SOUTH AFRICAN COMPANY LAW IN THE FOURTH INDUSTRIAL REVOLUTION: DOES ARTIFICIAL INTELLIGENCE CREATE A NEED FOR LEGAL REFORM?

by

NATHAN-ROSS ADAMS

3349487

LLB (UWC)

submitted in partial fulfilment of the requirements for the award of the degree of

MASTER OF LAWS: MERCANTILE LAW

in the Faculty of Law

UNIVERSITY OF THE WESTERN CAPE

Supervisor: Professor Monray Marsellus Botha

Co-supervisor: Professor Vivienne Antoinette Lawack

Submission date: December 2021

DECLARATION

I, Nathan-Ross Adams, declare that:

- 'South African Company Law in the Fourth Industrial Revolution: Does Artificial Intelligence Create a Need for Legal Reform?' is my work.
- I have not submitted the dissertation, in whole or part, for a degree or an examination at any other university.
- I have indicated and acknowledged all the sources I have used with complete references.

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Nathan-Ross Adams

December 2021

Supervisor:

_____

Professor Monray Marsellus Botha

December 2021

Co-supervisor:

_____

Professor Vivienne Antoinette Lawack

December 2021

DEDICATION

I dedicate the dissertation to African legal scholars with three specific intentions in mind. It should:

(i) inspire curiosity about the legal considerations of emerging technologies like artificial intelligence;

(ii) raise awareness on how these technologies can help and hurt us; and

(iii) make us realise we have meaningful and unique voices to add to international conversations about regulating emerging technologies; it is even possible for us to lead those conversations.

ACKNOWLEDGMENTS

Drafting the dissertation during the COVID-19 pandemic was extraordinarily challenging and rewarding. There were sensational days and frustrating days. However, with tact and resilience, *we* produced the final submission. I say '*we*' in the spirit of ubuntu because the dissertation is by no means self-made. Specifically, in conceptualising and writing it, I have been helped and supported by incredible people and cutting-edge artificial intelligence assistants. Let me share a bit about the dissertation's journey to acknowledge their contribution.

The initial idea for the dissertation presented itself in 2018 when I worked with Mike Smit, the Managing Director of Adstream South Africa. We had researched various artificial intelligence solutions for the business. My role was to research what artificial intelligence is and how it can help the company. However, in conducting the research, most sources I discovered explained the technology esoterically. Yet, despite its complexity, I still wanted to understand it thoroughly.

In hindsight, I suppose the mystery of artificial intelligence lured me to explore a new frontier. However, the reality was that I also needed to communicate how it works in plain language so that the company stakeholders, especially customers and investors, could easily understand its benefits. So, in essence, these corporate events began my journey into discovering artificial intelligence.

In 2019, I aligned my commercial research on artificial intelligence with my curiosity about company law. Together, they culminated into the dissertation statement and

hypothesis. I became curious about company law when I read for my LLB degree at the University of the Western Cape (UWC) under the instruction of Advocate Fourie Kotze, Doctor Brighton Mupangavanhu, and Professor Riekie Wandrag. They helped me engage meaningfully with aspects of company law and were sounding boards on the dissertation topic. Further, a special thank you goes to UWC's library staff for sourcing evasive academic resources and the Writing Centre's tutor, James Machingura, for reviewing my work.

Returning to my work experience, in early 2020, after leaving Adstream, I joined a firm of remarkable information technology attorneys, Michalsons, as a candidate legal practitioner. Since joining, I have learnt a great deal from its attorneys. I have also had the opportunity to work on the corporate governance, contractual, data privacy, and information security aspects of artificial intelligence. Plus, I will soon launch a dedicated practice area on artificial intelligence law. A special thank you to the Managing Attorney John Giles as well as Associate Akoalisa Emma-Iwuoha. They supplied rigorous insights into the legal challenges artificial intelligence creates.

Next, I need to highlight two exceptional people: my supervisors. First, thank you to Professor Monray Marsellus Botha, a leading academic in company and labour law, corporate governance, and corporate social responsibility. Secondly, thank you to Professor Vivienne Antoinette Lawack, UWC's trailblazing Academic Deputy Vice-Chancellor—a visionary expert in law and economics. Together they supported me by supplying thoughtful feedback throughout the writing process. In particular, I value that they recognised and honed my potential and helped me prepare the dissertation for

submission. Profs, thank you for your patience, kindness, direction, and clarity of thought.

Then, when it comes to artificial intelligence assistants, I used Otter AI for voice-to-text transcription and Grammarly Writing Assistant, WordRake, and Perfect It for editing. They helped me work more efficiently during the editing and proofing stages of writing. They also gave me practical insights into how artificial intelligence can help and hurt businesses.

Next, when it comes to family, I am incredibly grateful to my parents, Estelle and Thurstan, and brother, Ethan. They tolerated my eccentricities throughout the writing process. To this day, I am not sure how they dealt with my quirks and late-night frenzies, especially when a cloudy research point suddenly became clear to me. Plus, a special thank you to my mom for several cups of soothing sweet Ceylon tea. Wholeheartedly, I also express sincere gratitude to my ancestors. While suffering racial and class-based oppression, they remained resilient and persevered to create a world where I can read for this degree. Thank you for never giving up and staying with me through the writing process.

My second-last thank you goes to the people of my social-media communities. There were days when I doubted whether I could complete the dissertation. So, I turned to social media to vent and express my disillusion. During those times, my communities motivated me by sending messages of inspiration to me. Their beautiful and supportive messages kept me moving forward.

Finally, I could not have completed the dissertation without the wholesome love, support, and stolen chocolates of my partner-in-life-and-love, Günther Kriel. Günther, thank you for listening attentively to my repeated ramblings and wild ideas. However, most vitally, thank you for being my cheerleader and sounding board and for waiting for me at the finishing line.

KEY WORDS

Artificial Intelligence

Fourth Industrial Revolution

Decolonisation

Legal Personality, Agency, and Property

Corporate Governance, Risk, and Compliance

Directors Authority, Powers, and Duties

Corporate Data Governance

Business Judgement Rule

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CHAPTER 1 INTRODUCTION

1.1 Context and background

Across the world, the Fourth Industrial Revolution (4IR)[1] is disrupting the law.[2] The 4IR has specifically disrupted commercial law in areas such as banking,[3] competition,[4] consumer protection,[5] contract,[6] insurance,[7] labour,[8] and personality.[9] In addition, company law has also substantially been impacted by the 4IR. Leading legal scholars refer to this process of transformation as the 'Digitalisation of Company Law'.[10]

More specifically, the scholars attribute the transformation to technological advancements. These advancements include increased access to the internet,[11]

[1] Schwab K *The Fourth Industrial Revolution* (2017) 20-3.
[2] Philbeck T & Davis N 'The Fourth Industrial Revolution: Shaping a new era' (2019) 72(1) *Journal of International Affairs* 17-22.
[3] Reddy E & Lawack V 'An overview of the regulatory developments in South Africa regarding the use of cryptocurrencies' (2019) 32(1) *SAMLJ* 1-28.
[4] Feldman RC & Thieme N 'Competition at the dawn of artificial intelligence' in Lundqvist B (ed) *Competition Law for the Digital Economy* (2019) 71-92.
[5] Eiselen S 'Digitisation and consumer law in South Africa and Africa' (2021) 3 *TSAR* 436-55.
[6] Brownsword R 'The future of contract law: Three conversations at the Cape' 2021 *Acta Juridica* 3-36.
[7] Huneberg S 'The future of robo-advisors in the South African insurance industry: Is the South African regulatory framework ready?' (2020) 32(2) *SAMLJ* 175.
[8] Nxumalo L & Nxumalo C 'The impact of the Fourth Industrial Revolution on workplace law and employment in South Africa' (2021) 42 *Industrial Law Journal* 16-22.
[9] Mashinini N 'The impact of deepfakes on the right to identity: A South African perspective' (2020) 32(3) *SAMLJ* 407-36.
[10] European Commission: Justice and Consumers *Study on Digitalisation of Company Law* (2017) 8-9. The study's authors limit the concept of digitalisation to electronic communications within the company-law context; however, the meaning the writer ascribes to the concept extends to any form of technology that affects company law. The writer uses the latter meaning throughout the dissertation.
[11] Roser M, Ritchie H, & Ortiz-Ospina E 'Internet' available at https://ourworldindata.org/internet (accessed 10 March 2021).

cheaper access to internet-powered computers[12] and mobile phones,[13] the rapid sharing of knowledge,[14] advanced computer programmes,[15] and innovative business models.[16]

Among the technologies, artificial intelligence (AI) is the most disruptive and transformative.[17] AI refers to the simulation of human intelligence by algorithms,[18] computer programmes,[19] and machines.[20] Moreover, AI can assume many forms. On the one hand, it can be combined with robotic technology to manifest in human form like Sophia, the world's first robot citizen.[21] On the other hand, AI can take the form of

[12] Perry MJ 'Technology has advanced so rapidly that a laptop computer today is 96 per cent cheaper than a 1994 model and 1 000 times better' *AEI* 25 May 2016 available at *https://www.aei.org/carpe-diem/technology-has-advanced-so-rapidly-that-a-laptop-computer-today-is-96-cheaper-than-a-1994-model-and-1000x-better/* (accessed 10 March 2021).
[13] Lessler A 'The mobile phones of back then vs smartphones of today' *The Star* 17 May 2017 available at *https://www.thestar.com.my/tech/tech-news/2017/05/17/the-mobile-phones-of-back-then-vs-smartphones-of-today/* (accessed 10 March 2021).
[14] Eiselen S 'The electronic data interchange agreement' (1995) 7 *SAMLJ* 1.
[15] Lee G 'Development of advanced computer programmes' *Just Drinks* 24 May 2021 available at *https://www.just-drinks.com/analysis/quantum-computing-what-companies-need-to-know-focus_id133566.aspx* (accessed 24 May 2021).
[16] Brynjolfsson E & McAfee A 'The business of artificial intelligence: What it can — and cannot — do for your organization' *Harvard Business Review* 18 July 2017 available at *https://hbr.org/2017/07/the-business-of-artificial-intelligence* (accessed 21 August 2019).
[17] Barfield W 'Towards a law of artificial intelligence' in Barfield W & Pagallo U (eds) *Research Handbook on the Law of Artificial Intelligence* (2018) 2.
[18] An 'algorithm' refers to a documented series of steps which leads to changes in data, or the production of results based on the data: Ince D (ed) *A Dictionary of the Internet* 4 ed (2019) 27.
[19] Computer programmes are a manifestation of algorithms that enable them to be executed instantly: Ince D (2019) 27.
[20] Ricci SAG 'The technology and archaeology of corporate law' 2019 *Cornell Legal Studies Research Paper* 32.
[21] Stone Z 'Everything you need to know about Sophia, the world's first robot citizen' *Forbes* 7 November 2017 available at *https://www.forbes.com/sites/zarastone/2017/11/07/everything-you-need-to-know-about-sophia-the-worlds-first-robot-citizen/* (accessed 2 January 2019).

chatbots,[22] autonomous vehicles,[23] and virtual assistants,[24] for example, Amazon's Alexa, Apple's Siri, or Microsoft's Cortana. Excitingly, future AI could even immortalise human beings.[25] However, beyond these examples, it appears that there are no limits on the forms AI can assume: every day, discoveries emerge.

Notably, AI's varied forms make it attractive for various uses. In particular, industries across the globe are rapidly integrating AI into their operations for various purposes.[26] The most notable industries are the financial services, agricultural, and medical industries. For instance, when the COVID-19 pandemic started, medical companies used AI to help find a vaccine for the virus.[27] Further, governments also trialled AI to figure out the best way to distribute COVID-19 vaccines.[28]

[22] A chatbot refers to '[a] computer program designed to simulate conversation with human users, especially over the Internet': Oxford University Press 'Chatbot' available at https://www.lexico.com/en/definition/chatbot (accessed 20 August 2019).
[23] Adams N 'Regulating autonomous vehicles: South Africa's plan' *Michalsons* 25 May 2021 available at https://www.michalsons.com/blog/regulating-autonomous-vehicles-south-africas-plan/49571 (accessed 25 May 2021).
[24] Schwartz EH 'Samsung may replace Bixby with a 3D virtual assistant named Sam' *VoiceBot AI* 1 June 2021 available at https://voicebot.ai/2021/06/01/samsung-may-replace-bixby-with-a-3d-virtual-assistant-named-sam/ (accessed 10 June 2021).
[25] Paris M 'Deepak Chopra and Richard Branson to live on forever through AI, here's how' *Forbes* 4 June 2021 available at https://www.forbes.com/sites/martineparis/2021/06/04/deepak-chopra-plans-to-live-forever-through-ai-heres-how/ (accessed 7 June 2021).
[26] Osborne C 'Fortune 1000 to "urgently" invest in Big Data, AI in 2019 in fear of digital rivals' *ZDNet: Between the Lines* 3 January 2019 available at https://www.zdnet.com/article/fortune-1000-to-urgently-invest-in-big-data-ai-in-2019-in-fear-of-digital-rivals/ (accessed 20 August 2019).
[27] Etzioni O & Decario N 'AI can help scientists find a COVID-19 vaccine' *WIRED* 28 March 2021 available at https://www.wired.com/story/opinion-ai-can-help-find-scientists-find-a-covid-19-vaccine/ (accessed 20 December 2020).
[28] Greig J 'How AI is being used for COVID-19 vaccine creation and distribution' *Tech Republic* 20 April 2021 available at https://www.techrepublic.com/article/how-ai-is-being-used-for-covid-19-vaccine-creation-and-distribution/ (accessed 22 May 2021).

From a commercial perspective, AI also has many useful applications. Businesses are experimenting with various AI technologies that enable intelligent process automation, augment labour and production machinery, and promote ground-breaking innovation.[29] For example, AI has been used to automate rote administrative tasks[30] and eliminate bias in the recruitment process.[31] Moreover, intriguingly, a cartel of AI-driven companies known as 'smart companies' has emerged. They include Google, Facebook, Amazon, Netflix, and Spotify.[32] Plus, when the COVID-19 pandemic started, many ordinary and legacy businesses reconsidered incorporating AI into their existing business models to run more efficiently.[33]

Another crucial point is that AI is performing increasingly complex tasks. To illustrate this point, consider LawGeex AI, a contract-review service that detects risks in non-disclosure agreements better than human lawyers.[34] Further, a Hong Kong venture capitalist fund recently appointed an AI algorithm named 'Validating Investment Tool

[29] University of Pretoria 'Artificial intelligence for Africa: An opportunity for growth, development, and democratisation' available at https://www.up.ac.za/media/shared/7/ZP_Files/ai-for-africa.zp165664.pdf (accessed 12 August 2019).
[30] Davis N 'What is the Fourth Industrial Revolution?' *World Economic Forum* 19 January 2016 available at https://www.weforum.org/agenda/2016/01/what-is-the-fourth-industrial-revolution/ (accessed 21 August 2019).
[31] Folick O 'How AI can stop unconscious bias in recruiting' *Ideal Blog* 2 April 2019 available at https://ideal.com/unconscious-bias/ (accessed 20 August 2019).
[32] Galloway S 'How Amazon, Apple, Facebook and Google manipulate our emotions' *Ted Talk* 22 November 2017 available at https://bit.ly/3qtK7z6 (accessed 21 May 2021).
[33] Balakrishnan T 'The state of AI in 2020' *McKinsey & Company* 17 November 2020 available at https://www.mckinsey.com/business-functions/mckinsey-analytics/our-insights/global-survey-the-state-of-ai-in-2020 (accessed 21 May 2021).
[34] LawGeex 'Artificial intelligence more accurate than lawyers for reviewing contracts' *PR Newswire* 26 February 2018 available at https://www.prnewswire.com/news-releases/artificial-intelligence-more-accurate-than-lawyers-for-reviewing-contracts-new-study-reveals-300603781.html (accessed 12 August 2019).

for Advancing Life Science' AI (VITAL AI) to its board of directors.[35] Plus, remarkably, there are AI priests offer blessings and advice; they can also perform funerals.[36]

In South Africa, almost 46 per cent of businesses are incorporating AI into their strategies and operations.[37] For instance:

(a) Discovery uses AI to improve document analysis for its financial asset management.[38]

(b) Standard Bank uses AI to predict whether its clients are likely to cancel their insurance policies; they intend to use the predictions to improve their client services.[39]

(c) Multichoice uses an AI chatbot, 'The Ultimate Master of Information' (TUMI), to answer customer questions about their products and services.[40]

Other South African businesses are using AI assistants. For example, the Sandton-based Sky Hotel has introduced three AI robots (Micah, Lexi, and Ariel) to its staff. The

[35] Burridge N 'Artificial intelligence gets a seat in the boardroom' *Nikkei Asian Review* 10 May 2017 available at https://asia.nikkei.com/Business/Artificial-intelligence-gets-a-seat-in-the-boardroom (accessed 10 May 2019).
[36] Samuel S 'Robot priests can bless you, advise you, and even perform your funeral' *Vox* 13 January 2020 available at https://www.vox.com/future-perfect/2019/9/9/20851753/ai-religion-robot-priest-mindar-buddhism-christianity (accessed 21 May 2021).
[37] Staff Writer 'How AI is being used in South Africa' *Business Tech* 10 June 2019 available at https://businesstech.co.za/news/enterprise/322505/how-ai-is-being-used-in-south-africa/ (accessed 12 August 2019).
[38] Discovery 'Supporting a home-grown South African AI business' available at https://www.discovery.co.za/corporate/corporate-sustainability-home-grown-ai-business (accessed 21 May 2021).
[39] Moyo A 'Standard Bank taps AI to boost insurance business' *IT Web* 17 May 2021 available at https://www.itweb.co.za/content/wbrpOqgYXNj7DLZn (accessed 21 May 2021).
[40] Mungadze S 'MultiChoice hastens call centre automation with AI-powered chatbot' *IT Web* 8 June 2021 available at https://www.itweb.co.za/content/rxP3jqBm63yMA2ye (accessed 8 June 2021).

robots help with food delivery, entertainment, and rudimentary questions asked by guests.[41]

Further, South African technology firms are leading in developing AI technologies, like their Silicon Valley competitors, due to generous international funding.[42] For instance, in Cape Town over 450 technology firms employ more than 40 000 people.[43] On a related point, Big Tech[44] has also taken a particular interest in Cape Town. They have invested billions of Rand in technology infrastructure and local technology startups.[45] Some of them, like Amazon, are even planning to set up their continental headquarters in Cape Town.[46] Others, like Microsoft, are setting up powerful data centres for data storage and cloud computing in Cape Town and Johannesburg.[47]

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[41] Kesa D 'Robots at your service: Sandton hotel embraces AI tech with robo-concierge' *Times Live* 20 January 2021 available at https://www.timeslive.co.za/news/south-africa/2021-01-20-watch-robots-at-your-service-sandton-hotel-embraces-ai-tech-with-robo-concierge/ (accessed 21 May 2021).

[42] Microsoft Press Office 'SA companies piloting AI technologies' *IT Web* 12 June 2019 available at https://www.itweb.co.za/content/G98Yd7LxXya7X2PD (accessed 12 August 2019). Edward C 'The development of AI in South Africa' *The South African* 20 November 2018 available at https://www.thesouthafrican.com/news/the-development-of-ai-in-south-africa/ (accessed 12 August 2019). Lourie GG 'Here are 4 South African AI startups to keep an eye on' *Clevva* available at https://clevva.com/pressrelease/4-south-african-ai-startups-keep-eye/ (accessed 12 August 2019).

[43] Staff Writer 'South Africa's "silicon valley" has over 450 tech firms and employs more than 40,000 people' *Business Tech* 10 May 2021 available at https://businesstech.co.za/news/technology/489253/south-africas-silicon-valley-has-over-450-tech-firms-and-employs-more-than-40000-people/ (accessed 21 May 2021).

[44] 'Big Tech' refers to the most dominant companies in the information technology industry: Petit N *Big Tech and the Digital Economy: The Moligopoly Scenario* (2020) 6-28.

[45] Staff Writer 'South Africa's 'silicon valley' has over 450 tech firms and employs more than 40,000 people' *Business Tech* 10 May 2021 available at https://businesstech.co.za/news/technology/489253/south-africas-silicon-valley-has-over-450-tech-firms-and-employs-more-than-40000-people/ (accessed 21 May 2021).

[46] Staff Writer 'Amazon to set up South African headquarters in R4 billion Cape Town development' *Business Tech* 20 April 2021 available at https://businesstech.co.za/news/cloud-hosting/484385/amazon-to-set-up-south-african-headquarters-in-r4-billion-cape-town-development/ (accessed 21 May 2021).

[47] My Broadband 'Microsoft has launched new data centres in South Africa' *Business Tech* 6 March 2019 available at https://businesstech.co.za/news/cloud-hosting/303708/microsoft-has-launched-new-data-centres-in-south-africa/ (accessed 12 August 2019). 'Cloud computing' means the hosting of

Moreover, higher educational institutions (such as universities and colleges) have taken note of this drive for innovation[48] and are thus preparing students for a 4IR workplace.[49] Even young children are learning coding skills for AI and robotics from the first grade.[50] Whereas workplaces have introduced unique roles in managing AI from implementation, ethics, and data perspectives; for example, 'Chief AI Officer'[51] and 'Chief AI Ethics Officer'.[52] By 2026, accounting firm PricewaterhouseCoopers plans to spend US$12 billion to hire 100 000 new people in areas such as AI and cybersecurity.[53]

1.2 Problem statement and significance of the research

Despite the glamour and excitement surrounding AI, it is increasingly performing business tasks that the law would ordinarily consider as juristic acts, such as decision-

computer applications and databases in a distributed manner instead of having them reside on a single computer or closely connected computers: Ince D (2019) 57.

[48] Gleason NW *Higher Education in the Era of the Fourth Industrial Revolution* (2018) 1–12. Njotini M 'The Fourth Industrial Revolution (4IR) and the future of education: Do technologies result in the demise of a university?' in Louw A (ed) *Law and Industry 4.0 - Selected Perspectives on a New Scholarship of Teaching and Learning* (2020) 23-39.

[49] Fernandez KJ 'Reimagining higher education for the workforce of the future' *Gulf News* 29 April 2021 available at *https://gulfnews.com/uae/education/reimagining-higher-education-for-the-workforce-of-the-future-1.1619689770662* (accessed 21 May 2021). Brukwe K 'The role of universities in the digital era' *University of the Western Cape* 10 October 2018 available at *https://www.uwc.ac.za/news-and-announcements/news/the-role-of-of-universities-in-the-digital-era-542* (accessed 12 August 2019).

[50] Kammies K 'Coding for grade ones included in private schools curriculum' *Cape Talk* 5 October 2018 available at *http://www.capetalk.co.za/articles/321861/coding-for-grade-ones-included-in-private-schools-curriculum* (accessed 21 July 2019).

[51] Schmelzer R 'Do you really need a Chief AI Officer (CAIO)?' *Forbes* 19 December 2019 available at *https://www.forbes.com/sites/cognitiveworld/2019/12/19/do-you-really-need-a-chief-ai-officer-caio/* (accessed 21 January 2020).

[52] Deloitte *Does your Company Need a Chief AI Ethics Officer, an AI Ethicist, AI Ethics Council, or All Three?* (2021) 1-11.

[53] Maurer M 'PwC to spend $12 billion on hiring, expanding expertise in AI, cybersecurity' *The Wall Street Journal* 15 June 2021 available at *https://www.wsj.com/articles/pwc-to-spend-12-billion-on-hiring-expanding-expertise-in-ai-cybersecurity-11623758400* (accessed 15 June 2021).

making[54] and contracting.[55] Typically, humans with full legal capacity perform these tasks because they have legal consequences.

Further, there are genuine instances where AI has already caused harm. For instance, after continuously observing how AI-powered facial-recognition technology perpetuates racial bias, three leading AI ethics researchers, Joy Buolamwini, Timnit Gebru, and Deborah Raji, pioneered an ongoing research project to assess the harm.[56] In addition, to illustrate another instance of harm, the University of Stanford in the USA had created a COVID-19 vaccine distribution AI system that the medical industry abandoned because it had distributed vaccines incorrectly, which consequently left several frontline workers unvaccinated.[57] Further, international AI watchdogs like the Algorithmic Justice League and Algorithm Watch regularly point out several other instances where AI causes harm.[58] In sum, however, the instances reveal that scholars are only beginning to quantify the extent of AI's harm and identify who should be accountable for the harm.

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[54] Hickman E & Petrin M 'Trustworthy AI and corporate governance: The EU's ethics guidelines for trustworthy artificial intelligence from a company law perspective' 2021 *European Business Organization Law Review* 8-11.
[55] Mik E 'From automation to autonomy: Some non-existent problems in contract law' 2020 *Journal of Contract Law* 1-25.
[56] Metz C 'Who is making sure the AI machines aren't racist?' *The New York Times* 15 March 2021 available at https://www.nytimes.com/2021/03/15/technology/artificial-intelligence-google-bias.html (accessed 22 October 2021).
[57] Guo E & Hao K 'This is the Stanford vaccine algorithm that left out frontline doctors' *MIT Technology Review* 21 December 2021 available at https://www.technologyreview.com/2020/12/21/1015303/stanford-vaccine-algorithm/ (accessed 20 May 2021).
[58] Algorithmic Justice League 'About' available at https://www.ajl.org/about (accessed 20 May 2021). Algorithm Watch 'About' available at https://algorithmwatch.org/en/about-en-alt/ (accessed 20 May 2021).

