Regulating Artificial Intelligence to Advance Financial Inclusion in South Africa

ST Mota Makore*

P·E·R

Pioneer in peer-reviewed, open access online law publications

Author

Shelton T Mota Makore

Affiliation

University of the Free State, South Africa

Email

motamakorest@ufs.ac.za

Abstract

The emergence of artificial intelligence (AI) endowed with the capability to simulate human intelligence through software-coded operations has become a topical issue perplexing the minds of regulators, government officials, non-governmental organisations and the public across the globe. Linked to this increasing AI debate is the view that these technologies have the potential to facilitate financial inclusion. Whilst there are concomitant liability and cyber security-related issues associated with AI adoption, the importance of AI in facilitating financial inclusion cannot be overstated. AI can facilitate financial inclusion by enhancing the quality of the financial products and services offered by key players in the South African financial sector, including the capacity to improve the process of opening bank accounts, data analysis, the assessment of credit scores and the management of risk-linked to various financial products. Drawing significant lessons from a select study of the European Union (EU) and United Kingdom (UK) models on the regulation of AI, this article argues that there is a need for South Africa to develop an effective regulatory framework governing AI in pursuit of advancing the goals of financial inclusion, among other things. Finally, this article offers pertinent recommendations in search of avenues for developing policies, principles, norms and rules that govern AI in South Africa to advance financial inclusion and other important related goals.

Keywords

Artificial intelligence; financial inclusion; decentralisation.

....

1 Introduction

The world has entered the Fourth Industrial Revolution (4IR), which is marked by the development of Artificial Intelligence (AI), rapid digitalisation, and other significant technological discoveries.[1] The invention of AI technologies represents one of the epitomes of human ingenuity, a journey that started decades ago with the creation of the computer and, subsequently, the Internet.[2] AI has many capabilities, including the ability to simulate human intelligence through software-coded operations that raise various complex regulatory issues.[3] In the South African financial sector AI technologies can play a significant role in facilitating financial inclusion by enhancing the quality of the financial products and services offered by various financial institutions and other key industry players.[4] Although there are concomitant liability issues associated with the adoption of AI, its importance in facilitating financial inclusion cannot be overstated.[5]

However, for the South African financial sector to benefit sufficiently from the adoption of AI, this article argues that there is a need to develop an effective regulatory framework governing AI to advance the goals of financial inclusion, among others.[6] The article explores the potential financial inclusion benefits derived from the use of AI in the South African financial sector. Finally, this article offers pertinent recommendations for developing policies, principles, norms, and rules that govern AI technologies in South Africa to advance financial inclusion and other important goals.[7]

The article is divided into four parts. Immediately following this introduction is a part dealing, albeit very briefly, with an explanation of the definition and general features of AI, which is then followed by part two, establishing a linkage between AI and financial inclusion. This part unravels the role of AI in facilitating financial inclusion in the South African financial sector. This

---

*   Shelton Tapiwa Mota Makore. LLB, LLM, LLD. Senior Law Lecturer in the Department of Mercantile Law, University of the Free State, Bloemfontein, South Africa. Email: motamakorest@ufs.ac.za. ORCID: https://orcid.org/0000-0002-4515-8122.
1   Agrawal, Gans and Goldfarb 2019 *Information Economics and Policy* 2.
2   Oladipo 2023 https://ssrn.com/abstract=4562175; Villasenor 2019 https://www.brookings.edu/blog/techtank/2019/01/03/artificial-intelligence-and-bias-four-key-; Bazarbash 2019 https://www.imf.org/en/Publications/WP/Issues/2019/05/17/FinTech-in-Financial-Inclusion-Machine-Learning-Applications-in-Assessing-Credit-Risk-46883.
3   Kok *et al* 2009 https://www.eolss.net/ebooklib/bookinfo/artificial-intelligence.aspx.
4   Kshetri 2021 *Journal of Global Information Technology Management* 1-6; AFI 2018 https://www.afi-global.org/wp-content/uploads/publications/2018-09/AFI_FinTech_Special%20Report_AW_digital.pdf.
5   Anam Fazal and Nisar 2023 *Journal of Asian Development Studies* 158.
6   Akinnuwesi *et al* "Experimental Application of Machine Learning" 415.
7   Donnelly 2022 *PELJ* 2; Council of Europe 2018 https://rm.coe.int/prems-107320-gbr-2018-compli-cahai-couv-texte-a4-bat-web/1680a0c17a.

section not only explores the positive effect of adopting AI in pursuit of financial inclusion but also examines the potential drawbacks which arise from utilising AI as an instrument for advancing financial inclusion. In the third section the article explores the prospects and challenges for the effective regulation of AI in pursuit of advancing financial inclusion in South Africa. This includes AI-related regulatory issues to ensure that technology becomes an effective instrument for promoting financial inclusion. Finally, this article offers recommendations on how to effectively regulate AI to facilitate financial inclusion in South Africa.

2 Deconstructing the definition, classifications and features of AI

Before exploring whether AI can be effectively regulated to achieve financial inclusion, it is necessary to define AI as a subject of regulation.[8] Doing so in a manner that explains the nuances and technological features of what is referred to as "AI" is a cumbersome task that is beleaguered by difficulties and complexity, given the elasticity of the concept itself.[9] The term "AI" consists of two combined words; artificial and intelligence. The notion of intelligence is manifold and subjective.[10] Philosophically, many people have the propensity to think that the term intelligence is a monolithic and unitary concept, but it is a compound term often comprising many conflicting attributes.[11] Intelligence can be conceptualised as the ability to make rational decisions based on the sensory, observatory and hearing faculties.[12] Whether computers, machines, and non-human entities can, in reality and on a *quid pro quo* basis, possess the same degree of intelligence that human beings have remains a matter of contestation.[13] Furthermore, given the elasticity of AI, seeking a definitive definition of AI would be like shooting at a moving target that is undergoing constant metamorphosis.[14]

Notwithstanding the above definitional conundrum, an exploration of the literature on AI demonstrates that many academics have advanced various

---

[8]   Oliveira 2023 https://scitechdaily.com/6-challenges-identified-by-scientists-that-humans-face-with-artificial-intelligence.

[9]   Sheikh, Prins and Schrijvers "Artificial Intelligence" 16.

[10] Omohundro 2008 *Proceedings of the First AGI Conference* 2.

[11] Generally, AI is equated with algorithms. Lanz "Concept of Intelligence" 63.

[12] Intelligence is defined as the mental capacity to obtain and retain a wide variety of knowledge and problem-solving skills. Likewise, it includes the use of critical reasoning and constant learning in relation to lived experiences. The Oxford Dictionary defines AI as "the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages." Oxford Dictionary 2006 https://www.oxfordreference.com/display/10.1093/oi/authority.20110803095426960; see De Judicious 2015 *Journal of Cognitive Science* 107.

[13] De Judicious 2015 *Journal of Cognitive Science* 108.

[14] De Judicious 2015 *Journal of Cognitive Science* 108.

definitions of AI.[15] At the elementary level, Alan Turing, one of the earlier pioneers of AI technologies, defined it as the science and engineering of intelligent machines, especially intelligent computer programs.[16] According to the European Commission High-Level Expert Group, AI comprises systems that display intelligent behaviour by analysing their environment and taking action with some degree of autonomy to achieve specific goals.[17] The European Union (EU) *AI Act* defines AI as software developed using the techniques and approaches mentioned in Annex I to achieve various human-defined objectives of generating outputs, content, predictions, recommendations or decisions that influence the environments in which they operate.[18] From these definitions, it can be deduced that what sets AI apart from other technologies is its anthropomorphic nature, which enables it to operate with some degree of autonomy from human beings.[19] AI technologies can analyse and generate solutions to complex social and scientific problems, which is similar to what humans can do.[20]

Although AI can simulate human functions and operations, the extent to which these technologies achieve this differs, depending on the nature of the AI technology involved.[21] AI can be classified into three basic categories: narrow (weak), general (strong), and Artificial Super-Intelligence (ASI).[22] AI, which falls into the narrow AI category, competes with human reasoning in the same plane.[23] Examples of such AI technologies include robust IBM's Deep Blue chess-playing programme, which can outplay the best chess player in the world but cannot play other games such as checkers.[24] When one converses with Siri, one is not conversing with a conscious form of AI

---

[15]   Vinge "The Coming Technological Singularity" 17.
[16]   Turing 1950 *Mind* 443.
[17]   European Commission 2022 https://digital-strategy.ec.europa.eu/en/policies/expert-group-ai.
[18]   Annex I of the *AI Act* list includes (a) machine learning approaches from supervised, unsupervised and reinforcement learning, a wide variety of methods including deep learning; (b) logic- and knowledge-based approaches, including knowledge representation, inductive (logic) programming, knowledge bases, inference and deductive engines, (symbolic) reasoning and expert systems; (c) statistical approaches, bayesian estimation, search and optimisation method. Also see Art 3(1) of the *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 harmonised rules on Artificial Intelligence (Artificial Intelligence Act) and amending certain Union Legislative Acts (COM(2021)0206 – C9-0146/2021 – 2021/0106(COD))* Document P9_TA(2024)0138 (the *AI Act*).
[19]   Yu, Beam, and Kohane 2018 *Nature Biomedical Engineering* 719.
[20]   Scherer 2016 *Harv J L and Tech* 354.
[21]   Topol 2019 *Nature Medicine* 44.
[22]   Fourtané 2019 https://interestingengineering.com/innovation/the-three-types-of-artificial-intelligence-understanding-ai; McCarthy 2007 http://www-formal.stanford.edu/jmc/whatisai.pdf.
[23]   Bathaee 2018 *Harv J L & Tech* 905.
[24]   Menon 2021 *International Journal of High School Research* 66.

technology; rather, Siri is designed to process human language into the Google search engine and extract the results for human beings.[25] Most of the AI systems that fall in the category of narrowness are not without benefit. They can process data and complete significant tasks faster than humans, thus improving overall productivity, efficiency and the quality of life.[26]

Generally, strong AI comprises machines that exhibit human intelligence.[27] In other words, these machines can successfully perform any intellectual task assigned to them just as human beings can, beyond the mere merging, synthesising and processing of data.[28] This is a kind of AI that is often projected in Hollywood science-fiction cinematography, interacting with human beings and operating advanced systems that are conscious, sentient, and driven by a certain degree of emotion and self-awareness.[29] Sophia, the social humanoid robot developed on the 14th of February 2016 by the Hong Kong-based company Hanson Robotics, falls into this category of strong AI.[30] The AI robot lawyer developed by the American firm DoNotPay in 2023, which functions as a smartphone application and is endowed with the capacity to give legal advice to clients much as a human legal practitioner does, can be categorised as strong AI.[31] These AI technologies process data faster than people can, rationalise strategies, and tap into computer-driven intelligence to make informed decisions or generate new ideas.[32]

