LEGAL ASPECTS OF THE FOURTH INDUSTRIAL REVOLUTION (4iR) – (with specific reference to ChatGPT and other software purporting to give Legal Advice)

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SUMMARY

In the present article, the author explains the tremendous impact that Artificial Intelligence (AI) is likely to have on society in general. After a historical overview that covers the Fourth Industrial Revolution, the article also considers how the various legal disciplines are likely to be affected by the arrival of AI. This includes an evaluation of the legal advice likely to be given by new "experts" from these two disparate fields.

1 INTRODUCTION

Not all readers of the present article will have been old enough to view the movie *2001: A Space Odyssey*. The two human astronauts had the privilege(?) of having on board a computer, imaginatively named "HAL" (Heuristically-Programmed Algorithmic Computer). This early example of Artificial Intelligence (AI) was supposed to help them with navigation, and controlling their spaceship. However, suddenly, there was mutiny from the robot.

"Open the bay doors, HAL!" "I'm sorry Dave, I'm afraid I can't do that."

We are also privileged(?) to live in these times of unprecedented progress in high technology, despite the ancient Chinese proverb: "May you not be cursed to live in interesting times". Who would have thought that a computer would one day be able to advise us on the differing (and sometimes confusing) nomenclature used by UK and US English experts, respectively, when discussing motor cars and motoring components? Although the Fourth Industrial Revolution (4iR) has been dealt with in a comparatively recent

work,[1] ChatGPT (Chat Generative Pre-Trained Transformer) and its siblings have been too much of a novation to be dealt with, or even dreamt of, in that work. For this reason, the author offers the present article on the legal effects and problems that may arise from using ChatGPT and similar AI-systems in today's world.

2   BACKGROUND

Toffler[2] differentiates between three major historical phases or waves in the development of mankind, which depended on the economic framework current at the time. According to Toffler, the first wave of development came when man settled on a specific piece of land to generate income for himself and his family – in perpetuity. In some cases, a man was even known by his piece of land as the latter became part of his distinctive title – for instance, "The Earl of Oxford" and the "Duke of Northumberland" in England, or the "Markgraf von Essen" in Germany or Austria.[3]

The second wave came about as steam and smokestacks started a mass-manufacturing industry that drew millions of people from a life in the countryside to the cities. This often led to a clash of cultures; the Civil War in the United States from 1861 to 1865 was not just about the freeing of slaves but also about agriculture[4] yielding its predominant position to industry.[5] The widespread use of electricity at a later stage not only strengthened this wave but was also a *conditio sine qua non* for the all-important third wave.

The latter arrived with the invention and ever-increasing use of the computer. Computers were no longer confined to giant halls containing (often-hidden) mainframes with scores of dumb terminals telling would-be users that "Burroughs is down" ("Burroughs" being the brand of mainframe computer then installed at the University of Port Elizabeth) – now they showed their friendly faces on every employee's desk. In countries such as South Africa, a sizeable section of the population has by now eschewed the possession of an expensive desktop personal computer, seemingly quite content to do all their business on a palm-sized cell-phone.

3   WHAT EXACTLY DOES THE FOURTH INDUSTRIAL REVOLUTION (4IR) COMPRISE?

A new development has not only added to Toffler's trilogy but also re-arranged it to some extent. This novation has been described as follows:

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1   Van der Merwe, Roos, Eiselen, Nel, Erlank and Mabeka *Information and Communications Technology Law* (*ICT Law*) 3ed (2021) 65, 119–120, 384–385 and 647.

2   Toffler *The Third Wave* (1980).

3   The latter titles were done away with in 1919 after the First World War.

4   Especially the growth and labour-intensive harvesting of cotton in the southern states.

5   For instance, the weaving of cotton into dress materials in factories in the northern states.

> "The Fourth Industrial Revolution is really a 'revolution within a revolution' and deals with new applications for high technology such as artificial intelligence, robotics, self-driving vehicles (such as those from Tesla) and the 'Internet of Things' relating to physical objects that have become 'more intelligent' by gaining embedded sensors, firmware and software that helps 'them' to connect and swap data with other similar devices over the Internet."[6]

The first three industrial revolutions may (roughly) be described as: the manufacturing, marketing, buying and selling by means of coal, steam and gas (1iR); doing the same after the advent of electricity (2iR); and again, by means of the computer and digital technology (3iR). The fourth stage has been brought about by computers (as well as cell-phones) becoming much more "intelligent", so as to "think" and "advise" their users instantly and on a vast scale.