To add insult to injury, some companies disclaim liability for the potential harm AI would cause. They do so by securing limitations of liability from end-users of the technology in the companies' customer contracts.[59] Conversely, when harm has actually taken place, other companies claim that the conduct of AI is too far removed from theirs to attract liability. In other words, they argue that no causal link connects them to the harmful conduct of AI.[60]

Moreover, even where there is some accountability, the law and companies seem to take a reactive approach to harm. For example, Uber used AI that surveilled and then dismissed its drivers—also known as 'robo-firing'—and later, a court ordered the company to reinstate the drivers.[61] Additionally, AI deployed by Google labelled African Americans as gorillas in photos they had uploaded to Google Photos, an online photo album.[62] Google only removed the label after the media and interest groups raised the issues with technology.[63] Similarly, Facebook's AI labelled black men as

[59] Wray GR, Jarvie AM, & Bonanno S 'Artificial intelligence and product liability: Catching up with the future' *Lexology* 11 March 2021 available at https://www.lexology.com/library/detail.aspx?g=8008c436-671d-4064-8614-7be011258f56 (accessed 20 May 2021).
[60] Krolik A & Hill K 'The slander industry' *The New York Times* 24 April 2021 available at https://www.nytimes.com/interactive/2021/04/24/technology/online-slander-websites.html (20 May 2021).
[61] Nawrat A 'HR tech gone wrong? Uber told to reinstate drivers after "robo-firing"' *Unleash* 15 April 2021 available at https://www.unleashgroup.io/2021/04/15/court-rules-against-uber-robo-firing-employee-surveillance/ (accessed 20 May 2021).
[62] Vincent J 'Google "fixed" its racist algorithm by removing gorillas from its image-labelling tech' *The Verge* 12 January 2018 available at https://www.theverge.com/2018/1/12/16882408/google-racist-gorillas-photo-recognition-algorithm-ai (accessed 12 August 2019).
[63] Vincent J 'Google "fixed" its racist algorithm by removing gorillas from its image-labelling tech' *The Verge* 12 January 2018 available at https://www.theverge.com/2018/1/12/16882408/google-racist-gorillas-photo-recognition-algorithm-ai (accessed 12 August 2019).

primates, which rightfully infuriated the company's stakeholders.[64] Viewed together, these examples lead one to question how company stakeholders can trust the law and AI companies when there is not a proactive framework to protect them from harmful AI.[65]

Narrowing the focus to company law, the technology mainly presents significant risks for company stakeholders.[66] Alarmingly, there is little to no research on whether South African company law regulates AI's conduct, the decisions of company directors to use the technology, and whether the current regulation (if any) is enough. However, it would be irresponsible not to investigate this problem given the impelling facts that:

(a) South African businesses are leading Africa in incorporating AI into their operations.

(b) There are plans for the exponential development, deployment, and use of the technology in the country.

(c) AI presents significant risks for company stakeholders.

[64] Mac R 'Facebook apologizes after A.I. puts "primates" label on video of black men' *New York Times* 3 September 2021 available at *https://www-nytimes-com.cdn.ampproject.org/c/s/www.nytimes.com/2021/09/03/technology/facebook-ai-race-primates.amp.html* (accessed 5 September 2021).
[65] Gunawan J, Choffnes D, & Hartzog W *et al* 'The COVID-19 pandemic and the technology trust gap' (2021) 51 *Seton Hall Law Review* 1505-534.
[66] Cheatham B, Javanmardian K, & Samandari H 'Confronting the risks of artificial intelligence' *McKinsey Quarterly* 26 April 2019 available at *https://www.mckinsey.com/business-functions/mckinsey-analytics/our-insights/confronting-the-risks-of-artificial-intelligence* (accessed 12 August 2019).

1.3 Research question and sub-inquiries

The central research question that requires investigation is: ***Is there a need to reform South African company law to accommodate AI and protect company stakeholders from AI?***

With the central research question in mind, the dissertation answers the following sub-inquiries in the context of South African company law:

(a) Has AI entered the domain of company law?

(b) What is AI's legal status under South African law?

(c) Do company directors have the authority and powers to rely on or delegate to AI?

(d) Do company directors have the duty to rely on or delegate to AI?

(e) Can directors escape liability for deciding to rely on or delegate to AI?

(f) Can AI be appointed or elected to the board of directors, and can South African company law accommodate or even allow this event?

(g) In its current state, is South African company law robust enough to regulate AI?

1.4 Literature review

1.4.1 Conceptual framework

In part 1.1 above, the writer revealed that leading scholars argue the 4IR is disrupting the law. In particular, the 4IR has disrupted commercial law across various areas.

Further, owing to the 4IR's technological advancements,[67] legal scholars submit that company law is in the process of digitalisation.[68]

Nicholas Davis[69] succinctly captures how the 4IR has disrupted various industries:

> 'The Fourth Industrial Revolution can be described as the advent of "cyber-physical systems" involving entirely new capabilities for people and machines. While these capabilities are reliant on the technologies and infrastructure of the Third Industrial Revolution, the Fourth Industrial Revolution represents entirely new ways in which technology becomes embedded within societies and even our human bodies. Examples include genome editing, new forms of machine intelligence, breakthrough materials and approaches to governance that rely on cryptographic methods such as the blockchain'.[70]

Concerning an understanding of the 4IR, Klaus Schwab appears to be the global authority. He coined the term 'Fourth Industrial Revolution' and has written about it extensively with approval by many academic scholars.[71] Whereas in Africa generally and South Africa in particular, Prof Tshilidzi Marwala is the leading scholar.[72]

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[67] Eiselen S (1995) 1.
[68] European Commission: Justice and Consumers *Study on Digitalisation of Company Law* (2017) 8-9. To avoid confusion, the writer submits that it is important to distinguish between digitisation, digitalisation, and digital transformation. 'Digitisation is the process of converting information from a physical format to digital one, digitalisation is the process of leveraging digitisation to improve business processes, and digital transformation is the transformation of business activities, processes, products, and models to fully leverage the opportunities of digital technologies': Hapon M 'What is the difference between digitization, digitalization and digital transformation?' *Netguru* 28 September 2020 available at *https://www.netguru.com/blog/digitization-and-digitalization* (accessed 27 October 2021).
[69] Davis N 'What is the Fourth Industrial Revolution?' *World Economic Forum* 19 January 2016 available at *https://www.weforum.org/agenda/2016/01/what-is-the-fourth-industrial-revolution/* (accessed 21 August 2019).
[70] Davis N 'What is the Fourth Industrial Revolution?' *World Economic Forum* 19 January 2016 available at *https://www.weforum.org/agenda/2016/01/what-is-the-fourth-industrial-revolution/* (accessed 21 August 2019).
[71] Schwab K (2017) 20-3. Schwab K & David N *Shaping the Future of the Fourth Industrial Revolution* (2018) 52.
[72] Marwala T *Closing the Gap: The Fourth Industrial Revolution in Africa* (2020) 1-234. Marwala T *The Disruptive Fourth Industrial Revolution* (2020) 98-102.

Moreover, among the numerous technological advancements, Prof Woodrow Barfield correctly argues that AI is the most disruptive and transformative technology.[73] He also points out that AI challenges the law in deeply diverse ways.[74]

To understand how AI affects the law within an African 4IR context, the reader needs to understand AI's origins and core concepts. The writer observes that most if not all research into AI's origins has been considered only from a Western perspective.[75] Prof John Murungi supplies the insight that African voices are not present in the mainstream discourse because of the legacy of colonisation, which erased the continent's contribution to various fields, especially history and law.[76] Thus, the writer presents the first written decolonised narrative of AI's origins. The writer's goal is to validate African voices and values further in global conversations about AI.

Furthermore, in reviewing the literature on AI's core concepts, the writer noticed that most explanations are esoteric and inaccessible. Consequently, the dissertation examines the works of several AI scholars and reduces the works to plain language with practical examples. In essence, the literature speaks to the following core concepts that underpin AI: artificial neural networks, voice recognition, speech

[73] Barfield W (2018) 2.
[74] Barfield W (2018) 2.
[75] Wooldridge M *A Brief History of Artificial Intelligence: What It Is, Where We Are, and Where We Are Going* (2021) 9-34. Flasiński M *Introduction to Artificial Intelligence* (2016) 3-13. Nilsson NJ *The Quest for Artificial Intelligence* (2010) 3-9. Coppin B *Artificial Intelligence Illuminated* (2004) 3-9. Haenlein M & Kaplan A 'A brief history of artificial intelligence: on the past, present, and future of artificial intelligence' (2019) 61(4) *California Management Review* 5-8.
[76] Murungi J *An Introduction to African Legal Philosophy* (2013) 1.

recognition, natural language processing, computer vision, machine learning, and deep learning.

1.4.2 The legal status of artificial intelligence

Legal personality is a founding tenet of South African law.[77] Thus, whether South African law recognises AI as a legal person is fundamental because it influences the legal consequences of AI's conduct. To inform this inquiry, the writer consults the views of Profs Jacqueline Heaton,[78] and Hannaretha Kruger and Ann Skelton.[79]

In short, the legal framework for determining AI's legal status reveals that AI can either be a legal person, statutory agent, or property.[80] Plus, the dissertation needs to consider the laws relevant to AI's legal capacity to supply a holistic picture of AI's legal status. Sections 1 and 20 of the Electronic Communications and Transactions Act 25 of 2002 (hereafter, 'ECTA') are thus relevant to whether AI can contract on behalf of companies. Section 1 of ECTA defines 'electronic agents' while s 20 deals with the legal force and effect of automated transactions. Similarly, s 71 of the Protection of Personal Information Act 4 of 2013 (hereafter, 'POPIA') deals with automated decision-making in South Africa.

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[77] Kruger H & Skelton A (eds) *The Law of Persons in South Africa* 2 ed (2018) ch 1.
[78] Heaton J *The South African Law of Persons* 5 ed (2017) ch 1.
[79] Kruger H & Skelton A (2018) ch 1.
[80] Giuffrida I, Lederer F, & Vermerys N 'A legal perspective on the trials and tribulations of AI: How artificial intelligence, the internet of things, smart contracts, and other technologies will affect the law' (2018) 68(3) *Case Western Reserve Law Review* 763-69.

1.4.3 Interpreting the South African company law framework

The company directors of a Hong Kong venture capital firm factually gave VITAL AI, its AI algorithm, the right to vote on whether the firm invests in a specific company.[81] This decision raises the question of the authority and powers of directors to rely on or delegate to AI lawfully, more relevantly, from a South African company law perspective. South African legal scholars have not answered this question, so the writer interprets the applicable law in line with the views of local academics.

Notably, Profs Piet Delport[82] and Farouk Cassim[83] point out that South African company law relies heavily on English case law to inform the authority and powers of directors to rely on or delegate to company officials. The reader should note that, beyond the views of Dr Brighton Mupangavanhu,[84] there is a lack of legal writing on the South African legal position on reliance and delegation. Further, there is no case law on whether directors can rely on or delegate to AI. So, to reduce this gap, the writer draws analogies from South African cases where directors have relied on or delegated decision-making rights to personnel or third parties. Moreover, informed by

[81] Wile R 'A venture capital firm just named an algorithm to its board of directors — Here's what it actually does' *Business Insider* 13 May 2014 available at https://www.businessinsider.com/vital-named-to-board-2014-5 (accessed 14 December 2018).
[82] Delport PA (ed) *Henochsberg on the Companies Act 71 of 2008* vol 3 Twenty-Sixth Service Issue (2021) 211.
[83] Cassim FHI 'The duties and liability of directors' in Cassim FHI (ed) *Contemporary Company Law* 2 ed (2012) 561.
[84] Mupangavanhu BM *Directors' Standards of Care, Skill, Diligence, and the Business Judgment Rule in View of South Africa's Companies Act 71 of 2008: Future Implications for Corporate Governance* (unpublished PhD thesis, University of Cape Town, 2016) 135.

the perspectives of Profs Piet Delport and Farouk Cassim, the writer analyses the Companies Act to answer this question.

Within the context of Delaware and EU company law, Prof Florian Möslein raises an intriguing inquiry into whether company directors may have the duty to rely on or delegate to AI.[85] Legal scholars have not imported this question into South African company law, so the writer considers it for the first time.

The writer also considers whether AI can be appointed or elected to and replace the board of directors of a company. In the context of replacement, Prof Florian Möslein asserts that:

> 'Such a development would conform to the stage of autonomous artificial intelligence in which machines take over all decision rights, either because humans increasingly trust the machines' abilities to decide, or because decisions have to be taken so quickly or require so much data that humans are simply unable to decide'.[86]

In determining whether AI can be appointed or elected to the board of directors, the writer analyses the Companies Act in line with the interpretations of Prof Piet Delport.[87] Further, informed by the views of Prof Rehana Cassim[88] and Dr Kathy Idensohn,[89] the writer briefly discusses the adequacy of the common law de facto and shadow directors to deal with the question of appointment or election to the board.

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[85] Möslein F (2018) 662.
[86] Möslein F (2018) 662.
[87] Delport PA (2021) 264.
[88] Cassim R 'A comparative analysis of the identification of de facto and shadow directors in South Africa, the United Kingdom and Australia' (2021) 15(1) *International and Comparative Corporate Law Journal* 5.
[89] Idensohn K 'The regulation of shadow directors' (2010) 22 *SAMLJ* 327-28.

The writer then considers how AI would help and challenge company board structures. According to the writer's research, Prof Sergio Alberto Gramitto Ricci is the only global legal scholar that has directly broached this topic.[90] Little to no South African scholars have investigated this topic.

1.4.4 South African company law reform

As highlighted earlier, an AI algorithm named VITAL had been appointed to the board of directors of a Hong Kong based company.[91] It is not clear whether the laws of Hong Kong legally provide for this appointment. However, this development has inspired the need to investigate the desirability of South African company law development in this direction.

Considering the possibility of South African company law reform to accommodate AI in companies is not an over-ambitious venture. If anything, the venture is in line with the aspirations of contemporary South African company law. One of the goals of law reform that resulted in the country's current Companies Act 71 of 2008 was the need to harmonise South African company law with international best practices.[92]

In line with that goal, improving the global competitiveness of South African companies is considered necessary to 'enhance the economic welfare of South Africa as a partner

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[90] Ricci SAG (2020) 869-908.
[91] Burridge N 'Artificial intelligence gets a seat in the boardroom' *Nikkei Asian Review* 10 May 2017 available at https://asia.nikkei.com/Business/Artificial-intelligence-gets-a-seat-in-the-boardroom (accessed 10 May 2019).
[92] Department of Trade and Industry *South African Company Law for the Twenty-First Century: Guidelines for Corporate Law Reform* (2004) 9-10.

within the global economy'.[93] Further, the King IV Report on Corporate Governance also acknowledges the role of the 4IR in shaping our economy and corporate governance.[94]

The South African government seemingly recognises the need to align our laws and policies with international trends. Accordingly, in April 2019, President Cyril Ramaphosa appointed members of the Presidential Commission on the 4IR.[95] The task of the Commission is to identify appropriate action plans, policies, and strategies that would position South Africa as a competitive global player in the use of technology in the 4IR.[96] The Commission had promised to develop a strategy document in line with its task by March 2020.[97]

On Friday, 23 October 2020, Stella Ndabeni-Abrahams, the then Minister of Communications and Digital Technologies gazetted the Report of the Presidential Commission on the 4th Industrial Revolution (PC4IR).[98] The Report sets out South

[93] See s 7*(e)-(f)* of the Companies Act 71 of 2008. Katzew J 'Crossing the divide between the business of the corporation and the imperatives of human rights – The impact of section 7 of the Companies Act 71 of 2008' (2011) 128(4) *SALJ* 687-711.
[94] Institute of Directors South Africa *King IV: Report on Corporate Governance for South Africa* (2016) 1-121.
[95] The Presidency 'President appoints Commission on Fourth Industrial Revolution' available at *http://www.thepresidency.gov.za/press-statements/president-appoints-commission-fourth-industrial-revolution* (accessed 15 August 2019).
[96] The Presidency 'President appoints Commission on Fourth Industrial Revolution' available at *http://www.thepresidency.gov.za/press-statements/president-appoints-commission-fourth-industrial-revolution* (accessed 15 August 2019).
[97] Moyo A '4IR commission starts work' *IT Web* 12 June 2019 available at *https://www.itweb.co.za/content/4r1lyMRoGmzqpmda* (accessed 12 August 2019).
[98] Adams N 'Report of the Presidential Commission on the Fourth Industrial Revolution (PC4IR)' *Michalsons* 27 October 2020 available at *https://www.michalsons.com/blog/report-of-the-presidential-commission-on-the-4th-industrial-revolution-pc4ir/45956* (accessed 27 October 2020).

Africa's strategy, response, and framework for the 4IR. One of the recommendations is the establishment of an AI institute.[99] The Report says:

> '[The AI Institute] will enable the generation of new knowledge and creative technology applications in sectors such as health, agriculture, education, energy, manufacturing, tourism and ICT, amongst others. The institute's mandate should also include training, to be delivered across various sections of society, as well as ensuring positive social impact'.[100]

There are few legal articles written on the need for the law to develop to encapsulate the use of AI in companies.[101] However, these articles limit the discussion to the laws of the USA and Europe. Consequently, the dissertation explores novel territory by inquiring whether the moment has arrived for South African law to accommodate AI into the country's company law framework while still protecting company stakeholders.

1.5 Scope

The dissertation raises awareness of how AI challenges South African company law and its potential to harm company stakeholders. However, the dissertation is neither comprehensive nor conclusive on these issues. Instead, the writer aims to question the need for law reform through awareness of the pertinent legal issues.

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[99] Adams N 'Report of the Presidential Commission on the Fourth Industrial Revolution (PC4IR)' *Michalsons* 27 October 2020 available at https://www.michalsons.com/blog/report-of-the-presidential-commission-on-the-4th-industrial-revolution-pc4ir/45956 (accessed 27 October 2020).
[100] Department of Communications and Digital Technologies *Report of the Presidential Commission on the 4th Industrial Revolution (PC4IR)* (2020) 50.
[101] Möslein F 'Robots in the boardroom: artificial intelligence and corporate law' in Barfield W & Pagallo U (eds) *Research Handbook on the Law of Artificial Intelligence* (2018) 662. Ricci SAG 'Artificial agents in corporate boardrooms' (2020) 105 *Cornell Law Review* 901.

1.6 Research methodology

Given the dissertation's purpose, the writer adopts exploratory, doctrinal, socio-legal, and applied research methodologies for desktop research. In doing so, the dissertation considers primary and secondary sources of law. While the primary sources include constitutions, legislation, case law and government regulations, the secondary sources include journal articles, textbooks, and internet sources.

1.7 Hypothesis

The writer hypothesises that South Africa company law needs to reform to regulate AI because of its potential to harm company stakeholders. It also needs to follow African and international trends in line with the reform goals of the Companies Act, 2008 and other relevant laws.

1.8 Dissertation outline

CHAPTER 1 INTRODUCTION

This chapter contextualises the dissertation with the research background and the problem statement. Afterwards, the writer sets out the key research question and sub-inquiries. Following the research question is a brief literature review and delimitation of the dissertation scope. Finally, the writer describes the research methodology and offers a hypothesis. The chapter ends with the dissertation's outline.

CHAPTER 2 CONCEPTUAL FRAMEWORK: THE FOURTH INDUSTRIAL REVOLUTION AND ARTIFICIAL INTELLIGENCE

Chapter 2 describes the Fourth Industrial Revolution. It also supplies a decolonised narrative of AI's origins. Afterwards, the chapter describes AI and indicates the moment when AI had entered the domain of company law. Then, the writer considers AI's legal status under South African law.

CHAPTER 3 ARTIFICIAL INTELLIGENCE IN SMART COMPANIES THROUGH THE LENS OF SOUTH AFRICAN COMPANY LAW

This chapter discusses company directors' authority, powers, and duties to rely on or delegate to AI. It also considers the relationship between AI and corporate governance, risk, compliance, and accountability.

CHAPTER 4 CONCLUSION AND RECOMMENDATIONS ON REFORMING SOUTH AFRICAN COMPANY LAW TO ACCOMMODATE ARTIFICIAL INTELLIGENCE AND PROTECT COMPANY STAKEHOLDERS

This last chapter supplies recommendations based on the writer's findings and closes the dissertation.

CHAPTER 2 CONCEPTUAL FRAMEWORK: THE FOURTH INDUSTRIAL REVOLUTION AND ARTIFICIAL INTELLIGENCE

2.1 Introduction

This chapter sets the scene for the dissertation by introducing the backdrop of the 4IR, narrating a decolonised history of AI, and describing the core concepts of AI. Next, the chapter stages the moment when AI had entered the domain of company law. Finally, in closing, the chapter briefly discusses AI's legal status under South African law.

2.2 The Fourth Industrial Revolution

The time context for the dissertation is the 4IR. The 4IR[102] refers to the technological revolution where the traditional lines between the physical, digital, and biological spheres of reality blur.[103] In other words, this revolution sees emerging technologies becoming more ingrained in humans' daily lives and physical bodies.[104]

Practically speaking, humans are merging with these technologies to the extent that the distinction between 'natural' and 'artificial' becomes negligible.[105] For instance, in 2020, Elon Musk presented a device that can connect the human brain to a

[102] In 2016, Professor Klaus Schwab, Founder and Executive Chairperson of the World Economic Forum, coined the term 'Fourth Industrial Revolution': Schwab K (2017) 20-2.
[103] Schwab K (2017) 20-3.
[104] Schwab K & David N (2018) 52.
[105] Warwick K 'The merging of humans and machines' in Londral A, Encarnação P, & Rovira J (eds) *Neurotechnology, Electronics, and Informatics* 13 ed (2015) 79-89.

computer.[106] Another instance is a company that implanted microchips into its employees' hands to access the company premises, log onto their computers, and buy goods from the company's cafeteria.[107] Notably, the rate at which the lines blur between humans and technology is accelerating more quickly when compared with earlier industrial revolutions.[108] Plus, the COVID-19 pandemic has further fuelled this rate's momentum.[109]

Nevertheless, amongst the various 4IR emerging technologies, AI is the most disruptive and transformative technology.[110] In reality, AI is actively disrupting and replacing how humans perform tasks worldwide, especially in Africa and South Africa in particular.[111] The writer illustrates examples to this effect in the subchapters that follow.[112] However, the crucial point for the dissertation is that AI's disruptive and transformative nature creates significant challenges for the law.[113] In turn, these challenges raise several legal questions. Thus, the dissertation captures and deals with some of these legal questions.

[106] Adams N 'Neurolaw, privacy and neurotechnology' *Michalsons* 23 September 2020 available at *https://www.michalsons.com/blog/neurolaw-privacy-and-neurotechnology/45137* (accessed 24 September 2020).
[107] Metz R 'This company embeds microchips in its employees, and they love it' *MIT Technology Review* 17 August 2018 available at *https://www.technologyreview.com/2018/08/17/140994/this-company-embeds-microchips-in-its-employees-and-they-love-it/* (accessed 23 October 2021).
[108] Schwab K (2017) 20-3.
[109] Schwab K & Malleret T *COVID-19: The Great Reset* (2020) 15.
[110] Barfield W (2018) 2.
[111] Marwala T *Closing the Gap: The Fourth Industrial Revolution in Africa* (2020) 1-234. Marwala T *The Disruptive Fourth Industrial Revolution* (2020) 98-102.
[112] See 2.4 and 2.5 of the dissertation.
[113] Rodrigues R 'Legal and human rights issues of AI: Gaps, challenges and vulnerabilities' (2020) 4 *Journal of Responsible Technology* 1-12.

However, to understand the significant legal challenges AI creates, the reader must first become familiar with AI. So, in the next two subchapters, the writer introduces AI by narrating a decolonised history of AI and then describing its core concepts.

2.3 A decolonised narrative of the origins of artificial intelligence

To date, mainstream origin accounts of AI start with the premise that it originated in the West.[114] However, these accounts ignore the invaluable contributions of Africa in bringing AI to where it is today.[115] With these insights in mind, the writer argues that the status quo must change. Going forward with their research, legal scholars must adopt a decolonised narrative regarding AI's origin accounts. The reason is that a decolonised narrative validates African voices and values in global conversations about AI.[116]

Validating African voices and values is a critical priority. It is critical because Africans have historically witnessed the West trashing their thinking and cultural practices.[117] Consequently, to promote validation, the writer's contribution that follows adopts the first decolonised narrative of AI's origins.

[114] Wooldridge M (2016) 3-13. Nilsson NJ (2010) 3-9. Coppin B (2004) 3-9. Haenlein M & Kaplan A (2019) 5-8.
[115] For a brief history of the effects of colonisation on Africa, see Rashied N & Bhamjee M 'Does the global south need to decolonise the Fourth Industrial Revolution?' in Doorsamy W, Paul BS, & Marwala (eds) *The Disruptive Fourth Industrial Revolution* (2020) 98-102. Adams R 'Can artificial intelligence be decolonized?' (2021) 46(2) *Interdisciplinary Science Reviews* 176-97.
[116] Consider that decolonisation repositions the South African value of ubuntu as a leading value in the field of AI ethics. Wareham CS 'Artificial intelligence and African conceptions of personhood' 2020 *Ethics and Information Technology* 1.
[117] Murungi J (2013) 1.