ASI refers to technologies endowed with intelligence that surpasses that of humans in all aspects including creativity, general wisdom and problem-solving.[33] Nick Bostrom defines superintelligence as "any intellect that greatly exceeds the cognitive performance of humans in virtually all domains of interest."[34] ASI technology is not yet available in the global market.[35] ASI may have the capacity to exhibit intelligence that human beings have not seen before, even among geniuses.[36] This is a type of AI technology in which people such as the former Google AI experts Geoffrey Hinton and the Chief Executive of Tesla Company, Elon Musk believe will

25   Guzman "Making AI Safe for Humans" 69.
26   Agrawal, Gans and Goldfarb *Prediction Machines* 279.
27   Goertzel 2014 *Journal of Artificial General Intelligence* 4.
28   Goertzel 2014 *Journal of Artificial General Intelligence* 4.
29   Chuah and Yu 2021 *Journal of Retailing and Consumer Services* 8.
30   Riccio 2021 *The Drama Review* 42.
31   Retto   2017   https://www.researchgate.net/profile/Jesus-Retto/publication/32131 9964_sophia_first_citizen_robot_of_the_world/links/5a1c8aa2a6fdcc0af3265a44/s ophia-first-citizen-robot-of-the-world.pdf; Nangara 2023 https://theexchange.africa/ tech-business/worlds-first-robot-lawyer-to-defend-human-in-court/.
32   Vladeck 2014 *Wash L Rev* 117.
33   Jebari and Lundborg 2021 *AI and Society* 809.
34   Thorn 2014 *Minds and Machines* 286.
35   Bolstom 2012 *Minds and Machines* 71.
36   Xu 2021 *The Innovation* 6.

lead to the extinction of humans.[37] However, machines that exhibit human-like intelligence must be capable of experiencing consciousness.[38] Whether this type of AI technology can lead to machines experiencing consciousness remains controversial.[39]

3   Exploring the linkages between AI and financial inclusion

Having discussed the definition and characteristics of AI, it is pertinent to explore the role of this technology in promoting financial inclusion, especially in the South African financial sector.[40] Since the development of the third category of AI, which is super-intelligence, is still in the embryonic stage, the discussion below will focus only on how narrow and general forms of AI are advancing the goals of financial inclusion.[41] Further, before examining whether AI can be used as an instrument to facilitate financial inclusion, it is necessary to ascertain the meaning of the term financial inclusion.[42] In its basic form, the term financial inclusion can be conceptualised as referring to the availability, accessibility and affordability of financial services and goods, including transactions, payments, savings, credit and insurance, provided in a responsible, ethical and sustainable manner.[43] In the contemporary world financial inclusion is recognised as a conduit for poverty reduction and economic development, as it operates as a catalyst for achieving financial integration for those who are financially excluded or marginalised, especially the poor and those who are within the peripheries of the economy.[44] Financial inclusion as a concept and instrument is vital to the achievement of the United Nations (UN) Sustainable Development Goals (SDGs).[45] Notably, the realisation of various UN SDGs, such as eradicating poverty, ending hunger, achieving food security and promoting sustainable agriculture is predicated on the promotion of financial inclusion.[46] The relationship between financial

---

37   Kleinman and Vallance 2023 https://www.bbc.com/news/world-us-canada-65452940.

38   Zysman and Nitzberg 2020 https://www.econbiz.de/Record/governing-ai-understanding-the-limits-possibility-and-risks-of-ai-in-an-era-of-intelligent-tools-and-systems-zysman-john/10012824724.

39   Zysman and Nitzberg 2020 https://www.econbiz.de/Record/governing-ai-understanding-the-limits-possibility-and-risks-of-ai-in-an-era-of-intelligent-tools-and-systems-zysman-john/10012824724.

40   Anam Fazal and Nisar 2023 *Journal of Asian Development Studies* 158.

41   Institute for Global Affairs date unknown https://instituteforglobalaffairs.org/projects/digital-revolution/.

42   Bourreau and Valletti 2020 https://www.cgdev.org/publication/enabling-digital-financial-inclusion-through-improvements-competition-and; National Treasury 2023 https://www.treasury.gov.za/comm_media/press/2023/2023112701%20An%20Inclusive%20Financial%20Sector%20for%20all%202023.pdf.

43   Brownlee and Stemplowska "Financial Inclusion" 47.

44   Chitimira and Warikandwa "Financial Inclusion" 1-8.

45   UNDP 2023 https://www.undp.org/sustainable-development-goals.

46   UNSGSA 2018 https://sdgs.un.org/sites/default/files/publications/2649unsgsa.pdf.

inclusion and a catalogue of various human rights provided under international, regional and domestic human rights instruments is becoming more apparent.[47] The full realisation and enjoyment of civil and political rights, socio-economic rights and some third-generation rights hinge upon the creation of a conducive microeconomic environment via the advancement of financial inclusion in South Africa and beyond.[48]

It can be posited that financial inclusion is a key component of the right to human dignity, equality, and freedom of trade and occupation.[49] This concept enables the underserved population to engage in meaningful economic activities and, ultimately, trade.[50] The promotion of financial inclusion provides equality of access to a plethora of financial products/services to the poor, including an opportunity to acquire business loans, thereby empowering them to create self-employment and to release entrepreneurial potential, thus improving livelihoods.[51] Given the utility of financial inclusion as an aspiration, instrument and construct, the view that AI should be harnessed to advance the goal of financial inclusion cannot be overemphasised.[52] AI plays a vital role in ensuring that South Africa can reap the gains of financial inclusion in the era of the digital economy. This explains why some of the main regulatory objectives of South Africa should be to align the regulation of AI with the goals of financial inclusion, so that the country can derive the maximum benefits from the new technology.[53]

The rapid digitalisation of many financial services, especially in the banking sector in South Africa, has led to the explosion of the big data market, which has had a significant impact on the financial sector.[54] Banks use AI technologies to advance financial inclusion by ensuring that they interact with their customers in a digital space which is rapidly replacing the

---

47   Kumar 2017 https://mpra.ub.uni-muenchen.de/80336/1/MPRA_paper_80336.pdf.
48   National Treasury 2023 https://www.treasury.gov.za/comm_media/press/2023/ 2023112701%20An%20Inclusive%20Financial%20Sector%20for%20all%202023.p df.
49   OHCHR date unknown https://www.ohchr.org/sites/default/files/Documents/Issues/ Development/KeyMessageHRFinancingDevelopment.pdf;   Brownlee   and Stemplowska "Financial Inclusion" 47.
50   Omar and Inaba 2020 *Journal of Economic Structure* 4.
51   Kasradze 2020 *European Journal of Marketing and Economics* 50; Albertyn 2018 *SAJHR* 442.
52   Philip 2010 *LDD* 14.
53   Philip 2010 *LDD* 14.
54   Razzano   2021   https://www.wits.ac.za/media/wits-university/faculties-and-schools/ commerce-law-and-management/research-entities/mandela- institute/documents/research- publications/800482%20PB6%20Missteps%20in%20valuing%20data_REV%20De c2021.pdf; Beaulieu 2021 https://www.paldesk.com/how-artificial-intelligence-can- create-a-competitiveadvantage-in-business;   Biallas   and   O'Neill   2020 https://www.ifc.org/content/dam/ifc/doc/mgrt/emcompass-note-85-ai-innovation-in- financial-services.pdf.

traditional model of bank-customer interaction.[55] It is through this data-based transaction that banks and other financial providers in South Africa can have access and collect voluminous data such as emails, text and voice messages, pictures and videos through the conduit of various customer service edifices and virtual social media platforms such as Facebook, X, TikTok and YouTube.[56] Banks in South Africa are using data collected from these vital platforms to collect personal data, transactional history and social media interactions to enhance the quality of the financial decisions they make in the process.[57]

The availability of AI-related infrastructure such as high-speed computer hardware, software and clouds is being leveraged by the South African financial sector to promote financial inclusion.[58] The development of cloud technology, supercomputer resources and AI-related infrastructure allows players in the South African financial sector to make quicker financial decisions relating to credit provision.[59] AI technologies such as chatbots, which incorporate natural language processing (NLP), are being used by South African banks to interact and engage with customers for the whole twenty-four hours, thereby enhancing online financial conversations.[60] In addition to the common responses that chatbots offer to customers, they are used to assist customers with the opening of bank accounts and the collection of complaints to the designated customer service units in banks.[61]

Furthermore, various financial service providers in South Africa such as First National Bank (FNB), Nedbank, and Standard Bank have begun to use ChatGPT to perform a multiplicity of financial service-related functions.[62] ChatGPT can be conceptualised as an AI-driven language model which uses natural language processing and AI machine-learning techniques to process and generate human-like responses to user queries.[63] ChatGPT was launched on the 30th of November 2022. One month after its release, ChatGPT reached more than 100 million monthly active users, becoming

---

[55]   Gaffey   2021   https://policyaction.org.za/sites/default/files/PAN_TopicalGuide_AI Data9_FinServices_V1_Elec.pdf.

[56]   Stelzner   2011   http://www.socialmediaexaminer.com/social-mediamarketing-industry-report.

[57]   Van der Berg and Pather 2023 https://www.ey.com/en_za/financial-services/sa-banks-and-generative-.

[58]   Thompson   2019   https://www.businessinsider.co.za/banking-apps-share-your-information-2019-11.

[59]   Fraser 2023 https://businesstech.co.za/news/business/661863/banking-and-legal-experts-think-chatgpt-could-be-a-major-disruptor; Gomber, Koch and Siering 2019 *Journal of Business Research* 365.

[60]   Mhlanga 2023 http://dx.doi.org/10.2139/ssrn.4439267.

[61]   Alshurafat 2023 https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4345921.

[62]   Ali   and   Aysan   2023   *Modern   Finance*   117;   Malinga   2024 https://www.itweb.co.za/article/big-four-banks-take-lead-in-sas-genai-ai-deployments/G98YdqLGK9pMX2PD.