The legal implementation of 3iR has proved difficult enough to accomplish, since the law (as well as lawyers) are generally conservative. A notable exception has been the outstanding work on this topic by German scholar Schwab.[7] His research gauges the impact that 4iR will have on a number of important areas, on not only a national, but also a global scale. The author speaks of "a profound and systemic change". After an overview of its historic development, Schwab discusses the drivers behind this change, as well as the impact this change is likely to have on the economy, business, society and the individual. Even more penetrating is his analysis in a summarising index that covers topics such as implantable technology, "our digital presence", "Vision is the New Interface", wearable internet, ubiquitous computing, "A Supercomputer in your Pocket", storage for all, the "Internet of and for Things", the "Connected Home", "Smart Cities", "Big Data for Decisions", driverless cars and "Artificial Intelligence and Decision-making".[8] The list continues with "Artificial Intelligence and White-Collar Jobs", robotics and services, "Bitcoins and the Blockchain", the "Sharing Economy", governments and the blockchain, 3D-printing and manufacturing, 3D-printing and human health, 3-D printing and consumer products, "Designer Beings" and finally "Neurotechnologies".

While all these topics are important and merit further discussion, the limited scope of the present article requires a focus on only two.

These are "Artificial Intelligence[9] and Decision-Making" and to a lesser degree, "AI and White-Collar jobs." Dealing with the first concept, Schwab states:

> "Beyond driving cars, AI can learn from previous situations, to provide input and automate, complete future decision-making processes making it easier

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[6]   Van der Merwe *et al* *Information and Communications Technology Law* 65.

[7]   Schwab "The Fourth Industrial Revolution" (2016) https://www.weforum.org/about/the-fourth-industrial-revolution-by-klaus-schwab (accessed 2023-12-17).

[8]   A personal favourite of the present author, and the subject of the latter part of this article.

[9]   "AI" from now on.

and faster to arrive at concrete conclusions based on data and past experiences."[10]

Most of the rest of this article is devoted to the legal consequences that may arise from the "advice" given by clever machines running software such as "ChatGPT" from Microsoft, "Bard" from Google, "Bedrock" from Amazon and similar programs.

Dealing with the second concept, "AI and White-Collar Jobs", Schwab is of the opinion that in future AI might "replace a range of functions performed today by people".[11] He quotes an Oxford Martin School study that predicts that 47 per cent of US jobs in 2010 were "highly likely to become computerized in the next 10–20 years". In the discussion that follows, attention is also given to the effect clever machines may have on the present-day labour market.

4   THE RAMIFICATIONS OF LEGAL ADVICE GIVEN BY ARTIFICIAL INTELLIGENCE

One of the best discussions on this topic was written by South African author Erlank, although published as a chapter in an overseas *Festschrift*.[12] He argues that the new machine world "needs little (or no) human supervision, that many present job *types*[13] will simply disappear and that a considerable re-skilling and up-skilling will have to take place in the labour market". He then shows convincingly that considerable changes will need to be made by "a technocratic, legal, academic corps" in updating legislation such as the recent Cybercrime Act,[14] the Protection of Personal Information Act[15] and similar Acts of Parliament. The changes will also have severe implications for the future careers of paralegals and for legal education in general.

In another article on the same topic, Mukhova[16] shows how the previous phases of development (1iR, 2iR and 3iR) focused on scalable efficiency (doing things right) while moving towards scalable adaptability (doing the right thing). She predicts that 4iR will bring significant changes to the way we live, interact and do business, and that about one-third of activities in 60 per cent of all occupations will become automated. A combination of legal reform

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[10]   Schwab   https://www.weforum.org/about/the-fourth-industrial-revolution-by-klaus-schwab 137.
[11]   Schwab   https://www.weforum.org/about/the-fourth-industrial-revolution-by-klaus-schwab 138.
[12]   Erlank "The Fourth Industrial Revolution (4iR) and the Law: Challenges and Opportunities" in Akkermans and Berlee (eds) *Sjef Sache: Essays in Honour of Prof. Mr, Dr. JHM (Sjef) van Erp on the Occasion of his Retirement* (2021) 519–534.
[13]   Italics by the present author.
[14]   19 of 2020.
[15]   4 of 2013 (POPIA).
[16]   Mukhova "A Lawyer in the Fourth Industrial Revolution" (2018-11-1) *Without Prejudice* https://www.bing.com/search?q=Muchova+%22A+Lawyer+in+the+Fourth+Industrial+Revolution%22&FORM=AWRE (accessed 2023-12-17).

and partnerships between government, academia, private businesses and the professions (especially legal) will be required for future participation by these groups.

On the legislative front, a most promising development has been the European Union (EU) putting forward an advanced proposal for an AI Act.[17] It is wide-ranging, requiring providers of generative AI technologies (such as ChatGPT) to inform users that the content of a certain web page has been machine-generated, to provide summaries of any copyrighted materials used in training their AI systems and to take great care that certain new activities, such as machine surveillance, do not infringe upon fundamental rights. Where relevant, attention will be drawn to the EU's draft legislation in discussing the various legal fields as set out below.

5   HOW THE DIFFERENT LEGAL FIELDS ARE LIABLE TO BE AFFECTED BY "ADVISORY" 4IR SYSTEMS

5 1   AI Advisory 4iR systems like "Chat-GPT": implications for the law in general

The area of legal liability for advisory 4iR systems (or those humans "responsible" for the supervision of such systems) is brand new – so new that many interesting ideas have been broached, not in learned tomes of jurisprudence, nor even in legal journals with a high turnaround time before publishing, but on the Internet.

