaning of AI and highlight its unfolding impact on human life.

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3 See the preamble to ACHPR/Resolution 473 [EXT.OS/ XXXI] (2021).

4 ACHPR/Resolution 473 [EXT.OS/ XXXI] (2021) at para 1.

5 Many other scholars have grappled with this question. See Ncube C et al. (2023) 351; Finocchiaro G "The regulation of artificial intelligence" (2023) *Artificial Intelligence and Society* 1 at 6.

6 This approach focuses on analysing the impact of AI on human rights. See also UNESCO *A handbook for journalism educators: Reporting on artificial intelligence* (2023) available at https://unesdoc.unesco.org/in/documentViewer.xhtml?v=2.1.196&id=p::usmarcdef_0000384551&file=/in/rest/annotationSVC/DownloadWatermarkedAttachment/attach_import_23962281-ce1f-41be-92c2-b0bdfdc592d8%3F_%3D384551eng.pdf&locale=en&multi=true&ark=/ark:/48223/pf0000384551/PDF/384551eng.pdf#1186_22%20_CI_EN_Int_AI.indd%3A.81921%3A608 (accessed 28 February 2024).

7 Gerrard E & Westoby P "What is a just transition?" in Marais L et al. (eds) *Coal and energy in South Africa: Considering a just transition* Edinburgh: Edinburgh University Press (2022) at 24.

2 WHAT IS ARTIFICIAL INTELLIGENCE?

The term "artificial intelligence" is often used to describe "a collection of tools and technologies that are transforming operations and outcomes in diverse fields and sectors from healthcare to transportation, agriculture, and art".[8] According to the United Nations Educational, Scientific and Cultural Organization (UNESCO),

> [a]rtificial intelligence systems are information-processing technologies that integrate models and algorithms that produce a capacity to learn and to perform cognitive tasks leading to outcomes such as prediction and decision-making in material and virtual environments. Artificial intelligence systems are designed to operate with varying degrees of autonomy by means of knowledge modeling and representation and by exploiting data and calculating correlations.[9]

In its AI strategy document, the European Commission describes AI as "systems that display intelligent behavior by analysing their environment and taking action – with some degree of autonomy – to achieve specific goals".[10] Scholars such as Brennen have described it as "a collection of ideas, technologies, and techniques that relate to a computer system's capacity to perform tasks normally requiring human intelligence".[11]

There are two broad categories of AI. The first comprises task-specific AI, which is designed to perform specific tasks or functions that are narrow.[12] The second category refers to AI trained to perform broad functions, such as consulting with patients with diverse medical needs and prescribing solutions based on the diagnosis.[13] Both categories work through algorithms, which are "encoded procedures of transforming input data into

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8 UNESCO (2023) at 29.

9 UNESCO (2023) at 29.

10 European Commission *Coordinated plan on artificial intelligence review* (2021) 23 available at https://digital-strategy.ec.europa.eu/en/library/coordinated-plan-artificial-intelligence-2021-review (accessed 28 February 2024).

11 Brennen S et al. "An industry-led debate: How UK media cover artificial intelligence" (2018) *Reuters Institute for the Study of Journalism* 1 at 3. See also Mavedzenge J & Saki O "The possible future of African democracy in the age of artificial intelligence" in Ncube C et al. (eds) *Artificial intelligence and the law in Africa* Durban: LexisNexis (2023) at 111–112.

12 For example, AI-powered global positioning system (GPS) navigation software which is trained to provide route guidance. See UNESCO (2023) at 30.

13 See UNESCO (2023) at 30; Upadhyay V *South Africa artificial intelligence in healthcare market analysis* (2024) *Insights 10* 1 at 4 available at https://www.insights10.com/report/south-africa-artificial-intelligence-ai-in-healthcare-market-analysis/ (accessed 28 February 2024).

a determined output, based on specific calculations".[14] There are at least two types of AI algorithms: machine learning and deep learning algorithms.

Machine learning algorithms have been described as

> [a]lgorithms trained using examples instead of being coded via explicit instructions. Machine learning can be understood as recipes learned from data; it is an approach to making repeated decisions by algorithmically identifying patterns in historical data and using these to deal correctly (or in a desired way) when exposed to new data.[15]

Essentially, machine learning algorithms are designed to apply defined criteria to make decisions or determine outcomes based on the data that has been fed into the computer system. For example, machine learning is used for marketing products to a group of customers based on their history of purchases or demographic features. For instance, through machine learning, music streaming applications can suggest songs that may be of interest to listeners based on the music they have listened to previously. Video streaming applications also use machine learning to select films that may be of interest to subscribers based on what they have watched in the past. Machine learning is used as well to filter spam email messages based on patterns of undesirable email content, email domains, or internet protocol addresses.[16] Applications such as Google Maps apply machine learning algorithms that can predict the amount of time it will take to reach a definition by taking into account, inter alia, the distance, speed limit regulations, and volume of traffic at the time of travel.

By contrast, deep learning algorithms operate through multi-layered computer systems (neural networks) set up to mimic the human brain and its neural networks.[17] Through deep learning, these systems can recognise complex patterns in photographs, text, sounds, and other data in order to make predictions. For example, autonomous cars (self-driving cars) rely on deep learning algorithms to detect road signs and pedestrians,

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[14] Barfield W & Pagallo U *Research handbook on the law of artificial intelligence* Cheltenham: Edward Elgar Publishing (2018) at 14.

[15] UNESCO (2021) at 31.

[16] For more examples of machine learning, see Batta M "Machine learning algorithms – A review" (2020) 9(1) *International Journal of Science and Research* 381 at 385. See also Tableau "Machine learning examples" (2023) available at https://www.tableau.com/learn/articles/machine-learning-examples (accessed on 28 February 2024).