[63]   Adamopoulou and Moussiades *Machine Learning with Applications* 20.

the fastest-growing application ever recorded in human history.[64] In South Africa, traditional financial service providers such as banks use ChatGPT to monitor transaction activities, identify suspicious transactions and potential fraud, create content, and do programming, customer service and sales education.[65] ChatGPT is also utilised to analyse financial market data and assess the potential socio-economic and political risks which may have a negative effect on the viability of investments and the operation of financial service providers.[66] This application is enabling financial services providers to offer efficient personalised financial services to underbanked and unbanked persons at an unprecedented pace, thereby advancing financial inclusion in South Africa.[67]

In 2017, after amending the *Financial Intelligence Centre Act* of 2001, South Africa adopted a risk-based customer due diligence regime to combat money laundering and other illicit financial activities.[68] This shift has empowered South African financial service providers, including banks, to move from a blanket rules-based approach to assessing customers using a risk-profiling approach.[69] According to the South African Banking Risk Information, in 2022 an increasing rate of 36% in digital fraud cases was recorded in South Africa.[70] With the sophistication in which digital fraud crimes are committed, enhanced AI technologies are being added as an important layer of risk detection to enhance existing systems of identifying data anomalies.[71] The deployment of AI applications and technologies makes it possible to identify financial transactions that have previously evaded detection under the traditional anti-money laundering and fraud regulatory regime in South Africa.[72] This allows for a more proactive approach in which AI is used to prevent fraud before it occurs as opposed to the traditional reactive approach to fraud detection.[73] The 2022 South African Peer Bank Analysis Report[74] states that AI technologies in South

---

[64]   Hu 2023 https://www.reuters.com/technology/chatgpt-sets-record-fastest-growing-user-base-analyst-note-2023-02-01/.
[65]   Awasthi 2023 *Journal of Applied Management* 13.
[66]   Chatterjee and Dethlefs 2023 *Patterns* 2.
[67]   Hassnian and Aysan 2023 *Modern Finance* 116.
[68]   National Treasury 2017 https://www.treasury.gov.za/legislation/regulations/FICA/A%20new%20approach%20to%20combat%20money%20laundering%20and%20terrorist%20financing.pdf.
[69]   Bellomarini, Laurenza and Sallinger 2020 https://ceur-ws.org/Vol-2644/paper40.pdf.
[70]   SABRIC 2022 https://www.sabric.co.za/media/gq4hmbjw/sabric-annual-crime-stats-2022.pdf.
[71]   Chummun 2018 *Journal of Contemporary Management* 5.
[72]   Chitimira and Ncube 2021 *PELJ* 1.
[73]   Lin 2019 *Fordham L Rev* 536.
[74]   EY 2022 https://www.ey.com/en_za/south-african-banking-industry-updates.

Africa have empowered banks to take such a proactive approach to preventing fraud before it occurs.[75]

However, the foregoing financial inclusion gains emanating from the use of AI technologies could be eroded and undermined if South Africa does not effectively regulate AI in pursuit of advancing financial inclusion.[76] It could be maintained that South Africa should develop an AI regulatory framework that addresses the risk associated with the adoption of AI technologies including the accompanying liability and cybersecurity-related issues.[77] The proliferation of AI usage in the South African banking sector has created new ethical and legal concerns for regulators.[78] These challenges vary, but the most significant ones are the need to adequately secure customer data and privacy, ensuring that the data gathered and processed by AI is of high quality and meets the criteria of objectivity and non-discrimination in addition to strengthening the current cybersecurity accountability system.[79]

4   Developing an effective regulatory framework for AI in pursuit of advancing financial inclusion in South Africa

4.1   The absence of a comprehensive AI legal framework

Despite the financial inclusion benefits derived from AI alluded to above and the concomitant risk which arises from the use of AI in the financial sector, South Africa currently does not have specific norms, policies or legislation that govern AI, and enable it to maximise the potential gains emanating from its effective regulation.[80] The absence of comprehensive AI regulations is not unique to South Africa. Internationally, even developed countries, including the United Kingdom (UK) and the United States of America (US/USA) (the European Union is the exception), have not yet enacted stand-alone legislation that specifically governs AI in their territories. US states such as California and New Hampshire have passed legislation to limit or ban AI associated with facial recognition technology due to the human rights infringement concerns arising from the use of these technologies.[81] Despite these developments, many countries, including the

---

75   SARB   2023   https://www.resbank.co.za/content/dam/sarb/publications/reports/annualreports/2023/SARB%20Annual%20Report%202022-23.pdf.

76   Kgoale and Odeku 2023 *De Jure* 194.

77   Russell *Human Compatible* 21; Chan 2021 *AJLM* 351.

78   Adams *et al Human Rights and the Fourth Industrial Revolution* 7; Dash and Sharma 2023 *International Journal of Engineering and Applied Sciences* 1; Njontini 2021 *De Jure* 175; Benhamou and Ferland "Artificial Intelligence and Damages" 166.

79   Truby, Brown and Dahdal 2020 *LFMR* 112; Lee *AI Superpowers* 10.

80   Kgoale and Odeku 2023 *De Jure* 200.

81   See *California Assembly Bill* 1814 (Law Enforcement Agencies: Facial Recognition Technology). The *AI New Hampshire* 1596-FN is an Act requiring disclosure of AI usage in political advertising. See *New Hampshire House Bill* 1596-FN (Requiring a Disclosure of Deceptive Artificial Intelligence Usage in Political Advertising).

US, still lack comprehensive laws that govern AI.[82] They currently depend heavily on the combination of problematic existing sector-specific regulations and general principles of law, including those found under privacy-related legislation which focusses on ensuring that there is regulatory fairness and transparency in the usage of AI technologies.[83]

4.2 Lessons from the EU's model of AI regulation

South Africa could draw many lessons from how the European Union regulates AI in pursuit of financial inclusion.[84] The European Union enacted AI stand-alone legislation (*EU AI Act*) in 2024, which created a harmonised regulatory framework for AI in the EU community.[85] The *EU AI Act* is the first standalone comprehensive legislation in the world that focusses exclusively on AI issues.[86] The *AI Act* offers a generalist approach to AI regulation without focussing on one specific sector, although it has a substantial bearing on all areas of the economy, including the financial sector. The *EU AI Act* was the first of its kind and has become a significant reference point for AI regulations in many jurisdictions, including South Africa.[87] The importance of the *AI Act* cannot be overemphasised.[88]

The EU model epitomised by the *AI Act* follows a risk-based approach to governance.[89] This model considers the risk associated with the use of AI and industries likely to be negatively impacted (a horizontal approach) and ensures that the application and use of AI comply with current EU regulations, including adhering to assessments and data usage restrictions under the *General Data Protection Regulation* (GDPR).[90] The *AI Act* classifies AI systems into four categories based on their intended purpose and potential effects on health, safety or fundamental rights.[91] According to the *AI Act*, the four AI categories are (a) minor- or low-risk AI systems,(b)

---

[82]   Fournier-Tombs 2021 *Big Data and Society* 3.

[83]   United States Congress 2023 https://tile.loc.gov/storage-services/service/ ll/llglrd/2023555920/2023555920.pdf; UK 2021 https://assets.publishing.service. gov.uk/government/uploads/system/uploads/attachment_data/file/994125/final_tigrr _report__1_.pdf.

[84]   IMF 2023 https://www.imf.org/en/Publications/fintech-notes/Issues/2023/08/18/ Generative-Artificial-Intelligence-in-Finance-Risk-Considerations-537570.

[85]   *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 harmonised rules on Artificial Intelligence (Artificial Intelligence Act) and amending certain Union Legislative Acts (COM(2021)0206 – C9-0146/2021 – 2021/0106(COD))* Document P9_TA(2024)0138 (the *AI Act*).

[86]   The *AI Act*.

[87]   The *AI Act*.

[88]   The *AI Act*.

[89]   Mahler 2021 *Nordic Yearbook of Law and Informatics* 246; European Commission 2020 https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/ excellence-trust-artificial-intelligence_en.

[90]   Veale and Borgesius 2021 *Computer Law Review International* 97.

[91]   See *EU AI Act*.

limited-risk AI, (c) high-risk AI systems, and (d) unacceptable-risk AI systems.[92]

In brief, the *EU AI Act* requires the use of minor or low-risk AI technologies, such as spam filters, to comply with existing legislation, while limited-risk AI systems, including chatbots and deepfakes, are subject to transparency obligations.[93] High-risk AI systems are subject to stringent legal requirements and are classified into two subcategories: (i) those that constitute a safety component of a product or the product itself under EU harmonisation legislation and require a third-party conformity assessment; and (ii) those listed in specific sectors, including critical infrastructure management, law enforcement and migration management, among other sectors.[94] Lastly, the use of unacceptable-risk AI systems, including software for social scoring systems, is prohibited because of its discriminatory results and infringement of human rights, including the rights to human dignity, non-discrimination, equality and justice.[95] Importantly, Article 52 of the *AI Act* provides additional rudimentary guidance on the use of high-risk AI technologies created to interact with natural persons.[96] Article 69 of the *AI Act* requires operators of all other types of AI technologies to voluntarily observe the same principles applicable to high-risk systems.[97]

Notwithstanding the above, the *AI Act*'s approach to financial inclusion remains unclear in some instances.[98] Whilst the explanatory memorandum that accompanies the Act identifies finance as one of the main sectors called "high-impact sectors" affected by the use of AI, the Act does not explicitly include financial services among the list of high-risk AI in Annexes II and III of the *AI Act*.[99] This shortcoming could be exploited by financial services providers to use high-risk AI systems to the detriment of attaining financial inclusion.[100] However, the substantive part of the *AI Act* explicitly mentions credit providers such as banks in various articles.[101] The *AI Act* explicitly recognises credit scoring as a high-risk application without defining the meaning of "credit score" in the regulation.[102] The *AI Act* also lists access to

---

92   Sciarrone Alibrandi, Rabitti and Schneider 2023 https://ssrn.com/abstract=4414559.
93   Panigutti *et al* 2023 *Proceedings of the 2023 ACM Conference* 1139.
94   Article 6 of the *AI Act.*
95   Article 5 of the *AI Act.*
96   Article 52 of the *AI Act.*
97   Article 69 of the *AI Act.*
98   OECD 2021 https://www.oecd.org/finance/financial-markets/Artificial-intelligence-machine-learning-big-data-in-finance.pdf; Ferretti 2019 *MJ* 499.
99   See Annexes II and III of the *AI Act.*
100   Annexes II and III of the *AI Act.*
101   See Arts 11(3), 17(3), 20(2), 29(4), 29(5), 43(2) and 61(4) of the *AI Act.*
102   Aricles. 11(3), 17(3), 20(2), 29(4), 29(5), 43(2) and 61(4) of the *AI Act.* For a further discussion of AI Credit score see European Banking Authority 2023 https://www.eba.europa.eu/sites/default/documents/files/document_library/Publications/Reports/2023/.

various financial resources and other essential services such as electricity, housing and telecommunication services, as determined by the credit score.[103] This implies a broader interpretation of credit scoring than that traditionally used by financial service providers to assess the eligibility of a customer to a credit facility.[104] The *AI Act* imposes financial penalties for non-compliance with its provisions in some instances, which are higher than the maximum penalties provided under the GDPR.[105]

4.3 Lessons from the UK proposed model on the regulation of AI

Diametrically opposite to the above EU risk-based AI governance, the UK has recently proposed what it terms a pro-business approach to AI regulation.[106] The UK's AI regulatory regime is predicated on the need to achieve flexibility in AI regulations to avoid stifling innovation.[107] This approach encourages AI inventors to voluntarily comply with five principles designed to address AI risks: (a) safety, security and robustness; (b) appropriate transparency and explainability; (c) fairness; (d) accountability and governance; and (e) contestability and redressing.[108] Whether AI inventors and users can successfully implement these principles through voluntary compliance remains to be determined.[109] Strict enforcement of these five principles by regulators may be required in the future as the need arises.[110] The UK approach to AI regulations has three crucial components.[111] Aside from the enforcement-related issues, the UK's regulatory model depends on the current laws of the country applicable to data protection, the *Data Protection Act*, and product liability laws including the *Consumer Protection Act,* rather than the adoption of stand-alone new legislation that is entirely AI-centred.[112]

---

[103] European Banking Authority 2023 https://www.eba.europa.eu/sites/default/documents/files/document_library/Publications/Reports/2023/.