A good starting point for anyone desiring a good background on this rapidly changing field is the extensive article "Brave New World of Artificial Intelligence".[18] The author starts by asking what we really want from AI and whether ChatGPT is "dangerous". She then explains that a "chatbot" can give convincing advice, perhaps because the advice is almost indistinguishable from that given by a human expert in the field. It is also quite polite and succeeds in pleasing people, while purporting to give accurate information. The author then gives some examples to show the latter is not always the case. For instance, in answering the question "What is the largest mammal that lays eggs?", ChatGPT replied, "Elephants".

The program then proceeded to explain that these are large eggs and its other sentences followed nicely upon the opening statement. Niehaus then shows that the program was perhaps also designed to be a "people-

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[17]   An agreement towards such an enactment was reached on 9/12/23 – see Lomas "EU Lawmakers Back Transparency and Safety Rules for Generative AI" (11 May 2023) https://techcrunch.com/2023/05/11/eu-ai-act-mep-committee-votes/ (accessed 2022-05-22). See also under the last part of the next heading.

[18]   Niehaus   "Opinion   Piece"   (2023)   https://nstf.org.za/wp-content/uploads/2023/02/23FebEDsMessage.pdf (accessed 2023-12-08).

pleaser". Her contribution deserves an extended quotation in the present article because of the dangers that it exposes in some of the latest arrivals on the software scene.

> "Another research paper related to ChatGPT shows how they trained the AI to predict what humans preferred. The researchers noticed that the metrics used to rate the outputs of natural language processing AI resulted in machines that scored well on the metrics, but didn't align with what humans expected. The following is how the researchers explained the problem: 'Many machine learning applications optimize simple metrics which are only rough proxies for what the designer intends. This can lead to problems, such as YouTube recommendations promoting click-bait.'

> So the solution they designed was to create an AI that could output answers optimized to what humans preferred. To do that, they trained the AI using datasets of human comparisons between different answers so that the machine became better at predicting what humans judged to be satisfactory answers. The paper shares that training was done by summarizing Reddit posts and also tested on summarizing news. The research paper from February 2022 is called *Learning to Summarize from Human Feedback*.

> The researchers write: 'In this work, we show that it is possible to significantly improve summary quality by training a model to optimize for human preferences. We collect a large, high-quality dataset of human comparisons between summaries, train a model to predict the human-preferred summary, and use that model as a reward function to fine-tune a summarization policy using reinforcement learning.'

> In other words, the 'chatbot' strives to be popular amongst humans and might therefore provide us with answers that are interesting, but which do not always fit the parameters of a 'truthful reply'."

The author ends off her interesting and ground-breaking discussion with a quote from Professor Marwala.[19] The latter, in turn, quotes American science fiction writer Asimov:

> "It is only afterward that a new idea seems reasonable. To begin with, it usually seems unreasonable. It seems the height of unreason to suppose the earth was round instead of flat, or that it moved instead of the sun, or that objects required a force to stop them when in motion, instead of a force to keep them moving, and so on."[20]

When Marwala later on lists 11 attributes required of a leader in the twenty-first century, he lists "4iR thinking" among them.

Niehaus then proceeds to explain exactly what a "chatbot" amounts to, by making use of a definition from IBM, the computer and software company:

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[19]   At the time, still vice-chancellor of the University of Johannesburg and addressing a National Science and Technology Forum discussion forum (see "The Importance of Innovative Thinking in the 4iR" http://www.nstf.org.za/Creative-economy-science-and-the-4iR (accessed 2023-12-17)).

[20]   Marwala https://www.dailymaverick.co.za/opinionista/2023-01-19-artificial-intelligence-is-on-the-cusp-of-bringing-radical-change-to-the-criminal-justice-system/.

"A chatbot is a computer program that uses artificial intelligence (AI) and natural language processing (NLP) to understand customer questions and automate responses to them, simulating human conversation."[21]

She also provides a very useful definition of the business use to which such an AI chatbot might be put:

"Business use is equally varied. Marketers use AI chatbots to personalize customer experiences, IT teams use them to enable self-service, and customer contact centers rely on chatbots to streamline incoming communications and direct customers to resources."[22]

Looking at the reception of AI systems in general (without concentrating on a specific application like ChatGPT), it seems clear that the EU has taken the lead. This is evident from the website of British firm of attorneys Burges and Salmon. Here one finds a useful survey of the differing reaction of legislatures of the UK, EU and USA to the phenomenon of AI. In the general overview "Artificial Intelligence (AI) Law, Regulation and Policy Horizon Scanning: What Significant Developments Are Expected in 2023 in the UK, EU and US?",[23] the reader is given a useful overview of the differing reactions of legislatures in these countries and areas to the legal problems that AI is likely to present. One is then provided with an interactive map (or flowchart) of these developments. Each item is clickable and takes the reader to the full text of the source document concerned. This is an excellent and effective new way of imparting and accessing knowledge by means of interactive media, rather than by means of the printed word. Another website from the same firm has published a diagram that explains AI in its many permutations (not clickable). In order to get to the real meat of the AI Act, one has to visit the website again, since it also contains a useful glossary.[24] Here, terms such as "artificial intelligence", "data", "data subject", "expert system", "machine learning", "metadata" and "personal data" are authoritatively defined.