[17] See UNESCO (2023) at 27.

while military defence systems use deep learning algorithms to identify areas of interest in satellite images.[18] Speech recognition[19] applications[20] are another example of deep learning algorithms that enable the recognition of voice commands and translation of spoken language into text by computers.[21]

Scholars and analysts[22] have argued that there are three levels of AI, ranked from the type that can perform tasks with human help to the type of AI which is autonomous of human beings. In this schema, the first level is known as "assisted AI",[23] which can only work under the control of human beings and strengthens the ability of humans to accomplish tasks faster and more effectively. Examples include GPS software, which helps users find routes to get to their destination faster than they would have without the GPS.[24]

The second level is "augmented AI",[25] which helps people accomplish tasks they would not have been able to accomplish on their own. For example, in the medical field, AI can be used by doctors to generate health-care recommendations based on tonnes of medical data in the patient's medical record. As observed by some of the practitioners:

> Augmented intelligence is designed to work with humans to enhance their capabilities rather than remove humans from the picture. It relies on machine learning and deep learning to crunch through reams of data, which humans then use to make decisions and take action.[26]

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18 For more examples on the application of deep learning, see Batta M (2020) 381 at 384. See also Amazon Web Services "What is deep learning?" available at https://aws.amazon.com/what-is/deep-learning (accessed 28 February 2024).

19 Also known as computer speech recognition, speech-to-text or automatic speech recognition.

20 For example, Cortana, Siri, and Alexa.

21 For more examples of AI applications of deep learning, see Batta M (2020) 381 at 384. See Grover R "Deep learning: Overview, practical examples, popular algorithms" (20 September 2019) *Analytic Steps* available at https://www.analyticssteps.com/blogs/deep-learning-overview-practical-examples-popular-algorithms (accessed 28 February 2024).

22 Oosthuizen R "The Fourth Industrial Revolution: Smart technology, artificial intelligence, robotics and algorithms: Industrial psychologists in future workplaces" (2022) 5 *Frontiers in Artificial Intelligence* 1 at 4.

23 Oosthuizen (2022) at 4.

24 For further examples of assisted AI, see Dirox "Assisted, augmented, and autonomous intelligence: What differences?" (16 February 2023) *Dirox* available at https://dirox.com/post/assisted-augmented-and-autonomous-intelligence-what-differences (accessed 28 February 2024).

25 Oosthuizen (2022) at 4.

26 Kawamoto D "What is augmented intelligence?" (2023) *BuiltIn* available at https://builtin.com/artificial-intelligence/augmented-intelligence (accessed 28 February 2024).

The third level is autonomous AI, which encompasses "[intelligent] machines that are capable of making decisions and taking action without human input".[27] Examples include self-driving vehicles, which are capable of navigating roads on their own and making decisions based on sensors and machine learning algorithms. Another example is that of the automated trading algorithms used in financial markets. Operating independently of human control, these are capable of making decisions to buy and sell shares based on market data and predefined rules.[28]

Lastly, the relationship between AI and robots needs clarification because there is sometimes confusion about the two technologies.[29] AI and robotics are interlinked but not the same. Robots are machines that are mobile and able to interact with humans, other robots, and the environment in which they operate;[30] AI is the software which is installed to enable the robot to function intelligently to make decisions and perform functions that previously could be performed only by humans or which human beings cannot perform at all.[31] Developments in robotics and AI are leading toward a transition to an entirely digitalised society substantially powered by AI. In the paragraphs below, I highlight some of the ways in which this is happening.

3 HIGHLIGHTS OF AI'S IMPACT ON SOCIETY

As Ncube and others observe,[32] there is a knowledge gap when it comes to the ways in which different sectors of society, especially in Africa, are being impacted by AI. This is because there has yet to be a full assessment at the regional and national levels of these impacts. However, there are comprehensive discussions in this regard within legal academia, where the focus is mainly on the impact of AI on human rights. For example, Effoduh[33] provides an in-depth analysis of how AI is advancing the realisation of specific human rights in Africa. During the COVID-19 pandemic, AI-powered robots were deployed to conduct mass temperature screenings to detect the spread of the coronavirus

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27 Dirox (2023).

28 Dirox (2023).

29 See Joshi N "Three key differences between AI and robotics" (16 January 2022) *Forbes* available at https://www.forbes.com/sites/naveenjoshi/2022/01/16/3-key-differences-between-ai-and-robotics/?sh=79eec655d34d (accessed 28 February 2024).

30 Joshi (2022).

31 Joshi (2022).

32 Ncube et al. (2023) at 351.

33 Effoduh J "Artificial intelligence and human rights in Africa" in Ncube C et al. (eds) *Artificial intelligence and the law in Africa* Durban: LexisNexis (2023).

in countries such as Rwanda.[34] This demonstrates how AI can be utilised to protect the rights to health and to life in the face of threats emanating from a public emergency.

AI applications have also been developed to enable health-care providers to monitor and consult with their patients remotely and even deliver medical supplies. For example, in Tanzania the government is using AI-powered drones to distribute medical supplies to patients in remote communities.[35] In South Africa, there are plans to roll out applications that enable patients to consult remotely with medical providers.[36] Public access to health care in many parts of Africa, including Tanzania and South Africa, is constrained by lack of adequate medical staff, absence of health-care facilities (especially in rural areas), and poor road infrastructure that makes certain areas inaccessible. The deployment of AI to enable remote patient monitoring, remote consultation, and delivery of medicine to remote communities improves access to health care for such communities. AI is also being used to promote mental wellness. For example, psychologists have built chatbots that provide life-coaching to people based on questions they ask in text-message conversations.[37]

In addition, AI-driven facial recognition technology is being used in countries such as Uganda and Kenya. Law enforcement agencies use devices installed in public places to identify criminal suspects, witnesses, and victims of criminal conduct by linking their images with their biometric data.[38] This demonstrates that AI can be used to strengthen access to justice and the protection of the right to security. Yet AI is also being used to undermine human rights. For example, the same facial recognition technology is used to conduct illegal surveillance of legitimate political competitors and political activists, thereby violating their right to privacy and personal security.[39] This has led scholars such as Effoduh to conclude that AI is having a dichotomous impact on human rights.[40]

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[34] Walter D & King-Okoye M "Artificial intelligence and robotics addressing COVID-19 pandemic's challenges" in Mazal J et al. (eds) *Modelling and simulation for autonomous systems* Heidelberg: Springer Nature (2020) 285.