[104] Bluwstein *et al* 2020 https://www.bankofengland.co.uk/working-paper/2020/credit-growth-the-yield-curve-andfinancial-crisis-prediction-evidence-from-a-machine-learning.

[105] Article 71 of the *AI Act*.

[106] Alan Turing Institute date unknown https://rm.coe.int/huderaf-coe-final-1-2752-6741-5300-v-1/1680a3f688.

[107] UK 2013 https://www.gov.uk/government/publications/ai-regulation-a-pro-innovation-approach.

[108] UK 2013 https://www.gov.uk/government/publications/ai-regulation-a-pro-innovation-approach.

[109] UK 2013 https://www.gov.uk/government/publications/ai-regulation-a-pro-innovation-approach.

[110] UK 2013 https://www.gov.uk/government/publications/ai-regulation-a-pro-innovation-approach.

[111] CBI date unknown https://www.cbi.org.uk/media/0gnbkt41/cbi-ai-regulation-and-governance-policy-paper.pdf.

[112] *Data Protection Act*, 2018 and *Consumer Protection Act*, 1987.

The UK's AI regulatory regime has both merits and demerits. One of the advantages is that the model proposes to use evidence relating to AI in its suitable context, rather than to follow the simple *AI Act* approach, which transplants rules from one EU sector to another inappropriately.[113] Second, the UK AI regime is designed in such a manner that rules can be easily crafted to suit the requirements of the AI used in various sectors. Since the risk posed by AI is not yet fully understood, the UK regulatory model is an adaptive model premised on the difficulty of predicting potential AI risks.[114] Further, the UK regulatory model eschews the centralisation of AI oversight under the purview of a single national regulator, an approach that could lead to inefficient enforcement.[115] Notably, regulators with specialised knowledge in various areas such as aviation, financial markets and transport are more suited to regulating the use of AI in their fields of expertise.[116] This decentralised approach embedded in the UK regulatory regime also potentially minimises the risk of a single regulatory failure caused by regulators directing their attention to areas of insufficient public interest.[117]

5   Shifting South African regulatory governance towards a decentralised AI regulatory framework anchored on Afrocentric principles to advance financial inclusion

Based on the foregoing, it can be deduced that there is no international instrument in general that specifically regulates AI in pursuit of financial inclusion.[118] Despite this, the UN Secretary-General, António Guterres, on the 26th of October, 2023, announced the appointment of a UN-driven international advisory panel mandated to explore avenues on the key opportunities, risks and challenges in developing international governance of AI.[119] It can be argued that at the global level South Africa should support initiatives towards adopting an international treaty governing AI.[120] This is because the absence of a global regulatory framework may potentially result in a haphazard approach to the regulation of AI, which may lead to the

---

[113]   Bank of England 2022 https://www.bankofengland.co.uk/-/media/boe/files/fintech/ai-public-private-forum-final-report.pdf.

[114]   UK Finance 2023 https://www.ukfinance.org.uk/system/files/202311/The%20 impact%20of%20AI%20in%20financial%20services.pdf.

[115]   Almeida, Dos Santos and Farias 2021 *Ethics and Information Technology* 525.

[116]   Chu 2022 *Proceedings of the International AAAI Conference on Web and Social Media* 80.

[117]   Also see Australian Government Department of Science, Industry and Resources date unknown https://consult.industry.gov.au/supporting-responsible-ai.

[118]   Ernst & Young 2023 https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl /topics/ai/ey-the-artificial-intelligence-ai-global-regulatory-landscape.pdf?download.

[119]   UN date unknown https://www.un.org/techenvoy/ai-advisory-body.

[120]   UN date unknown https://www.un.org/techenvoy/ai-advisory-body.

fragmentation and regulatory conflict of AI rules.[121] South Africa should extend support towards efforts both at the continental and global levels, such as African Union and UN programmes, whose goal is to negotiate a global agreement on the adaptation of AI and the incorporation of accountability mechanisms for AI use and adoption. It could be argued that South Africa should play a central role in global conversations concerning AI governance to ensure that developing countries' interests in AI data autonomy and governance, and access to these technologies are taken properly into account when developing the global framework governing AI.[122]

Aside from the international efforts alluded to above, at the domestic level South Africa should move towards a regulatory framework for AI that is benchmarked on the EU and UK models and other emerging models to prevent the evolution of conflicting regulatory norms and the fragmentation of AI regulation. South Africa should adopt effective regulations that do not impose unnecessary burdens on the development of AI technologies.[123] The proposed model should adequately respond to the risk caused by AI, while striking a balance with the need to incentivise innovators to invest in AI technologies.[124] Further, the adoption of an effective regulatory framework for AI to facilitate financial inclusion would boost AI consumers' trust in this technology, as their rights would be better protected under law.[125]

It could be maintained that South Africa should develop a proportionate regulatory approach to enable the responsible use of AI in pursuit of financial inclusion.[126] As mentioned above, a proportionate regulatory approach to AI would not create unnecessarily cumbersome rules which would hinder the application of all AI technologies.[127] The proposed South African AI regulatory approach should promote the use of AI applications such as generative AI, whilst addressing the legal and ethical issues which arise from their increased use. This means that the regulation of AI in South Africa should be deployed to enable the use of AI rather than banning the technology itself.[128] Currently South Africa has made no concrete move towards creating a legal environment conducive to embracing and addressing the legal conundrum of the use of AI in a manner that promotes

121   Wu and Liu 2023 *Communications of the ACM* 28.
122   Wu and Liu 2023 *Communications of the ACM* 28.
123   Wu and Liu 2023 *Communications of the ACM* 29.
124   Wu and Liu 2023 *Communications of the ACM* 29.
125   Haddad 2023 https://www.jurist.org/commentary/2023/03/mais-haddad-international-regulations-artificial-intelligence/.
126   Council of Europe 2020 https://edoc.coe.int/en/artificial-intelligence/9656-towards-regulation-of-ai-systems.html.
127   Hadfield and Clark 2023 https://arxiv.org/pdf/2304.04914.
128   Buczynski *et al* 2022 *CYELS* 263.

innovation.[129] Despite this, in April 2019, the South African president, Cyril Ramaphosa, appointed members of the Presidential Commission on the Fourth Industrial Revolution (4IR Commission), which produced a report on policies, strategies and action plans that South Africa should implement to position itself as a global competitive player in AI technologies.[130] The establishment of the 4IR Commission shows that South Africa is taking initial steps towards regulating AI technologies in pursuit of facilitating financial inclusion.[131]

It could be strongly argued that the patchwork of legal frameworks that currently exist in South Africa and which could be used to regulate some areas of AI, such as data protection, including the *Protection of Personal Information Act* (POPI),[132] does not sufficiently address the risks posed by the use of AI.[133] The *Financial Sector Regulation Act* (FSRA) promulgated in August 2017 established the Twin Peaks supervisory model in the form of the Prudential Authority (PA) and the Financial Sector Conduct Authority (FSCA) to promote financial stability.[134] The PA operates under the South African Reserve Bank (SARB) administration, and the FSCA is the legal successor of the former Financial Services Board (FSB).[135] The old elements drawn from the current self-regulatory and institutionalised South African Twin Peaks regulation system relating to financial safety and market conduct may apply to AI technologies but do not regulate them with specificity.[136] This is because neither the POPI nor the preamble to the FSRA, including section 1, which defines the terms used in the Act, explicitly refers to and defines AI technologies, a regulatory loophole that renders the current regulatory framework largely inoperative.[137]

The envisaged South African framework for AI governance should be steeped in the principles of *ubuntu*, egalitarianism, the elimination of risk, and social justice to ensure the responsible and ethical use of AI.[138] Further, the South African government should ensure that companies and organisations adopt AI in an ethically sound manner.[139] Given that AI technologies, especially general and strong AI, are disruptive in nature and capable of causing massive industrialisation and job losses by replacing

[129]   Buczynski *et al* 2022 *CYELS* 263.
[130]   GN 591 in GG 43834 of 23 October 2020.
[131]   GN 591 in GG 43834 of 23 October 2020.
[132]   *Protection of Personal Information Act* 4 of 2013.
[133]   Donnelly 2022 *PELJ* 2.
[134]   South African Government 2013 https://www.gov.za/documents/other/implementing -twin-peaks-model-financial-regulation-south-africa-01-feb-2013.
[135]   Godwin 2018 *LFMR* 155.
[136]   Qumba 2022 *SALJ* 78.
[137]   *Financial Sector Regulation Act* 9 of 2017.
[138]   Van Norren 2022 https://montrealethics.ai/the-ethics-of-artificial-intelligence- through-the-lens-of-ubuntu/.
[139]   Brand 2022 *JeDEM* 132.

people in a range of professions, there is a need to facilitate the transition to mitigate the negative effects of these technologies.[140] This means that the proposed regulatory framework should be informed by the risk that AI poses and should allow regulators to perform a cost-benefit analysis before allowing the use of general and strong AI.[141] It should require all AI developers and users to be licensed and have an AI regulatory body or committee consisting of AI experts and regulators to spearhead the 4IR in light of the South African National Development Plan.[142]