A slightly negative note on this legislation has been sounded in an article by Perrigo.[25] The author states:

"[B]ehind the scenes, OpenAI has lobbied for significant elements of the most comprehensive AI legislation in the world – the E.U.'s AI Act – to be watered down in ways that would reduce the regulatory burden on the company."

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21   Niehaus https://nstf.org.za/wp-content/uploads/2023/02/23FebEDsMessage.pdf.

22   *Ibid.*

23   Burges and Salmon Ltd "Artificial Intelligence (AI) Law, Regulation and Policy Horizon Scanning: What Significant Developments Are Expected in 2023 in the UK, EU and US?" (24/01/2023) https://passlenet.s3.amazonaws.com/Passle/5d9604688cb6230bac62c2d0 /MediaLibrary/Document/2023-02-01-10-43-08-102-BurgesSalmonAIRegulationHorizon Scanning-24January2023.2.pdf (accessed 2023-05-22).

24   Burges and Salmon Ltd "The Artificial Intelligence (AI) Law, Regulation and Policy Glossary" (24 January 2023) https://www.lexology.com/library/detail.aspx?g=a65c2879-7861-452d-8a2d-625491bcfb95 (accessed 2023-12-17).

25   Perrigo "Exclusive: OpenAI Lobbied the EU to Water Down AI Regulation" (20 June 2023) https://time.com/6288245/openai-eu-lobbying-ai-act/ (accessed 2023-12-17).

Apparently these "improvements" have now made their way into the present text of this Act, which may soon be finalised. The issue was whether the new systems should be considered "high risk", in which case they would be subject to "stringent legal requirements including transparency, traceability, and human oversight". OpenAI (and its investor Microsoft) successfully argued against this classification in the *Open AI White Paper on the European Union's Artificial Intelligence Act.*[26]

The final draft of the Act has now been approved by the EU Parliament.[27] After final discussions, the new Act may even become the law of the continent by early 2024.

With regard to AI, the United States has been less responsive but there are signs that the FBI is now starting to take an interest in the matter.

5 2   The effect AI advisory systems (such as 4iR) may have on labour law

Mention has already been made of the upheaval brought about by the Second Industrial Revolution;[28] an entire generation became urbanised within their own lifetimes. In contrast, the Third Industrial Revolution happened within a decade and the latest 4iR seems to be playing itself out in a matter of months.

The above developments have also had an effect on labour relations. Instead of a well-populated group of militant trade unionists, membership of such organisations has reached historic lows. Workers seem happy to trade a possibly secure lifetime income for a more exciting career of upskilling and even re-skilling, thus ensuring career mobility.

In a recent article entitled "AI and Labour",[29] Surianarain and Hlatshwayo take an optimistic view on this question. In their opinion, AI (coupled with a youth-led customer-service ethos) has helped to solve three issues. The first is how AI can deal with questions of extensive scale.

> "The chatbot can streamline simple queries and direct them appropriately without losing the human feel. At the same time, our actual human guides are freed up to address more complex queries. Neither of these experiences is out of touch with the lived reality of the unemployed work-seeker. During the three-week DBE recruitment drive, the chatbot handled 37,000 chats,

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[26] See https://commission.europa.eu/publications/white-paper-artificial-intelligence-european-approach-excellence-and-trust_en (20 June 2023). The present author has had access to this document and, as it stands, it seems to support the OpenAI argument.

[27] On 14 June 2023.

[28] For instance, both parents of the present author had grown up on the "platteland" (countryside), but had to move to Port Elizabeth because of the labour opportunities presented by the GM and Ford assembly plants in that harbour city.

[29] Surianarain and Hlatshwayo "AI and the Employment Crisis – Friend or Foe?" (27 March 2023) https://www.harambee.co.za/ai-and-the-employment-crisis-friend-or-foe/ (accessed 2023-05-23).

providing assistance 24/7, which further drove inclusivity because unemployment does not keep office hours."[30]

A second issue addressed by the use of AI was freeing human guides in the organisation "without taking them off their phones or out of the contact centre". This was accomplished through the intervention of a chatbot called "Coachmee". Surianarain and Hlatshwayo also opine that a third issue that AI is likely to help them solve is increased engagement among customers, which should help the latter search and apply for more relevant jobs, in keeping with their specific skill-sets.

Finally, the article deals with an all-too-practical issue in present-day South Africa.

"For too many young South Africans, arguing over data costs, let alone AI, is a luxury: they don't have access to broadband, let alone electricity."[31]

Even adult South Africans are growing more worried about the ever-worsening availability of electricity from Escom (Electricity Supply Commission). The best-laid AI-plans in South Africa will have to deal with the possibility of no power for periods of four hours a day.