[35] Walter D & King-Okoye M (2020) at 284.

[36] Upadhyay (2024) 4.

[37] See Gower P "Psychology and the 4IR: Adaptability will be key to navigating the future career space" (15 November 2018) *University of Pretoria* available at https://www.up.ac.za/faculty-of-humanities/news/post_2734234-psychology-and-the-4ir-adaptability-will-be-key-to-navigating-the-future-career-space (accessed 28 February 2024).

[38] Mavedzenge & Saki (2023) at 117–118.

[39] Mavedzenge & Saki (2023) at 117–118.

[40] Effoduh (2023) at 56.

This is an accurate observation, not just about the impact of AI on human rights but its impact on broader governance issues and various spheres of the economy. For example, according to Mavedzenge and Saki,[41] AI can be utilised both to improve the quality of elections as well as to undermine their integrity. Algorithms embedded in social media and other AI-powered applications can be used to promote civic participation and public engagement with election candidates in their campaign manifestos.[42] Election candidates and election management bodies can also use chatbots to sensitise the electorate on questions relating to campaign manifestos or voting procedures.[43] Thus, AI can be utilised to promote civic participation in democratic processes such as elections. However, it can also be used to promote disinformation so as to manipulate voters during elections.[44] For example, AI can be used to generate so-called deepfake videos or clone the voices of political actors and public figures during election campaigns.

In the economic sphere, an analysis by Papp and Olubiyi[45] finds that the intervention of AI in the legal services sector is (to some degree) increasing the efficiency and accessibility of legal services. Analysis by Chege and Nalule[46] demonstrates that the deployment of AI in mining is increasing productivity and workplace safety, while Adebola and Ibeke[47] show that the adoption of AI in the agriculture sector is promising to enhance productivity. In essence, the use of AI allows humans to withdraw from monotonous and risky tasks, thereby increasing productivity and improving workplace safety. However, these scholars also show that the advantages of efficiency, safety, and productivity are accompanied by challenges such as worsening unemployment given that certain human functions are being replaced by AI.

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41 Mavedzenge & Saki (2023) at 111–124.

42 Mavedzenge & Saki (2023) at 119.

43 Savaget P et al. "Empowering political participation through artificial intelligence" (2019) 46(3) *Science and Public Policy* 369 at 378–380.

44 Mavedzenge & Saki (2023) at 113–114.

45 Papp I & Olubiyi I "The use of artificial intelligence in legal process and business" in Ncube C et al. (eds) *Artificial intelligence and the law in Africa* Durban: LexisNexis (2023) 225.

46 Chege K & Nalule V "Artificial intelligence in the African energy and mining sectors: Legal and regulatory review" in Ncube C et al. (eds) *Artificial intelligence and the law in Africa* (2023) 263.

47 Adebola T & Ibeke E "Agriculture in Africa: The emerging role of artificial intelligence" in Ncube C et al. (eds) *Artificial intelligence and the law in Africa* (2023) 289.

In the United States, a study conducted in 2025 by the Massachusetts Institute of Technology found that AI can already do the job of 11.7 per cent of the US labour market.[48] At Amazon, AI has displaced 30 000 people from employment due to AI led automation of their roles, since 2025.[49] In January 2026, one of the United States' large media houses (The Washington Post) announced plans for large scale job cuts, citing the impact of AI on the media-ecosystem.[50] Several other large corporates have laid off employees or announced plans to do so, signifying a growing trend of job cuts due to AI automation of job roles.[51]

Considering the already high levels of unemployment in South Africa[52] and the African continent, this trend will have a devastating impact of worsening unemployment. Only a few new jobs will be created through AI, and it is unclear whether those new jobs will be meaningful employment or accessible to low-skilled workers. Scholars, including Oosthuizen,[53] have cautioned that the adoption of AI could lead to a reduction in the demand for low-skilled workers, as their tasks are the first and easiest to be taken over by AI-driven machines such as chatbots. This is evident in the retail and financial services sectors, where routine functions such as checkout, customer service, credit ratings and client financial risk assessments are increasingly being automated through the use of AI algorithms, thus pushing many workers out of employment.[54]

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48 Sigalos M "MIT study finds AI can already replace 11.7% of U.S. workforce" (26 November 2025) *CNBC* available at https://www.cnbc.com/2025/11/26/mit-study-finds-ai-can-already-replace-11point7percent-of-us-workforce.html (accessed 13 February 2026).

49 Patridge J "Amazon tells workers it will cut 16,000 jobs worldwide in second big wave of layoffs" (28 January 2026) *The Guardian* available at https://www.theguardian.com/technology/2026/jan/28/amazon-global-job-cuts-email-error-workers-sent (accessed 13 February 2026).

50 Beddall K "Bezos-led Washington Post announces painful job cuts" (5 February 2026) *Japan Times* available https://www.japantimes.co.jp/business/2026/02/05/bezos-washington-post-layoffs/ (accessed 13 February 2026).

51 Cunningham M "More companies are pointing to AI as they lay off employees" (3 February 2026) *CBNC* available at https://www.cbsnews.com/news/ai-layoffs-2026-artificial-intelligence-amazon-pinterest/# (accessed 13 February 2026).

52 South Africa's joblessness has escalated at alarming rates in recent years, and youth remain vulnerable in the labour market. The official unemployment rate was 32.9 per cent, as at the first quarter of 2023, according to Statistics South Africa, with unemployed youth (15–34 years) at 46.5 per cent. See South African Government "Statistics South Africa on Quarterly Labour Force Survey quarter three 2023" (14 November 2023) available at https://www.gov.za/news/media-statements/statistics-south-africa-quarterly-labour-force-survey-quarter-three-2023-14 (acessed 28 February 2024).

53 Oosthuizen (2022) at 4.

54 The internet of things, cellphone applications, bookkeeping robotisation, and driverless vehicles offer further examples of human functions that are being taken over by artificial intelligence. See Oosthuizen (2022) at 4.