The proposed regulatory framework should address the comprehensive societal and regulatory challenges linked to the development and use of AI.[143] This includes issues such as access to data, sustainability, the protection of the rights of users, and striking a balance between AI developers and their obligations under various legislation, including POPI. South Africa should take wider action to ensure that the country attains the status of a global leader in AI by developing rules related to intellectual property law and generative AI.[144] This would ensure that South Africa maintained the right balance between protecting rights holders and establishing an AI-driven thriving economy while supporting AI developers to access the data they need in pursuit of advancing financial inclusion.[145] A new AI regulatory body should be established and granted enforcement powers so that it can issue fines and impose criminal liability where necessary.[146]

6   Concluding remarks

This study has demonstrated that the use of AI in the financial sector has the potential to advance financial inclusion in South Africa.[147] It has been argued that AI facilitates financial inclusion by enhancing the quality of a plethora of financial services and products, including improving the process of opening bank accounts, data analysis, the assessment of credit scores, and the management of risk linked to financial products.[148] Given the various financial inclusion benefits derived from the adoption of AI, this

---

140   Gerke, Minssen and Cohen "Ethical and Legal Challenges" 295-302.
141   Flach *Machine Learning* 20.
142   South African Government 2012 https://www.gov.za/issues/national-development-plan-2030.
143   United States Congress 2019 https://www.loc.gov/item/2019668143/.
144   Roberts *et al* 2021 *AI and Society* 59.
145   Access Partnerships date unknown https://www.up.ac.za/media/shared/7/ZP_Files/ai-for-africa.zp165664.pdf.
146   Demaidi 2023 https://stip.oecd.org/stip/interactivedashboards/policyinitiatives/2023%2Fdata%2FpolicyInitiatives%2F24270.
147   Haddad 2023 https://www.jurist.org/commentary/2023/03/mais-haddad-international-regulations-artificial-intelligence/.
148   Fraser 2023 https://businesstech.co.za/news/business/661863/banking-and-legal-experts-think-chatgpt-could-be-a-major-disruptor.

study posits that there is a need for South Africa to develop an effective regulatory framework governing AI in pursuit of advancing its goals of financial inclusion, among others.[149] South Africa should develop effective AI governance that addresses the liability- and cybersecurity-related issues associated with AI use.[150]

The article maintains that there is a need for South Africa to develop an effective decentralised proportionate regulatory framework governing AI which is based on the universal principles of *ubuntu*, egalitarianism, the elimination of risk, and social justice, to ensure the responsible and ethical usage of AI.[151] The article has proposed that, in light of lessons derived from the EU and UK models on the regulation of AI, South Africa should develop a decentralised proportionate approach to AI governance.[152] Such an approach to AI regulation would strengthen the existing inadequately formulated rules on AI. This would enable South Africa to be regarded as one of the leading countries in AI, harnessing the ability of technology to drive economic development and the goal of financial inclusion.[153]

Bibliography

Literature

Adamopoulou and Moussiades 2020 *Machine Learning with Applications*
Adamopoulou E and Moussiades L "Chatbots: History, Technology, and Applications" 2020 *Machine Learning with Applications* 1-18

Adams *et al Human Rights and the Fourth Industrial Revolution*
Adams R *et al Human Rights and the Fourth Industrial Revolution in South Africa* (HSRC Press Cape Town 2021)

Agrawal, Gans and Goldfarb 2019 *Information Economics and Policy*
Agrawal A, Gans J and Goldfarb A "Exploring the Impact of Artificial Intelligence: Prediction Versus Judgment" 2019 *Information Economics and Policy* 1-6

Agrawal, Gans and Goldfarb *Prediction Machines*

---

[149] Bluwstein *et al* 2020 https://www.bankofengland.co.uk/working-paper/2020/credit-growth-the-yield-curve-andfinancial-crisis-prediction-evidence-from-a-machine-learning.

[150] Zysman and Nitzberg 2020 https://www.econbiz.de/Record/governing-ai-understanding-the-limits-possibility-and-risks-of-ai-in-an-era-of-intelligent-tools-and-systems-zysman-john/10012824724.

[151] Van Norren 2022 https://montrealethics.ai/the-ethics-of-artificial-intelligence-through-the-lens-of-ubuntu/.

[152] UK 2013 https://www.gov.uk/government/publications/ai-regulation-a-pro-innovation-approach.

[153] GN 591 in GG 43834 of 23 October 2020.

Agrawal A, Gans J and Goldfarb A *Prediction Machines: The Simple Economics of Artificial Intelligence* (Harvard Business Press Boston 2018)

Akinnuwesi *et al* "Experimental Application of Machine Learning"
Akinnuwesi B *et al* "Experimental Application of Machine Learning on Financial Inclusion Data for Governance in Eswatini" in Hattingh M *et al* (eds) *Responsible Design, Implementation and Use of Information and Communication Technology* (Springer Cham 2020) 414-425

Albertyn 2018 *SAJHR*
Albertyn C "Contested Substantive Equality in the South African Constitution" 2018 *SAJHR* 441-468

Ali and Aysan 2023 *Modern Finance*
Ali H and Aysan AF "What Will ChatGPT Revolutionize in the Financial Industry?" 2023 *Modern Finance* 116-130

Almeida, Dos Santos and Farias 2021 *Ethics and Information Technology*
Almeida P, Dos Santos CD and Farias JS "Artificial Intelligence Regulation: A Framework for Governance" 2021 *Ethics and Information Technology* 505-525

Anam Fazal and Nisar 2023 *Journal of Asian Development Studies*
Anam Fazal AA and Nisar S "Artificial Intelligence and Financial Inclusion: A Systematic Literature Review" 2023 *Journal of Asian Development Studies* 158-168

Awasthi 2023 *Journal of Applied Management*
Awasthi S "The Role of ChatGPT in Enhancing Financial Literacy and Education" 2023 *Journal of Applied Management* 1-62

Bathaee 2018 *Harv J L & Tech*
Bathaee Y "The Artificial Intelligence Black Box and The Failure of Intent and Causation" 2018 *Harv J L & Tech* 890-938

Benhamou and Ferland "Artificial Intelligence and Damages"
Benhamou Y and Ferland J "Artificial Intelligence and Damages: Assessing Liability and Calculating Damages" in D'Agostino G, Gaon A and Piovesan C *Leading Legal Disruption: Artificial Intelligence and a Toolkit for Lawyers and the Law* (Thomson Reuters Montréal 2021) 165-197

Bolstom 2012 *Minds and Machines*
Bostrom N "The Superintelligent Will: Motivation and Instrumental Rationality in Advanced Artificial Agents" 2012 *Minds and Machines* 71-85

Brand 2022 *JeDEM*
Brand DJ "Responsible Artificial Intelligence in Government: Development of a Legal Framework for South Africa" 2022 *JeDEM* 130-150

Brownlee and Stemplowska "Financial Inclusion"
Brownlee K and Stemplowska Z "Financial Inclusion, Education, and Human Rights" in Sorell T and Cabrera L (eds) *Microfinance Rights and Global Justice* (Cambridge University Press Cambridge 2015) 47-62

Buczynski *et al* 2022 *CYELS*
Buczynski W *et al* "Hard Law and Soft Law Regulations of Artificial Intelligence in Investment Management" 2022 *CYELS* 262-293

Chan 2021 *AJLM*
Chan B "Applying a Common Enterprise Theory of Liability to Clinical AI Systems" 2021 *AJLM* 351-385

Chatterjee and Dethlefs 2023 *Patterns*
Chatterjee J and Dethlefs N "This New Conversational AI Model Can Be Your Friend, Philosopher, and Guide. And Even Your Worst Enemy" 2023 *Patterns* 1-3

Chitimira and Ncube 2021 *PELJ*
Chitimira H and Ncube P "The Regulation and Use of Artificial Intelligence and 5G Technology to Combat Cybercrime and Financial Crime in South African Banks" 2021 *PELJ* 1-33

Chitimira and Warikandwa "Financial Inclusion"
Chitimira H and Warikandwa TP "Financial Inclusion as an Enabler of the United Nations Sustainable Development Goals in the Twenty First Century" in Chitimira H and Warikandwa TV (eds) *Financial Inclusion and Digital Transformation Regulatory Practices in Selected Southern African Development Countries* (Springer Cham 2023) 1-22

Chu 2022 *Proceedings of the International AAAI Conference on Web and Social Media*
Chu W "A Decentralized Approach towards Responsible AI in Social Ecosystems" 2022 *Proceedings of the International AAAI Conference on Web and Social Media* 79-89

Chuah and Yu 2021 *Journal of Retailing and Consumer Services*
Chuah SHW and Yu J "The Future of Service: The Power of Emotion in Human-Robot Interaction" 2021 *Journal of Retailing and Consumer Services* 1-8

Chummun 2018 *Journal of Contemporary Management*
Chummun BZ "How Can Artificial Intelligence Reduce Fraud in the Inclusive Cover Niche: A Case of Developing African Countries" 2018 *Journal of Contemporary Management* 1-17

Dash and Sharma 2023 *International Journal of Engineering and Applied Sciences*
Dash B and Sharma P "Are ChatGPT and Deepfake Algorithms Endangering the Cybersecurity Industry? A Review" 2023 *International Journal of Engineering and Applied Sciences* 1-5

De Judicious 2015 *Journal of Cognitive Science*
De Judicious D "The Definition of Intelligence" 2015 *Journal of Cognitive Science* 107-132

Donnelly 2022 *PELJ*
Donnelly D "First Do No Harm: Legal Principles Regulating the Future of Artificial Intelligence in Health Care in South Africa" 2022 *PELJ* 1-43

Ferretti 2019 *MJ*
Ferretti F "Consumer Access to Capital in the Age of FinTech and Big Data: The Limits of EU Law" 2018 *MJ* 476-499

Flach *Machine Learning*
Flach P *Machine Learning: The Art and Science of Algorithms that Make Sense of Data* (Cambridge University Press Cambridge 2012)

Fournier-Tombs 2021 *Big Data and Society*
Fournier-Tombs E "Towards a United Nations Internal Regulation for Artificial Intelligence" 2021 *Big Data and Society* 1-5

Gerke, Minssen and Cohen "Ethical and Legal Challenges"
Gerke S, Minssen T and Cohen G "Ethical and Legal Challenges of Artificial Intelligence-driven Healthcare" in Bohr A (ed) *Artificial Intelligence in Healthcare* (London Elsevier 2020) 295-336

Godwin 2018 *LFMR*
Godwin A "Introduction to Special Issue: The Twin Peaks Model of Financial Regulation and Reform in South Africa" 2018 *LFMR* 151-153

Goertzel 2014 *Journal of Artificial General Intelligence*
Goertzel B "Artificial General Intelligence: Concept, State of the Art, and Future Prospects" 2014 *Journal of Artificial General Intelligence* 1-46