Brederode[32] wrote another interesting article on the interface between labour and AI. The author makes the valid point that we often miss an important facet of the AI story, namely "that it often relies on a large human workforce". This is borne out by no less an authority than Sonam Jindal, the programme lead for AI, labour and the economy at "The Partnership on AI".[33] Speaking on an NBC (National Broadcasting Company) News interview earlier in May 2023, Jindal said humans have to provide feedback to AI tools in order to "train" their systems, humans have to perform labelling of images or content as explicit or unsafe, and human input will still be sorely needed to perfect such systems ultimately.[34]

Brederode then draws attention to organisations such as "Sama", "a US-based machine-learning training institution that hires workers from Kenya, Uganda and India to label data for clients like Google, Meta and Microsoft". Sama was used by OpenAI to "train" ChatGPT, probably their most well-known program. Another such an AI training tool is Amazon's "Mechanical Turk", mostly manned by freelance workers known as "turkers". A typical labour problem seems to be that many of these workers were paid less than

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[30]   *Ibid.*

[31]   *Ibid.*

[32]   Brederode "The Unseen Human Workforce Behind AI, Including ChatGPT" (23 May 2023) https://www.news24.com/news24/tech-and-trends/news/the-unseen-human-workforce-behind-ai-including-chatgpt-20230523 (accessed 2023-05-23).

[33]   A US-based AI research institute.

[34]   Jindal "ChatGPT is Powered by These Contractors Making $15 an Hour" (6 May 2023) https://www.nbcnews.com/tech/innovation/openai-chatgpt-ai-jobs-contractors-talk-shadow-workforce-powers-rcna81892 (accessed 2023-01-17).

the statutory minimum wage and had to work overtime without adequate compensation.

5 3   The effect AI advisory systems (4iR) may have on copyright

Partly in response to a report of the Copyright Review Commission and the Draft Intellectual Property Policy of 2013, the South African government embarked on a revision of South African copyright.[35] In June 2015, Cabinet approved publication of the Copyright Amendment Bill 2015 in the *Government Gazette*[36] for further feedback, and after a month also published the Copyright Amendment Bill 2015 for public comment.

Comment on the Bill has varied widely. It has been argued that it would introduce radical amendments to the Copyright Act,[37] such as partial implementation of the WCT,[38] the WPPT,[39] the Marrakesh Treaty as well as the Beijing Treaty. The new Act would also introduce some controversial measures, for instance state ownership of "orphan works" in perpetuity and the imposition of onerous local content requirements on broadcasters, to mention only two of these. Most of the commentary has been negative. For instance:

> "This unconstitutional legislation is being imposed regardless of the cost to local creative industries or education. An international bridgehead for Big Tech will turn South African creators into virtual slaves whose labour will be denied its fair value."[40]

The authors claim further that the Bill's "initial laudable intentions" have since been replaced by a demand for user rights, by copyright exceptions and an undefined "fair use" provision. This would "disempower creators and authors" and would seriously weaken protection of published materials used for educational purposes.

For purposes of the present article, the above debate (although intriguing) will be left aside while attention is drawn to the effect that ChapGPT and its family of AI programs is likely to have on copyright. The latter confluence is dealt with engagingly in the article "Artificial Intelligence, Copyright Infringement and Protection: A Legal Quagmire?"[41] Hlomani and Rens opine that the latest AI model raises three copyright issues:

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[35]   Van der Merwe *et al Information and Communications Technology Law* 319.

[36]   See GN 646 in *GG* 39028 of 2015-07-27.

[37]   98 of 1978.

[38]   The WIPO (World Intellectual Property Organisation) Copyright Treaty (WCT 1996).

[39]   The WIPO Performances and Phonographs Treaty (WPPT 1996).

[40]   Tomaselli   and   Pieterse   "Opinionista"   (24   May   2023) https://www.dailymaverick.co.za/opinionista/2023-05-24-sas-copyright-amendment-bill-threatens-livelihoods-and-weakens-protections/ (accessed 2023-05-23).

[41]   Hlomani and Rens "Artificial Intelligence, Copyright Infringement and Protection: A Legal Quagmire?" (24 May 2023) https://www.dailymaverick.co.za/opinionista/2023-05-24-sas-

"Should outputs from AI models be protected by copyright? Do AI models infringe upon human authors' copyright when the model's output are based on the creative productions of human authors? And can these outputs be considered creative for legal purposes?"

Hlomani and Rens remark (in a lighter vein) that a short answer might simply be "that the law is unclear". In a longer answer, they consider that because the lines of code that make ChatGPT run, as well as any text produced by that code, are not the result of human labour and creativity, these would not be subject to copyright since they lack human authorship. They also cite other reasons for not extending copyright protection to AI-produced works. Since the machine makes use of a multitude of pre-existing information or texts, most of which might themselves be subject to copyright, the new AI-generated text cannot be considered "truly original", a requirement for copyright. If ChatGPT is used in training, permission might have to be sought from all producers of material used by the program in such training unless such material already forms part of the public domain. The authors feel that this might specifically raise problems for artists when their work is used to create training programmes. Even if the original creators do have such rights, it might be difficult and expensive to try and enforce these internationally.