For instance, the call centre industry has been touted as "a beacon of hope" for South Africa's unemployment crisis, as it is capable of absorbing low-skilled unemployed youths. It is estimated that more than 270,000 people are currently employed in the call centre industry, and recent reports had estimated that this would grow to 775,000 jobs by 2030.[55] However, these employment opportunities are now at risk as a result of the increased adoption of AI, which is capable of performing customer service functions. Chatbots are being introduced to resolve routine customer service issues, with the option existing to connect clients to human agents to address more complicated problems.[56] Moreover, rapid advancements in AI are enabling chatbots to resolve ever more complex service issues without the assistance of human beings. As a result, the existing 270,000 jobs in the call centre industry are at risk of being displaced by AI.

It appears, then, that AI is having a dichotomous impact on various facets of human life, including human rights, the economy, and politics in Africa. On the one hand, it has made it easier for people to access social services, as well as increased efficiency and productivity in the economy. On the other, AI is replacing human beings in the workplace, thereby worsening the unemployment crisis and leading to growing poverty in some parts of the continent and even the wider world. This has led to growing calls for the regulation of AI to ensure that it can be used for the greater good rather than for harm.

The regulation of AI is a legal process that entails creating a framework consisting of normative standards with which developers and users of AI must comply and mechanisms to enforce their compliance. Yet although AI regulation is a legal process, it should be underpinned by a conceptual framework that informs the normative content of the regulatory framework. For example, the process of identifying normative standards to be complied with by AI developers and users should be informed by a clear conceptual framework that seeks to address specific challenges.

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55 "Call centre industry a beacon of hope for South Africa's unemployed youth" (20 April 2023) *The Good News* available at https://www.sagoodnews.co.za/call-centre-industry-a-beacon-of-hope-for-south-africas-unemployed-youth/ (accessed 28 February 2024).

56 See, for example, Barron S "17 customer service chatbot examples and how you should be using them" (20 September 2023) *Hubspot* available at https://blog.hubspot.com/service/customer-service-chatbots (accessed 28 February 2024).

4 WEAKNESSES AND GAPS IN THE DEBATE ON AI REGULATION

In recent years, governments have made attempts to regulate AI, while scholars have offered critiques of these same attempts. For example, Adams and others[57] note that some governments adopt a "piecemeal approach" in which policy and legislative frameworks that pre-existed the advent of AI are used to regulate AI. Such legislative frameworks include cybercrime and data protection laws as well as copyright laws. This approach is proving to be inadequate in maximising the opportunities, and addressing the challenges, arising from the introduction of AI, given that most of these frameworks were not designed with AI in mind. They are thus not comprehensive enough to address the unique challenges posed by AI.[58]

Drawing on their analysis of various national jurisdictions,[59] Ncube and others have identified a range of approaches to AI regulation. Some governments take a sectoral approach in which they develop regulatory frameworks specific to each sector of society, while others adopt a generalised approach whereby they introduce a framework that applies to all sectors.[60] Ncube goes on to argue as follows in regard to the African context:

> Whatever the approach adopted, national and regional artificial intelligence legal and policy initiatives must be rooted in regulatory frameworks that are home-grown and responsive to the peculiar needs of the African continent in order to effectively harness the benefits of artificial intelligence while addressing its challenges. Such regulatory frameworks must be flexible and balanced to allow room for the development of artificial intelligence technology in Africa; must be developed through an open, consultative, and transparent process; and must be framed and tailored with cautious optimism to suit the lived experiences of Africans, address the challenges faced by Africans, and achieve the developmental priorities of the continent as articulated in the AU Agenda 2063. Put differently, an

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57 Adams R et al. "A new research agenda for African generative AI" (2023) 7 *Nature Human Behaviour* 1 at 8–13.

58 For example, the default legal position under copyright protection law is that the use of copyrighted materials for purposes of training is not a violation of copyright. This has been used to justify the use of copyrighted images to train algorithms that generate art. *Getty Images (US) Inc* v *Stability AI Inc ("Getty Images")* Case 1:23-CV-00135-UNA, available at https://fingfx.thomsonreuters.com/gfx/legaldocs/byvrlkmwnve/GETTY%20IMAGES%20AI%20LAWSUIT%20complaint.pdf (accessed 28 February 2024).

59 USA, EU, Canada, Korea, Singapore, United Kingdom, Japan and China.

60 Ncube et al. (2023) at 353.

> artificial intelligence regulation framework from Africa must be people-centered, promote ethical and responsible use of artificial intelligence, and ensure the sustainable development of Africa.[61]

I agree with these assertions. However, it is essential to recall that although the regulation of AI is ultimately a legal process that involves the identification of normative standards to be complied with and the establishment of mechanisms mandated to enforce those standards, such a process must be anchored on a conceptual framework. Put differently, a policy on the regulation of AI must be based on a clear framework which is rooted in an ideological grounding and becomes the foundational basis for identifying the specific normative standards and principles to be complied with by users and developers of AI. This is because AI (as has been demonstrated above and by other scholars)[62] is a force with the potential to radically change not just the way in which commercial goods and services are produced but the nature of power relations in society and the global balance of power between states. AI is not just a form of technology; it is a powerful political, social, and economic tool that can be used to re-order society.

Thus, while scholars such as Ncube and Schonwetter[63] are correct that African governments should aim at developing regulatory frameworks that "are people-centred, promote ethical and responsible use of artificial intelligence, and ensure the sustainable development of Africa", there is a need to brainstorm further on the values that should form the foundation of such a framework. In the absence of a conceptual framework, it may be challenging to identify these values, build consensus around them, and justify why they should be the foundation of an AI regulatory framework.

Various propositions have been made advocating the use of a human rights approach to the regulation of AI as a framework of thought that could be applied to identify normative standards and principles that users and developers of AI must comply with as part of the regulatory framework. Of note are UNESCO's recommendations on the ethics of AI.[64] In developing these recommendations, UNESCO applied a human rights-based

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61 Ncube et al. (2023) at 353.

62 Ünver HA "Artificial intelligence, authoritarianism and the future of political systems" (2018) *Centre for Economics and Foreign Policy Studie*s 1 at 10–16.