Gomber, Koch and Siering 2019 *Journal of Business Research*
Gomber P, Koch JA and Siering M "Chatbots in Finance: State-of-the-art and Future Directions" 2019 *Journal of Business Research* 365-380

Guzman "Making AI Safe for Humans"
Guzman AL "Making AI Safe for Humans: A Conversation with Siri" in Gehl RW and Bakardjieva M (ed) *Socialbots and Their Friends: Digital Media and the Automation of Sociality* (Routledge New York 2016) 69-85

Hassnian and Aysan 2023 *Modern Finance*
Hassnian A and Aysan AF "What Will ChatGPT Revolutionise in the Financial Industry?" 2023 *Modern Finance* 116-130

Jebari and Lundborg 2021 *AI and Society*
Jebari K and Lundborg J "Artificial Superintelligence and Its Limits: Why AlphaZero Cannot Become a General Agent" 2021 *AI and Society* 807-815

Kasradze 2020 *European Journal of Marketing and Economics*
Kasradze T "Challenges Facing Financial Inclusion Due to the COVID-19 Pandemic" 2020 *European Journal of Marketing and Economics* 50-63

Kgoale and Odeku 2023 *De Jure*
Kgoale T and Odeku K "An Analysis of Legal Accountability for Artificial Intelligence Systems in the South African Financial Sector" 2023 *De Jure* 191-205

Kshetri 2021 *Journal of Global Information Technology Management*
Kshetri N "The Role of Artificial Intelligence in Promoting Financial Inclusion in Developing Countries" 2021 *Journal of Global Information Technology Management* 1-6

Lanz "Concept of Intelligence"
Lanz P "The Concept of Intelligence" in Cruse H, Dean J and Ritter H (eds) *Prerational Intelligence: Adaptive Behaviour and Intelligent Systems Without Symbols and Logic* (Springer Dordrecht 2000) 63-108

Lee *AI Superpowers*
Lee K *AI Superpowers: China, Silicon Valley, and the New World Order* (Houghton Mifflin Boston 2021)

Lin 2019 *Fordham L Rev*
Lin T "Artificial Intelligence, Finance, and the Law" 2019 *Fordham L Rev* 531-551

Mahler 2021 *Nordic Yearbook of Law and Informatics*
Mahler T "Between Risk Management and Proportionality: The Risk-based Approach in the EU's Artificial Intelligence Act Proposal" 2021 *Nordic Yearbook of Law and Informatics* 245-267

Menon 2021 *International Journal of High School Research*
Menon A "The Impact of Artificial Intelligence (AI) and Engines on Boardgames (Chess and Go)" 2021 *International Journal of High School Research* 65-70

Njontini 2021 *De Jure*
Njontini MN "Disruptive Technologies and the Future of Regulations: ICT Regulatory Structure(s) Determined" 2021 *De Jure* 174-193

Omar and Inaba 2020 *Journal of Economic Structure*
Omar MA and Inaba K "Does Financial Inclusion Reduce Poverty and Income Inequality in Developing Countries? A Panel Data Analysis" 2020 *Journal of Economic Structure* 4-25

Omohundro 2008 *Proceedings of the First AGI Conference*
Omohundro S "The Basic AI Drives, in Artificial General Intelligence" 2008 *Proceedings of the First AGI Conference* 1-10.

Panigutti *et al* 2023 *Proceedings of the 2023 ACM Conference*
Panigutti C *et al* "The Role of Explainable AI in the Context of the AI Act" in 2023 *Proceedings of the 2023 ACM Conference on Fairness, Accountability, and Transparency* 1139-1150

Philip 2010 *LDD*
Philip K "Inequality and Economic Marginalisation: How the Structure of the Economy Impacts on Opportunities on the Margins" 2010 *LDD* 1-28

Qumba 2022 *SALJ*
Qumba MF "A Comparative Analysis of the Twin Peaks Model of Financial Regulation in South Africa and the United Kingdom" 2022 *SALJ* 78-113

Riccio 2021 *The Drama Review*
Riccio T "Sophia Robot: An Emergent Ethnography" 2021 *The Drama Review* 42-77

Roberts *et al* 2021 *AI and Society*
Roberts H *et al* "The Chinese Approach to Artificial Intelligence: An Analysis of Policy, Ethics, and Regulation" 2021 *AI and Society* 59-77

Russell *Human Compatible*
Russell S *Human Compatible: AI and the Problem of Control* (Oxford University Press Oxford 2019)

Scherer 2016 *Harv J L & Tech*
Scherer MU "Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies, and Strategies" 2016 *Harv J L & Tech* 354-398

Sheikh, Prins and Schrijvers "Artificial Intelligence"
Sheikh H, Prins C and Schrijvers E "Artificial Intelligence: Definition and Background" in Sheikh H, Prins C and Schrijvers E (eds) *Mission AI. Research for Policy* (Springer Hague 2021) 15-41

Thorn 2014 *Minds and Machines*
Thorn PD "Nick Bostrom: Superintelligence: Paths, Dangers, Strategies" 2014 *Minds and Machines* 285-289

Topol 2019 *Nature Medicine*
Topol E "High-performance Medicine: The Convergence of Human and Artificial Intelligence" 2019 *Nature Medicine* 44-56

Truby, Brown and Dahdal 2020 *LFMR*
Truby J, Brown R and Dahdal A "Banking on AI: Mandating a Proactive Approach to AI Regulation in the Financial Sector" 2020 *LFMR* 110-120

Turing 1950 *Mind*
Turing AM "Computing Machinery and Intelligence" 1950 *Mind* 433-460

Veale and Borgesius 2021 *Computer Law Review International*
Veale M and Borgesius FZ "Demystifying the Draft EU Artificial Intelligence Act" 2021 *Computer Law Review International* 97-112

Vinge "The Coming Technological Singularity"
Vinge V "The Coming Technological Singularity: How to Survive in the Post-human Era in Vision-21. Interdisciplinary Science and Engineering in the Era of Cyberspace" in *NASA Conference Publication 10129* (1993 Cleveland) 11-22

Vladeck 2014 *Wash L Rev*
Vladeck DC "Machines without Principals: Liability Rules and Artificial Intelligence" 2014 *Wash L Rev* 117-121

Wu and Liu 2023 *Communications of the ACM*
Wu W and Liu S "Dilemma of the Artificial Intelligence Regulatory Landscape" 2023 *Communications of the ACM* 28-31

Xu 2021 *The Innovation*
Xu Y *et al* "Artificial intelligence: A Powerful Paradigm for Scientific Research" 2021 *The Innovation* 1-27

Yu, Beam and Kohane 2018 *Nature Biomedical Engineering*
Yu K, Beam A and Kohane I "Artificial Intelligence in Healthcare" 2018 *Nature Biomedical Engineering* 719-731

Legislation

European Union

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 harmonised rules on Artificial Intelligence (Artificial Intelligence Act) and amending certain Union Legislative Acts (COM(2021)0206 – C9-0146/2021 – 2021/0106(COD)) Document P9_TA(2024)0138

Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the

processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation) OJ L 119/1

South Africa

Financial Intelligence Centre Act 38 of 2001

Financial Sector Regulation Act 9 of 2017

Protection of Personal Information Act 4 of 2013

United Kingdom

Data Protection Act, 2018

Consumer Protection Act, 1987

United States of America

California Assembly Bill 1814 (Law Enforcement Agencies: Facial Recognition Technology)

New Hampshire House Bill 1596-FN (Requiring a Disclosure of Deceptive Artificial Intelligence Usage in Political Advertising)

Government publications

South Africa

GN 591 in GG 43834 of 23 October 2020

Internet sources

Access Partnerships date unknown https://www.up.ac.za/media/shared/7/ZP_Files/ai-for-africa.zp165664.pdf
Access Partnerships date unknown *Artificial Intelligence for Africa: An Opportunity for Growth, Development, and Democratisation* https://www.up.ac.za/media/shared/7/ZP_Files/ai-for-africa.zp165664.pdf accessed 7 December 2023

AFI 2018 https://www.afi-global.org/wp-content/uploads/publications/2018-09/AFI_FinTech_Special%20Report_AW_digital.pdf
Alliance for Financial Inclusion 2018 *Fintech for Financial Inclusion: A Framework for Digital Financial Transformation* https://www.afi-global.org/wp-content/uploads/publications/2018-09/AFI_FinTech_Special%20Report_AW_digital.pdf accessed 24 October 2023

Alan Turin Institute date unknown https://rm.coe.int/huderaf-coe-final-1-2752-6741-5300-v-1/1680a3f688
Alan Turin Institute date unknown *Human Rights, Democracy, and the Rule of Law Assurance Framework for AI Systems: A Proposal Prepared for the Council of Europe's Ad Hoc Committee on Artificial Intelligence* https://rm.coe.int/huderaf-coe-final-1-2752-6741-5300-v-1/1680a3f688 accessed 10 December 2023

Alshurafat 2023 https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4345921
Alshurafat H 2023 *The Usefulness and Challenges of Chatbots for Accounting Professionals: Application Won ChatGPT* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4345921 accessed 18 December 2023

Australian Government Department of Science, Industry and Resources date unknown https://consult.industry.gov.au/supporting-responsible-ai
Australian Government Department of Science, Industry and Resources date unknown *Supporting Responsible AI: Discussion Paper* https://consult.industry.gov.au/supporting-responsible-ai accessed 18 December 2023

Bank of England 2022 https://www.bankofengland.co.uk/-/media/boe/files/fintech/ai-public-private-forum-final-report.pdf
Bank of England 2022 *Final Report: Artificial Intelligence Public-Private Forum* https://www.bankofengland.co.uk/-/media/boe/files/fintech/ai-public-private-forum-final-report.pdf accessed 12 December 2023

Bazarbash 2019 https://www.imf.org/en/Publications/WP/Issues/2019/05/17/FinTech-in-Financial-Inclusion-Machine-Learning-Applications-in-Assessing-Credit-Risk-46883
Bazarbash M 2019 *Fintech in Financial Inclusion: Machine Learning Applications in Assessing Credit Risk* https://www.imf.org/en/Publications/WP/Issues/2019/05/17/FinTech-in-Financial-Inclusion-Machine-Learning-Applications-in-Assessing-Credit-Risk-46883 accessed 24 October 2023

Beaulieu 2021 https://www.paldesk.com/how-artificial-intelligence-can-create-a-competitiveadvantage-in-business
Beaulieu D 2021 *How Can AI Create a Competitive Advantage in Business?* https://www.paldesk.com/how-artificial-intelligence-can-create-a-competitiveadvantage-in-business accessed 18 November 2023