In another article, authored by Collett,[42] the author warns that "ChatGPT's feedback, like every office gossip, despite sounding convincing, is often incorrect, misleading, and faced with inherent bias". She opines that the whole process of consulting this new machine "raises copyright red flags in many countries, including in South Africa". Because the program "mines" many sources of information without the necessary permission, the users of ChatGPT, as well as the firm OpenAI,[43] might be liable for copyright infringement as soon as the scale of work copied is too great to fall under the "fair dealing" defence.

Collett also wonders who the true "owner" of the copyright material used by ChatGPT would be. Because the program is trained on a multiplicity of sources, it could be argued that the (many) creators of the source materials "could have some claim to the copyright in the ChapGPT generated content". However, a counter argument might be that it is OpenAI that has copyright to the content since its machine really "generated" the content.

In closing her interesting discussion, the author shows that the present Copyright Act is already 45 years old and "certainly did not contemplate artificial intelligence technologies when it was drafted". Even though new

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copyright-amendment-bill-threatens-livelihoods-and-weakens-protections/ (accessed 2023-05-25).

[42] Collett "What You Need to Know About ChatGPT and Copyright" (1 March 2023) https://www.engineerit.co.za/article/what-you-need-know-about-chatgpt-and-copyright (accessed 2023-03-25).

[43] The owner and creator of the program.

legislation is hovering in the wings,[44] she awaits the balancing of rights by the legislature, courts and other organisations with interest.

One particular tension is now arising with owners of copyrighted material that is being placed upon "shadow library" websites[45] by companies such as OpenAI and Meta in order to train the latter's AI robots to anticipate and answer any possible queries.[46] The Authors Guild (an advocacy group for writers) has now published an open letter warning high-tech companies to first seek permission from and then reward authors for their legally copyrighted works.

This has also been reflected in the Afrikaans press,[47] which quotes two instances where copyrighted works from authors Tremblay and Awad have been "scraped" to render accurate and concise summaries of their works for Internet searches. In order to do this, ChatGPT allegedly uses "deep learning" techniques, a form of artificial intelligence that extracts the gist of these works for interested users of the Internet. The article also quotes Professor Bruce Watson,[48] who warns that excessive regulation of AI will simply force knowledgeable users (and producers) to navigate around such restrictions. In fact, such legislative "overkill" might lead to an entire country or region falling behind in today's rapid AI developments.

5 4   The effect AI advisory systems (4iR) may have on investments in the stock market

In a fascinating article by Sanlam investment advisors,[49] they opine that AI has experienced "a step change" over the last six months as a result of the rise of ChatGPT and similar AI tools. They go so far as to call AI

> "a transformative investment theme of very long duration, and its longer-term social and economic impact could be comparable to that of the railways, the internal combustion engine, the telephone or television."

It is interesting to note that all the examples cited are drawn from the Second Industrial Revolution (2iR) and do not even include the computer, a critical example from the Third Industrial Revolution (3iR). The authors make the familiar point that AI will remove a lot of "dull, repetitive rules-based work",

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44   See under the beginning of heading 5 3 above.

45   Such as "Bibliotik" and "Library Genesis".

46   Milmo "Sarah Silverman Sues OpenAI and Meta Claiming AI Training Infringed Copyright" (10 July 2023) https://www.theguardian.com/technology/2023/jul/10/sarah-silverman-sues-openai-meta-copyright-infringement (accessed 2023-12-17).

47   Peyper "Hofgedinge Kom Oor ChatGPT se 'Skrapery'" (9 July 2023) https://www.netwerk24.com/netwerk24/sake/tegnuus/hofgedinge-kom-oor-chatgpt-se-skrapery-20230708 (accessed 2023-08-23).

48   AI expert from the University of Stellenbosch.

49   SPW Contributors "The Role of AI in a Diversified Portfolio" (31 May 2023) https://sanlamprivatewealth.sanlam.com/resources/investments/the-role-of-AI-in-a-diversified-portfolio/ (accessed 2023-05-31).

but realistically add that "many jobs in the developed world are likely to disappear in the coming years due to AI-enabled automation". It will be key to "reskill" workers, in which event the benefits of AI should outweigh the downsides.

One aspect upon which the Sanlam investment advisors should be uniquely qualified to comment turns on investment portfolios. They urge investors to

> "think about how AI will affect the earnings and long-term growth trajectories of the companies they invest in – companies that use and deploy AI can build even stronger moats around their existing businesses, but those that fail to engage run the risk of becoming irrelevant."[50]

The authors then divulge their "core thesis", which is that they expect AI "to permeate the entire economy over time". Investors should therefore base their future investments on the "levels of adoption and engagement with AI" shown, as well as the richness of data sets owned or controlled by certain companies.