63 Ncube et al. (2023) at 353–354.

64 UNESCO (2023) at 27.

approach as a conceptual framework for identifying the relevant ethical norms and standards. Similarly, in 2021, the ACHPR adopted a Resolution on AI calling for

> State Parties to ensure that the development and use of artificial intelligence, robotics, and other new and emerging technologies are compatible with the rights and duties in the African Charter and other regional and international human rights instruments, in order to uphold human dignity, privacy, equality, non-discrimination, inclusion, diversity, safety, fairness, transparency, accountability, and economic development as underlying principles that guide the development and use of artificial intelligence, robotics, and other new and emerging technologies.[65]

Thus, a common approach at both at the international and African regional levels is to seek to regulate AI in order to protect human rights. A human rights-based approach, however, generates only human rights-oriented solutions. In other words, the solutions are restricted to what can be justified legally within the scope of obligations that arise from specific human rights guaranteed under domestic and international law. While this is important, such an approach is inadequate for addressing the complex and nuanced challenges that arise from the introduction of AI in the global economy.

Notably, it could result in the retrenchment of employees as human functions are replaced by AI. We have already begun to witness this in various industrial sectors, as discussed above. Labour laws in different jurisdictions, including South Africa, permit the retrenchment of workers providing the employer complies with specific procedural requirements and avails the required compensation.[66] Therefore, a strictly human rights-based approach is insufficient to protect humans from being pushed out of employment by AI. At best, it can only delay their retrenchment and ensure that retrenched employees secure monetary compensation for losing their jobs – it does not provide workers with the much-needed guarantee of job security.

Another weakness inherent in taking a strictly human rights-centric approach is that it assumes that the scope of the legal framework is adequate to guarantee the protection of human rights. The inadequacy of the law has been exposed time and time again,

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[65] African Commission on Human and Peoples' Rights (2021) at para 1.

[66] See, for example, *L & C Steinmuller (Africa) Ltd* v *Shepherd* [2004] ZALAC 11.

especially when it comes to addressing the novel threats that emerging technologies pose to human rights. The law is always playing catch-up with technology, with the result that, in many cases, the damage is done already by the time the legal framework is updated to address the threat in question.

A good example is the theft of intellectual property by generative art developers despite the protection of intellectual property rights under the law. The case of *Andersen* v *Stability AI Ltd,* which at the time of this writing is before the courts in the United States of America (USA), illustrates the inadequacy of the law and, by implication, the insufficiency of the human rights-based approach in addressing threats emanating from the adoption of AI.

In this case, the plaintiffs are artists alleging that Stability AI Inc. collected copyrighted images from online sources without permission and used them to train image-generating algorithms to produce new images without attribution to the original artists who provided the training material.[67] Stability AI Inc. has counter-argued that its art generative algorithms do not copy or store any copyrighted images but only analyse their properties to generate parameters that the algorithms use in creating unique images from text prompts. Similar arguments have been advanced in the case of *Getty Images (US) Inc* v *Stability AI Inc*,[68] where Getty Images is suing Stability AI Inc., alleging copyright and trademark infringement through the use of images available on its website to train Stability AI's image-generating algorithm.[69]

The court's verdict is still pending in both cases. It is, however, critical to note that copyright regulation generally, including in the USA and South Africa, permits the use of copyrighted materials for training purposes. In other words, the use of copyrighted work to conduct training is not considered a violation of copyright. When this law was developed, the framers did not have in mind the reality that, someday, copyrighted works would be used to train algorithms that would replace artists. Therefore, until the law is updated, copyrighted works remain vulnerable to large-scale exploitation by generative

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67 *Sarah Andersen and others* v *Stability Inc* Case 3:23-Cv-00201.

68 *Getty Images.*

69 Numerous other cases have been filed that raise similar concerns about the violation of copyright. See Valente C et al. "Recent trends in generative artificial intelligence litigation in the United States" (5 September 2023) *K & L Gates* available at https://www.klgates.com/Recent-Trends-in-Generative-Artificial-Intelligence-Litigation-in-the-United-States-9-5-2023 (accessed 28 February 2024).

art developers. In this sense, copyright laws are playing a catch-up game with AI, and this renders the human rights-based approach insufficient to protect artists against the harm that could arise from the use of AI.

Regulation of AI is a necessity to address the challenges and threats emanating from its intervention in the global economy and society. In order to identify and design the normative standards, principles, and mechanisms that make up the regulatory framework, policy-makers should adopt a conceptual framework that ensures justice in its broader sense rather than a version of justice restricted to human rights. Human rights are a central part of justice, but justice is an ideal that goes beyond human rights. It encompasses other social values, including solidarity, compassion, and care. The concept of a just transition, which underpins these values, can be adapted and applied to address the broader questions of social justice that arise from the introduction of AI.

5 THE JUST TRANSITION AND REGULATION OF AI

Although there is debate as to who coined the term "just transition", the concept itself can be traced back to the labour movement in the USA and Canada in the 1970s when there was a strong push towards making industries environmentally friendly.[70] Regulations were introduced that would compel industries to adopt environmental-friendly production processes, including cutting down on water and air pollution. Complying with these regulations stood to result in massive job losses, so the labour movement demanded a just transition towards environmentally friendly methods of production. Such a transition had to ensure that workers were not rendered jobless as a result of the transformation to the new methods of production.

As Rosemberg notes,[71] when it was introduced, the just transition was a conceptual framework that sought to reconcile the need for decent jobs and the need to protect the environment. This was reflected in the position adopted in 1990 by the Canadian Labour Congress:

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[70] Newell P & Mulvaney D "The political economy of the just transition" (2013) 179(2) *Geographical Journal* 132 at 135–140. See also Morena E "Securing workers' rights in the transition to a low-carbon world: The just transition concept and its evolution" in Duyck S et al. (eds) *Routledge handbook of human rights and climate governance* London: Routledge (2018) 292.

[71] Rosemberg A "Building a just transition: The linkages between climate change and employment" (2010) 2(2) *International Journal of Labour Research* 125 at 128.