Bellomarini, Laurenza and Sallinger 2020 https://ceur-ws.org/Vol-2644/paper40.pdf
Bellomarini L, Laurenza E and Sallinger E 2020 *Rule-based Anti-Money Laundering in Financial Intelligence Units: Experience and Vision* https://ceur-ws.org/Vol-2644/paper40.pdf accessed 19 December 2023

Bourreau and Valletti 2020 https://www.cgdev.org/publication/enabling-digital-financial-inclusion-through-improvements-competition-and
Bourreau M and Valletti T 2020 *Enabling Digital Financial Inclusion through Improvements in Competition and Interoperability: What Works and What Doesn't?* https://www.cgdev.org/publication/enabling-digital-financial-inclusion-through-improvements-competition-and accessed 8 November 2023

Biallas and O'Neill 2020 https://www.ifc.org/content/dam/ifc/doc/mgrt/em compass-note-85-ai-innovation-in-financial-services.pdf
Biallas M and O'Neill F 2020 *Artificial Intelligence Innovation in Financial Services* https://www.ifc.org/content/dam/ifc/doc/mgrt/emcompass-note-85-ai-innovation-in-financial-services.pdf accessed 22 November 2023

Bluwstein *et al* 2020 https://www.bankofengland.co.uk/working-paper/2020/credit-growth-the-yield-curve-andfinancial-crisis-prediction-evidence-from-a-machine-learning
Bluwstein K *et al* 2020 *Credit Growth, the Yield Curve and Financial Crisis Prediction: Evidence from a Machine Learning Approach* https://www.bankofengland.co.uk/working-paper/2020/credit-growth-the-yield-curve-andfinancial-crisis-prediction-evidence-from-a-machine-learning accessed 9 December 2023

CBI date unknown https://www.cbi.org.uk/media/0gnbkt41/cbi-ai-regulation-and-governance-policy-paper.pdf
Confederation of British Industry date unknown *Regulating AI: A Framework to Support UK Growth and Realise UK AI Strategic Advantage* https://www.cbi.org.uk/media/0gnbkt41/cbi-ai-regulation-and-governance-policy-paper.pdf accessed 11 December 2023

Council of Europe 2018 https://rm.coe.int/prems-107320-gbr-2018-compli-cahai-couv-texte-a4-bat-web/1680a0c17a
Council of Europe 2018 *Towards Regulation of AI Systems: Global Perspectives on the Development of a Legal Framework on Artificial Intelligence (AI) Systems Based on the Council of Europe's Standards on Human Rights, Democracy and the Rule of Law* https://rm.coe.int/prems-107320-gbr-2018-compli-cahai-couv-texte-a4-bat-web/1680a0c17a accessed 3 December 2023

Council of Europe 2020 https://edoc.coe.int/en/artificial-intelligence/9656-towards-regulation-of-ai-systems.html
Council of Europe 2020 *Towards Regulation of AI Systems* https://edoc.coe.int/en/artificial-intelligence/9656-towards-regulation-of-ai-systems.html accessed 4 December 2023

Demaidi   2023   https://stip.oecd.org/stip/interactivedashboards/policy initiatives/2023%2Fdata%2FpolicyInitiatives%2F24270
Demaidi MN 2023 *Artificial Intelligence National Strategy in a Developing Country*
https://stip.oecd.org/stip/interactivedashboards/policyinitiatives/2023%2Fd ata%2FpolicyInitiatives%2F24270 accessed 8 December 2023

Ernst & Young 2023 https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl/topics/ai/ey-the-artificial-intelligence-ai-global-regulatory-landscape.pdf?download
Ernst & Young 2023 *The Artificial Intelligence (AI) Global Regulatory Landscape. Policy Trends and Considerations to Build Confidence in AI* https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl/topics/ai/ey-the-artificial-intelligence-ai-global-regulatory-landscape.pdf?download accessed 13 December 2023

European Banking Authority 2023 https://www.eba.europa.eu/sites/default/ documents/files/document_library/Publications/Reports/2023/
European Banking Authority 2023 *Machine Learning for IRB Models. A Follow-up Report from the Consultation on the Discussion Paper on Machine Learning for IRB Models* https://www.eba.europa.eu/sites/default/ documents/files/document_library/Publications/Reports/2023/ accessed 9 December 2023

European Commission 2020 https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/excellence-trust-artificial-intelligence_en
European Commission 2020 *Excellence and Trust in Artificial Intelligence* https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/excellence-trust-artificial-intelligence_en accessed 6 December 2023

European   Commission   2022   https://digital-strategy.ec.europa.eu/ en/policies/expert-group-ai
European Commission 2022 *A Definition of AI: Main Capabilities and Scientific Disciplines* https://digital-strategy.ec.europa.eu/en/policies/expert -group-ai accessed 1 November 2023

EY   2022   https://www.ey.com/en_za/south-african-banking-industry-updates
EY 2022 *South Africa Bank Report FY22* https://www.ey.com/en_za/south-african-banking-industry-updates accessed 1 December 2023

Fraser 2023 https://businesstech.co.za/news/business/661863/banking-and-legal-experts-think-chatgpt-could-be-a-major-disruptor
Fraser L 2023 *Banking and Legal Experts Think ChatGPT Could Be a Major Disruptor* https://businesstech.co.za/news/business/661863/banking-and-legal-experts-think-chatgpt-could-be-a-major-disruptor/ accessed 22 November 2023

Fourtané 2019 https://interestingengineering.com/innovation/the-three-types-of-artificial-intelligence-understanding-ai
Fourtané S 2019 *The Three Types of Artificial Intelligence: Understanding AI* https://interestingengineering.com/innovation/the-three-types-of-artificial-intelligence-understanding-ai accessed 01 November 2023

Gaffey 2021 https://policyaction.org.za/sites/default/files/PAN_TopicalGuide_AIData9_FinServices_V1_Elec.pdf
Gaffley M 2021 *AI and Data in South Africa's Finance Sector: Toward Financial Inclusion* https://policyaction.org.za/sites/default/files/PAN_TopicalGuide_AIData9_FinServices_V1_Elec.pdf accessed 22 November 2023

Haddad 2023 https://www.jurist.org/commentary/2023/03/mais-haddad-international-regulations-artificial-intelligence/
Haddad M 2023 *The Race for AI Governance: Navigating the International Regulatory Landscape of Artificial Intelligence* https://www.jurist.org/commentary/2023/03/mais-haddad-international-regulations-artificial-intelligence/ accessed 9 December 2023

Hadfield and Clark 2023 https://arxiv.org/pdf/2304.04914
Hadfield GK and Clark J 2023 *Regulatory Markets: The Future of AI Governance* https://arxiv.org/pdf/2304.04914 accessed 26 November 2023

Hu 2023 https://www.reuters.com/technology/chatgpt-sets-record-fastest-growing-user-base-analyst-note-2023-02-01/
Hu K 2023 *ChatGPT Sets Record for Fastest-growing User Base - Analyst Note* https://www.reuters.com/technology/chatgpt-sets-record-fastest-growing-user-base-analyst-note-2023-02-01/ accessed 28 November 2023

IMF 2023 https://www.imf.org/en/Publications/fintech-notes/Issues/2023/08/18/Generative-Artificial-Intelligence-in-Finance-Risk-Considerations-537570
International Monetary Fund 2023 *Generative Artificial Intelligence in Finance: Risk Considerations* https://www.imf.org/en/Publications/fintech-notes/Issues/2023/08/18/Generative-Artificial-Intelligence-in-Finance-Risk-Considerations-537570 accessed 4 December 2023

Institute for Global Affairs date unknown https://instituteforglobalaffairs.org/projects/digital-revolution/
Institute for Global Affairs date unknown *Digital Revolution: Technology, Power, and You* https://instituteforglobalaffairs.org/projects/digital-revolution/ accessed 18 December 2023

Kleinman and Vallance 2023 https://www.bbc.com/news/world-us-canada-65452940
Kleinman Z and Vallance C *AI "Godfather" Geoffrey Hinton Warns of Dangers as He Quits Google* https://www.bbc.com/news/world-us-canada-65452940 accessed 7 November 2023

Kok *et al* 2009 https://www.eolss.net/ebooklib/bookinfo/artificial-intelligence.aspx
Kok JN *et al* 2009 *Artificial Intelligence: Definition, Trends Techniques, and Cases* https://www.eolss.net/ebooklib/bookinfo/artificial-intelligence.aspx accessed 22 October 2023

Kumar 2017 https://mpra.ub.uni-muenchen.de/80336/1/MPRA_paper_80336.pdf
Kumar P 2017 *Access to Finance and Human Rights* https://mpra.ub.uni-muenchen.de/80336/1/MPRA_paper_80336.pdf accessed 12 November 2023

Malinga 2024 https://www.itweb.co.za/article/big-four-banks-take-lead-in-sas-genai-ai-deployments/G98YdqLGK9pMX2PD
Malinga S 2024 *Big-four Banks Take Lead in SA's GenAI, AI Deployments* https://www.itweb.co.za/article/big-four-banks-take-lead-in-sas-genai-ai-deployments/G98YdqLGK9pMX2PD accessed 19 April 2024

McCarthy 2007 http://www-formal.stanford.edu/jmc/whatisai.pdf
McCarthy J 2007 *What is Artificial Intelligence?* http://www-formal.stanford.edu/jmc/whatisai.pdf accessed 1 November 2023

Mhlanga 2023 http://dx.doi.org/10.2139/ssrn.4439267
Mhlanga D 2023 *The Value of Open AI and Chat GPT for the Current Learning Environments and the Potential Future Uses* http://dx.doi.org/10.2139/ssrn.4439267 accessed 28 November 2023

Nangara 2023 https://theexchange.africa/tech-business/worlds-first-robot-lawyer-to-defend-human-in-court/
Nangara A 2023 *World's First Robot Lawyer to Defend Human in Court* https://theexchange.africa/tech-business/worlds-first-robot-lawyer-to-defend-human-in-court/ accessed 4 November 2023

National Treasury 2017 https://www.treasury.gov.za/legislation/regulations/FICA/A%20new%20approach%20to%20combat%20money%20laundering%20and%20terrorist%20financing.pdf
National Treasury 2017 *A New Approach to Combat Money Laundering and Terrorist Financing* https://www.treasury.gov.za/legislation/regulations/FICA/A%20new%20approach%20to%20combat%20money%20laundering%20and%20terrorist%20financing.pdf accessed 1 June 2024

National Treasury 2023 https://www.treasury.gov.za/comm_media/press/ 2023/2023112701%20An%20Inclusive%20Financial%20Sector%20for%2 0all%202023.pdf
National Treasury 2023 *An Inclusive Financial Sector for All* http://www.treasury.gov.za/comm_media/press/2020/Financial%20Inclusio n%20Policy%20%20An%20Inclusive%20Financial%20Sector%20For%20 All.pdf accessed 10 November 2023