2.3.1 The mythology that inspired the first dreams of artificial intelligence

The writer has traced the beginnings of AI to mythology, imagination, fiction, and philosophy.[118] Ancient African mythology seems to have inspired the first imaginings of AI. Since about twelve thousand years ago, the Yoruba people of West Africa have worshipped Ogun, a primordial orisha[119] of iron, technology, and creative intelligence.[120] Specifically, they recognise Ogun for his metalwork skills.[121] They also believe they could summon robotic soldiers called 'shigidi' through ancestor veneration.[122]

Later, similar mythology arose in the Western and Eastern worlds. In the West—in the eighth century BC—the ancient Greeks spoke of Hephaestus, the god of fire, metalwork, and artisans.[123] Hephaestus reportedly created living robots called 'automata'.[124] However, in the East, Indian mythology tells stories of robotic warriors who protected Buddha's prized artefacts.[125]

[118] Buchanan BG 'A (very) brief history of artificial intelligence' (2005) 26(4) *AI Magazine* 53.
[119] An 'orisha' is quasi-deity that reflects a manifestation of the Creator, Olodumare, in the Yoruba religious system: Cohen PF 'The orisha Atlantic: Historicizing the roots of a global religion' in Csordas TJ (ed) *Transnational Transcendence: Essays on Religion and Globalization* (2009) 205-30.
[120] Barnes ST (ed) *Africa's Ogun: Old World and New* 2 ed (1997) 2.
[121] Barnes ST (1997) 178.
[122] Prince R 'Curse, invocation and mental health among the Yoruba' (1960) 5(2) *Canadian Psychiatric Association Journal* 67-73.
[123] Dolmage J '"Breathe upon us an even flame": Hephaestus, history, and the body of rhetoric' (2006) 25(2) *Rhetoric Review* 119-40.
[124] Chace C *Artificial Intelligence and the Two Singularities* (2018) 6. McCorduck P, Minsky M, & Selfridge OG *et al* 'History of artificial intelligence' (1998) *International Joint Conferences on Artificial Intelligence* 951-54.
[125] Mayor A *Gods and Robots Myths, Machines, and Ancient Dreams of Technology* (2018) 27.

2.3.2 The creation of rudimentary robots

AI mythology seems to have inspired the manufacture of rudimentary robots. In the early Western world, the manufacture of robots became fashionable. Ancient Greek technologists were impressively skilled in mechanics and metalwork. Mayor describes how the fifth century BC Olympic Games boasted bronze robots manufactured by early Greek technologists.[126] As a result of these skills, from the fifth to first century BC, the Western world manufactured even more robots.[127]

During the third century BC, rudimentary robots appeared in Alexandria, Egypt.[128] Over the next three centuries, during the Ptolemaic Dynasty's rule, moving figures and statues of humans (including mechanical trumpeters), animals, and mythological beasts were integrated into the royal pageantry (the colourful and formal things done for royal occasions).[129]

In around eight-hundred-and-fifty AD, the Western world reportedly inspired the Byzantine Empire and Arab nations to develop a version of rudimentary robots.[130] However, the Royal Society reports that the development caused a decline in

[126] Mayor A (2018) 27.
[127] Mayor A (2018) 27.
[128] Graves P 'The early history of robots and automata' *GWS Robotics* 25 June 2018 available at https://www.gwsrobotics.com/blog/history-of-robots (accessed 28 August 2019).
[129] Graves P 'The early history of robots and automata' *GWS Robotics* 25 June 2018 available at https://www.gwsrobotics.com/blog/history-of-robots (accessed 28 August 2019).
[130] Cave S & Dihal K 'The automaton chronicles' (2018) 559 *Nature* 474.

manufacturing in the West.[131] The Society suggests that when the West discovered that the East had started to build robots, robots became associated with foreignness, suspicion, and wonder.[132] Consequently, robot manufacture in the West plummeted.[133]

Then, before the European Renaissance, there were rudimentary robots crafted in Benin (present-day Nigeria and the world's first smart city).[134] One can see remnants of these robots from a collection of robot-like bronze sculptures called the 'Benin Bronzes',[135] which are slowly returning to Africa from colonial museums.[136]

2.3.3 The European Renaissance

During the Renaissance (fourteenth to seventeenth century AD), the likes of Leonard da Vinci revived the creation of robots. For instance, Da Vinci drew plans for weight-and-pulley robotic knights.[137] Ironically, he and other Renaissance inventors could

[131] The Royal Society 'Portrayals and perceptions of AI and why they matter' available at https://royalsociety.org/-/media/policy/projects/ai-narratives/AI-narratives-workshop-findings.pdf (accessed 28 August 2019).
[132] The Royal Society 'Portrayals and perceptions of AI and why they matter' available at https://royalsociety.org/-/media/policy/projects/ai-narratives/AI-narratives-workshop-findings.pdf (accessed 28 August 2019).
[133] The Royal Society 'Portrayals and perceptions of AI and why they matter' available at https://royalsociety.org/-/media/policy/projects/ai-narratives/AI-narratives-workshop-findings.pdf (accessed 28 August 2019).
[134] Koutonin M 'Story of cities number five: Benin City, the mighty medieval capital now lost without trace' available at *The Guardian* 18 March 2016 https://amp.theguardian.com/cities/2016/mar/18/story-of-cities-5-benin-city-edo-nigeria-mighty-medieval-capital-lost-without-trace (accessed 17 April 2021).
[135] Marshall A 'This art was looted 123 years ago. Will it ever be returned?' *The New York Times* 23 January 2020 available at https://www.nytimes.com/2020/01/23/arts/design/benin-bronzes.htmle (accessed 17 April 2021).
[136] Treisman R 'Germany will repatriate Benin Bronzes, plundered from Africa in the nineteenth century' *NPR* 30 April 2021 available at https://www.npr.org/2021/04/30/992496264/germany-will-repatriate-benin-bronzes-plundered-from-africa-in-the-19th-century (accessed 1 May 2021).
[137] Cave S & Dihal K (2018) 474.

calculate the specifications and designs for robots with unprecedented precision owing to Europe adopting the Arabic numeric system to replace Roman numerals.[138] Subsequently, in 1649, René Descartes supposedly built an automaton version of his deceased daughter, Francine, as a tribute to her life.[139]

2.3.4 African mathematics (ethnomathematics) as the foundation for today's artificial intelligence

An often-unknown theory is that binary code,[140] the foundation of algorithms, computers, and digital networks, may have started in Africa. It potentially finds its origins in Ifá divination[141] and Bamana sand divination[142] in the form of fractals.[143] In the ninth century AD, Arab mystics reportedly learnt divination symbolism (containing binary code) from African diviners.[144] Then, in the twelfth century AD, Hugo of Santalla spent time with Arabic mystics, learnt African binary code divination, then brought it to Spain.[145] After its introduction to Spain, the African binary code inspired the European

[138] Al-Khalili J *The House of Wisdom: How Arabic Science Saved Ancient Knowledge and Gave Us the Renaissance* (2011) 1-254.
[139] Wood G 'Edison's Eve' *The New York Times* 25 August 2002 available at https://www.nytimes.com/2002/08/25/books/chapters/edisons-eve.html (accessed 29 August 2019).
[140] Binary Code is a computer coding system that uses the numerical digits '0' and '1' in unique sequences to represent a letter, digit, or other character. In simple terms, it is the language of computers. Franson D *Introduction to Number System and Binary Codes: Practical Tools with Stimulating Examples: Learn Binary Code Programming* (2021) ch 1.
[141] Alamu FO, Aworinde HO, & Isharufe WI 'A comparative study on Ifá divination and computer science' (2013) 1(6) *International Journal of Innovative Technology and Research* 524-28.
[142] Eglash R 'Bamana sand divination: Recursion in ethnomathematics' (1997) 99(1) *American Anthropologist* 112-22.
[143] Fractals are never-ending patterns that repeat themselves at varied sizes. Mandelbrot BB 'Fractals and the geometry of nature' (1987) 5 *Encyclopaedia of Physical Science and Technology* 593-97.
[144] Eglash R (1997) 117.
[145] Eglash R *African Fractals: Modern Computing and Indigenous Design* (1999) 20-38.

alchemy community.[146] However, they called it 'Geomancy', which means 'divination through the earth'.[147]

Afterwards, the German mathematician Gottfried Leibniz reportedly discussed geomancy in his 1666 dissertation 'De Arte Combinatoria'.[148] He also changed the representation of African binary code from fractals to Arabic numerals (1s and 0s).[149] Next, George Boole used Leibniz's version of binary code to create Boolean algebra.[150] Then, John von Neumann used Boolean algebra to create the concept of the digital computer.[151]

2.3.5 Towards intelligent artificial intelligence

Up until the European Renaissance, manufacturing focused on the complex mechanisation of robots. However, these robots were basic and relied on regular human help to function effectively;[152] they were unintelligent shells.[153] So, the next step was to elevate rudimentary robots by adding intelligence.

[146] Braswell-Means L 'The popular art of geomancy in the medieval West and contemporary Asia' (1990) 23(4) *Journal of Popular Culture* 131-43.
[147] Bourguignon E 'Geomancy' (2005) 5 *Encyclopedia of Religion* 3437-438.
[148] Ekotto F & Kenneth WH (eds) *Rethinking African Culture Production* (2015) 91.
[149] Ekotto F & Kenneth WH (2015) 91.
[150] Béziau J 'Logic: A history of its central concepts' in Gabbay DM, Pelletier FJ, & Woods J (eds) *Handbook of the History of Logic* 11 ed (2012) 235-307.
[151] Halmos PR 'The legend of John von Neumann' (1972) 80(4) *The American Mathematical Monthly* 382-94.
[152] Herman D 'A renaissance robot' (1998) 120(2) *Mechanical Engineering* 80-2.
[153] Graves P 'The early history of robots and automata' *GWS Robotics* 25 June 2018 available at https://www.gwsrobotics.com/blog/history-of-robots (accessed 28 August 2019).

Owing to the work of eighteenth-century philosophers, the creation of intelligent AI had become more tangible.[154] They mused on how they could replicate human thinking for use in robots.[155] One of the results of their experiments was the creation of Euphonia, a Victorian talking machine.[156] She was one of the first robots who could 'speak' sentences.[157] She was so spine-chilling that one commentator described her as a 'scientific Frankenstein monster' with a 'hoarse sepulchral voice'.[158]

Later, in the 1940s, the philosophers' musings inspired the idea of creating an artificial brain.[159] Further, in the 1950s, Alan Turing, a renowned mathematician and codebreaker, proposed a test that measured whether a computer programme would qualify as intelligent AI.[160] In essence, the test says that intelligent AI can replicate human actions to the degree that its actions become indistinguishable from human actions.[161] However, the writer adds that one can take the test further to include a machine's ability to surpass human intelligence.[162] Nevertheless, later in the 1950s,

[154] Reynoso R 'A complete history of artificial intelligence' *G2* 25 May 2021 available at https://www.g2.com/articles/history-of-artificial-intelligence (accessed 10 June 2021).
[155] Wooldridge M (2021) 16-27.
[156] Nugent A 'Text-to-speech in 1846 involved a talking robotic head with ringlets' *Atlas Obscura* 9 March 2016 available at https://www.atlasobscura.com/articles/texttospeech-in-1846-involved-a-talking-robotic-head-with-ringlets (accessed 23 August 2019).
[157] Nugent A 'Text-to-speech in 1846 involved a talking robotic head with ringlets' *Atlas Obscura* 9 March 2016 available at https://www.atlasobscura.com/articles/texttospeech-in-1846-involved-a-talking-robotic-head-with-ringlets (accessed 23 August 2019).
[158] Nugent A 'Text-to-speech in 1846 involved a talking robotic head with ringlets' *Atlas Obscura* 9 March 2016 available at https://www.atlasobscura.com/articles/texttospeech-in-1846-involved-a-talking-robotic-head-with-ringlets (accessed 23 August 2019).
[159] Reynoso R 'A complete history of artificial intelligence' *Learning Hub* 1 March 2019 available at https://learn.g2.com/history-of-artificial-intelligence#ai-1 (accessed 23 August 2019).
[160] Mueller JP & Massaron L *Artificial Intelligence for Dummies* (2018) 45.
[161] Wooldridge M (2021) 16-27.
[162] Wooldridge M (2021) 16-27.

the researchers formalised the field of AI research—as it is known today—during a summer conference at Dartmouth College, where John McCarthy, a computer and cognitive scientist, coined the term 'artificial intelligence'.[163]

From the 1950s onward, AI researchers from varying related fields contributed to developing AI to where it is today.[164] With each new decade, novel innovations and findings have developed, which have changed the fundamental knowledge of what the world knows about AI.[165] Moreover, historical advancements have catapulted AI from being a distant dream to a tangible reality. Today, AI research has advanced to the point of facial recognition technology,[166] self-driving cars,[167] insurance robo-advisors,[168] and cancer detection in patients better than medical doctors.[169] Plus, various scholars have consistently and correctly argued that the future of AI is in Africa.[170]

[163] Mueller JP & Massaron L (2018) 45.
[164] Reynoso R 'A complete history of artificial intelligence' *Learning Hub* 1 March 2019 available at https://learn.g2.com/history-of-artificial-intelligence#ai-1 (accessed 23 August 2019).
[165] Graves P 'The early history of robots and automata' *GWS Robotics* 25 June 2018 available at https://www.gwsrobotics.com/blog/history-of-robots (accessed 28 August 2019).
[166] Ingber S 'Users can sue Facebook over facial recognition software, court rules' *NPR* 8 August 2019 available at https://www.npr.org/2019/08/08/749474600/users-can-sue-facebook-over-facial-recognition-software-court-rules (accessed 4 September 2019).
[167] Adams N 'Regulating autonomous vehicles: South Africa's plan' Michalsons 25 May 2021 available at https://www.michalsons.com/blog/regulating-autonomous-vehicles-south-africas-plan/49571 (accessed 25 May 2021).
[168] Huneberg S (2020) 175.
[169] Walsh F 'AI "outperforms" doctors diagnosing breast cancer' *BBC News* 2 January 2020 available at https://www.bbc.com/news/health-50857759 (accessed 12 January 2020).
[170] Hao K 'The future of AI research is in Africa' *MIT Technology Review* 21 June 2019 available at https://www.technologyreview.com/2019/06/21/134820/ai-africa-machine-learning-ibm-google/ (accessed 12 January 2020).

On another point, the original goal of AI research was to understand better how humans work.[171] However, from the 1970s to the early 1990s, the funding of AI research suffered challenges (the so-called 'AI Winters').[172] So, the goal of research shifted to the commercial application of AI to fund further research.[173] This last point is crucial to the dissertation as it motivates why AI now plays a more significant role in commercial spaces.

2.4 A description of how artificial intelligence (currently) works

2.4.1 Artificial neural networks

The human brain comprises a network of neurons that process information.[174] Since the 1940s, AI scientists have been working on replicating the structure and functions of the human brain.[175] They intended to manufacture similar cognitive capabilities for AI.[176] This AI research is known as 'artificial neural networks' (ANNs). Notably, ANNs also refer to the technology itself.

[171] Anyoha R 'The history of artificial intelligence' *Harvard University* 28 August 2017 available at https://sitn.hms.harvard.edu/flash/2017/history-artificial-intelligence/ (accessed 2 September 2019).
[172] Russell SJ & Norvig P (eds) *Artificial Intelligence: A Modern Approach* 3 ed (2010) 28.
[173] Bakken A 'Business applications for artificial intelligence: An update for 2020' *Harvard University* 18 March 2019 available at https://professional.dce.harvard.edu/blog/business-applications-for-artificial-intelligence-an-update-for-2020/ (accessed 2 September 2019).
[174] New Scientist *The Brain: Everything You Need to Know* (2020) ch 1.
[175] McCulloch WS & Pitts W 'A logical calculus of the ideas immanent in nervous activity' (1943) 5 *Bulletin of Mathematical Biophysics* 115-33.
[176] McCulloch WS & Pitts W (1943) 115-33.

Initially, the development of ANNs was slow because of weak computer processing power.[177] Recently, however, AI researchers have developed fully functional ANNs because of advances in computer processing power.[178] As a result, current ANNs can solve business problems such as customer behaviour prediction, data validation, risk management, and sales forecasting.[179] Further, excitingly, some AI researchers believe they are close to developing ANNs that match human intelligence.[180] For instance, in July 2019, Microsoft invested one billion US dollars in Elon Musk's Open AI, aiming to match and surpass human cognitive capabilities.[181]

Another compelling aspect of ANNs is that researchers are investigating memory-retention capabilities for AI. However, current ANNs can retain only short memories[182] and use the memories for only one task at a time.[183] Nevertheless, as humble as this achievement may seem, ANNs are performing impressive tasks. For example, Google's DeepMind is an ANN that researchers had trained with basic information

[177] Alexander D *Neural Networks: History and Applications* (2020) ch 1.
[178] Alexander D (2020) ch 1.
[179] Rosa JLG (ed) *Artificial Neural Networks: Models and Applications* (2020) ch 7-15.
[180] Cuthbertson A 'Elon Musk's AI project to replicate the human brain receives US$1 billion from Microsoft' *Independent* 23 July 2019 available at https://www.independent.co.uk/life-style/gadgets-and-tech/news/elon-musk-ai-openai-microsoft-artificial-intelligence-funding-a9016736.html (accessed 5 August 2019).
[181] Cuthbertson A 'Elon Musk's AI project to replicate the human brain receives US$1 billion from Microsoft' *Independent* 23 July 2019 available at https://www.independent.co.uk/life-style/gadgets-and-tech/news/elon-musk-ai-openai-microsoft-artificial-intelligence-funding-a9016736.html (accessed 5 August 2019).
[182] ANNs capable of memory are referred to as 'Recurrent Neural Networks' (RNNs). For a brief introduction to RNNs, see Zhou V 'An introduction to recurrent neural networks for beginners' *Towards Data Science* 25 July 2019 available at https://towardsdatascience.com/an-introduction-to-recurrent-neural-networks-for-beginners-664d717adbd (accessed 1 August 2019).
[183] Engelking C 'An artificial neural network forms its own memories' *Discover Magazine* 13 October 2016 available at http://blogs.discovermagazine.com/d-brief/2016/10/13/artificial-neural-network-memories/#.XXpD55MzbaY (accessed 12 January 2019).

about family relationships.[184] DeepMind stored the details of a family tree in its memory.[185] Then, researchers asked it to identify a family member with the question 'Who is Freya's maternal great uncle?'.[186] Remarkably, it could answer the question with ease.[187]

2.4.2 The sensory capabilities of artificial intelligence

Like ANNs, it appears that AI scientists use the blueprints of human sensory capabilities to create a model for AI's sensory capabilities. Examples of the relevant human sensory capabilities include hearing, vision, speech, and comprehension. However, as will be illustrated below, AI can exceed human capabilities when the processing power of AI exceeds that of humans.[188]

2.4.2.1 Speech recognition

Humans can recognise that someone is speaking to them and identify who the speaker is by the quality of their voice (timbre). Thus, recognition starts with speaking, then the corresponding acts of hearing, processing, and identification. AI researchers call this

[184] Wayne G & Graves A 'Differentiable neural computers' *DeepMind Blog* 12 October 2016 available at https://deepmind.com/blog/article/differentiable-neural-computers (accessed 12 January 2019).
[185] Williams O 'Google DeepMind's artificial intelligence just got a lot smarter' *Huffington Post* 18 October 2016 available at https://www.huffingtonpost.co.uk/entry/google-deepmind-just-got-much-smarter_uk_58060609e4b07ebc072b6426 (accessed 12 January 2019).
[186] Wayne G & Graves A 'Differentiable neural computers' *DeepMind Blog* 12 October 2016 available at https://deepmind.com/blog/article/differentiable-neural-computers (accessed 12 January 2019).
[187] Engelking C 'An artificial neural network forms its own memories' *Discover Magazine* 13 October 2016 available at http://blogs.discovermagazine.com/d-brief/2016/10/13/artificial-neural-network-memories/#.XXpD55MzbaY (accessed 12 January 2019).
[188] Anderson J & Rainie L 'Artificial intelligence and the future of humans' *Pew Research Centre* 10 December 2018 available at https://www.pewresearch.org/internet/2018/12/10/artificial-intelligence-and-the-future-of-humans/ (accessed 12 January 2019).

sensory capability 'speech recognition'. That is the ability of a computer to recognise and distinguish the nuances of a human's voice.[189]

Speech recognition works like the process by which a child would identify their parents and learn a language. Chronologically, the child would initially hear their parents' spoken words and absorb information about their voice timbre. Then, the child's brain would form patterns and connections for future reference.[190] Similarly, speech recognition technology would *hear* by using microphones for real-time recognition or speech recordings for later recognition. After that, the technology trains itself to identify and distinguish between different voices by forming patterns and connections.[191]

An example of speech recognition technology is the Google Assistant that performs tasks by voice command. Practically speaking, humans could instruct Google Assistant to unlock their mobile phones[192] or create a restaurant reservation.[193] Another example is the voice-to-text transcription software, Otter AI. Otter AI can

[189] Lynn J 'Can we talk: Speech recognition technology is changing your relationship with your computer' (1999) 14 *Commercial Law Bulletin* 14-7.
[190] Globalme 'Speech Recognition Technology Overview' available at https://www.globalme.net/blog/the-present-future-of-speech-recognition (accessed 10 September 2019).
[191] Rybovic A 'Speech Recognition In Training: What You Need To Know' *eLearning Industry* 22 August 2018 available at https://elearningindustry.com/speech-recognition-in-training-what-need-know (accessed 10 September 2019).
[192] 'The Google Assistant is a virtual assistant powered by artificial intelligence and developed by Google that is primarily available on mobile and smart home devices. Unlike Google Now, the Google Assistant can engage in two-way conversations': Oloo V 'How to unlock your phone with your voice using Google Assistant' *Dignited* 8 September 2018 available at https://www.dignited.com/34613/unlock-smartphone-voice-google-assistant/ (accessed 7 June 2019).
[193] Lumb D 'Google Assistant can now make vocal restaurant reservations in 43 states' *Techradar* 6 March 2019 available https://www.techradar.com/news/google-assistant-can-now-make-restaurant-reservations-in-43-states (accessed 10 September 2019).

transcribe recordings of conversations (for example, interviews, lecturers, meetings) and identify then separate each speaker according to their voice timbre.[194] However, despite the excitement surrounding this technology, there are dangers to speech recognition technology, particularly when it comes to information security. For example, voice-activated mobile phone security has become almost useless because AI can clone the voices of humans with an alarming degree of accuracy.[195]

2.4.2.2 Natural Language Processing

It is a common fact that computers excel at learning from number-filled spreadsheets of data. However, when it comes to human communication, humans generally communicate with words, not numbers. Consequently, computers need to understand and communicate in human language to interact with humans. Thus, 'Natural Language Processing' (NLP) is a field of research that aims to empower computers to communicate with humans.

NLP achieves the goal of understanding and communicating with humans through programming AI to understand and apply rules of syntax (grammar), semantics (the meaning of words), and pragmatics (context and subtext).[196] An example of an NLP

[194] Su J 'CEO tech talk: How otter.ai uses artificial intelligence to automatically transcribe speech to text' *Forbes* 18 June 2019 available at https://www.forbes.com/sites/jeanbaptiste/2019/06/19/ceo-tech-talk-how-otter-ai-uses-artificial-intelligence-to-automatically-transcribe-speech-to-text/#76d8d1c38729 (accessed 31 July 2019).
[195] Cole S 'Deep voice software can clone anyone's voice with just 3.7 seconds of audio' *Vice* 7 March 2018 available at https://www.vice.com/en_us/article/3k7mgn/baidu-deep-voice-software-can-clone-anyones-voice-with-just-37-seconds-of-audio (accessed 12 May 2019).
[196] Ghosh S & Gunning D *Natural Language Processing Fundamentals* (2019) ch 1.

technology is Grammarly, an AI-powered writing assistant that automatically detects grammar, spelling, punctuation, word choice, and style mistakes.[197] Grammarly's algorithms flag issues in the written text and suggest corrections based on context and various writing styles.[198]

2.4.2.3 Computer vision

Humans can generally see with their eyes and process what they see. However, 'Computer vision' is the AI research field that focuses on enabling AI to interpret and understand the visual world.[199] From a physics perspective, the visual world consists of image data such as images, videos (a series of image frames), and three-dimensional objects.[200] AI researchers have discovered that they can feed the visual data to AI in real-time via cameras for AI to process. Alternatively, AI can process the data after the fact by analysing the visual data uploaded into their computer vision system. Thus, to draw insight from this process, 'the goal of computer vision problems

[197] Marr B 'The amazing ways Google and Grammarly use artificial intelligence to improve your writing' *Forbes* 12 November 2018 available at https://www.forbes.com/sites/bernardmarr/2018/11/12/the-amazing-ways-google-and-grammarly-use-artificial-intelligence-to-improve-our-writing/#46c98ded3bb0 (accessed 3 September 2019).
[198] Hill S 'How Grammarly & Google are using artificial intelligence for flawless writing' *Big Data Made Simple* 13 December 2018 available at https://bigdata-madesimple.com/how-grammarly-google-are-using-artificial-intelligence-for-flawless-writing/ (accessed 3 September 2019).
[199] Dawson-Howe K *A Practical Introduction to Computer Vision with OpenCV* (2014) ch 1.
[200] Dawson-Howe K (2014) ch 2.

is to use the observed image data to infer something about the world'.[201] In other words, the goal is for AI to interpret visual data.