> The just transition policy [of the Canadian Labour Congress] calls on governments to establish fair and positive arrangements that help workers who are displaced by environmentally desirable initiatives to shift to alternative, environmentally desirable jobs. The idea is to ensure that workers are willing participants rather than victims of environmental improvement.[72]

Thus, the central question the just transition concept sought to address was how to protect both jobs and the environment. In recent years, the concept of a just transition has grown beyond seeking to reconcile the need for decent jobs and the need to protect the environment. As Gerrard and Westoby point out, "the term has evolved considerably, drawing from sustainable development debates, human rights agendas, and climate change concerns". [73] Rosenberg notes that

> [t]oday, "Just Transition" can be understood as the conceptual framework in which the labour movement captures the complexities of the transition towards a low-carbon and climate-resilient economy, highlighting public policy needs and aiming to maximize benefits and minimize hardships for workers and their communities in this transformation.[74]

This is reflected in the policy positions of the United Nations Development Program (UNDP) and International Labour Organization (ILO). According to the UNDP, the just transition is about "meeting climate goals by ensuring [that] the whole of society – all communities, all workers, all social groups – are brought along in the pivot to a net-zero future".[75] Similarly, the ILO has defined the just transition as entailing "[g]reening the economy in a way that is as fair and inclusive as possible to everyone concerned, creating decent work opportunities and leaving no one behind".[76] In contemporary terms, the concept of just transition thus seeks to address the question of how decarbonisation of the economy can be achieved in a socially just way that addresses – adequately and equitably – the needs of workers and communities.

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[72] Burrows M "Just transition" (2001) 27(1) *Alternatives Journal* 29 at 30.

[73] Gerrard & Westoby (2022) at 24.

[74] Rosemberg (2010) 125 at 141. See also Velicu I & Barca S "The just transition and its work of inequality" (2020) 16(1) *Sustainability: Science, Practice and Policy* 263 at 269–273.

[75] Lee S & Baumgartner L *How just transition can help deliver the Paris Agreement* (2022) United Nations Development Program at 8.

[76] Lee & Baumgartner (2022) at 8.

Details on the measures that constitute just transition policies differ from one geographical context to the other, partly because decarbonisation affects different countries differently. As such, each country has its own peculiar needs that it must address in order to ensure a socially just transition to a decarbonised economy. However, there is international consensus[77] on the principle that each country, through democratic deliberation, must craft and adopt a shared vision for what a just transition means for its impacted workers, communities, and businesses. There is also growing support for the position that just transition policies need to ensure that, as the world moves to a decarbonised global economy, workers have meaningful employment, people's right to self-determination is respected (particularly their right to participate in decision-making processes), decarbonisation results in a world where resources and power are distributed equally amongst peoples, and all human rights are fully respected, including socio-economic rights.[78]

This idea of a just transition can be adapted to provide a conceptual foundation for the development of an AI regulatory policy framework. As discussed earlier, the introduction of AI is meant to enhance efficiency and reduce production costs in industry by reducing human error and increasing accuracy and precision through the automation of processes. Thus, AI has triggered a transformation of the global economy and across all industrial sectors. The concept of just transition can be applied to regulate the adoption of AI in order to ensure that there is a socially just transformation towards an entirely digitalised global economy and society powered by AI.

In the context of managing climate change, the notion of the just transition entails that decarbonisation of the economy must be achieved in a way which is fair and inclusive to everyone concerned, creates decent work opportunities and leaves no one behind.[79] I propose that, in the context of AI, the concept of the just transition should be adapted to facilitate global consensus on the need to ensure that the digital transformation of the economy and industry as a result of the introduction of AI must be achieved in a socially just way that reconciles the need to enhance efficiency and productivity with the need to

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77 Lee S and Baumgartner L (2022) at 9.

78 Climate Justice Alliance "What do we mean by just transition?" (2019) *Climate Justice Alliance* available at https://climatejusticealliance.org/just-transition/ (accessed 29 February 2024).

79 Rosemberg (2010) 125 at 141.

protect jobs and the interests of the communities where workers live. This requires policy-makers to interrogate not just how the legal rights of workers and communities should be protected but how values of compassion, solidarity, and care can be integrated to ensure a socially just transition to an AI-powered economy and society.

In order to achieve this, there is a need to agree on a set of principles that constitute a just transition in the context of AI. I propose that if the purpose of adopting the concept of just transition as a theoretical and policy framework is to ensure that the transformation occasioned by AI is achieved in a socially just manner, then the principles that constitute a just transition should be derived from the concept of social justice itself. As a concept, social justice entails the application of various theories of justice to address social problems.[80] The introduction of AI could result in the social problem of large-scale unemployment, which in turn would worsen global poverty, global inequalities, and crime and potentially lead to the breakdown of public order.

A socially just transition, therefore, must include the protection of employment and the creation of decent work (guaranteeing job security); respecting the right of the people to participate in decision-making processes that involve the use of AI; addressing the existing challenges of racial and gender inequalities; fostering transparency and accountability; and ensuring that all human rights are fully respected.

In the paragraphs below, I discuss what these principles would entail and how they can be applied in practice to regulate the introduction of AI in industry and commerce.

5.1 Job security: Protecting employment and creating decent work

Job security is a crucial principle of social justice.[81] A socially just transition towards an entirely AI-powered economy and society must (out of necessity) involve adequate guarantees for job security. The threat posed by AI to human employment is evident. However, it is critical to add that while the threat is more immediate for low-skilled employees, the impact is spreading to even highly skilled employees as high-technology algorithms and robots with high-precision finesse are introduced. A recent survey by the

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80 Miller D *Principles of social justice* Cambridge, Massachusetts: Harvard University Press (1999) at 21.

81 Stiglitz J "Employment, social justice and societal well-being" (2002) *International Labour Review* 1 at 13. See also Miller (1999) at 2.

ILO found that highly digitisalise cognitive jobs in media, aviation and banking-related occupations are also at risk of being taken over by AI.[82] Industrial psychologists[83] find that the adoption of AI is making workers anxious about job security. Workers need government protection through a regulatory framework.