Another article investigating the correlation between ChatGPT and the stock market is tantalisingly entitled "Can ChatGPT Predict the Stock Market? A Ground-Breaking Study Investigates".[51] Herbst cites a much more extensive paper on this topic entitled "Can ChatGPT Forecast Stock Price Movements? Return Predictability and Large Language Models".[52]

In rather florid language,[53] Herbst praises the illuminating nature of the cited article:

> "Unflinchingly, it lacerates through academia's knotted thickets, ushering in a tantalising foretaste of a future where algorithms conduct our fiscal affairs with a maestro's finesse."

Whatever the style of writing, Herbst makes the valid point that "large language models (LLMs)" constitute the key to progress with regard to AI. The two professors cited by Herbst screened a number of news outlets for credibility, "enabling them to discern and rank the reliability of these sources". This may lead to an investment world where AI "could profoundly transform investment strategies and bolster investor confidence", although Herbst also warns of risks such as "irrelevant responses, inherent bias, data privacy and the reliability of AI predictions". This is the balance that every potential user will have to strike in order to achieve a positive balance sheet.

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[50]   *Ibid.*

[51]   Herbst "Can ChatGPT Predict the Stock Market? A Ground-Breaking Study Investigates" (31 May 2023) https://www.moneyweb.co.za/financial-advisor-views/can-chatgpt-predict-the-stock-market/ (accessed 2023-05-31).

[52]   Herbst cites the authors as Dr A Lopez-Lira and Dr Y Tang from the University of Florida but with no publication particulars.

[53]   One wonders whether Herbst did not perhaps make use of ChatGPT itself in writing the article, perhaps instructing it to use the style Shakespeare would have used.

5 5   The effect AI advisory systems (4iR) may have on privacy and data protection

South Africa is fortunate in having already enacted its Protection of Personal Information (POPI) Act.[54] The EU has now also weighed in with a draft General Data Protection Regulation (GDPR).[55] The USA is looking at possible regulation of ChatGPT by the Federal Trade Commission[56] and has also called for an investigation by the Federal Bureau of Investigation and Central Intelligence Agency.[57]

Although how a program such as ChatGPT will affect the law in this regard is not specifically addressed in the EU's regulations, the EU deserves acclaim for the deep thought that has gone into any future AI-related legislation. The present author was privileged to hear an address on the topic by Professor Borges from the Institute of Legal Informatics at Saarland University in Germany.[58] Focusing on the civil side of liability (or tort law), Borges discussed the AI Act of the EU. He did so under four headings: Prohibited Practices; Protection of Systems Against Risk; the Need for Transparency; and a fourth category where no additional protection, over and above the normal systems security, should be needed. A major stumbling block in law might be the present requirement of "behaviour" for liability: it is doubtful that a machine would be seen to "behave" in this sense. It is equally doubtful that a machine could be "at fault", and therefore present law will not be able to hold a machine culpable in the case of injury or damage.

It is interesting to compare the above draft with another EU draft directive, namely that on "New Product Liability". The latter places considerable emphasis on proving matters: article 8 deals with "Disclosure of Evidence" and article 9 with "Burden of Proof". These matters are referred to again in the discussion about evidence under heading 5 7 below.

In his conclusion, Borges admits that "the draft Directive on AI liability falls short". On the other hand, he opines that "the draft new Product Liability Directive might shift liability towards the manufacturer of AI systems". This

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[54]   4 of 2013.

[55]   See https://www.gdpr-info.eu/ (accessed 2023-06-06).

[56]   Bloomberg "OpenAI's ChatGPT Bot Probed by US Federal Trade Commission Over Consumer Harms" *Daily Maverick* (13 July 2023) https://internal.dailymaverick.co.za/article/2023-07-13-openais-chatgpt-bot-probed-by-us-federal-trade-commission-over-consumer-harms/ (accessed 2023-07-21).

[57]   Vincent "CIA to Investigate How Generative AI (like ChatGPT) Can Assist Intelligence Agencies" *Daily Maverick* (16 February 2023) https://defensescoop.com/2023/02/16/cia-to-investigate-how-generative-ai-like-chatgpt-can-assist-intelligence-agencies/ (accessed 2023-07-21).

[58]   Borges "A Legal Framework for AI. The Example of European Legislation", as part of a discussion forum on the "Pitfalls of Artificial Intelligence", virtually delivered on 19 May 2023 see https://nstf.org.za/wp-content/uploads/2023/05/23NSTF_PitfallsofArtificialIntelligence_ProfBorges.pdf (accessed 2023-12-17).

would be an interesting and positive development, also in the opinion of the present author.