In practice, an example of computer vision technology is Facebook's facial recognition software. This software analyses the details of human faces in photographs uploaded to the social media platform. The analysis includes calculating the distance between their eyes, nose, and other facial features.[202] In *Patel v Facebook*,[203] a recent case dealing with whether Facebook users can sue Facebook for consent issues related to facial-recognition software, the USA Ninth Circuit Court of Appeals articulated that:

> 'Once a face template of an individual is created, Facebook can use it to identify that individual in any of the other hundreds of millions of photos uploaded to Facebook each day…'.[204]

2.4.3 Humanoid artificial intelligence

Notably, computer scientists have created AI that looks like humans by using robot technology. These AI-powered robots are known as humanoid robots.[205] To illustrate, Sophia is an AI humanoid robot that was recently granted citizenship in Saudi Arabia.[206] Fascinatingly, the inventors of Sophia contend that AI, like Sophia, needs

[201] Brownlee J 'A Gentle Introduction to Computer Vision' *Machine Learning Mastery* 5 July 2019 available at https://machinelearningmastery.com/what-is-computer-vision/ (accessed 5 September 2019).
[202] Ingber S 'Users can sue Facebook over facial recognition software, court rules' *NPR* 8 August 2019 available at https://www.npr.org/2019/08/08/749474600/users-can-sue-facebook-over-facial-recognition-software-court-rules (accessed 4 September 2019).
[203] *Patel v Facebook Inc* No. 18-15982 (9th Cir. 2019) at 17.
[204] *Patel v Facebook Inc* No. 18-15982 (9th Cir. 2019) at 17.
[205] Hunt V *Smart Robots: A Handbook of Intelligent Robotic Systems* (1985) 1-30.
[206] Stone Z 'Everything you need to know about Sophia, the world's first robot citizen' *Forbes* 7 November 2017 available at https://www.forbes.com/sites/zarastone/2017/11/07/everything-you-need-to-know-about-sophia-the-worlds-first-robot-citizen/ (accessed 2 January 2019).

to develop a social relationship with humans to assimilate human qualities such as compassion and ethics.[207] In the writer's view, the inventors' reasoning is particularly relevant when proposed AI board members like VITAL AI play roles on company boards. The reason is that they would need to assimilate corporate governance values such as ethical leadership. More on this point later.[208]

On another point, AI humanoid robots do not only assume corporate leadership roles. The demand for AI humanoid robots is high across starkly different industries. On the one hand, various nations are developing AI humanoids for their armies.[209] On the other hand, the adult industry has created AI humanoid sex robots for companionship.[210] Further, Elon Musk is creating humanoid AI robots that could perform dangerous work instead of humans.[211] Consequently, AI is penetrating every imaginable industry.

[207] Hanson DF 'Why Sofia was made' *YouTube* 4 February 2018 available at https://www.youtube.com/watch?v=h4-_2b9zPiA (accessed 9 May 2019).
[208] See ch 3 of the dissertation.
[209] Cole S 'U.S. army preps for future of AI on the battlefield' *Military Embedded Systems* 8 April 2019 available at http://mil-embedded.com/articles/u-s-army-preps-for-future-of-ai-on-the-battlefield/ (accessed 12 September 2019).
[210] Adams N 'Sextech: A first-timer's guide to the legal kinks' *African Tech Lawyer* 24 February 2021 available at https://africantechlawyer.com/2021/02/24/sextech-a-first-timers-guide-to-the-legal-kinks/ (accessed 24 February 2021).
[211] Kay G 'Elon Musk unveils "Tesla bot", a humanoid robot that would be made from Tesla's self-driving AI' *Business Insider* 20 August 2021 available at https://www.businessinsider.co.za/elon-musk-unveils-tesla-bot-humanoid-robot-based-off-autopilot-2021-8 (accessed 22 August 2021).

2.4.4 How artificial intelligence learns

As mentioned elsewhere, AI's development centres on mimicking human behaviour. Since humans have learning techniques to achieve intelligence, AI must also have its learning techniques. Consequently, this reasoning brings us the question of how AI learns.

It is generally accepted that Machine Learning (ML) is the primary learning technique of AI. However, how does ML work? Well, ML reportedly achieves intelligence for AI through algorithms trained with large data sets. Through ML, AI can learn from patterns in data, then make predictions based on what it has learnt.[212]

What is important to note is that ML forms part of the everyday lives of humans. The most basic example is Google Search. When a Google Search user searches for a given topic via the search engine, Google will return the most relevant results based on the user's search history. In this example, Google uses the user's search history as the data source to train the ML algorithms. The search history data may, for instance, reveal that the user is a coffee lover, so when the user searches for the word 'Java', websites about coffee will appear first. In contrast, if the user's search history reveals that the user is a computer programmer, then when searching for 'Java',

[212] Surden H 'Machine learning and law' (2014) 89 *Washington Law Review* 89-93.

websites about the computer coding language 'java code' will appear in the search results.[213]

However, ML is not the only AI learning technique. 'Deep Learning' (DL) is a subset of ML inspired by how the human brain learns. If the reader recalls, ANNs are the product of AI researchers and scientists trying to replicate the human brain. Consequently, there is a clear link between ANNs and DL.

As ANNs advance, they can learn more challenging problems. DL techniques specifically aim to replicate the learning development pathways of humans with a focus on the visual or symbolic perception instead of datasets.[214] In other words, DL refers to the technique that ANNs use to learn.

To make DL real, consider the example of an image classifier such as Facebook's facial recognition technology. In this example, Facebook integrates DL into their algorithms with users' images as the visual data source. The DL system then recognises patterns in the facial features of a particular user. Once the system has recognised the face, it can autodetect a user's picture on the social media platform from anywhere in the world.

[213] Google Cloud Platform 'What is Machine Learning? (AI Adventures)' *You Tube* 24 August 2017 available at https://www.youtube.com/watch?v=HcqpanDadyQ (accessed 17 May 2018).
[214] Karanasiou AP & Pinotsis DA 'A study into the layers of automated decision-making: Emergent normative and legal aspects of deep learning' (2017) 31(2) *International Review of Law, Computers and Technology* 174.

2.5 Has artificial intelligence entered the domain of company law?

The writer has shown that, over time, AI has developed from ancient folklore conceived in Africa, the East and the West into an intelligent and compelling technology disrupting industries across the globe. However, for the scope of the dissertation, what is most compelling is AI's ability to support or replace human decision-making.[215] This point will become clearer soon. However, for now, since decision-making forms the basis of conducting business, and AI is good at making decisions, it is not difficult to accept that AI can play an active role in business.

Turning now to the roles AI can play in the corporate environment, the writer has assessed the works of computer science, commercial, legal and mathematics scholars[216] and considered each of their merits related to AI as a corporate role player. After this exercise, the writer decided to adopt Hilb's description of the types of AI[217] subject to minor wording changes. The reason is that Hilb's work is the most comprehensive compared to the other scholars' works. Plus, Hilb insightfully considers AI as it exists today and how it would likely develop in the near and distant future.

[215] Paliukas V & Savanevičienė A 'Harmonization of rational and creative decisions in quality management using AI technologies' (2018) 32 *Economics and Business Journal* 197-201.
[216] Hilb M (2020) 851-70. Petrin M 'Corporate management in the age of AI' (2019) 3 *Columbia Business Law Review* 965-1030. Kumar D, Kaur R, & Kaur P 'Legal analysis of artificial intelligence in corporate board rooms' (2021) 12(7) *Turkish Journal of Computer and Mathematics Education* 1514-521. Ricci SAG (2020) 869-908. Armour J & Eidenmueller H 'Self-driving corporations?' (2020) 10(1) *Harvard Business Law Review* 87-116.
[217] Hilb M (2020) 851-70.

Below, the writer lists each type of AI, describes the relationship between directors and AI, states who the decision-maker is, and provides real-world examples of the AI.

(a) ***Assisting AI.*** Directors are the decision-makers. However, they rely on the support of assisting AI in reaching their decisions. An excellent example is Google Translate, an AI translation service that instantly translates text from one language to another language.[218] Practically, a Xhosa-speaking director may use similar technology to translate an executive brief from Xhosa to German for a German reader to understand the text.[219]

(b) ***Augmenting AI.*** Directors are still the decision-makers, but AI can augment the director's intelligence. For instance, consider Luminance AI, a platform for lawyers and corporate officials that uses ML to read and analyse documents better and faster than humans.[220] This technology empowers directors by

[218] Pitt R 'AI could make African languages more accessible with machine translation — but people need to make it happen' *Daily Maverick* 24 May 2021 available at https://www.dailymaverick.co.za/article/2021-05-24-ai-could-make-african-languages-more-accessible-with-machine-translation-but-people-need-to-make-it-happen/ (accessed 25 May 2021).
[219] Another great initiative is the one of the telecoms group, Telkom. They recently launched izwe.ai, an AI platform that enables users to translate spoken English into text in several African languages. Claasen L 'New AI platform translates Zulu, Xhosa, Sepedi and Swahili' *Business Insider* 8 September 2021 available at https://www.businessinsider.co.za/telkoms-new-ai-services-can-translate-zulu-xhosa-sepedi-swahili-english-afrikaans-and-portuguese-2021-9 (accessed 13 September 2021).
[220] Cambridge Network 'Leading legal AI technology, Luminance, exceeds 300 customers in over 50 countries' 27 January 2021 available at https://www.cambridgenetwork.co.uk/news/leading-legal-ai-technology-luminance-exceeds-300-customers-over-50-countries (accessed 12 May 2021).

giving more profound insights into due diligence, compliance reviews, e-Discovery,[221] and contract management processes.[222]

(c) ***Amplifying AI.*** Directors and AI are joint decision-makers. Therefore, AI would make expert recommendations subject to approval and change or enhancement by the directors. For example, consider Netflix's what-to-watch suggestions or recommendation system. Netflix uses AI to find shows that viewers might not have initially chosen to watch.[223] Moving to the corporate examples, the writer considers VITAL AI and Alicia T as amplifying AI because they make expert recommendations on business transactions subject to approval by directors.

(d) ***Autonomous AI.*** AI is an independent decision-maker within a specific context without the general need for director interference. To illustrate, consider autonomous vehicles. They are motor vehicles that drive themselves with little to no human input. They are also known as driverless cars, self-driving cars, and robo-cars. The technology allows a car's computer to collect data from its sensors. Its sensors then empower it to interact with other

[221] 'Electronic discovery (sometimes known as e-discovery, ediscovery, eDiscovery, or e-Discovery) is the electronic aspect of identifying, collecting and producing electronically stored information (ESI) in response to a request for production in a law suit or investigation. ESI includes, but is not limited to, emails, documents, presentations, databases, voicemail, audio and video files, social media, and web sites.': Complete Discovery Source 'The basics: What is e-Discovery?' available at *https://cdslegal.com/knowledge/the-basics-what-is-e-discovery/* (accessed 12 May 2021).
[222] Cambridge Network 'Leading legal AI technology, Luminance, exceeds 300 customers in over 50 countries' 27 January 2021 available at *https://www.cambridgenetwork.co.uk/news/leading-legal-ai-technology-luminance-exceeds-300-customers-over-50-countries* (accessed 12 May 2021).
[223] Plummer L 'This is how Netflix's top-secret recommendation system works' *Wired* 22 August 2017 available at *https://www.wired.co.uk/article/how-do-netflixs-algorithms-work-machine-learning-helps-to-predict-what-viewers-will-like* (accessed 29 January 2019).

vehicles and their environment and control its functions, for example, speeding up, braking, or reporting an accident.[224]

(e) ***Autopoietic AI.*** It is also known as 'Artificial General Intelligence'. This AI would make independent decisions across various contexts, and its intelligence would expand over time.[225] It could also autonomously create other AI.[226] It would only need human input in exceptional circumstances.[227] One can find examples of this AI kind in science fiction[228] and the imaginings of philosophical scholars.[229] However, some scholars believe autopoietic AI is coming sooner than most people realise.[230]

Based on the AI types illustrated above, AI is performing roles in the corporate environment. These roles are like the roles played by ordinary corporate players, for example, supporting directors in their decision-making. Further, when ordinary corporate players perform these roles, their conduct is subject to company law. Similarly, since AI is a corporate player, there can be no doubt that AI has entered the

[224] Adams N 'Regulating autonomous vehicles: South Africa's plan' *Michalsons* 25 May 2021 available at https://www.michalsons.com/blog/regulating-autonomous-vehicles-south-africas-plan/49571 (accessed 25 May 2021).
[225] Mudbari M 'Autopoietic intelligent system' *Vunela* 2 May 2017 available at https://magazine.vunela.com/autopoietic-intelligent-system-9b40f961475d (accessed 12 June 2020).
[226] Wiedermann J 'Autopoietic automata: Complexity issues in offspring-producing evolving processes' (2007) 23 *Theoretical Computer Science* 260-69.
[227] Hilb M (2020) 861.
[228] Vincent J 'An AI reading list — from practical primers to sci-fi short stories' *The Verge* 29 January 2019 available at https://www.theverge.com/2019/1/29/18200585/understand-ai-artificial-intelligence-reading-list-books-scifi (accessed 25 May 2021).
[229] Waser MR 'Bootstrapping a structured self-improving & safe autopoietic self' (2014) 14 *Procedia Computer Science* 134-39.
[230] Heaven WD 'AI is learning how to create itself' *MIT Technology Review* 27 May 2021 available at https://www.technologyreview.com/2021/05/27/1025453/artificial-intelligence-learning-create-itself-agi/ (accessed 2 June 2021).

domain of company law. Consequently, the writer concludes that company law must apply to AI.

2.6 The legal status of artificial intelligence: legal person, statutory agent, or property?

It has been revealed that AI engages in business decision-making. This fact triggers the writer's curiosity as to what legal status AI enjoys making decisions lawfully. In other words, do the decisions of AI have legal effects? Put differently, do these decisions amount to juristic acts? This subchapter investigates these questions by considering the legal status of AI under South African law. However, note that the investigation is neither comprehensive nor conclusive since the focus of the dissertation is limited. More specifically, the limited focus is to investigate AI's legal status to the extent that its status informs its role under South African company law.

In investigating AI's legal status, legal scholars have posited different approaches to navigating this inquiry. However, after considering several sources, the writer adopts Giuffrida *et al.'s* approach.[231] The reason is that their approach is concise, insightful, and relevant to the dissertation's scope. Specifically, in the writer's view, they correctly argue that the law can treat AI in three ways: as a legal person, statutory agent, or

[231] Giuffrida I, Lederer F, & Vermerys N (2018) 763-69.

property.[232] Consequently, the following text uses their approach as a framework for analysing the South African position on AI's legal status.

2.6.1 Artificial intelligence and legal personality

In October 2017, the Saudi Arabian government granted citizenship to Sophia, a humanoid AI robot.[233] This event justifiably horrified feminist critics. They reasoned that the country unconscionably grants limited rights to human women but is willing to grant citizenship to a female AI robot.[234] However, this event is significant from a legal standpoint because it is the first time a country has purported to grant legal personality to AI (citizenship is a means by which a country confers legal personality).[235] Further, shortly after Saudi Arabia announced Sophia's citizenship, Tokyo's Shibuya district granted residency to an AI system.

Moreover, while granting legal personality to AI is new, the concept of doing so is not new. As early as 1992, Lawrence B Solum proposed a form of a legal personality for

[232] Giuffrida I, Lederer F, & Vermerys N (2018) 763-69.
[233] Walsh A 'Saudi Arabia grants citizenship to robot Sophia' *Deutsche Welle* 28 November 2017 available at https://www.dw.com/en/saudi-arabia-grants-citizenship-to-robot-sophia/a-41150856 (accessed 10 December 2019).
[234] Wootson CR 'Saudi Arabia, which denies women equal rights, makes a robot a citizen' *The Washington Post* 29 October 2017 available at https://www.washingtonpost.com/news/innovations/wp/2017/10/29/saudi-arabia-which-denies-women-equal-rights-makes-a-robot-a-citizen/ (accessed 10 December 2019).
[235] Turner J *Robot Rules: Regulating Artificial Intelligence* (2019) 173.

AI.[236] Since then, several commentators have followed suit with their perspectives on the topic.

When entering conversations about legal personality, legal scholars consult the law of persons. In South Africa, this branch of law regulates legal status and decides who qualifies as a legal person. [237] The law of persons also speaks to the rights and responsibilities of legal persons, that is, their legal capacity.[238] The question crucial to the dissertation is whether South African law recognises AI as a legal person. It is crucial because the answer influences the legal consequences of AI's conduct in the corporate environment. More specifically, AI needs the legal capacity that flows from legal personality to attract rights and responsibility in corporate transactions. So, the writer consults this branch of law to determine whether South African law recognises AI as a legal person.

2.6.1.1 Is artificial intelligence a legal person under South African law?

The writer's research reveals that South African law does not currently recognise AI as a legal person. The writer bases this conclusion on the fact that neither the South African Constitution,[239] common law, nor statutory law expressly confers legal personality on AI. Further, while the writer concedes that South Africa is the first

[236] Solum LB 'Legal personhood for artificial intelligences' (1992) 70(4) *North Carolina Law Review* 1231-287.
[237] Kruger H & Skelton A (2018) ch 1.
[238] Kruger H & Skelton A (2018) ch 1.
[239] Constitution of the Republic of South Africa, 1996.

country to deem AI capable of being a patent inventor,[240] suggesting legal personality, this decision does not mean that AI is a legal person.

So, since South African law does not recognise AI as a legal person, it should not have the legal capacity to conclude valid juristic acts. The reasoning is that AI is not a legal person, so it cannot have the capacity to act. In turn, it cannot have the capacity to conclude corporate transactions.

2.6.1.2 Should the South African legislature make artificial intelligence a legal person?

The writer's view is that the South African legislature should not grant legal personality to AI in AI's current state. The main reason is that AI is not mature enough. If the reader recalls, the AI deployed in the corporate environment is either Assisting, Augmenting or Amplifying AI. However, none of these AI has reached the autonomy levels of human beings. So, legal personality is unwarranted.

Nevertheless, future AI that has reached the right level of maturity will likely need a different approach to legal personality. With future AI in mind, suppose the South African legislature decides to grant legal personality to AI. In that event, the writer contends it should be a unique artificial personality explicitly designed for AI's

[240] Adams N 'AI listed as inventor for first time ever | South Africa' *Michalsons* 28 July 2021 available at *https://www.michalsons.com/blog/ai-listed-as-inventor-for-first-time-ever-south-africa/51248* (accessed 28 July 2021).

idiosyncrasies. Conversely, what it should not be is a quasi-juristic personality. Consider the writer's reasoning below.

To the writer's knowledge, South African legal scholars have not yet formally contributed to the discourse on whether the South African legislature should grant legal personality to AI and the content of that legal personality. Nevertheless, the reason this question arises is the broad theme of accountability for business decisions.[241] Accountability is an important international issue because of the potential consequences of business decisions. The reader can see the issue's importance from the various laws that demand accountability. For instance, in South Africa, directors' statutory and common law duties and soft laws to ensure good corporate governance, such as the King IV Report on Corporate Governance,[242] emphasise accountability. Further, on the next logical point, Pagallo correctly argues that legal scholars need to know where accountability for AI's business decisions lies to ensure legal certainty.[243]

Some legal scholars suggest that making AI a legal person is the best solution to the accountability problem. The philosophical motive for this suggestion seems to be that an intelligent species, like AI, should have the capacity to enjoy rights and acquire

[241] Pagallo U 'From automation to autonomous systems: A legal phenomenology with problems of accountability' 2017 *Proceedings of the Twenty-Sixth International Joint Conference on Artificial Intelligence* 17-23.
[242] Institute of Directors South Africa (2016) 1-121.
[243] Pagallo U 'From automation to autonomous systems: A legal phenomenology with problems of accountability' 2017 *Proceedings of the Twenty-Sixth International Joint Conference on Artificial Intelligence* 17-23.

responsibilities.[244] Furthermore, these scholars suggest various approaches to a legal personality like the personality conferred on natural persons[245] (human beings) and juristic persons (e.g. companies, trusts, universities).[246] At the outset, the writer respectfully disagrees with the scholars but limits his response to refuting the suggestion of a quasi-juristic legal personality due to the dissertation's focus.

First, South African company law follows the long-established principle that a company enjoys legal personality separately from its directors and shareholders.[247] While the principle applies consistently across most jurisdictions, the *content* of juristic personality differs. In the following text, the writer contrasts these differences.

In South Africa, the courts have stated that South African companies enjoy the rights to privacy and reputation. In *Financial Mail (Pty) Ltd v Sage Holdings Ltd*, [248] the court held that other persons could infringe juristic persons' privacy and reputation rights even though juristic persons lack injured feelings.[249] Further, in *Janit v Motor Industry*

[244] Pagallo U 'Vital, Sophia, and co—The quest for the legal personhood of robots' (2018) 9(9) *Information Open Access Journal* 237.
[245] Chen J & Burgess P 'The boundaries of legal personhood: How spontaneous intelligence can problematise differences between humans, artificial intelligence, companies and animals' (2019) 27 *Artificial Intelligence and Law* 73-92.
[246] Karnow CEA 'Liability for distributed artificial intelligence' (1996) 11 *Berkeley Technology Law* 147-83. Lerouge J 'The use of electronic agents questioned under contractual law: Suggested solutions on a European and American level' (2000) 18 *John Marshall Journal of Computer Information Law* 403-34. Weitzenboeck EN 'Electronic agents and the formation of contracts' (2001) 9 *International Journal of Law and Information Technology* 204-34.
[247] *Salomon v Salomon and Co Ltd* 1897 AC 22 (HL).
[248] *Financial Mail (Pty) Ltd and Others v Sage Holdings Ltd and Another* (612/90) [1993] ZASCA 3 at 462-63.
[249] *Financial Mail (Pty) Ltd and Others v Sage Holdings Ltd and Another* (612/90) [1993] ZASCA 3 at 462-63.

Fund Administrators (Pty) Ltd,[250] the court held the following. Suppose a criminal were to steal the confidential communications of a juristic person's directors and employees. In that event, the theft would amount to an unlawful invasion of that juristic person's privacy.[251]

However, in *Investigating Directorate: Serious Economic Offences ao v Hyundai Motor Distributors (Pty) Ltd ao; In re Hyundai Motor Distributors (Pty) Ltd ao v Smit NO*,[252] the court explained that since juristic persons cannot have human dignity, their privacy rights will never be as extensive as those of natural persons. It added that a court would need to assess a limit of a juristic person's privacy on a case-by-case basis.[253] Yet, in addition, South Africa's data privacy law, POPIA, protects the privacy of both natural and juristic persons.[254]

Nevertheless, in contrast to South Africa, juristic persons in the EU and UK do not enjoy an explicit right to privacy. Plus, the EU and UK's data privacy laws do not protect juristic persons. Further, in the UK, juristic persons can be appointed to the board of

[250] *Janit v Motor Industry Fund Administrators* 1995 (4) SA 293 (AD) at 303.
[251] *Janit v Motor Industry Fund Administrators* 1995 (4) SA 293 (AD) at 303.
[252] *Investigating Directorate: Serious Economic Offences and Others v Hyundai Motor Distributors (Pty) Ltd and Others, in re: Hyundai Motor Distributors (Pty) Ltd and Others v Smit NO and Others* 2001 (1) SA 545 (CC) at 557.
[253] *Investigating Directorate: Serious Economic Offences and Others v Hyundai Motor Distributors (Pty) Ltd and Others, in re: Hyundai Motor Distributors (Pty) Ltd and Others v Smit NO and Others* 2001 (1) SA 545 (CC) at 557.
[254] POPIA applies to juristic persons because section 1 of the Act defines 'personal information' as any information about a living human being or an existing juristic person.

directors,[255] but not in South Africa.[256] Therefore, due to juristic personality's differing content across these jurisdictions, a quasi-juristic personality does not seem suitable for AI. Supporting this conclusion is the fact that most AI businesses supply their services internationally. Consequently, for commercial practicality, legal personality for AI should apply consistently across all jurisdictions.

Secondly, AI's nature is inconsistent with the nature of juristic persons. Juristic persons lack tangible physical form and the ability to think and act. Consequently, they need humans to execute their decisions and actions.[257] In contrast, AI can have a physical body, such as Sophia, the Saudi Arabian humanoid AI robot; or, be represented visually using holographic technology.[258] Further, unlike juristic persons, AI can make decisions and influence the actions taken by company leadership. For example, Alicia T (the Finnish AI bot serving on her company's leadership team) could recommend that her directors introduce their products to a new market. The directors would probably act on her advice because of her superior information processing ability when compared with their abilities. Thus, because the natures of AI and juristic persons are inconsistent, a quasi-juristic personality would be inappropriate for AI.

[255] Bainbridge SM 'Corporate directors in the United Kingdom' (2017) 59 *William & Mary Law Review Online* 65-84.
[256] S69(7)*(a)* of the Companies Act 71 of 2008.
[257] Hubbard FP 'Do androids dream?: Personhood and intelligent artifacts' (2011) 83 *Temple Law Review* 433-34.
[258] Satisfi Labs 'A new, artificially intelligent hologram was just born' *Futurism* available at https://futurism.com/a-new-artificially-intelligent-hologram-was-just-born (accessed 23 October 2021).

Thirdly, Bryson *et al.* contend that a quasi-juristic personality could create the problem where humans insulate themselves from liability and human rights violations by hiding behind the personality of AI.[259] In principle, the writer agrees with Bryson *et al.'s* contention. However, the writer concedes that the South African legislature could utilise a mechanism like 'piercing the corporate veil'[260] to ameliorate the insulation problem. This mechanism is a common-law remedy South African courts use to uncover the abuse of corporate personality by directors and shareholders of the company.