AI must be adopted for its benefits of increasing productivity, workplace safety, and efficiency, but this must never be done at the cost of job security. The adoption of AI in any form in any sector of the economy should not result in existing employees being rendered unemployed. I propose that the regulatory framework should ensure that companies intending to adopt AI – which takes over existing jobs being done by humans – may be authorised to adopt such technology only if they can demonstrate that affected employees will still be employed meaningfully under similar or better employment conditions. In addition, quotas should be set to regulate the acceptable ratio of human-performed functions versus AI-performed functions per company. These quotas must be determined in accordance with criteria established through tripartite deliberations involving labour, employers, and government. The criteria for setting the quotas should include consideration of factors such as whether the introduction of AI would create more meaningful jobs[84] in the sector or the other sectors, as well as considerations in regard to the safety of workers.

5.2 Stakeholder participation

Stakeholder participation, including the participation of marginalised and vulnerable groups, is a fundamental principle of social justice.[85] Therefore, a socially just transition towards an entirely AI-powered economy and society requires democratic deliberation and stakeholder participation in decision-making.

Regulatory frameworks must ensure that decisions on the adoption of AI are not undertaken without adequately consulting the stakeholders who will be impacted by those decisions. This includes decisions to adopt legislation and policies on AI, as well as decisions to introduce AI in companies and sectors of society. There must be meaningful

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82 ILO (2025).

83 See, for example, American Psychological Association "2023 Work in America Survey" (n.d.) available at https://www.apa.org/pubs/reports/work-in-america/2023-work-america-ai-monitoring (accessed 13 February 2026).

84 Stiglitz (2002) at 12.

85 Miller (1999) at 26.

engagement with those who would be affected by such decisions before the intended decisions are carried out. In this sense, meaningful engagement would imply providing affected stakeholders with adequate notice for consultations and adequate information on the proposed decision. The consultations must be conducted in ways that demonstrate that the authorities seeking to implement the proposal are open-minded and engaged robustly with the views or concerns of stakeholders before they make the decision.[86]

5.3 Addressing inequalities

Ensuring equality, both in its formal and substantive senses,[87] is a cardinal principle of social justice. AI must not be used to create or worsen inequalities if a just transition towards a global economy and society fully powered by AI is to be achieved. Research[88] has revealed that AI may discriminate unfairly against certain groups of people due to algorithmic bias, which arises when AI algorithms are trained to discriminate on the basis of identity or status.[89] Alternatively, algorithmic bias arises when algorithms are fed with biased criteria for making predictions or determining outcomes.[90]

Regulatory frameworks should ensure that companies licensed to develop, trade in, or deploy AI undertake to ensure that their technology does not unfairly discriminate. Governments should consider making it mandatory, as part of the regulatory framework, that companies (or other users) obtain a license before they deploy AI to serve the public in sectors such as public health care, access-to-finance, education in view of the potential impact on employment. The technology must be tested for bias by the regulator before being approved for use.

The adoption of AI in the workplace is also threatening to widen socio-economic inequalities. The World Economic Forum has warned that

> [i]n the absence of proactive efforts, inequality is likely to be exacerbated by the dual impact of technology and the pandemic recession – jobs held by lower-wage

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86 Mavedzenge J "Revisiting the role of the judiciary in enforcing the state's duty to provide access to the minimum core content of socio-economic rights in South Africa and Kenya" (2020) *Journal of Comparative Law in Africa* 60 at 82.

87 Coburn A & Sinead G "Social justice and equality" (2017) *Counterpoints* 40 at 53.

88 Varsha P "How can we manage biases in artificial intelligence systems – A systematic literature review" (2023) 3(1) *International Journal of Information Management Data Insights* 1 at 3.

89 For examples, see Battista D & Molano J "How AI bots have reinforced gender bias in hate speech" (2023) 48 *Ex Aquo* 54 at 60.

90 Battista & Molano (2023) at 60.

> workers, women, and younger workers were more deeply impacted in the first phase of the economic contraction.[91]

In South Africa (and more broadly in Africa), most of the jobs at risk of being taken over first by AI are the functions currently performed by low-skilled persons, who are predominantly black Africans.[92] For example, in the call centre industry, 87 per cent of the employees are black Africans.[93] It is also estimated that 76 per cent of employees in this sector are from low-income households.[94] The adoption of technology such as live chatbots capable of solving complex customer service queries is threatening to replace most of these employees. This will push more black Africans into unemployment and poverty, resulting in widening racial inequalities in South Africa. Prior to the advent of AI, South Africa was already ranked as the world's most unequal country.[95] The advent of AI is likely to worsen these inequalities if its impact on the employment sectors discussed in this article is anything to go by.

The adoption of AI in the call centre industry is also likely to widen existing gender inequalities. Experts in this industry, including Joel Walker, have argued that women make up 71 per cent of the global call centre industry.[96] In South Africa, it is estimated that 67 per cent of employees in this sector are women.[97] Therefore, the adoption of AI in this sector is likely to render more women unemployed and worsen poverty amongst them, thereby creating further inequalities between men and women.

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91 World Economic Forum (2020) 12.

92 As a result of discrimination during apartheid.

93 Fifty-six per cent are blacks, while 31 per cent are coloured. See De Lange R "Call centres are crucial in absorbing SA's jobless youth accreditation" (25 June 2023) *City Press* at https://www.news24.com/citypress/business/call-centres-are-crucial-in-absorbing-sas-jobless-youth-20230625 (accessed 29 February 2024).

94 Mzekandaba S "Graduates turn to booming call centres amid jobs crunch" (7 September 2023) *IT Web* available at https://www.itweb.co.za/article/graduates-turn-to-booming-call-centres-amid-jobs-crunch/LPwQ57lbmVWqNgkj (accessed 29 February 2024).

95 World Bank "Inequality in Southern Africa: An assessment of the Southern African Customs Union" (2022) available at https://www.worldbank.org/en/news/press-release/2022/03/09/new-world-bank-report-assesses-sources-of-inequality-in-five-countries-in-southern-africa (accessed 29 February 2024).