OECD 2021 https://www.oecd.org/finance/financial-markets/Artificial- intelligence-machine-learning-big-data-in-finance.pdf
Organisation for Economic Co-operation and Development 2021 *Artificial Intelligence, Machine Learning and Big Data in Finance Opportunities, Challenges and Implications for Policy Makers* https://www.oecd.org/ finance/financial-markets/Artificial-intelligence-machine-learning-big-data- in-finance.pdf accessed 7 December 2023

OHCHR date unknown https://www.ohchr.org/sites/default/files/ Documents/Issues/Development/KeyMessageHRFinancingDevelopment.p df
United Nations Human Rights Office of the High Commissioner date unknown *Key Messages on Human Rights and Financing for Development* https://www.ohchr.org/sites/default/files/Documents/Issues/Development/K eyMessageHRFinancingDevelopment.pdf accessed 17 November 2023

Oladipo 2023 https://ssrn.com/abstract=4562175
Oladipo JO 2023 *Artificial Intelligence and Law* https://ssrn.com/abstract= 4562175 accessed 23 October 2023

Oliveira 2023 https://scitechdaily.com/6-challenges-identified-by-scientists- that-humans-face-with-artificial-intelligence/
Oliveira BNR 2023 *6 Challenges – Identified by Scientists – that Humans Face with Artificial Intelligence* https://scitechdaily.com/6-challenges- identified-by-scientists-that-humans-face-with-artificial-intelligence/ accessed 26 October 2023

Oxford Dictionary 2006 https://www.oxfordreference.com/display/ 10.1093/oi/authority.20110803095426960
Oxford Dictionary 2006 *Artificial Intelligence* https://www.oxford reference.com/display/10.1093/oi/authority.20110803095426960 accessed 4 July 2024

Razzano 2021 https://www.wits.ac.za/media/wits-university/faculties-and- schools/commerce-law-and-management/research-entities/mandela- institute/documents/research- publications/800482%20PB6%20Missteps%20in%20valuing%20data_RE V%20Dec2021.pdf

Razzano G 2021 *Data Localisation in South Africa: Missteps in the Valuing of Data* https://www.wits.ac.za/media/wits-university/faculties-and-schools/commerce-law-and-management/research-entities/mandela-institute/documents/research-publications/800482%20PB6%20Missteps%20in%20valuing%20data_REV%20Dec2021.pdf accessed 1 June 2024

Retto 2017 https://www.researchgate.net/profile/Jesus-Retto/publication/321319964_sophia_first_citizen_robot_of_the_world/links/5a1c8aa2a6fdcc0af3265a44/sophia-first-citizen-robot-of-the-world.pdf
Retto J 2017 *Sophia, First Citizen Robot of the World* https://www.researchgate.net/profile/Jesus-Retto/publication/321319964_sophia_first_citizen_robot_of_the_world/links/5a1c8aa2a6fdcc0af3265a44/sophia-first-citizen-robot-of-the-world.pdf accessed 1 November 2023

SABRIC 2022 https://www.sabric.co.za/media/gq4hmbjw/sabric-annual-crime-stats-2022.pdf
South African Banking Risk Information Centre 2022 *Annual Crime Statistics* https://www.sabric.co.za/media/gq4hmbjw/sabric-annual-crime-stats-2022.pdf accessed 1 June 2024

SARB 2023 https://www.resbank.co.za/content/dam/sarb/publications/reports/annualreports/2023/SARB%20Annual%20Report%202022-23.pdf
South African Reserve Bank 2023 *South African Reserve Bank Annual Report 2022/23* https://www.resbank.co.za/content/dam/sarb/publications/reports/annualreports/2023/SARB%20Annual%20Report%202022-23.pdf accessed 1 December 2023

Sciarrone Alibrandi, Rabitti and Schneider 2023 https://ssrn.com/abstract=4414559
Sciarrone Alibrandi A, Rabitti M and Schneider G 2023 *The European AI Act's Impact on Financial Markets: From Governance to Co-Regulation* https://ssrn.com/abstract=4414559 accessed 4 December 2023

South African Government 2012 https://www.gov.za/issues/national-development-plan-2030
South African Government 2012 *National Development Plan 2030* https://www.gov.za/issues/national-development-plan-2030 accessed 5 December 2023

South African Government 2013 https://www.gov.za/documents/other/implementing-twin-peaks-model-financial-regulation-south-africa-01-feb-2013
South African Government 2013 *Implementing a Twin Peaks Model of Financial Regulation in South Africa* https://www.gov.za/documents/other/implementing-twin-peaks-model-financial-regulation-south-africa-01-feb-2013 accessed 6 December 2023

Stelzner 2011 http://www.socialmediaexaminer.com/social-media marketing-industry-report
Stelzner M 2011 *Social Media Marketing Report* http://www.socialmediaexaminer.com/social-mediamarketing-industry-report accessed 24 November 2023

Thompson 2019 https://www.businessinsider.co.za/banking-apps-share-your-information-2019-11
Thompson A 2019 *Banks and Financial Apps in South Africa are Sharing Your Personal Information – Here's How to Stop Them* https://www.businessinsider.co.za/banking-apps-share-your-information-2019-11 accessed 25 November 2023

UK 2013 https://www.gov.uk/government/publications/ai-regulation-a-pro-innovation-approach
United Kingdom Department for Science, Innovation and Technology and Office for Artificial Intelligence 2013 *White Paper on AI Regulation: A Pro-innovation Approach* https://www.gov.uk/government/publications/ai-regulation-a-pro-innovation-approach accessed 11 December 2023

UK 2021 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/994125/final_tigrr_report__1_.pdf
United Kingdom 2021 *Taskforce on Innovation, Growth and Regulatory Reform* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/994125/final_tigrr_report__1_.pdf accessed 3 December 2023

UK Finance 2023 https://www.ukfinance.org.uk/system/files/202311/The%20impact%20of%20AI%20in%20financial%20services.pdf
United Kingdom Finance 2023 *The Impact of AI in Financial Services: Opportunities, Risk and Policy Considerations* https://www.ukfinance.org.uk/system/files/202311/The%20impact%20of%20AI%20in%20financial%20services.pdf accessed 12 December 2023

UN date unknown https://www.un.org/techenvoy/ai-advisory-body
United Nations date unknown *High-Level Advisory Body on Artificial Intelligence* https://www.un.org/techenvoy/ai-advisory-body accessed 12 December 2023

UNDP 2023 https://www.undp.org/sustainable-development-goals
United Nations Development Programme 2023 *What Are the Sustainable Development Goals?* https://www.undp.org/sustainable-development-goals accessed 11 November 2023

United States Congress 2019 https://www.loc.gov/item/2019668143/
United States Congress 2019 *Regulation of Artificial Intelligence in Selected Jurisdictions* https://www.loc.gov/item/2019668143/ accessed 6 December 2023

United States Congress 2023 https://tile.loc.gov/storage-services/service/ll/llglrd/2023555920/2023555920.pdf
United States Congress 2023 *Regulation of Artificial Intelligence around the World* https://tile.loc.gov/storage-services/service/ll/llglrd/2023555920/2023555920.pdf accessed 2 December 2023

UNSGSA 2018 https://sdgs.un.org/sites/default/files/publications/2649unsgsa.pdf
United Nations Secretary-General's Special Advocate for Inclusive Finance for Development 2018 *Financial Inclusion Technology, Innovation, Progress* https://sdgs.un.org/sites/default/files/publications/2649unsgsa.pdf accessed 12 November 2023

Van der Berg and Pather 2023 https://www.ey.com/en_za/financial-services/sa-banks-and-generative-
Van der Berg M and Pather K 2023 *How South African Banks Can Deploy and Benefit from Generative AI* https://www.ey.com/en_za/financial-services/sa-banks-and-generative-ai accessed 24 November 2023

Van Norren 2022 https://montrealethics.ai/the-ethics-of-artificial-intelligence-through-the-lens-of-ubuntu/
Van Norren D 2022 *The Ethics of Artificial Intelligence through the Lens of Ubuntu* https://montrealethics.ai/the-ethics-of-artificial-intelligence-through-the-lens-of-ubuntu/ accessed 7 December 2023

Villasenor 2019 https://www.brookings.edu/blog/techtank/2019/01/03/artificial-intelligence-and-bias-four-key-
Villasenor J 2019 *Artificial Intelligence and Bias: Four Key Challenges* https://www.brookings.edu/blog/techtank/2019/01/03/artificial-intelligence-and-bias-four-key- accessed 23 October 2023

Zysman and Nitzberg 2020 https://www.econbiz.de/Record/governing-ai-understanding-the-limits-possibility-and-risks-of-ai-in-an-era-of-intelligent-tools-and-systems-zysman-john/10012824724
Zysman J and Nitzberg M 2020 *Governing AI: Understanding the Limits, Possibility, and Risks of AI in an Era of Intelligent Tools and Systems* https://www.econbiz.de/Record/governing-ai-understanding-the-limits-possibility-and-risks-of-ai-in-an-era-of-intelligent-tools-and-systems-zysman-john/10012824724 accessed 14 December 2023

List of Abbreviations

4IR	Fourth Industrial Revolution
AFI	Alliance for Financial Inclusion
AI	artificial intelligence
AJLM	American Journal of Law and Medicine
ASI	artificial super-intelligence
CBI	Confederation of British Industry
CYELS	Cambridge Yearbook of European Legal Studies
EU	European Union
Fordham L Rev	Fordham Law Review
FSCA	Financial Sector Conduct Authority
FSRA	Financial Sector Regulation Act 9 of 2017
GDPR	General Data Protection Regulation
Harv J L & Tech	Harvard Journal of Law and Technology
IMF	International Monetary Fund
JeDEM	eJournal of eDemocracy and Open Government
MJ	Maastricht Journal of European Comparative Law
LDD	Law, Democracy and Development
LFMR	Law and Financial Markets Review
OECD	Organisation for Economic Co-operation and Development
OHCHR	United Nations Human Rights Office of the High Commissioner
PA	Prudential Authority
PELJ	Potchefstroom Electronic Law Journal
POPI	Protection of Personal Information Act 4 of 2013
SABRIC	South African Banking Risk Information Centre
SAJHR	South African Journal on Human Rights
SALJ	South African Law Journal
SARB	South African Reserve Bank
SDGs	Sustainable Development Goals
UK	United Kingdom
UN	United Nations
UNDP	United Nations Development Programme
UNSGSA	United Nations Secretary-General's Special Advocate for Inclusive Finance for Development
US/USA	United States of America
Wash L Rev	Washington Law Review