To introduce the concept of piercing the veil, in *Airport Cold Storage (Pty) Ltd v Ebrahim*,[261] the court confirmed when South African courts might disregard a company's separate legal personality and pierce the corporate veil. The court stated that:

> '[I]n the sphere of companies, the directors and members of a company ordinarily enjoy extensive protection against personal liability. However, such protection is not absolute, as the court has the power—in certain exceptional circumstances—to "pierce" or "lift" or "pull aside" "the corporate veil" and to hold the directors personally liable for the debts of the company'.[262]

The writer suggests that this mechanism could scrutinise the data fed to AI and its algorithms to determine whether someone fed the AI dirty data or manipulated its algorithms to decide in a particular way. However, as mentioned in the *Airport Cold*

[259] Bryson JJ, Diamantis ME, & Grant TD 'Of, for, and by the people: The legal lacuna of synthetic persons' (2017) 25(3) *Artificial Intelligence and Law* 287.
[260] For the South African position on piercing the corporate veil, see Delport PA (2021) 114.
[261] *Airport Cold Storage (Pty) Limited v Ebrahim and Others* 2008 (2) SA 303 (C).
[262] *Airport Cold Storage* at 19.

Storage case, the South African courts will only pierce the corporate veil in exceptional circumstances,[263] such as gross abuse.[264] Thus, the risk is that this threshold may extend to AI with terrible results. For example, one result is that courts would only examine AI in exceptional circumstances, thus taking a reactive approach to AI's harm. Nevertheless, a piercing-the-veil mechanism for AI would be another workaround to an already problematic approach to accountability for AI's business decisions. On a related point, the reader needs to consider the issue's converse, where AI—instead of humans—should be liable because AI's conduct is too far removed from humans (causation).[265]

Finally, other than a quasi-juristic personality, legal measures exist that could address accountability for AI's business decisions. One possibility is for the South African government to create a compulsory insurance scheme[266] to which AI companies must subscribe. However, the writer agrees with Ricci's contention that the role of insurance is to repair damage caused by AI, so it does not directly address or enhance accountability in a proactive way.[267] In other words, the South African legislature would need to combine compulsory insurance with other proactive measures to ensure accountability.

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[263] *Airport Cold Storage* at 19.
[264] Giles G 'Lifting corporate veil: Absence of gross abuse' *Giles Files* 31 May 2021 available at https://www.gilesfiles.co.za/lifting-corporate-veil/ (accessed 31 May 2021). *Wilson v Prinsloo; In re: Prinsloo v Expidor 163 CC t/a The League of Gentleman and Another* [2021] ZALAC 10.
[265] Pagallo U (2018) 236.
[266] Andrade F, Novais P, & Machado J et al 'Contracting agents: Legal personality and representation' (2007) 15 *Artificial Intelligence Law* 367.
[267] Ricci SAG (2019) 41.

Thus, to end the discussion on AI and legal personality, the writer concludes that a quasi-juristic personality would be inappropriate for AI.

2.6.2 Artificial intelligence and statutory agency

The writer has proven that AI is not a legal person under South African law. Nevertheless, that conclusion does not end the investigation into AI's legal status. In reality, two statutory laws (ECTA and POPIA) speak to AI's ability to be a statutory agent. The writer uses the term 'statutory agent' because AI would be sourcing its agency powers from legislation instead of the usual source of the common law. Specifically, these Acts are significant to AI's legal status because they potentially provide a legal mechanism—statutory agency—to deem AI's conduct as valid juristic acts.

2.6.2.1 Electronic Communications and Transactions Act 25 of 2002

ECTA is South Africa's electronic communications and transactions law.[268] Its main aim is 'to enable and facilitate electronic communications and transactions in the public interest'.[269]

[268] Ncube CB 'Electronic transactions' in Kühne M, Faris J, & Harms LTC (eds) *The Law of South Africa* vol 16 3 ed (2017) para 491.
[269] S2(1) of the Electronic Communications and Transactions Act 25 of 2002.

Section 1 of ECTA defines an 'electronic agent' as:

> 'a computer program or an electronic or other automated means used independently to initiate an action or respond to data messages or performances in whole or in part, in an automated transaction'.[270]

However, ECTA does not define a 'computer programme' or 'other automated means'. To close this gap, Ramokanate suggests that the Copyright Act 98 of 1979 can guide legal scholars by ascribing meaning to the term, 'computer programme'.[271] Following his reasoning, s 1(1) of the Copyright Act defines a 'computer programme' as 'a set of instructions fixed or stored in any manner which, when used directly or indirectly in a computer, directs its operations to bring about a result'.[272] Thus, the writer submits that because AI is a computer programme, it can fall within the definition of a 'computer programme' under the Copyright Act.

Further, suppose the reader recalls that the very function of AI is intelligent automation.[273] In that case, it is easy to see how AI could fall within the term 'other automated means' in ECTA's definition of an 'electronic agent'. So, separately and together, these terms suggest that AI is an electronic agent. Plus, the South African Government's National e-Strategy, which ECTA mandates,[274] references AI multiple

[270] S1 of the Electronic Communications and Transactions Act 25 of 2002.
[271] Ramokanate LL *Modifying Contract Law Principles to Accommodate Automated Transactions in South Africa* (unpublished LLD thesis, North-West University, 2018) 45.
[272] S1(1) of the Copyright Act 98 of 1979.
[273] See 2.4 of the dissertation.
[274] S5 of the Electronic Communications and Transactions Act 25 of 2002. The 'National Integrated ICT Policy White Paper' (published in *GG* 40325 of 28 September 2016) ch 10.

times and thus supports that preliminary conclusion.[275] Consequently, it is safe to conclude that ECTA applies to AI.

Additionally, s 20*(a)-(b)* of ECTA provides:

> '20**. Automated transactions**
> In an automated transaction—
> *(a)* an agreement may be formed where an electronic agent performs an action required by law for agreement formation;
> *(b)* an agreement may be formed where all parties to a transaction or either one of them uses an electronic agent…'.[276]

If the reader concludes that ECTA applies to AI, it colours how the writer can interpret ECTA. For example, consider that section 20*(a)-(b)* deals with the validity of an electronic agent's transactions, including AI. On reading this section, the writer interprets ECTA to grant statutory agency to AI to conclude contracts. However, for the contracts to be valid and enforceable, AI needs to function as a contracting party, even if it is only as an agent of a company. On this interpretation, AI can thus enter into and conclude contracts on behalf of a company. Further, focusing on company law, the writer's interpretation will legitimise the validity of corporate transactions concluded by AI. The significance is that AI will have the ability to be a lawful corporate role player.

[275] Department of Communications and Digital Technologies *National e-Government Strategy and Roadmap* (2017) 9, 15, 19, 23.
[276] S20(a)-(b) of the Electronic Communications and Transactions Act 25 of 2002.

The writer further interprets s 20*(a)–(b)* of ECTA to give AI's decisions legal effect. The writer founds his reasoning on the contract theory of the firm.[277] Under the theory, a company is a series of contracts. Since ECTA empowers AI to enter into contracts, its decisions that inform the conclusion of contracts need to be lawful. For example, AI needs to make decisions during contractual negotiations, such as accepting changes to contractual clauses. Hence, ECTA must be interpreted to give AI the power to make lawful corporate decisions.

However, there are two primary limits to AI's decision making and contracting abilities. First, AI can only function as an agent of the company (principal). So, AI can only enter corporate transactions in a representative capacity. Secondly, ECTA limits the contractual capacity of AI in that it must be capable of being scrutinised by a natural person.[278] In other words, a human must be able to review the contracts entered into by AI.

2.6.2.2 Protection of Personal Information Act 4 of 2013

POPIA is South Africa's information privacy law. Section 71 of POPIA deals with the legal position on automated decision-making concerning the processing of personal information.[279] Essentially, s 71 limits AI's ability to make decisions where those

[277] Kállay B 'Contract theory of the firm' (2012) 5(1) *Economics & Sociology* 39-50.
[278] S20*(d)* of the Electronic Communications and Transactions Act 25 of 2002.
[279] S1 of the Protection of Personal Information Act 4 of 2013 defines 'personal information' as 'means information relating to an identifiable, living, natural person, and where it is applicable, an identifiable, existing juristic person…'.

decisions use the personal information of a data subject.[280] This section applies where the decision results in legal consequences for data subjects and profiles data subjects.[281]

The crucial point is that POPIA prevents AI from making these decisions unless companies implement special measures to protect data subjects.[282] For example, AI cannot make decisions based on personal information about a company's employees, customers, suppliers, and other data subjects, without having these special measures in place.[283] Further, AI may not decide based on special personal information[284] without the data subject's consent or unless it is in the public interest.[285] Consequently, POPIA significantly limits the decision-making ability of AI in corporate transactions.

2.6.2.3 The limits on artificial intelligence's legal capacity as a statutory agent

The writer has shown that ECTA gives AI the ability to enter into contracts and make decisions lawfully. However, ECTA limits the scope of AI's legal capacity in two ways. One, it can only be an agent and, two, a human must review the contracts into which AI enters. Moreover, POPIA goes further and reduces the scope of AI's decision-

[280] S1 of the Protection of Personal Information Act 4 of 2013 defines a 'data subject' as 'the person to whom personal information relates'.
[281] S71(1) of the Protection of Personal Information Act 4 of 2013.
[282] S71(1)-(3) of the Protection of Personal Information Act 4 of 2013.
[283] De Stadler E & Esselaar P *A Guide to the Protection of Personal Information Act* (2015) 50-1.
[284] S26 of the Protection of Personal Information Act 4 of 2013 defines 'special personal information' as 'the religious or philosophical beliefs, race or ethnic origin, trade union membership, political persuasion, health or sex life or biometric information of a data subject; or the criminal behaviour of a data subject…'.
[285] Giles J 'Using special personal data to make automated decisions' *Michalsons* 10 September 2018 available at https://www.michalsons.com/blog/using-special-personal-data-to-make-automated-decisions/34447 (accessed 27 February 2020).

making capacity when it makes decisions using personal information or special personal information. In conclusion, the consequence is that AI has severely limited capacity to conclude corporate transactions.

2.6.3 Artificial intelligence and property

Currently, South African law does not see AI as a legal person. However, the writer has offered a compelling argument for it to be a statutory agent. Nevertheless, there is one last inquiry in our investigation into AI's legal status: can the law regard AI as property? Well, the writer contends that AI can be property. For example, consider the events where one company buys AI from another company or commissions someone to develop AI using software and robotic parts. In these events, the law will treat AI as property because it is the subject of a corporate transaction. However, the writer submits that the law will probably see AI as a statutory agent in some transactions and property in others. For example, AI is probably a statutory agent for concluding corporate transactions on a company's behalf; however, it can also be the merchandise (property) itself—the subject of the transaction.

2.6.4 Conclusion

The investigation into AI's legal status is telling. The law is clear that AI is not a legal person. However, the writer has interpreted ECTA and POPIA to imply that AI is a statutory agent subject to certain legislative limitations on its contracting and decision-making powers. Further, AI may sometimes be a statutory agent and, other times, property depending on the corporate transaction. Nevertheless, the writer must

acknowledge that it was uncomfortable interpreting ECTA and POPIA: it appears that the South African legislature did not draft the laws with AI's idiosyncrasies in mind. So, the writer recommends that the topic of AI's legal status undergoes further research and legislative review. Further, the South African legislature needs to decide its approach to AI's legal status for legal certainty.

CHAPTER 3 ARTIFICIAL INTELLIGENCE IN SMART COMPANIES THROUGH THE LENS OF SOUTH AFRICAN COMPANY LAW

3.1 Introduction

In Chapter 2, the writer concluded that AI had entered the domain of company law. He also concluded that it can lawfully engage in corporate transactions subject to legal limits. Yet, until now, the dissertation has focused on how South African law sees AI; that is, AI's legal status. However, Chapter 3 shifts the focus to how South African company law regulates the use of AI in corporate transactions by company directors.

The chapter unfolds as follows. First, it discusses whether company directors have the authority and powers to rely on or delegate to AI. The reason for starting with directors' authority and powers is that directors have increasingly been using AI to support their decisions. Plus, AI's supporting role will probably remain the same for many years to come owing to the natural evolution of company boards.[286] Next, the chapter considers whether South African company law imposes a duty on directors to rely on or delegate to AI. Afterwards, it briefly illustrates the risks of AI for company stakeholders. Finally, the chapter debates and concludes on whether AI can be a company director under South African company law. Part of the debate expands on how AI directors would challenge the way South African company boards are traditionally composed.

[286] Goodwin A, Lee PW, & Langford RT *Technology and Corporate Law: How Innovation Shapes Corporate Activity* (2021) 3-4.

3.2 Company directors relying on and delegating to artificial intelligence: authority, powers, and duties

Early in Chapter 2, the writer explained that companies are operating in the 4IR.[287] Within the 4IR context, commercial scholars argue that companies need to make intelligent decisions faster than ever before to remain competitive.[288] In the writer's view, South Africa's PC4IR Report supports the scholars' arguments:

> 'We recognise this moment as containing…the potential to use technology to address the most challenging development problems faced by South Africa and the rest of the continent. By supporting SMMEs to develop technology that will optimise the delivery of services in sectors such as health, education and transport, we can simultaneously enhance the wellbeing of our citizens and become globally competitive'.[289]

The writer's research reveals that AI appears to be the technology of choice for companies. If the reader recalls, he listed how AI can support companies (Assisting AI to Autopoietic AI).[290] On a further point, companies that use AI to make intelligent decisions are known as 'smart companies'.[291] Uber is one of the world's smart companies. AI provides Uber with insights on its business and the markets in which it

[287] See 2.2 of the dissertation.
[288] Liebowitz J *Strategic Intelligence: Business Intelligence, Competitive Intelligence, and Knowledge Management* (2006) 12-22.
[289] Adams N 'Report of the Presidential Commission on the 4th Industrial Revolution (PC4IR)' *Michalsons* 27 October 2020 available at https://www.michalsons.com/blog/report-of-the-presidential-commission-on-the-4th-industrial-revolution-pc4ir/45956 (accessed 27 October 2020).
[290] See 2.5 of the dissertation.
[291] Fisher T *The Data Asset: How Smart Companies Govern Their Data for Business Success* (2009) 3-18.

operates.[292] As a result, Uber leads its industry when compared with traditional car-service companies and other platform competitors.[293]

For the dissertation, the essential point is that Uber's directors use AI to make crucial decisions about the business' present and future. Yet Uber is not alone: other smart companies rely on AI, for example, Netflix, Amazon, Facebook, Snapchat, Twitter, and SalesForce.[294] SalesForce is an intriguing example because its Chief Executive Officer (CEO) relies on his AI assistant, Einstein, to help him make better decisions for the company.[295]

While it is not difficult to notice a trend in smart-company directors using AI; legally speaking, however, the question is whether the directors have the authority, powers, and possibly a duty to do so. Thus, in the text that follows, the writer considers this question from a South African company law perspective.

3.2.1 A primer on reliance and delegation

Every day, company directors make decisions. However, the quality of their decisions depends on the information or support available to the board. So, it makes sense that

[292] Ghahramani Z 'Uber AI in 2019: Advancing mobility with artificial intelligence' *Uber* 18 December 2019 available at https://eng.uber.com/uber-ai-blog-2019/ (accessed 12 May 2021).
[293] Papadopoulos S & Van Eck S 'Disruptive technologies and taxi rides in South Africa: What is the "*Uber*" uproar about?' in Ayata Z & Önay I (eds) *Global Perspectives on Legal Challenges Posed by Ridesharing Companies* (2021) 199-229.
[294] Krauth O 'The 10 tech companies that have invested the most money in AI' *Tech Republic* 12 January 2018 available at https://www.techrepublic.com/article/the-10-tech-companies-that-have-invested-the-most-money-in-ai/ (accessed 12 May 2021).
[295] Armour J & Eidenmueller H (2020) 98.

directors need to be able to rely on or delegate to others to manage companies effectively.[296] The reader can see this point in action from the fact that directors often rely on the advice of external auditors or legal counsel. Further, directors commonly delegate their functions to their company's management team.

But what exactly does 'reliance' and 'delegation mean? Mupangavanhu[297] appears to the leading South African company law scholar that ascribes meaning to these terms. According to him, on the one hand, *to rely* means directors act on the advice, information, and guidance of a person positioned to support the directors so that they can make business decisions.[298] On the other hand, *to delegate* means directors transfer their powers to another competent person for that person to act for the benefit of the directors.[299] Consequently, the writer adopts these definitions for the text that follows.

Now that the meaning of reliance and delegation is clear, the following parts of the dissertation consider the dissertation's remaining sub-inquiries.[300] To answer these sub-inquiries, the writer first set outs the applicable laws, then interprets the laws through South African court decisions and legal literature. Once the interpretation exercise ends, the writer applies the laws to the facts about how company directors

[296] Cassim FHI (2012) 561.
[297] Mupangavanhu BM (2016) 135.
[298] Mupangavanhu BM (2016) 135.
[299] Mupangavanhu BM (2016) 135.
[300] See 1.3 of the dissertation.

use AI and then supplies insights on other potential AI-related issues. By the end of this chapter, the reader should have concrete answers to the sub-inquiries.

3.2.2 The authority of directors to rely on and delegate to company officials

3.2.2.1 Common law

Historically, South Africa's common law agency rules[301] founded the agency relationship between companies and their directors.[302] However, unlike natural persons with full legal capacity, companies are juristic persons who cannot act for themselves. Naturally, this legal fact created problems for the agency rules.[303] So, to resolve these problems, South African courts created special agency rules for companies.[304] Yet what is important to note is with the enactment of the Companies Act, 2008, the special agency rules are subject to the provisions the Act.[305] Thus, the agency rules must be read with the Act.

Shifting the focus to company directors, under the common law, the authority of directors to represent companies can be based on actual authority, the Turquand

[301] Glover G 'Agency in South Africa: Mapping its defining characteristics' 2021 *Acta Juridica* 243-73.
[302] Cilliers HS, Benade ML, & Henning JJ *et al Corporate Law* (2007) 179. Mujulizi J 'The continued relevance of the Turquand Rule under the current company law regime in South Africa' (2021) 1 *JCCLP* 54-65.
[303] Cilliers HS *et al* (2007) 179.
[304] For example, South African courts developed the doctrine of constructive notice and *Turquand* rule to deal with the nature of companies: Olivier E 'Section 19(5)*(a)* of the Companies Act 71 of 2008; Enter a positive doctrine of constructive notice?' (2017) 28(3) *Stellenbosch Law Review* 614-23.
[305] Delport PA (ed) *Nuwe Ondernemingsreg* (2011) 101.

rule,[306] or estoppel.[307] However, the dissertation does not engage with the Turquand rule or estoppel because they expand the sub-inquiries beyond the dissertation's limits; so instead, the writer will focus on actual authority.

In a corporate transaction, a director should have actual authority to attracts rights and obligations for the company. Whether a director has actual authority is a question of fact determine on a case-by-case basis.[308] On a related point, actual authority can be express or implied. To determine if a director has express authority, an interested party can look at the company's MOI or a board or shareholder's resolution.[309] However, concerning implied authority, the investigation is more challenging. So, the writer turns to the South African common law for guidance.

In the case of *Tuckers Land and Development Corporation (Pty) Ltd v Perpellief*,[310] the court described implied authority as follows:

> 'The rule applicable is set out in The Law of agency in South Africa by De Villiers and Macintosch, 2nd ed p 56: "Where an agent is employed to act in the course of his trade, business or profession as agent, he has implied authority to bind his principal in regard to matters which are necessary to enable him to perform the ordinary duties incidental to his position as agent, or which form part of the ordinary course of business transacted by that agent"'.[311]

[306] Olivier E 'The Turquand rule in South African company law: A(nother) suggested solution' (2019) 5(2) *JCCLP* 1-28.
[307] *University of Johannesburg v Auckland Park Theological Seminary* [2021] ZACC 13 at 117.
[308] Benade ML, Henning JJ, & Du Plessis JJ *et al Entrepreneurial Law: Incorporating the New Companies Act Manual - Special Edition* (2009) 146.
[309] *Tuckers Land and Development Corporation (Pty) Ltd v Perpellief* 1978 2 SA 11 (T) at 14-15.
[310] *Tuckers Land* at 14-15.
[311] *Tuckers Land* at 14-15.

The court added that implied authority can also be 'inferred from the acquiescence of the directors in a course of dealing inside the company itself'.[312]

As a practical point, the writer suggests that a party investigating actual authority (express or implied) considers the provisions of any contracts between the parties. For example, suppose a director contracts with a vendor and the contract precludes representations or warranties of authority. In that event, the vendor cannot rely on implied authority because the contract excludes it.

3.2.2.2 Statutory law: Companies Act 71 of 2008

Section 66(1) of Companies Act, 2008 deals with the authority of directors. The section states that the directors of a company have the authority to exercise all the powers and functions of the company.[313] Their authority is subject only to legislative restrictions and the company's MOI.[314]

Practically speaking, directors have generous authority derived from the Act to manage the affairs of the company unless a law or the company's MOI limits the scope of this authority.[315] However, one director cannot act for the company unless the board

[312] *Tuckers Land* 14-15.
[313] S66(1) of Companies Act 71 of 2008. Companies and Intellectual Property Commission Guideline 2 of 2020.
[314] S66(1) of Companies Act 71 of 2008. Visser C & Pretorius JT *Essays in Honour of Frans Malan: Former Judge of the Supreme Court of Appeal* 6 ed (2014) 81-92. It is not clear whether the MOI can exclude all management functions of directors: Delport PA (2021) 208-11. Note, however, that some of the powers of the board are subject to approval (or ratification) by the shareholders: ss 41, 44, 45, 112, and 126 of the Companies Act 71 of 2008.
[315] *Kaimowitz v Delahunt and Others* 2017 (3) SA 201 (WCC) at 12. *Navigator Property Investments (Pty) Ltd v Silver Lakes Crossing Shopping Centre (Pty) Ltd and Others* [2014] JOL 32101 (WCC) at

gives that director the authority to do so.[316] If a director were to act without any authority or outside the scope of the authority, the act will only bind the company if the company ratifies the transaction or if someone binds the company by estoppel (subject to the contracts between the parties).[317] However, s 218 of the Act says that a director's conduct will not be void until a court decides that it is.[318]

Specifically, company directors *must* manage the affairs of companies.[319] However, it is not feasible for directors to do so by being involved in the granular daily operations of the company.[320] If they were to focus exclusively on the daily operations of the company, the company would have no-one to direct it.[321] So, instead, they exercise overall control and supervise the company's affairs.[322] Hence, based on the company's demands, directors often rely on or delegate their functions to other company officials, such as managers and advisors.[323]

31. However, the ultimate power in state-owned companies is not with the board: see *Organisation Undoing Tax Abuse and Another v Myeni and Others* [2020] 3 All SA 578 (GP) at 38.
[316] Companies and Intellectual Property Commission Guideline 2 of 2020.
[317] Delport PA (2021) 208-11.
[318] S218 of the Companies Act 71 of 2008. S120 of the Companies Amendment Act 3 of 2011.
[319] Delport PA (2021) 208-11. This section places a positive obligation on directors to manage the company affairs in line with their duties in s 76 of the Companies Act 71 of 2008. This obligation differs from the Companies Act 61 of 1973, where the directors are merely functionaries of the company.
[320] Möslein F (2018) 658.
[321] Möslein F (2018) 658.
[322] Delport PA (2021) 299.
[323] Directors may delegate their authority and powers but not their responsibilities and duties: Delport PA (2021) 299.

3.2.3 The powers of directors to rely on or delegate to company officials

As a starting point, the directors' powers of reliance and delegation begin when the director is appointed or elected to the board.[324] Notably, the powers relate to the board as a unit.[325] Thus, the powers tie to the office of directorship.

3.2.3.1 Common law

Few South African cases deal with the directors' powers of reliance and delegation.[326] Fortunately, however, South African common law incorporates English common law principles for guidance on reliance and delegation.[327] Hence, South Africa legal scholars consult English precedent for company law guidance where the South African common law is quiet. Consequently, the writer follows the scholars' approach and consults English precedent.

The English courts have confirmed the powers of directors to rely on fellow directors to direct the company's affairs. In the 1901 case of *Dovey and The Metropolitan Bank (of England and Wales) Limited v Cory*,[328] the court ruled that a company director has the powers to rely on the information, advice, and judgement of a fellow director.

[324] Delport PA (2021) 208-11.
[325] Delport PA (2021) 208-11.
[326] *Fisheries Development Corporation of SA Ltd v Jorgensen and Another; Fisheries Development Corporation of SA Ltd v AWJ Investments (Pty) Ltd and Others* 1980 (4) SA 156 (W) at 534. Naudé SJ *Die Regsposisie van Die Maatskappydirekteur met Besondere Verwysing na Die Interne Maatskappyverband* (1970) 157-66.
[327] Cilliers HS, Benade ML, & De Villiers SWL *Company Law* 3 ed (1973) 257-59.
[328] *Dovey and The Metropolitan Bank (of England and Wales) Limited v Cory* 1901 AC 477.