96 Walker J "Are call centres female ghettos?" (2021) at https://www.linkedin.com/pulse/call-centres-female-ghettos-joel-walker-1e/ (accessed 29 February 2024).

97 Mzekandaba (2023).

Some argue that AI is creating new employment opportunities.[98] As discussed earlier, it is not yet clear what these roles look like and whether they would be suitable for low-skilled employees. However, it has been noted that most companies developing and using AI have teams composed of engineers, computer scientists, developers, data scientists, and other math- and tech-savvy professionals.[99] Most blacks in Africa, including in South Africa, lack these skills and expertise[100] as a result of historical discrimination in the education sector and contemporary deficiencies in the education system. Thus, black Africans are less likely to be equipped for some of the technically sophisticated new employment opportunities that arise as a result of AI.

To ensure that the Fourth Industrial Revolution results in a socially just transition, it is therefore crucial that governments consider the impact of AI on access to employment, particularly for low-skilled employees. In order to avoid worsening existing inequalities, the rate at which AI is adopted in the workplace and economy should be proportionate to the levels of education provided to persons who are currently regarded as low-skilled employees with the aim of having them adapt their skills to emerging employment opportunities. These people should be provided with access to the necessary training and education to ensure that they can transition into the new roles that are potentially going to be created through the adoption of AI. The education curricula must also be updated to incorporate AI skills development.

By its very nature, AI is highly dynamic and unpredictable. Therefore, apart from what has been discussed above, there are several other ways through which its adoption could result in inequalities. As part of the regulatory framework, the regulator must conduct regular assessments to assess the impact of AI on equality; for their part, governments and stakeholders must undertake measures to ensure the fair and equal distribution of AI benefits in a way that does not exacerbate inequalities.[101]

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98 Oosthuizen (2022) at 5.

99 Raisch S & Krakowski S *Artificial intelligence and management: The automation–augmentation paradox* (2021) 46(1) *Academy of Management Review* 192.

100 Venturini F "Intelligent technologies and productivity spill overs: Evidence from the Fourth Industrial Revolution" (2022) *Journal of Economic Behaviour and Organization* 220 at 231.

101 African Commission on Human and Peoples' Rights (2021) at para 1.

5.4 Transparency and accountability

One of the key challenges associated with AI is the lack of transparency on the types of AI products being deployed, how these are being used, and the nature of the algorithms they use to make decisions.[102] As a result, it is difficult to hold AI dealers and users accountable to enforce their compliance with established regulatory ethics. Transparency and accountability are fundamental principles that must be respected in order to achieve a socially just transition towards a global economy and society that is entirely AI-enabled.

To foster compliance with these principles, governments should consider making it mandatory for companies and individuals to seek licenses from AI regulators before producing, trading in, or deploying any form of AI into society. As part of the requirements for licensing, governments should consider demanding that applicants disclose to the regulator information on the nature and capabilities of AI they plan to deal in; its potential benefits for society; the data used to train the algorithms and how that data was obtained; the methodologies used to train the algorithms; and the risk of misuse and measures in place to mitigate such risks.

The regulator should develop objective criteria that will be applied to assess this information and make appropriate licensing decisions. Before making its decisions, the regulator must disclose to the public the contents of the applications and invite the public to comment, including making objections. This would strengthen public participation in AI regulation. The licenses should be subject to periodic renewal upon the regulator having received an application for renewal and being satisfied that the applicants have adhered to the established set of regulatory standards ethics (some of which have been discussed above, among them respect for human rights).

Reporting conditions should also be imposed, compelling licensed AI dealers to report periodically on the impact of their technologies, the risk of violation of regulatory ethics, and how these risks have been mitigated during the reporting period. These reports would enable the regulator and other stakeholders to monitor the impact of AI on society and the scope of its use and adopt measures to address emergent challenges. On their own initiative, regulatory authorities must conduct regular assessments to monitor

[102] Perc M et al. "Social and juristic challenges of artificial intelligence" (2019) 5 *Palgrave Communications* 61 at 63.

compliance with regulatory standards. Where there are violations, sanctions – including suspension of licenses, imposition of fines and compensation for damage – must be imposed by the regulator. Decisions on sanctions must be made impartially and in a transparent manner. In addition, the development of laws and policies on AI regulation must be done transparently and explained in a way which is easily understood by those affected by such decisions, including ordinary members of the public.

To ensure that the development and use of AI complies with the stipulated ethical standards and that accountability may be enforced in case of violations, AI must remain under meaningful human control.[103] As Robbins correctly observes,[104] the concept of meaningful human control invites diverse interpretations in the context of AI. However, at the centre of this concept is the idea that "humans, not computers and their algorithms, should ultimately remain in control of, and thus morally [and legally] responsible for, relevant decisions …"[105] In practice, this means that AI must be supervised by human beings who are technically competent and have sufficient control of the technology to promptly detect any violations of ethical standards and take corrective measures.[106]

6 CONCLUSION

As the world transitions into a fully digitalised society powered by AI, there is no doubt that the development and use of AI needs to be regulated. Discussions of AI regulation must be based on a clear conceptual framework which helps to identify the norms, values, and principles that the proposed regulatory frameworks must embody. The theory of a just transition should be adapted and applied to help identify these norms, values and principles. The transition to a fully digital world economy powered by AI needs to be a socially just process of transformation. This is why the theory of a just transition is an ideal conceptual framework for developing an AI regulatory framework. If applied, this framework would make it justifiable to place the social justice values of job security, equality, meaningful stakeholder engagement, transparency, accountability, and human rights protection at the centre of AI regulatory frameworks.

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[103] This principle has also been underscored by the African Commission. See African Commission on Human and Peoples' Rights (2021) at para 3.

[104] Robbins S "The many meanings of meaningful human control" (2023) 4(4) *AI and Ethics* 1 at 3.

[105] Santoni F & Van de Hoven J "Meaningful human control over autonomous systems: A philosophical account" (2018) *Frontiers in Robotics and AI* 1 at 11–14.

[106] Robbins (2023) at 3.

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