However, the relying director must not have a suspicion about the fellow director's competence, integrity, and skill.[329]

Conversely, with delegation in mind, the court articulated that:

> '[B]usiness life could not go on if [directors] could not trust those [fellow directors] who are put into a position of trust for the express purpose of attending to the details of management'.[330]

Plus, the court added that the delegating director must not have any grounds of suspicion about person to whom the director delegates.[331]

A South African court incorporated the English precedent of reliance and delegation into South African common law in the *Fisheries Development*[332] case. The court also enhanced the precedent. In essence, the court accepted the requirements laid out in the *Dovey* case. However, it also added the requirement that the reliance must be reasonable.[333] Further, it broadened the scope of people that a director can rely on from only a fellow director to a fellow director and other company officials.[334]

The practical effect of the *Fisheries Development* case is that a director can rely on or delegate to any company officials but cannot accept their information and advice

[329] *Dovey* at 486.
[330] *Dovey* at 486.
[331] *Dovey* at 486.
[332] *Fisheries Development Corporation of SA Ltd v Jorgensen and Another; Fisheries Development Corporation of SA Ltd v AWJ Investments (Pty) Ltd and Others* 1980 (4) SA 156 (W).
[333] The judge relied on the English case of *Re City Equitable Fire Insurance Co Ltd* [1925] Ch 407 (CA) to add the requirement of reasonableness to South African law.
[334] *Fisheries Development* at 534.

blindly.[335] Put differently, the court in *S v Shaban*[336] stated that a director may not be a mere dummy or puppet. The director must use independent judgement and protect the interests of the company.[337] Plus, the court in *Cooper and Another NNO v Myburgh and Others*[338] stated that the director may not hide behind ignorance or not understanding the company's affairs. Thus, in sum, the writer captures the gist of these cases as follows: directors can rely on the advice of company officials but must still exercise reasoned and engaged judgement.

3.2.3.2 Statutory law: Companies Act 71 of 2008

South African company law has partially codified and enhanced the common law on reliance and delegation in the Companies Act, 2008.[339] Section 76(4)*(b)*(ii) of the Act deals with the statutory scope of *reliance*:

> '76**. Standards of directors conduct.**–
> (1) […]
> (2) […]
> (3) […]
> (4) In respect of any particular matter arising in the exercise of the powers or the performance of the functions of director, a particular director of a company–
> *(a)* is entitled to rely on–
> (i) […]
> (ii) any information, opinions, recommendations, reports or statements, including financial statements and other financial data,

[335] *Fisheries Development* at 534.
[336] *S v Shaban* 1965 (4) SA 646 (W) at 651-52. *Fisheries Development* at 163.
[337] *Novick v Comair Holdings Ltd* 1979 (2) SA 116 (W) at 130. *Howard v Herrigel NO* 1991 (2) SA 660 (A) at 674.
[338] *Cooper and Another NNO v Myburgh and* Others [2021] 2 All SA 114 (WCC) at 15.
[339] However, the common still has a significant role to play in South African company law, especially where the Act is silent: *Mthimunye-Bakoro v Petroleum Oil and Gas Corporation of South Africa (SOC) Limited and Another* 2015 (6) SA 338 (WCC).

> prepared or presented by any of the persons specified in subsection (5)'.[340]

Importantly, the standards of conduct in s 76 applies to directors, alternate directors, prescribed officers, and persons who are board or audit committee members, irrespective of whether these persons are also board members.[341] Moreover, s 76(5) lists four categories of company officials on whom the director can rely. Those persons are trustworthy and competent company employees, professional persons, fellow directors, and board committees.[342]

Following the ordinary rules of statutory interpretation,[343] the writer submits that should directors rely on the categories of persons in s 76(4)*(b)*(ii) read with s 76(5), directors would be presumed to have reliance powers. From an evidentiary perspective, this submission means s 76(4)*(b)*(ii) creates a rebuttable presumption in favour of the director; any person alleging no power would need to prove otherwise. However, if a director were to rely on someone outside of the scope of ss 76(4)*(b)*(ii) and 76(5), then the director would need to prove that the reliance was reasonable. Empirically and logically, the writer deduces that reasonable reliance is a factual enquiry guided by the common law.

[340] S76(4)*(b)*(ii) of the Companies Act 71 of 2008.
[341] Delport PA (2021) 295-98. R38 of the Companies Regulations in GN 351 *GG* 34239 of 26 April 2011.
[342] S76(5) of the Companies Act 71 of 2008.
[343] Botha C *Statutory Interpretation: An Introduction for Students* 5 ed (2012) 111-56.

Dovetailing to delegation, s 76(4)*(b)*(i) deals with the statutory scope for *delegation*:

> '76**. Standards of directors conduct.**–
> (1) […]
> (2) […]
> (3) […]
> (4) In respect of any particular matter arising in the exercise of the powers or the performance of the functions of director, a particular director of a company–
> *(a)* […]
> *(b)* is entitled to rely on–
> (i) the performance by any of the persons–
> (aa) referred to in subsection (5); or
> (bb) to whom the board may reasonably have delegated, formally or informally by course of conduct, the authority or duty to perform one or more of the board's functions that are delegable under applicable law'.[344]

The writer interprets s 76(4)*(b)*(i) to empower a director to delegate to the persons listed in s 76(5)—or any other person at the board's discretion—subject to legislative restrictions and the company's MOI.[345] Following the rebuttable presumption logic the writer set out under reliance, in the instance where a director delegates to the persons in s 76(4)*(b)*(i) read with s 76(5), the delegation would be presumed to be valid. However, suppose a director delegates outside of the scope of s 76(4)*(b)*(i). In that event, the director would need to prove that the delegation was reasonable. Like under reliance, reasonable delegation is a factual enquiry guided by the common law.

[344] S76(4)*(b)*(i) of the Companies Act 71 of 2008.
[345] Although the legislature uses the word 'rely', a purposive interpretation of the Act leads the writer to believe that it meant delegate. Botha C *Statutory Interpretation: An Introduction for Students* 5 ed (2012) 111-56.

3.2.3.3 The King IV Code and Information Technology Governance

The King IV Code[346] is a voluntary code or soft law[347] that, among other topics, deals with Information and Technology Governance (IT Governance). IT Governance is a subset of corporate governance focused on information technology and its performance, security, and risk management.[348] This approach corresponds with the trend of technologies permeating companies' operations.[349] According to principle 12 of the code, the purpose of IT Governance is to support the company to set and achieve its IT objectives.[350] Moreover, the main outcome of a company's IT Governance efforts should be adequate and effective control over IT matters.[351]

The King IV Report also refers to the advances in technology and digitisation as well as the 4IR's significant impact on all companies.[352] Similarly, the King IV Code (practices under principle 12) recommends that the board of directors should delegate to management the responsibility to manage IT Governance effectively.[353] Consequently, the writer contends that it is reasonable to suggest that reliance and

[346] Institute of Directors South Africa (2016) 42-73.
[347] The code is generally voluntary however Johannesburg Stock Exchange listed companies must follow it: Esser IM & Delport PA 'The South African King IV Report on Corporate Governance: Is the crown shiny enough?' (2018) 39(11) *Company Lawyer* 378-84.
[348] Ebert C, Vizcaino A, & Manjavacas A 'IT Governance' (2020) 37(6) *IEEE Software* 13-20.
[349] Giles J 'King IV Code and IT Governance' *Michalsons* 1 November 2016 available at *https://www.michalsons.com/blog/king-iv-code-and-it-governance/18691* (accessed 12 May 2021).
[350] Staff Writer 'With great power comes great responsibility' *Quote Investigator* 23 July 2015 available at *https://quoteinvestigator.com/2015/07/23/great-power/* (accessed 12 May 2021).
[351] Crooke G 'Report: The implications of IT Governance outlined in King IV™' *BDO South Africa* 11 November 2016 available at *https://www.bdo.co.za/en-za/insights/2016/report/the-implications-of-it-governance-outlined-in-king-iv* (accessed 12 May 2021).
[352] Institute of Directors South Africa (2016) 3, 30.
[353] Padayachee V 'King IV is here: Corporate governance in SA revisited' (2017) 66 *SAJSEP* 17-21.

delegation to AI should be guided by the principles articulated in the King IV Report and Code to promote sound business decisions by directors.

3.2.4 Extending and applying reliance and delegation laws to directors that rely on or delegate to artificial intelligence

Earlier, the writer reported that smart-company directors are factually relying on and delegating to AI. The report included examples of AI, such as Einstein, VITAL AI, and Alicia T, supporting the board. However, legally speaking, the factual use of AI in smart companies raised the question of whether South African company law allows directors to rely on and delegate to AI. Thus, the writer investigated this question by considering the applicable law.

In 3.2.2 and 3.2.3, the writer set out and interpreted the laws applicable to reliance and delegation. In retrospect, the reader should realise that South African company law is technology neutral, meaning it does not reference specific technologies like AI. Technology neutrality aims to future-proof laws so that they are flexible enough to apply to any technology.[354] However, legal scholars argue that there is a downside to technology neutrality: legal uncertainty.[355] This point can be seen from the fact that the current reliance and delegation laws do not specifically mention AI; thus, technology neutrality also creates legal uncertainty. Nevertheless, it would be foolhardy to ignore the premise that technology-neutral laws are flexible enough to extend to new events.

[354] Greenberg B 'Rethinking technology neutrality' (2016) 100 *Minnesota Law Review* 1502-524.
[355] Greenberg B (2016) 1502-524.

So, relying on that premise, the writer extends the ordinary reliance and delegation laws to AI.

To recap, when it comes to the authority, South African company law gives directors generous authority to manage the company's affairs subject to legislative restrictions and the company's MOI (the prime contract between directors and the company). So, if South African law and the company's MOI do not prevent directors from relying on and delegating to AI, then directors must have the authority to do so. Notably, considering the dissertation's scope, the writer does not discuss whether the company's MOI restricts directors from relying on or delegating to AI. Instead, he focuses on whether South African law restricts directors from doing so.

As detailed earlier, the South African laws applicable to reliance and delegation are the common law and Companies Act, 2008. On the writer's interpretation, they limit and qualify the powers of directors to rely on and delegate. In particular, the Act clarifies that directors can rely on or delegate *to persons* for the statutory presumption of reasonable reliance or delegation to apply.[356] Therefore, practically speaking, a prudent director would probably prefer relying on or delegating to an AI vendor than AI itself. The reason is that the vendor is probably a juristic person, with legal personality, and thus would be accountable if something were to go wrong (subject to the contractual arrangements between the parties).

[356] See 3.3.3.2 of the dissertation.

Conversely, consider the scenario where a director relies on or delegates to AI it purchased or developed. As mentioned earlier, AI's legal status is not settled.[357] While AI is not a legal person, the writer's view is that AI will probably be a statutory agent, property, or both depending on the type of corporate transaction.[358] Taking the writer's view a step further, suppose a director relies on or delegates to AI as a statutory agent under s 20 of the ECTA. In that event, can s 20 be read with the reliance and delegation laws under the Companies Act, 2008 to the effect that the presumption of reasonableness applies?

Temptingly, one could argue that s 20 be interpreted to grant AI implied legal personality; in which event, all the corresponding rights and duties of legal personality will follow, and the presumption of reasonable reliance or delegation would apply. However, the writer contends that this argument will probably not succeed because legal personality is legally sacred. Our law does not just grant legal personality to any entity. In fact, only humans and juristic persons enjoy legal personality.[359] It is also tempting to suggest that the writer must concede the following:

(a) in some instances, unborn children have conditional legal personality for inheritance purposes;[360] and

[357] See 2.6 of the dissertation.
[358] See 2.6.4 of the dissertation.
[359] Kruger H & Skelton A (2018) ch 1.
[360] Smit VT 'Everyone has the right to life – Fact or a nasciturus fiction?' (2015) *De Rebus* 42-50.

(b) nascent companies can have pre-incorporation contracts.[361]

However, these instances are conditional respectively on the unborn child being born alive[362] and the company being incorporated and the board ratifying the pre-incorporation contract.[363] So, legal personality starts at some point for the child or company.

Moreover, the reader should bear in mind that legal personality is not implied in these instances; the law expressly creates it. Hence, the writer takes the view that granting legal personality to AI cannot be an interpretation exercise. Instead, it needs to be a clear and unambiguous fiction the legislature creates.

In sum, the presumption of reasonable reliance and delegation probably does not apply to the event where AI is a statutory agent; thus, the relying or delegating director would lose the decision-making protection from the Companies Act. As a result, the director would need to prove that the reliance or delegation is reasonable.[364] So, the next question is how a director would prove that their reliance or delegation is reasonable where the presumption falls away.

[361] S21 of the Companies 71 of 2008. Ncube CB 'Pre-incorporation contracts: Statutory reform' (2009) 2 *SALJ* 255-69.
[362] *Pinchin v Santam Insurance Co Ltd* 1963 2 SA 254 (W). *Christian League of SA v Rall* 1981 2 SA 821 (O).
[363] Cassim MF 'Some difficult aspects of pre-incorporation contracts in South African law and other jurisdictions' (2012) 13(1) *Business Law International* 5-26.
[364] The writer submits that the director would need to prove the same where the presumption is rebutted.

While neither the Act, common law, nor King IV Report definitively answers what reasonable reliance and delegation to AI is, the writer infers that the legislature, courts, and Institute of Directors South Africa probably did not want to frustrate the commercial decisions of company directors. Nevertheless, however valid their decision may have been, it leaves legal scholars with no direction on reasonable reliance on or delegation to AI.

However, the writer submits that there may be a way to move a bit closer to certainty. Consider that s 7*(c)* of the Companies Act provides for innovation in company law.[365] Plus, the King IV Report acknowledges the role of 4IR technologies in corporate governance.[366] Consequently, in the spirit of the Act and the King IV Report, the writer extrapolates the common law and Act's requirements[367] to hypothesise how South Africans courts could approach reasonable reliance on or delegation to AI.

For memory's sake, the common-law requirement is that a director must not have *suspicion* about the *competence, integrity, and skills* of the person on or to whom the director relies or delegates. The question is how this requirement applies to reliance on or delegation to AI. The law has not said anything in this regard. Further, while the common law provides examples where directors rely on or delegate to personnel or third parties, these cases deal with legal persons. Plus, it has been proven that AI is

[365] S7*(c)* of the Companies Act 71 of 2008. Katzew J (2011) 686-711.
[366] Institute of Directors South Africa (2016) 30.
[367] The Companies Act 71 of 2008 must not be interpreted to exclude the common law: Henning J 'Interpreting the new South African Companies Act: Some challenges' (2012) 91 *Amicus Curiae* 12-14.

probably not a legal person under South African law. Consequently, the writer uses hypotheticals to evaluate how a director would comply with the requirement relating to suspicion, competence, integrity, and skills.

First, when it comes to *competence*, deductive reasoning suggests the director would usually consider the qualifications of the reliance or delegation candidate. Extending this reasoning to AI, the writer submits that the director should have vetted the AI against an industry standard. Perhaps, the AI would need to comply with a standard from the South African Bureau of Standards (SABS). By analogy, in South Africa, SABS applies the International Organization for Standardization (ISO)'s standards for developing robotic technology—the physical manifestation of AI.[368] SABS could create a similar standard for AI.[369] Further, for ongoing competence, the director would have needed to ensure that the AI is sufficiently maintained, serviced, and updated. Here, the analogy would be refresher courses for ordinary reliance or delegation candidates.

Secondly, considering *integrity*, this element empirically and logically refers to the moral compass of company officials. However, the writer interprets this element in two ways. One, it refers to the moral compass of AI. What is important to recognise

[368] Giles J & Emma-Iwuoha A 'South African chapter' in Bensoussan A & Bensoussan J (eds) *Comparative Handbook: Robotic Technologies Law* (2016) 173-74.
[369] Diab WW 'Enabling the digital transformation of industry: The roles of AI, big data, analytics, and related data ecosystem' *Regulatory Affairs Professional Society* 1 June 2021 available at https://www.raps.org/news-and-articles/news-articles/2021/6/enabling-the-digital-transformation-of-industry-th (accessed 14 September 2021).

here is that AI's moral compass reflects the data on which it is trained.[370] So, the director would have needed to ensure AI is trained on unbiased data. (Bias in training data will be dealt with in the next subchapter.) Two, the writer interprets integrity to refer to the 'make-up' of AI. The director would need to consider if the AI is 'healthy'. By 'healthy', the writer means 'free from errors or defects' or at minimum, gain a guarantee from a service provider that bugs[371] will be repaired within a reasonable time.

Thirdly, when it comes to *skill*, the writer reasons that a director ordinarily must ensure that the reliance or delegation candidate has skills tied to the purpose for reliance or delegation. The same reasoning applies to AI.[372] For example, if the director wants to rely on AI to support financial decision-making, then an AI skilled at healthcare decisions would be inappropriate for this purpose.

Finally, when you consider the element of *suspicion*, determining suspicion is challenging. The question is what would cause a director to be suspicious about a decision made by AI. Normally, when a director relies on a human, they can speak to the human to understand why (reasons) the human made a particular decision.[373]

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[370] See 3.3.2.1.2 of the dissertation.
[371] 'Bugs' refer to errors in computer systems or programmes: Butterfield A, Ngondi GE, & Kerr A (eds) *A Dictionary of Computer Science* 7 ed (2016) 52.
[372] The European Commission's Draft AI regulations takes this stance: Adams N 'AI regulations and plan proposed by European Commission' *Michalsons* 22 April 2021 available at https://www.michalsons.com/blog/ai-regulations-and-plan-proposed-by-european-commission/49125 (accessed 23 April 2021).
[373] Delport PA (2021) 208-11.

Based on those reasons and supported with evidence, a director can assess the human's decision and make a reasoned and engaged judgement call.

But how would a director assess whether AI made a proper decision? Unless the director has an intricate knowledge of the reasoning models of AI as well as advanced coding skills, the director would find it impossible or impractical to assess why AI reached a certain conclusion. This problem is the case with black-box AI,[374] where the reasoning models are advanced and coded in a way that it would not be possible to analyse the reasoning within the time[375] the responsible director would need to assess the decision of AI.

While the writer concedes that the director could ask the AI developer to design AI that—one—is transparent about how it decides and—two—explains why it reached a decision,[376] the concession is merely theoretical. The reality is that even Big Tech with their virtually unlimited resources struggle to make AI transparent and explainable.[377] Thus, there is no legal certainty about the element of suspicion.

Now that the investigation into reasonable reliance and delegation is closed, it is easy for the reader to observe that there are more questions than answers. Further, while

[374] Zednik C 'Solving the black box problem: A normative framework for explainable artificial intelligence' (2021) 34 *Philosophy & Technology* 265-88.
[375] Zednik C (2021) 265-88.
[376] Arrieta IB, Díaz-Rodríguez N, & Del Ser J *et al* 'Explainable artificial intelligence (XAI): Concepts, taxonomies, opportunities and challenges toward responsible AI' (2020) 58 *Information Fusion* 82-115.
[377] Simonite T 'When it comes to gorillas, Google Photos remains blind' *Wired* 1 November 2018 available at https://www.wired.com/story/when-it-comes-to-gorillas-google-photos-remains-blind/ (accessed 12 January 2021).

the writer's hypotheticals simulate how the common law can help the investigation, they are merely hypotheticals, not law. Thus, legal uncertainty persists.

3.2.5 Do directors have a company-law duty to rely on or delegate to artificial intelligence?

The writer has shown that the directors of smart companies have the authority and powers to rely on and delegate to AI under South African company law. However, there is a popular adage that advises: 'with great power, comes great responsibility'.[378] So, it is unsurprising that directors owe several common law and statutory law duties to their company in the exercise of their authority and powers.[379] However, it is not the dissertation's task to consider these established legal duties. Instead, the writer considers a narrow and intriguing question: do company directors have a duty to rely on or delegate to AI[380] under South African company law?

[378] Staff Writer 'With great power comes great responsibility' *Quote Investigator* available at https://quoteinvestigator.com/2015/07/23/great-power/ (accessed 21 May 2021).
[379] Delport PA (2021) 295-98.
[380] Möslein F (2018) 660.

The reader may wonder what prompted this question. Well, consider s 76(4)*(a)*(i) of the Companies Act that states the following:

> '**76. Standards of directors conduct**
> (1) […]
> (2) […]
> (3) […]
> (4) In respect of any particular matter arising in the exercise of the powers or the performance of the functions of director, a particular director of a company—
> (a) will have satisfied the obligations of subsection (3)*(b)* and *(c)* if—
> (i) the director has taken reasonably diligent steps to become informed about the matter'.[381]

In essence, this section says directors would discharge their statutory duties to act in the best interests of the company[382] and with care, skill, and diligence[383] if they act on an informed basis. The question thus arises as to what it means for a director to act on an informed basis. Owing to dynamic nature of business decisions, the writer submits that the scope of acting on an informed basis is a factual enquiry depending on the circumstances relevant to a corporate transaction concluded by the directors. The writer deals with the basis for this submission later in the dissertation.[384] For now, the reader should proceed with the knowledge that directors have to make informed decisions to comply with their company-law duties.

[381] S76(4)*(a)*(i) of the Companies Act 71 of 2008.
[382] S76(3)*(b)* of the Companies Act 71 of 2008. *Da Silva v CH Chemicals (Pty) Ltd* 2008 (6) SA 620 (SCA) at 18.
[383] S 76(3)*(c)* of the Companies Act 71 of 2008. Mongalo TH 'Directors' standards of conduct under the South African Companies Act and the possible influence of Delaware Law' (2016) 6(2) *JCCLP* 1-16.
[384] See 3.4 of the dissertation.

For context, it is common knowledge that businesses expect directors to digest enormous volumes of information quickly to make quality decisions.[385] Sometimes the volumes are impossible for them to digest.[386] However, earlier, the writer explained that AI has superior information processing abilities when compared with human directors. So, AI could play a significant role in digesting this information for directors. Thus, the question arises as to whether the standard of conduct (to act on an informed basis) implies that a director has a duty to rely on or delegate to AI.

In discussing Delaware (a USA state) and European company law, Möslein convincingly argues that directors do not currently have any company-law duty to rely on or delegate to AI.[387] The writer supports Möslein's argument and considers whether it holds true within a South African company law context.

First, the director's duty to act on informed basis is a subjective duty. In the *Visser Sitrus* case,[388] the court said:

> 'What is required is that the directors, having taken reasonably diligent steps to become informed, should subjectively have believed that their decision was in the best interests of the company and this belief must have had "a rational basis".'[389]

[385] Ashour S 'Artificial Intelligence in the boardroom: An outright exposure to directorial liability?' *Oxford Business Law Blog* 12 October 2020 available at https://www.law.ox.ac.uk/business-law-blog/blog/2020/10/artificial-intelligence-boardroom-outright-exposure-directorial (accessed 21 May 2021).
[386] In the Australian case of *ASIC v Healey* (2011) 83 ACSR 484 at 229, the Court held that the complexity and volume of data cannot excuse directors for not reading and understanding the company's financial statements.
[387] Möslein F (2018) 660.
[388] *Visser Sitrus (Pty) Ltd v Goede Hoop Sitrus (Pty) Ltd and Others* 2014 (5) SA 179 (WCC) at 74.
[389] *Visser Sitrus (Pty) Ltd v Goede Hoop Sitrus (Pty) Ltd and Others* 2014 (5) SA 179 (WCC) at 74.

The effect of this case is that directors need not be aware of all the information objectively relevant to a corporate transaction. Instead, they merely need to consider what they think are reasonably diligent steps in the circumstances. So, if directors were to decide *not* to rely on or delegate to AI—for whatever reason—the writer argues the directors would still meet the standard of conduct to act on an informed basis.

Secondly, when directors decide to collect information to support a business decision, that decision to collect information is a business decision. Bearing the nature of business decisions in mind, the South African courts are hesitant to interfere with these decisions because they do not have the expertise to make business decisions.[390] The courts' reasoning is that when a decision goes awry, they also have the benefit of hindsight.[391] So, the writer contends that it is unlikely that a court will read a duty to rely on or delegate to AI into South African company law framework. Thus, in sum, the writer takes the view that, at present, no duty to rely on or delegate to AI exists under South African company law.

On another point, Möslein argues that some company law frameworks may deem that a duty lies in exceptional cases where a director is grossly negligent when deciding not to rely on or delegate to AI.[392] However, the writer respectfully disagrees with his contention within the context of South African company law. No such duty exists

[390] Mupangavanhu BM 'Standard of conduct or standard of review? Examination of an African Business Judgment Rule under South Africa's Companies Act 71 of 2008' (2019) 63(1) *Journal of African Law* 128-30.
[391] Mupangavanhu BM (2019) 128-30.
[392] Möslein F (2018) 662.

explicitly or implicitly under South African company law. Further, South African law follows the well-known principle of legality: there can be no penalty without a law.[393] Consequently, no legal duty equals no accountability for breach of a non-existent duty. However, the writer concedes that a director could be liable under the other company-law duties for a breach of those duties relating to reliance on or delegation to AI. In that event, breach of the respective duty would need to be proven accordingly.

Looking to the future, the South African legislature might create a duty for company directors to rely on or delegate to AI. The thinking is that AI will eventually become integral to business operations.[394] It will also become more widespread. Therefore, its use by directors would probably need to be regulated. However, South African company law would then need to reform, and the South African legislature would need to create that duty.

3.3 Corporate governance, risk, and compliance: the potential of artificial intelligence to harm company stakeholders

It has been established that directors have the authority and powers to rely on and delegate to AI in managing the company's affairs. In other words, South African company law gives directors generous authority and powers to incorporate AI into their

[393] Michelman FI 'The rule of law, legality and the supremacy of the constitution' in Woolman S & Bishop M (eds) *Constitutional Law of South Africa* 2 ed (2013) ch 11. *Fedsure Life Assurance Ltd and Others v Greater Johannesburg Transitional Metropolitan Council and Others* 1998 (12) BCLR 1458 (CC) at 58.
[394] PTI 'Robot in board room possible by 2025, says WEF survey' The *Economic Times* 9 September 2015 available at https://economictimes.indiatimes.com/news/company/corporate-trends/robot-in-board-room-possible-by-2025-says-wef-survey/articleshow/48883853.cms (accessed 27 June 2021).

company's operations. While the writer has discovered directors can use AI to promote good corporate governance,[395] the crucial point is AI can also create significant and varied risks for company stakeholders. This point is crucial because it illustrates that AI is a corporate risk that South African company law needs to govern. Thus, the text that follows contextualises risk governance and speaks to the specific risks AI creates for company stakeholders from an IT Governance perspective.

3.3.1 The importance of risk governance and stakeholder relationships for smart companies

Risk governance is crucial for all South African companies. In the King IV Code, principle 11 states that '[t]he governing body should govern risk in a way that supports the organisation in setting and achieving its strategic objectives'.[396] However, the writer submits that, within the context of smart companies, the principles relevant to risk governance play an even more crucial role in how directors manage the affairs of these companies. The basis for the writer's submission is that AI is a pervasive and disruptive technology.[397]

[395] Torre F, Teigland R, & Engstam L 'AI leadership and the future of corporate governance: Changing demands for board competence' in Larsson A & Teigland R (eds) *The Digital Transformation of Labor: Automation, the Gig Economy and Welfare* (2019) 116-46. Ivashkovskaya I & Ivaninskiy I 'What impact does artificial intelligence have on corporate governance?' (2020) 14(4) *Journal of Corporate Finance Research* 90-101.
[396] Institute of Directors South Africa (2016) 61.
[397] Barfield W 'Towards a law of artificial intelligence' in Barfield W & Pagallo U (eds) *Research Handbook on the Law of Artificial Intelligence* (2018) 2.

Moving to the next point, the writer contends that directors need to pay particular attention to how AI impacts company stakeholders. For context, companies have long since moved from a shareholder primacy to stakeholder-inclusive approach to corporate governance.[398] King IV echoes this approach in principle 16:

> '[I]n the execution of its governance role and responsibilities, the governing body should adopt a stakeholder-inclusive approach that balances the needs, interests and expectations of material stakeholders in the best interests of the organisation over time'.[399]

Plus, Marwala has convincingly argued that 4IR technologies like AI must help and not harm South African company stakeholders.[400] Thus, risk governance and stakeholder relationships are essential to how directors discharge their corporate governance duties.[401]

As a matter of observation, AI's risks to company stakeholders are severely under-investigated.[402] This fact is unsettling considering the far-reaching consequences of AI's use. For instance, AI is being used to fire employees,[403] decide whether to grant

[398] Singh S 'Balancing the interests of shareholders and stakeholders through corporate governance' in Blanpain R, Bromwich W, Rymkevich O *et al* (eds) *Rethinking Corporate Governance: From Shareholder Value to Stakeholder Value* (2011) 334-40.
[399] Institute of Directors South Africa (2016) 71.
[400] Marwala T *Closing the Gap: The Fourth Industrial Revolution in Africa* (2020) 1-3.
[401] Botha MM 'The role and duties of directors in the promotion of corporate governance: A South African perspective (2009) 30(3) *Obiter* 702-15.
[402] Wiggers K 'Study finds that few major AI research papers consider negative impacts' *Venture Beat* 1 July 2021 available at *https://venturebeat.com/2021/07/01/study-finds-that-few-major-ai-research-papers-consider-negative-impacts/* (accessed 6 July 2021).
[403] Nawrat A 'HR tech gone wrong? Uber told to reinstate drivers after "robo-firing"' *Unleash* 15 April 2021 available at *https://www.unleashgroup.io/2021/04/15/court-rules-against-uber-robo-firing-employee-surveillance/* (accessed 20 May 2021).

loans to customers,[404] and determine the precedence order for distributing COVID-19 vaccines.[405] Consequently, to shed light on AI's risks, the dissertation's following sections introduce the glaring risks and illuminate how AI can harm company stakeholders.

3.3.2 Information Technology Governance

3.3.2.1 Data governance

Data governance refers to the people, processes, and technology needed to manage and protect an organisation's data assets.[406] The aim is for an organisation to supply company stakeholders with understandable, correct, complete, trustworthy, secure, and discoverable data.[407] From a data governance perspective, AI poses two main risks to company stakeholders: poor data quality and biased data sets.

[404] Dolgorukov D 'How AI and ML will be transforming banking and finance' *Finextra* 19 January 2021 available at *https://www.finextra.com/blogposting/19774/how-ai-and-ml-will-be-transforming-banking-and-finance* (accessed 23 October 2021).
[405] Guo E & Hao K 'This is the Stanford vaccine algorithm that left out frontline doctors' *MIT Technology Review* 21 December 2021 available at *https://www.technologyreview.com/2020/12/21/1015303/stanford-vaccine-algorithm/* (accessed 20 May 2021).
[406] Holt A *Governance of Data: Delivering a Data Strategy* (2021) 1-10. 'Data assets refer to a system, application output file, document, database, or web page that companies use to generate revenues. Data assets are some of the most valuable assets in the technology era, and organizations spend billions of dollars to manage such assets': Corporate Finance Institute 'What are data assets?' available at *https://corporatefinanceinstitute.com/resources/knowledge/other/data-assets/* (accessed 22 June 2021).
[407] Ladley J *Data Governance: How to Design, Deploy and Sustain an Effective Data Governance Program* (2012) 1-20.

3.3.2.1.1 Poor data quality

Quality data is crucial for AI to produce reliable results.[408] Quality data is accurate, complete, relevant, valid, time-specific, and consistent.[409] Recently, a Harvard Business Review study found that almost all companies struggle with maintaining quality data.[410] The problem is that companies train AI on this data. In turn, AI uses the training data as the foundation for decisions that impact company stakeholders. Consequently, in the short term, poor data quality may only appear to harm the stakeholders directly connected to AI's bad decisions. However, in the long term, companies could suffer reputational damage and lose company stakeholders' trust and business opportunities.[411]

Considering personal information, POPIA mandates that companies keep accurate records of data subjects (persons to whom the personal information relates).[412] Section 16 of POPIA provides:

> '**16. Quality of information**
>
> (1) A responsible party must take reasonably practicable steps to ensure that the personal information is complete, accurate, not misleading and updated where necessary.

[408] European Union Agency for Fundamental Rights *Data quality and artificial intelligence – mitigating bias and error to protect fundamental rights* (2019) 2-5.
[409] Ladley J (2012) 14-15.
[410] Nagle T, Redman TC, & Sammon D 'Only 3% of companies' data meets basic quality standards' *Harvard Business Review* 11 September 2017 available at https://hbr.org/2017/09/only-3-of-companies-data-meets-basic-quality-standards (accessed 12 June 2020).
[411] Compton J 'Data quality: The risks of dirty data and AI' *Forbes* 27 March 2019 available at https://www.forbes.com/sites/intelai/2019/03/27/the-risks-of-dirty-data-and-ai/ (accessed 12 June 2020).
[412] S16 of the Protection of Personal Information Act 4 of 2013.

> (2) In taking the steps referred to in subsection (1), the responsible party must have regard to the purpose for which personal information is collected or further processed'.[413]

Notably, while this obligation protects personal information's data quality, it does not extend to other types of confidential, sensitive and proprietary data that AI uses to make decisions. The risk is that company stakeholders do not enjoy data quality rights beyond personal information. In other words, companies do not owe their stakeholders data quality duties beyond personal information. Thus, when AI makes a decision using poor quality confidential, sensitive, or proprietary data, and it harms company stakeholders, the stakeholders have no recourse against the company for using poor quality data.

3.3.2.1.2 Biased datasets

Biased datasets are one of the biggest problems in training AI to make decisions.[414] These are datasets that contain human biases such as racial and gender discrimination.[415] Biased data often perpetuates stereotypes and results in horrible outcomes for company stakeholders.[416] Consider the example of Microsoft's chatbot, 'Tay', that learnt from conversations humans had had on the social network platform,

[413] S16 of the Protection of Personal Information Act 4 of 2013.
[414] Villasenor J 'Artificial intelligence and bias: Four key challenges' *Brookings* 3 January 2019 available at https://www.brookings.edu/blog/techtank/2019/01/03/artificial-intelligence-and-bias-four-key-challenges/ (accessed 12 May 2021).
[415] Madgavkar A 'A conversation on artificial intelligence and gender bias' *McKinsey & Company* 7 April 2021 available at https://www.mckinsey.com/featured-insights/asia-pacific/a-conversation-on-artificial-intelligence-and-gender-bias# (accessed 12 May 2021).
[416] Lee NT, Resnick P, & Barton G 'Algorithmic bias detection and mitigation: Best practices and policies to reduce consumer harms' *Brookings* 22 May 2019 available at https://www.brookings.edu/research/algorithmic-bias-detection-and-mitigation-best-practices-and-policies-to-reduce-consumer-harms/ (accessed 12 May 2021).

Twitter.[417] Soon after Microsoft launched Tay, Twitter users tweeted at the bot with misogynistic, racist, and anti-Semitic remarks.[418] Tay used this data (tweets) to decide what to post to its Twitter account. Unsurprisingly, its tweets echoed the misogyny, racism, and anti-Semitism of the platform's human users.

Tay is a sobering example of the significant risk of racial, ethnic, and gender-based discrimination in biased datasets for company stakeholders. Further, the World Economic Forum (WEF) has acknowledged that regulation in this regard has fallen behind the exponential impact of biased datasets on company stakeholders.[419]

3.3.2.2 Technology governance

3.3.2.2.1 Data protection

Another central risk of AI is whether it protects the privacy of the people whose data it processes. In particular, the concern is that AI may process personal information

[417] Twitter is an international microblogging service and social-network platform on which users post and interact with text messages known as 'tweets'. Registered users can post, 'like', and 'retweet tweets'. However, unregistered users can only read these messages: Staff Writer 'What is Twitter and why should you use it?' *Economic and Social Research Council* available at https://esrc.ukri.org/research/impact-toolkit/social-media/twitter/what-is-twitter/ (accessed 12 June 2021).

[418] Hunt E 'Tay, Microsoft's AI chatbot, gets a crash course in racism from Twitter' *The Guardian* 24 March 2016 available at https://www.theguardian.com/technology/2016/mar/24/tay-microsofts-ai-chatbot-gets-a-crash-course-in-racism-from-twitter (accessed 12 May 2021).

[419] Sundareswaran V 'Chatbots are on the rise. This approach accounts for their risks.' *World Economic Forum* 16 June 2021 available at https://www.weforum.org/agenda/2021/06/chatbots-are-on-the-rise-this-approach-accounts-for-their-risks/ (accessed 17 June 2021).

against the wishes of the data subject (person to whom personal information relates); more specifically, company stakeholders who are data subjects.[420]

It appears that the South African legislature had this point in mind in drafting POPIA.[421] Section 71 of POPIA regulates decision-making by automated means. In essence, it says that the data subject has the right not to be subjected to a decision by automated means where that decision will profile the data subject.[422] Profiling extends to the data subject's performance at work, credit worthiness, reliability, location, health, personal preferences, and conduct.[423]

However, the prohibition has two exceptions. First, it does not apply where AI makes the decision to execute or conclude a contract and the data subject's contractual requests have been met, or the company takes appropriate measures to protect the data subject's interests.[424] Secondly, it will not apply if there is a law or code of conduct with appropriate measures to protect the legitimate interests of data subjects.[425]

However, POPIA does not address two pressing issues. The first issue is how directors would evaluate AI's decision if its decisions were not transparent or explainable. Earlier, the writer illustrated that not all AI have transparent and

[420] S1 of the Protection of Personal Information Act 4 of 2013, defines a 'data subject' as 'the person to whom the personal information relates'. Importantly, a data subject can be a natural or a juristic person: Burns Y & Burger-Smidt A *Commentary on the Protection of Personal Information Act* (2018) 133-34.
[421] South African Law Reform Commission (Project 124) *Privacy and Data Protection Report* (2009) 366.
[422] De Stadler E & Esselaar P *A Guide to the Protection of Personal Information Act* (2015) 50-1.
[423] Burns Y & Burger-Smidt A (2018) 143-44.
[424] S71(2)*(a)* of the Protection of Personal Information Act 4 of 2013.
[425] S71(2)*(b)* of the Protection of Personal Information Act 4 of 2013.

explainable decision-making processes. Further, on the second issue, what happens if the data subject does not know that it is interacting with AI? Surely, there should be a legal obligation on companies to alert company stakeholders to the fact that they are interacting with AI. Otherwise, the stakeholders would not know on what basis (automated decision-making) to enforce their rights. Thus, these issues need legal clarification.

3.3.2.2.2 Poor information security measures

Another corporate risk is not securing information adequately. It is a common fact that information has value.[426] Information security deals with the technical and organisational measures that an organisation should implement to secure AI when it processes data.[427] Currently, South African law does not specifically mandate general information security standards within companies.[428] This gap exists even though cyber hackers often and aggressively target South African companies.[429]

[426] Etsebeth V 'Defining the current corporate IT risk landscape' (2011) 6(2) *Journal of International Commercial Law and Technology* 62-73.
[427] Whitman ME & Mattord HJ *Principles of Information Security* 4 ed (2012) 1-33.
[428] Empirically, the writer has observed that some companies follow information security standards as international best practice even though the law does not mandate these standards.
[429] Moyo A 'Experian hacked, 24M personal details of South Africans exposed' *IT Web* 19 August 2020 available at https://www.itweb.co.za/content/rxP3jqBmNzpMA2ye (accessed 21 August 2020). Alfreds D 'SA companies lose on average R36 million every time they get hacked' *Business Insider* 12 July 2018 available at https://www.businessinsider.co.za/heres-just-how-much-sa-companies-are-losing-the-cyber-war-to-crooks-20180712 (accessed 21 August 2020).

However, within the context of personal information, s 19(1) of POPIA states:

> 'A responsible party must secure the integrity and confidentiality of personal information in its possession or under its control by taking appropriate, reasonable technical and organisational measures to prevent—
> (*a*) loss of, damage to or unauthorised destruction of personal information; and
> (*b*) unlawful access to or processing of personal information'.[430]

In essence, the responsible party—who decides why the information is processed—must ensure it keeps the personal information it processes secure and confidential by taking 'appropriate, reasonable technical and organisational' steps to stop it from being lost, damaged, destroyed, or unlawfully accessed or processed. Further, if organisations do not have these measures in place, their conduct may fall foul of the Cybercrimes Act, 2020, for unlawful processing of personal information.[431]

However, the focus of POPIA is on the protection of personal information. What about other types of information that has value like confidential information (know-how, organisational processes, business plans, software code)? South African law is silent in this regard. The writer draws the reader's attention to the consequences of silence. Suppose AI unlawfully collects sensitive information from a company (belonging to company stakeholders), and it does not secure the information because the law does not require it to do so. Then, a hacker decides to access and distribute the information. What happens then? Who should be liable for the poor security measures?

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[430] S19(1) of the Protection of Personal Information Act 4 of 2013.
[431] Cybercrimes Act 19 of 2020. Giles J 'The practical impact of the Cybercrimes Act on you' *Michalsons* 30 May 2021 available at *https://www.michalsons.com/blog/the-practical-impact-of-the-cyber-bill-on-you/25300* (accessed 31 May 2021).

Moreover, the South African Department of Communications and Digital Technologies recently proposed a National Data and Cloud Policy.[432] Part of this policy deals with information security. Specifically, it says that the government will implement measures in line with the National Cybersecurity Policy Framework (NCPF) and other related policies, legislation, and international best practice.[433] However, the NCPF is yet to be developed, so there is no guidance on how it can protect company stakeholders.

3.3.2.2.3 Algorithmic bias[434]

Then, there is the risk of algorithmic bias. Algorithmic bias occurs when companies train AI on biased datasets and AI perpetuates this bias in its decision-making.[435] While the investigation into algorithmic bias is still in its infancy, algorithmic bias has developed into a rapidly growing field. For instance, after continuously observing how AI-powered facial-recognition technology perpetuates racial bias, three leading AI ethics researchers, Joy Buolamwini, Timnit Gebru, and Deborah Raji, pioneered an

[432] Department of Communications and Digital Technologies *Draft National Data and Cloud Policy* (2021).
[433] Giles J 'National Data and Cloud Policy in South Africa | Draft' *Michalsons* 13 May 2021 available at https://www.michalsons.com/blog/national-data-and-cloud-policy-in-south-africa-draft/49239 (accessed 21 May 2021).
[434] Gravett W 'The dark side of artificial intelligence: Challenges for the legal system' (2020) 35 *Southern African Public* Law 1-30.
[435] Baer T *Understand, Manage, and Prevent Algorithmic Bias: A Guide for Business Users and Data Scientists* (2019) 1-50. Noble SU *Algorithms of Oppression: How Search Engines Reinforce Racism* (2006) 1-14.

ongoing research project to assess the harm.[436] A result of Joy Buolamwini's research is the popular Netflix documentary on algorithmic bias called 'Coded Bias'.[437]

The writer submits that in the event AI perpetuates bias that amounts to hate speech, unfair discrimination, and harassment, victims probably have claims against smart companies under the Promotion of Equality and Prevention of Unfair Discrimination Act, 2000.[438] However, prevention is better than cure. So, companies should take a proactive approach to govern risk by prioritising IT Governance. The writer submits that if companies do not prioritise IT Governance, then AI may open them to damaging class actions founded on algorithmic bias.

3.4 The business judgment rule: how directors avoid liability for deciding to rely on or delegate to artificial intelligence

The writer has proven that AI can harm company stakeholders significantly. Yet, no laws exist that directly regulate AI. With these points in mind, what would happen if directors were to decide to use AI within their company or as an external offering, and the AI harms company stakeholders? This question relates to whether the director's

[436] Metz C 'Who is making sure the AI machines aren't racist?' *The New York Times* 15 March 2021 available at https://www.nytimes.com/2021/03/15/technology/artificial-intelligence-google-bias.html (accessed 22 October 2021).
[437] Jha AM 'Coded Bias review: Remarkable documentary on Netflix examines racist facets of facial recognition systems' *Firstpost* 6 April 2021 available at https://www.firstpost.com/entertainment/coded-bias-review-remarkable-documentary-on-netflix-examines-racist-facets-of-facial-recognition-systems-9500351.html (accessed 22 October 2021).
[438] Geldenhuys J & Kelly-Louw M 'Demystifying hate speech under the PEPUDA' (2020) 23(1) *PELJ* 1-50.

statutory duties[439] will prevent directors from deciding to develop, deploy, or use AI that will harm company stakeholders. In other words, does South African company law sufficiently protect company stakeholders and the company itself from directors making bad decisions about relying on or delegating to AI? The writer will not focus on the duties. Instead, he posits that directors will, in most instances, escape liability for breach of these duties by relying on the business judgment rule.

The business judgment rule is a legal device of USA origin that prevents a court from interfering in the honest and reasonable decisions of company directors.[440] The general principle is that suppose directors do not perform their duties which, in the circumstances, may reasonably be expected from a person of their knowledge and experience. In that event, they would be liable to the company for any consequential damage.[441] The rule's effect is to counter or alleviate the directors' duties in managing the company's affairs.[442]

Moving to South Africa, s 76(4) of the Companies Act, 2008 introduced the business judgment rule into South African company law.[443] The section sets out three requirements for directors to invoke the rule as a defence where a company claims its

[439] S76(3) of the Companies Act 71 of 2008. These are the directors' duties to manage the company's affairs in good faith and for a proper purpose, in the best interests of the company, and with care, skill, and diligence: Delport PA (2021) 298.
[440] Mupangavanhu BM (2019) 128-30.
[441] Delport PA (2021) 298.
[442] Muswaka L 'Shielding Directors against liability imputations: The Business Judgment Rule and good corporate governance' 2013 *Speculum Juris* 25-8.
[443] Delport PA (2021) 298.

directors have breached their common law or statutory duties they owe to the company.[444]

(a) First, the directors must have made an informed decision.[445]

(b) Secondly, the directors had to have no personal financial interests in the decision or action, or the directors had to have disclosed the interest.[446]

(c) Thirdly, the directors would have had to have a rational basis for believing that they were acting in the company's best interests.[447]

When directors meet these requirements, the effect is that their decision will not be subject to judicial review.[448]

From a philosophical perspective, legal scholars contend that the rule encourages innovation, entrepreneurial activities, and risk-taking by protecting certain decisions and acts of directors.[449] In particular, David and Geach[450] suggest that the business judgment rule is intended to promote the objectives of the Companies Act:

> 'Read as a whole, the 2008 Act promotes the objective that there should not be an over-regulation of company business. The Act grants directors the legal authority to run companies as they deem fit, provided that they act within the legislative framework. In other words, the Act tries to ensure that it is the board of directors, duly appointed, who run the business rather than regulators and judges, who are never best placed to balance the

[444] Delport PA (2021) 299.
[445] S76(4)*(a)*(i) of the Companies Act 71 of 2008.
[446] S76(4)*(a)*(ii) of the Companies Act 71 of 2008.
[447] S76(4)*(a)*(iii) of the Companies Act 71 of 2008.
[448] Cassim FHI (2012) 565.
[449] Cassim FHI (2012) 563.
[450] Davis D & Geach W *Companies and other Business Structures in South Africa* 4 ed (2019) 16.

> interests of shareholders, the firm and the larger society within the context of running a business'.[451]

However, few South African cases provide guidance on the application of the business judgment rule. So, to seek guidance, the writer turns to other jurisdictions that have the same rule. Based on what has transpired in other jurisdictions, it appears that it would be relatively easy for directors to meet the requirements of the rule and rely on it to escape liability for a breach of their duties.[452] Applying this trend to AI, South African company directors will probably remain legally untouched for deciding to develop, deploy, or use AI that harms company stakeholders.

The implication is that we have a liability gap. Suppose AI harms company stakeholders and they hold the company liable based on contract law, data protection law, vicarious liability, or another manner of recourse. In that event, it is unlikely that the company with be able to recover those costs from directors where their decision to rely on or delegate to AI is causally connected to the harm experienced by the company stakeholders. In other words, the business judgment rule shields directors from liability to the company. However, one mitigating solution is for the company to subscribe to cyber insurance[453] for harm caused by AI linked to a director's decision.

[451] Davis D & Geach W (2019) 16.
[452] Hamadziripi F & Osode PC 'The nature and evolution of the Business Judgment Rule and its transplantation to South Africa under the Companies Act of 2008' (2019) 33(1) *Speculum Juris* 26-41.
[453] Selby J 'Understanding cyber insurance' (2018) 2 *International Journal for the Data Protection Officer, Privacy Officer and Privacy Counsel* 21-4.

Otherwise, there is non-financial recourse: the company can terminate the director's employment (if any) or remove the director from the board.[454]

3.5 Artificial intelligence joining the board as company directors

3.5.1 Introduction

Up until now, the dissertation has focused on the relationship between company directors and AI to the extent that directors rely on or delegate to AI. Next, however, the writer considers whether AI can lawfully *be* a company director. Unsurprisingly, this question is a hot topic in legal debates across the globe. The debate started when two companies factually appointed AI to their boards:

(a) ***Vital AI.*** In May 2014, a Hong Kong venture capitalist fund factually appointed an AI algorithm named VITAL AI to its board of directors. VITAL AI was reportedly allowed to vote on whether the firm invests in a specific company.[455]

(b) ***Alicia T.*** In October 2016, a Finnish software and service company, Tieto Oyj, factually appointed an AI system called Alicia T to its leadership team.[456] Alicia T can vote on matters and make business decisions in Tieto Oyj.[457] According

[454] S71 of the Companies Act 71 of 2008.
[455] Wile R 'A venture capital firm just named an algorithm to its board of directors — Here's what it actually does' *Business Insider* 13 May 2014 available at https://www.businessinsider.com/vital-named-to-board-2014-5 (accessed 14 December 2018).
[456] Claburn T 'Oh God, here comes the artificially intelligent boss bot – look busy!' *The Register* 19 October 2016 available at https://www.theregister.co.uk/2016/10/19/ai_bot_will_guide_finnish_it_firm/ (accessed 2 May 2019).
[457] Pagallo U (2018) 233.

> to the company, she supports its leadership team by supplying innovative data-rich insights to pursue infinite business opportunities.[458]

However, legally speaking, what troubles legal scholars is whether the company law, in their respective jurisdictions, allows AI to be appointed to the board of directors.[459] Importing that question into South Africa for the first time, the writer considers and concludes on whether South African company law allows AI to be appointed to the board of directors.

3.5.2 The South African company law requirements to be a company director

3.5.2.1 Defining the term 'director'

Section 1 of the Companies Act defines a 'director' as:

> '[A] member of the board of a company, as contemplated in section 66, or an alternate director of a company and includes any person occupying the position of a director or alternate director, by whatever name designated'.[460]

The writer interprets the definition based on guidance from South African case law. First, the use of the word 'includes' implies that the definition is inclusive and non-exhaustive. In other words, formalities are not crucial in identifying who a director is.[461] Secondly, reference to 'occupying the position of a director' means the definition

[458] Pagallo U (2018) 233.
[459] Möslein F (2018) 649-69. Ricci SAG (2020) 869-908.
[460] S1 of Companies Act 71 of 2008.
[461] *Re Lo-Lin Electric Motors* [1988] Ch 477 at 489.

includes purported directors who act with or without lawful authority.[462] Finally, 'by whatever name designated' implies that the title of the director does not matter.[463]

3.5.2.2 Ineligibility to be a director

Section 69(7) of the Act provides grounds for ineligibility for becoming a director:[464]

> '(7) A person is ineligible to be a director of a company if the person–
> (*a*) is a juristic person;
> (*b*) is an unemancipated minor, or is under a similar legal disability; or
> (*c*) does not satisfy any qualification set out in the company's Memorandum of Incorporation'.[465]

The reader should note that s 69(7) also applies to prescribed officers and members of the board committee or audit committee of a company.[466] Delport correctly points out that:

> '[a] person who is ineligible…must not be appointed or elected as a director of a company, or consent to being appointed or elected as a director or act as a director of a company'.[467]

In other words, the appointment of an ineligible director is void. Further, s 69(6)*(a)* of the Act provides that a company's MOI can specify which persons cannot be a director of the company.

[462] *Corporate Affairs Commission v Drysdale* (1978) 141 CLR 236 at 242.
[463] *Re Mea Corporation Ltd* [2007] BCC 288 at para 82. *R v Mall* (1959) 4 SA 607 (N) at 624. *S v Vandenberg* (1979) 1 SA 208 (D) at 216-17.
[464] *Steenkamp and another v Central Energy Fund SOC Ltd and others* 2018 (1) SA 311 (WCC) at 31.
[465] S69(7) of the Companies Act 71 of 2008. *Recycling and Economic Development Initiative of South Africa v Minister of Environmental Affairs and a related matter* [2019] 2 All SA 1 (SCA) at 169.
[466] Delport PA (2021) 264.
[467] Delport PA (2021) 264.

3.5.2.3 The appointment and election of company directors

Section 66 of the Act deals with the appointment (by fellow directors) and election (by shareholders) of directors. In brief, there are three ways a person can be appointed and two ways by which a person can be elected.

(a) The first way to appoint is under the company's MOI.[468]

(b) The next way is through the person holding an office, designation, or similar status; that is, the so-called 'ex officio director'.[469]

(c) The third way is by the person being appointed or elected as an alternate director. If there is a meeting, which a director cannot attend, an alternate director will attend the meeting and represent the director who could not attend.[470]

(d) Finally, the shareholders of a company can elect a director.[471] In this instance, a shareholders' agreement would govern the election.

In addition, South African company law also recognises the following other kinds of directors:

- **temporary director**—a person appointed to fill a vacancy and serve as a director temporarily;[472]

[468] S66(4)*(a)*(i) of the Companies Act 71 of 2008.
[469] S66(4)*(a)*(ii) of the Companies Act 71 of 2008.
[470] S66(4)*(a)*(iii) of the Companies Act 71 of 2008.
[471] Ss 66(4)(*b*) and 68(1) of the Companies Act 71 of 2008.
[472] S68(3) of the Companies Act 71 of 2008.

- **nominee director**—a director who owes their nomination as a director to a shareholder or other third party;[473] and
- **puppet director**—a person placed on the board with the intention to blindly follow the instructions of a puppet master.[474]

A full discussion of these directors is beyond the dissertation's scope. However, returning to whether AI can be a company director, the answer is probably 'no' for the following reasons. First, for the law to regard the appointment or election of the director as valid, the proposed director must consent in writing to be a director.[475] Yet AI cannot consent in any way. Consent presupposes the exercise of a free will. However, humans encode AI's will.[476] Secondly, the writer established earlier that AI is not a legal person under South African law. So, it does not meet South African company law's requirements for a person to be a company director. Thus, it appears that AI cannot lawfully be a director under South African law.

[473] *S v Shaban* 1965 (4) SA 646 (W) at 651.
[474] *S v Shaban* 1965 (4) SA 646 (W) at 652-3.
[475] S66(11) of the Companies Act 71 of 2008. S44*(b)* of the Companies Amendment Act 3 of 2011.
[476] Nahmias E, Allen CH, & Loveall B 'When do robots have free will? Exploring the relationships between (attributions of) consciousness and free will' in Feltz B, Missal M, & Sims AC (eds) *Free Will, Causality, and Neuroscience* (2020) 57-80.

3.5.2.4 The curious common law de facto and shadow directors

Under South African common law, there are other types of directors that must be considered to determine whether AI can be a common law director. These are de facto and shadow directors.

A de facto director is a person who claims and purports to act as a director without having been validly appointed to the board or appointed at all.[477] Cassim[478] correctly points out that the inquiry into whether persons are de facto directors usually arises when those persons try to avoid accountability by asserting that they are not officially appointed or elected directors.[479] The next question is how to determine whether a person is a de facto director.

South African law presents no single test for determining whether a person is a de facto director. Instead, the South African courts have approached the question by considering all the relevant factors.[480] In other words, the inquiry is factual. More specifically, the courts have provided some guidance on how to establish if a person is a de facto director:

(a) First, the person undertakes functions for the company that could only be properly discharged by a director.[481]

[477] *Re Hydrodam (Corby) Ltd* [1994] BCC 161 at 162-3.
[478] Cassim R (2021) 5.
[479] Cassim R (2021) 5.
[480] *Secretary of State for Trade and Industry v Tjolle* [1998] BCC 282 at 290. *Re Kaytech International plc; Portier v Secretary of State for Trade and Industry* [1999] BCC 391 at 402.
[481] *Re Hydrodam (Corby) Ltd* [1994] BCC 161 at 163.

(b) Secondly, the person managed the company's affairs on an equal footing to an actual director and not in a subordinate role.[482]

(c) Thirdly, the person exercised real influence in the decision-making process.[483]

(d) Finally, there is no need that the company portrays the person as a director.[484] But if a company were to portray the person as a director, this fact would be evidence supporting the conclusion that that person acted as a director.[485]

Reading the common law and Companies Act together, the writer submits that de facto directors fall within the Companies Act definition of a director because they 'occupy the position' of a director.[486] Consequently, de facto directors fall within the definition of a director under the Act.

On a different point, consider the common law shadow director. The shadow director is a person who covertly influences and controls company directors without being appointed or elected to the board.[487] However, shadow directors seek to avoid liability because they are either disqualified from being a company director or because they prefer the anonymity of not being on the board.[488] Notably, shadow directors have

[482] *Gemma v Davis* [2008] BCC 812 at 40. *Secretary of State for Trade and Industry v Hollier* [2007] BCC 11 at 68-9, 81.
[483] *Re Kaytech International plc; Portier v Secretary of State for Trade and Industry* [1999] BCC 391 at 402. *Gemma v Davis* [2008] BCC 812 at 40.
[484] *Gemma v Davis* [2008] BCC 812 at 40.
[485] *Secretary of State for Trade and Industry v Tjolle* [1998] BCC 282 at 66.
[486] For the reasoning, see Cassim R (2021) 5-6.
[487] Fakude N 'Fighting with your shadow understanding the concept of nonexecutive and shadow directors' 2020 *De Rebus* 31-2.
[488] Idensohn K 'The regulation of shadow directors' (2010) 22 *SAMLJ* 327-28.

become increasingly popular owing to scholars attributing massive corporate governance failures and state capture to them.[489]

On a related point, the Companies Act introduced the concept of a 'prescribed officer' into South African law.[490] Regulation 38 of the Companies Regulations, 2011 defines a 'prescribed officer'.[491] The regulation states:

> '(1) Despite not being a director of a particular company, a person is a "prescribed officer" of the company for all purposes of the Act if that person–
> (*a*) exercises general executive control over and management of the whole, or a significant portion, of the business and activities of the company; or
> (*b*) regularly participates to a material degree in the exercise of general executive control over and management of the whole, or a significant portion, of the business and activities of the company.
> (2) This regulation applies to a person contemplated in sub-regulation (1) irrespective of any particular title given by the company to–
> (*a*) an office held by the person in the company; or
> (*b*) a function performed by the person for the company'.[492]

The effect of being a prescribed officer is that South African company law treats the person like an ordinary company director with all the ensuing duties and liabilities.[493] Further, when reading the definitions of 'shadow director' and 'prescribed officer' together, Idensohn correctly contends that the definition of prescribed officer is wide

[489] Cassim R 'South African law is failing to make sure that "shadow directors" are held accountable' *The Conversation* 24 May 2021 available at https://theconversation.com/south-african-law-is-failing-to-make-sure-that-shadow-directors-are-held-accountable-161200 (accessed 12 June 2021).
[490] S1 of the Companies Act 71 of 2008.
[491] R38 of the Companies Regulations in GN 351 *GG* 34239 of 26 April 2011.
[492] R38 of the Companies Regulations in GN 351 *GG* 34239 of 26 April 2011. Idensohn K 'The meaning of prescribed officers under the Companies Act 71 of 2008' (2012) 129 *SALJ* 718-21.
[493] S77 of the Companies Act 71 of 2008.

enough to include shadow directors.[494] Thus, the writer concludes that both the Act and common law apply to shadow directors.

Returning the attention to AI, when it performs functions equivalent to ordinary directors, it would seem logical to treat them as ordinary directors. Remember, AI often has superior processing capabilities when compared with human directors. So, it is not difficult to see how they could be 'occupying the position' of a director (de facto director) or covertly exercising executive control over a company (shadow director or prescribed officer). However, South African law does not recognise AI as a legal person,[495] so it cannot meet the founding requirement for being either of these types of directors or a prescribed officer. Consequently, the writer concludes that AI cannot be a de facto or shadow director under South African law.

However, the conclusion that AI cannot be a director under South African company law leaves companies with a looming accountability problem. The danger is that AI can perform an executive role with no meaningful accountability. It is equivalent to state capture where people who significantly influence the company's affairs are not held accountable when they cause harm to company stakeholders.[496]

[494] Idensohn K (2012) 717, 721-4.
[495] See 2.6.1 of the dissertation.
[496] Cassim R 'South African law is failing to make sure that "shadow directors" are held accountable' *The Conversation* 24 May 2021 available at https://theconversation.com/south-african-law-is-failing-to-make-sure-that-shadow-directors-are-held-accountable-161200 (accessed 12 June 2021).

3.5.3 Should South African company law develop to allow artificial intelligence to be a company director?

The short answer is that it is unclear to the writer whether the law should develop to allow AI to be a company director. The reason is that not much research has been conducted into whether AI has objectively reached the stage where it can play a role in smart companies equal to that of or better than human directors. While the WEF predicts that AI will start being company directors from the year 2025,[497] smart companies have still not figured out how to eliminate AI's risks to protect company stakeholders.[498] In sum, the writer observes that there is much uncertainty. Consequently, it seems unlikely that AI will be on the board as quickly as the WEF predicts. Nevertheless, considering the future of AI, Möslein correctly captures the moment when AI will be ready for company boards:

> 'Such a development would conform to the stage of autonomous artificial intelligence in which machines take over all decision rights, either because humans increasingly trust the machines' abilities to decide, or because decisions have to be taken so quickly or require so much data that humans are simply unable to decide'.[499]

[497] Cann O 'Robots in the boardroom and other technology tipping points' *World Economic Forum* 9 September 2015 available at *https://www.weforum.org/press/2015/09/robots-in-the-boardroom-and-other-technology-tipping-points/* (accessed 12 June 2021).
[498] See 3.3 of the dissertation.
[499] Möslein F (2018) 662.

3.6 Artificial intelligence helps and challenges contemporary company board compositions

Suppose AI advances to the stage where the South African legislature deems it worthy of being a legal person with the necessary legal capacity to conclude juristic acts. Suppose further that South African company law gives AI the authority and powers to conclude corporate transactions. Once these events materialise, it would be safe to suggest that the law would treat AI equally or similarly to human directors.

However, the question arises as to what would motivate smart companies to have AI directors on their board. Notably, there are not-so-obvious benefits to having AI on a company's board. Ricci[500] succinctly captures three benefits:

> 'First, they could outperform humans in processing the almost never-ending stream of information regarding virtually any and all specific investments, risks, opportunities, and strategies. Second, artificial directors could theoretically come to board meetings unbiased and without an agenda (barring, of course, skewed programming by any original programmers and developers). Moreover, artificial directors could, by bringing alternative ideas to the table, enhance a plurality of views in boardrooms. Such an addition to meetings would ensure that diverse perspectives would be considered in the whole decision-making process, which in turn could lead to better outcomes'.[501] (footnotes omitted)

In the writer's view, the most pertinent benefit of AI directors to South African companies is to promote leadership diversity. It is a common fact that South African companies are often criticised for a lack of diversity on their boards.[502] This situation

[500] Ricci SAG (2020) 901.
[501] Ricci SAG (2020) 901.
[502] Mans-Kemp N & Viviers S 'Investigating board diversity in South Africa' (2015) 8(2) *Journal of Economic and Financial* Sciences 392-414.

persists despite many studies convincingly proving the commercial rationale for diversity.[503] In essence, these studies reveal that diverse teams make better general and investment decisions for companies.[504]

What is even more compelling, according to the Boston Consulting Group Henderson Institute, is that companies with above-average diversity ratings generate 45 per cent of revenue through innovation, compared to 26 per cent for companies with below-average diversity scores.[505] Further, principle 7 of the King IV Code states that '[t]he governing body should comprise the appropriate balance of knowledge, skills, experience, *diversity* and independence for it to discharge its governance role and responsibilities objectively and effectively' (the writer's emphasis).[506]

With the leadership diversity challenges of South African companies in mind, the writer submits that AI directors can aid leadership diversity quite extensively. For example, AI directors can be coded to prioritise empowerment and employment equity initiatives. How prioritisation can happen is a detailed and separate conversation. However, for now, the crucial point is AI directors have the potential to solve leadership diversity challenges by joining the boards of South African companies.

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[503] Viviers S, Mans-Kemp N, & Fawcett R 'Mechanisms to promote board gender diversity in South Africa' (2017) 17(1) *Acta Commercii* 1-10.
[504] Natesan P & Du Plessis P 'Diversity on SA boards – are we doing enough?' *IODSA* 21 April 2021 available at *https://www.iodsa.co.za/news/561574/Diversity-on-SA-boards--are-we-doing-enough.htm* (accessed 30 May 2021).
[505] Lorenzo R, Voigt N, & Tsusaka M *et al* 'How diverse leadership teams boost innovation' *Boston Consulting Group* 23 January 2018 available at *https://www.bcg.com/publications/2018/how-diverse-leadership-teams-boost-innovation* (accessed 30 May 2021).
[506] Institute of Directors South Africa (2016) 50.

Nevertheless, while AI directors can promote leadership diversity, they will also significantly challenge South African company law. Specifically, the challenges will flow from AI directors disrupting the traditional composition of company boards and contemporary corporate governance models. Below, the writer illustrates these challenges by presenting two board compositions where AI has a seat on the board.

3.6.1 The hybrid board of company directors: human and artificial intelligence directors

As a matter of composition, the hybrid board would compose of human and AI directors.[507] According to some scholars, AI directors could make better decisions when compared with their human counterparts because they magnify the most desirable traits of human directors: competence, loyalty, diligence, care, and lawful behaviour.[508] However, as complementary as this setup may appear, it also creates several challenges. A comprehensive study of these challenges falls beyond the dissertation's scope. However, the writer introduces two challenges to whet the reader's appetite.

The first challenge is that human directors may be compelled to conform to the decisions of AI directors[509] to the detriment of their company-law duties.[510] If the reader recalls, the Companies Act states that human directors must manage the company's

[507] Ricci SAG (2020) 900-2.
[508] Ricci SAG (2020) 901.
[509] Ricci SAG (2020) 902.
[510] Delport PA (2021) 295-98.

affairs[511] in line with the standards of conduct set out in the Act.[512] However, while it is tempting to think AI directors could not compel human directors to conform to their decisions, consider that AI directors have superior information processing capabilities when compared with human directors.[513] For example, suppose a hybrid board consists of human directors and an AI director who is an expert financial decision maker. That AI director will probably be more efficient at number-crunching than the human directors. Thus, the probable result is that the human directors would not question the AI director's financial decisions.

In any event, human directors cannot always question the decisions of AI directors. The reason is that it is not always clear how AI reaches its decisions. To recap, earlier the writer introduced black-box AI where humans cannot determine why AI reaches certain decisions or it would be impractical to determine how it makes decisions.[514] Thus, it may not even be possible for human directors to discharge their company-law obligations and duties where AI is on the board.

The second challenge is asymmetric accountability.[515] Generally speaking, South African company law sees the board as a unit.[516] Practically speaking, this principle means that the board is accountable for the decisions of each of its directors. However,

[511] S66(1) of the Companies Act 71 of 2008.
[512] S76 of the Companies Act 71 of 2008.
[513] Ricci SAG (2020) 901.
[514] Rudin C & Radin J 'Why are we using black box models in AI when we don't need to? A lesson from an explainable AI competition' (2019) 1(2) *Harvard Data Science Review* 1-9.
[515] Ricci SAG (2020) 902.
[516] Delport PA (2021) 208-11.

with hybrid boards, the accountability challenge is that South African company law may unintentionally hold human directors liable for the decisions of AI directors. Picture the scenario where an AI director makes a decision, and the human directors go along with the decision because they cannot question it or do not have the time to question it. Then, the decision causes harm to the company or its stakeholders. In that event, the entire board may be held liable for that AI director's decision.

Moreover, it is unclear whether the business judgment rule will aid human directors to avoid liability. For memory's sake, the business judgment rule requires directors to take reasonably diligent steps to become informed about the matter.[517] In the previous paragraph, the scenario presented facts where human directors did not make a decision; they simply followed the decision of the AI director in the belief that that decision was superior to any decision they could have made. The probable result, submits the writer, is that human directors will be held liable for decisions that they *could not* question. This result is patently unfair to human directors. On a related point, asymmetric accountability may cause boards and shareholders to avoid appointing or electing, respectively, AI directors to the board. Asymmetric accountability may also disincentivise human directors from joining hybrid boards.

Conversely, there is also the risk that human directors may defer their decisions to unaccountable AI directors to avoid liability.[518] This risk highlights another event where

[517] S76(4)*(a)*(iii) of the Companies Act 71 of 2008.
[518] Jones N & Tholen J 'WorkLife two point zero: A robot in control—should AI have a voice on the board?' *Lexology* 19 January 2021 available at

human directors would not actively be managing the company's affairs in line with the Act.

After considering the two challenges (compulsion to conform and asymmetric accountability), the writer concludes that more legal investigation is needed to figure out how human and AI directors can coexist where human directors will not be liable for the decisions of AI directors and vice versa.

3.6.2 The board composed exclusively of artificial intelligence directors

The second board composition consists of AI directors only.[519] Practically speaking, there are two ways this board can be composed: a board consisting of one AI director or two or more AI directors.[520] Some 4IR thought leaders are already testing this AI-only board composition.[521] They refer to companies that have AI-only boards as 'algorithmic entities' or 'decentralised autonomous organisations' (DAOs).[522] In fact, the writer argues that DAOs are in line with the South African government's move to innovation in corporate entity design. In the Department of Trade and Industry's policy paper on South African Company Law for the Twenty-First Century, the Department articulated that South Africa envisions promoting innovation and investment in South

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https://www.lexology.com/library/detail.aspx?g=c6e46c55-3b56-4122-b2af-872269af71bd (accessed 10 May 2021).
[519] Ricci SAG (2020) 903.
[520] Ricci SAG (2020) 903.
[521] Tse N 'Decentralised autonomous organisations and the corporate form' (2020) 51(2) *Victoria University of Wellington Law Review* 313-56.
[522] Metjahic L 'Deconstructing the DAO: The need for legal recognition and the application of securities law to decentralized organizations' 39 *Cardozo Law Review* 1537-549.

African markets and companies by providing for flexibility in the design and organisation of companies.[523] This vision is echoed in section 7*(c)* of the Companies Act which provides that one of the Act's aims is to 'promote innovation and investment in the South African markets'.[524]

Practically speaking, the 4IR thought leaders suggest that a holding company with a board of human directors can experiment with DAOs. The leaders recommend starting with a subsidiary company where AI directors would control low-risk tasks.[525] Notably, the dissertation will not deal with the legality of DAOs. However, the scenario of an AI-only board raises intriguing corporate governance challenges. In the text that follows, the writer gives the reader a glimpse of two challenges.

Visualise the event where an AI-only board manages the affairs of a company. Naturally, their decisions would have significant consequences for company stakeholders, such as the company, and human shareholders, directors, and personnel. However, contemporary South African company law relies on the ordinary directors' duties to make directors accountable for their decisions. Now, keeping the principle of functional equivalence[526] in mind, the first conceptual challenge is how AI directors would comply with the duties of human directors. Would software developers

[523] Department of Trade and Industry *South African Company Law for the Twenty-First Century: Guidelines for Corporate Law Reform* (2004) 9-10.
[524] S7*(c)* of the Companies Act 71 of 2008.
[525] Garcia Rolo A 'Challenges in the legal qualification of Decentralised Autonomous Organisations (DAOs): The rise of the crypto-partnership?' (2019) 1(1) *Revista de Direito e Tecnologia* 33-87.
[526] The functional equivalence principle creates criteria under which electronic communications may be considered equivalent to paper-based communications': Article 1 of the UNCITRAL Model Law on Electronic Commerce, 1996: with additional article 5 *bis* as adopted in 1998.

code the duties into their algorithms? Another question is how companies would know if AI directors complied with their duties or whether they gave more weight to some duties than others. Again, the writer draws the reader's attention to challenges of inexplicable and opaque black-box AI. Moreover, are duties for AI even necessary? Therefore, the writer observes that there appears to be many questions desperately in need of further research.

Moving to the next point, the second challenge relates to liability for the decisions of AI directors. The question is who would be liable to the company if AI directors were to make a decision that harmed the company or its stakeholders. In this regard, the law is silent. Thus, in sum, the writer concludes that much more research is needed to investigate how AI directors disrupt contemporary board compositions and accountability for business decisions.

CHAPTER 4 CONCLUSION AND RECOMMENDATIONS ON REFORMING SOUTH AFRICAN COMPANY LAW TO ACCOMMODATE ARTIFICIAL INTELLIGENCE AND PROTECT COMPANY STAKEHOLDERS

In Chapter 1, the dissertation set out to investigate whether there is a need to reform South African company law to accommodate AI and protect company stakeholders. By way of introduction, the research revealed that company law across the globe is transforming drastically because of technological advancements in the 4IR. Specifically, AI is the most critical disruption driver internationally and within South Africa. To support this contention, the writer reported that almost 46 per cent of South African businesses are experimenting with a range of AI technologies. Plus, AI is increasingly performing acts that the law would ordinarily deem as juristic acts when performed by legal persons.

In Chapter 2, the writer contextualised the dissertation within the 4IR. Then, he narrated a decolonised history of AI. He also argued that decolonisation is vital to validate African voices even further in global conversations about AI. Next, the chapter explained how AI works and learns. Afterwards, the writer's findings revealed that AI had entered the domain of company law as soon as it started performing corporate juristic acts such as decision-making that ordinary company officials perform with legal consequences.

In the same chapter, the types of AI in the corporate environment were articulated: Assisting AI, Augmenting AI, Amplifying AI, Autonomous AI, And Autopoietic AI. Next,

the chapter presented three ways the law can treat AI: as a legal person, statutory agent, or property. The writer concluded that AI is not a legal person under South African law; however, the law will probably recognise AI as a statutory agent, property, or both depending on the corporate transaction in question.

In Chapter 3, the writer considered AI in smart companies through the lens of South African company law. The question was whether company directors have the authority and powers to rely on or delegate to AI. The writer found that South African company law does give directors the authority and powers to rely on or delegate to AI subject to restrictions by law and the company's MOI. However, in the absence of directors transacting with an AI vendor with legal personality, directors bear the burden of proving that the reliance or delegation to AI (as an individual entity) is reasonable. The reason is that AI lacks legal personality. Further, even where AI is a statutory agent, the writer observed that directors will find it difficult to prove reasonable reliance or delegation. While the common law may provide some guidance in this regard, legal certainty is still needed.

Moreover, the next question that arose was whether directors must rely on or delegate to AI. The writer concluded that no such duty exists in South African law, whether in ordinary or exceptional circumstances. Nevertheless, the writer conceded that a director might be liable under another company-law duty. Plus, the writer concluded that the duty to rely on or delegate to AI might be needed in the future as AI plays a more active role in the corporate environment.

Then, still in third chapter, the writer illustrated the significant corporate risks that AI creates for company stakeholders. He illustrated this point by isolating the IT Governance instances of poor data quality, biased datasets, data protection, poor information security measures, and algorithmic bias. In essence, the findings revealed that, in these instances, the law is not clear on who would be liable if AI were to harm company stakeholders. Further, despite the apparent risks, AI remains unregulated. Plus, directors can likely invoke the business judgment rule to escape liability for deciding to rely on or delegate to AI. Similarly, the company does not have sufficient financial recourse against directors where their decision to rely on and delegate to AI harms company stakeholders.

Next, the writer resolved that South African company law will not allow AI to be appointed to the board of directors. However, this position may change when AI directors become factually ubiquitous. Moreover, it must be noted that if AI is appointed to the board of directors, they will challenge traditional conceptions of board compositions and corporate accountability.

To conclude finally, the dissertation has proven its hypothesis and answered its research question in the affirmative. In other words, the writer's findings suggest that legal reform is necessary to accommodate AI into South African company law and protect company stakeholders. However, before reform can take place, the topic needs more research to investigate the precise impact of AI on the whole of South African company law. Furthermore, following the same reasoning and noting the scope

limits of the dissertation, the extent to which reform should take place also needs investigation.

As a matter of last words, here lies some prescient advice for South African legal scholars:

> 'Africa has a unique opportunity to pioneer an ethical and principle-based approach to AI law that will guide its nations for generations to come. It's time for us to seize this opportunity and take a leading role in the global AI community'.[527]

Word count: 32 345

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