5 6   The effect AI advisory systems (4iR) may have on criminal law

Has the above development been a gift to hackers? In a recent contribution to this debate by Marwala and Mpedi,[59] the authors refer at the outset to an article for the International Bar Association (IBA) entitled "Artificial Intelligence (AI) in Criminal Justice: Invasion or Revolution?".[60] The international view will be revisited presently, but first our local expertise is analysed. South Africa is fortunate in having an updated Cybercrimes Act,[61] which provides cures for some of the defects in the old Electronic Communication and Transactions Act.[62]

Marwala and Mpedi refer to ChatGPT and opine that "the case for AI in the criminal justice system is overwhelming".[63] This is because "AI technology, such as ChatGPT" would address "the plethora of challenges that plague the criminal justice system" by means of "efficient and effective use of resources" while also "modernising the criminal justice system though a proactive approach".[64] The authors are sensitive to possible drawbacks to these systems – for instance, the fact that US programs such as "Idemia" and "Rekognition" might contain a colour bias against "dark-skinned faces". For this reason, they conclude that "AI is not a universal remedy for all the challenges facing the criminal justice system, although it does present new and exciting opportunities for the sector."[65]

In the IBA article that the local authors have referred to at the outset, the two French authors seem to be slightly more careful about welcoming AI:

> "Although the use of AI in criminal justice is meant to fulfil fundamental legal principles such as public order and security, it can also create negative externalities by amplifying pre-existing prejudices and errors, and consequently undermine the efficiency of justice and law enforcement."[66]

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[59]   Marwala and Mpedi "Artificial Intelligence Is on the Cusp of Bringing Radical Change to the Criminal Justice System" (19 January 2023) https://www.dailymaverick.co.za/opinionista/ 2023-01-19-artificial-intelligence-is-on-the-cusp-of-bringing-radical-change-to-the-criminal-justice-system/ (accessed 2023-05-31).

[60]   Idder and Coulax "Artificial Intelligence (AI) in Criminal Justice: Invasion or Revolution?" (13 December 2021) https://www.dailymaverick.co.za/opinionista/2023-01-19-artificial-intelligence-is-on-the-cusp-of-bringing-radical-change-to-the-criminal-justice-system/ (accessed 2023-05-31).

[61]   19 of 2020.

[62]   25 of 2002.

[63]   Marwala and Mpedi https://www.dailymaverick.co.za/opinionista/2023-01-19-artificial-intelligence-is-on-the-cusp-of-bringing-radical-change-to-the-criminal-justice-system/.

[64]   *Ibid.*

[65]   *Ibid.*

[66]   Idder and Coulax https://www.dailymaverick.co.za/opinionista/2023-01-19-artificial-intelligence-is-on-the-cusp-of-bringing-radical-change-to-the-criminal-justice-system/.

After just a brief history of AI, the authors do recognise its positive role in criminal justice, for instance, its potential for efficiency "by reducing time-consuming tasks and human error". One example is systems that have been taught to recognise car number plates "even with poor resolution or low ambient light", *inter alia* by the Canadian police. By means of its power of detecting typical suspicious activities, AI may also play a role in the prevention of crime. An interesting new advantage of AI would also lie in "predictive justice, which is the statistical analysis of a large amount of case law data – mainly previously rendered court decisions – in order to predict court outcomes".[67] This same amount of processing power might also be useful in predicting recidivism. In their conclusion Idder and Coulax also warn that even though AI might curb criminal behaviour, it might also increase discrimination against minorities and harm fundamental principles of fair trial and the protection of privacy. To the present author this seems to represent the conundrum of an age-old search by criminal justice to find a balance between "crime control" and "due process", as clearly explained by the author Herbert Packer in his seminal work *The Limits of the Criminal Sanction.*[68]

In an article focusing strictly on the continent of Africa,[69] Sigsworth quotes figures from a 2021 Interpol report that lists South Africa as the African country with the greatest number of cyber threats for that year. He then opines:

> "The widespread personal use of AI applications such as ChatGPT and resemble.ai increases concerns about potential abuses."

As a countermeasure, however, AI also gives the police and private security companies advantages to combat cybercrime. The article cites applications such as VumaCam's licence plate recognition system in Johannesburg, and "Earth Ranger" to dismantle poaching rings in Tanzania and Malawi. All such systems come with the risk, however, of government suppression of citizens' right to privacy.

In any discussion of cybercrime, cyber security also becomes important. If the latter is adequate, the chance of the former being committed diminishes meaningfully. In an article entitled "Cybercrime: One of 2023's Biggest Risks to SA Businesses",[70] Cakwebe points out that the Fourth Industrial Revolution has brought about innovations "such as artificial intelligence, the

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[67] Idder and Coulax https://www.dailymaverick.co.za/opinionista/2023-01-19-artificial-intelligence-is-on-the-cusp-of-bringing-radical-change-to-the-criminal-justice-system/ One wonders whether this would include both the court's finding as well as the sentence that should be imposed.

[68] Packer "The Limits of the Criminal Sanction" (1968); see also a review of this work – Katz (untitled review) 1969 *University of Pennsylvania Law Review* 640.

[69] Sigsworth "AI Poses Multitude of Risks and Rewards for Organised Crime in Africa: Policing Must Adapt" (11 July 2023) https://dailymaverick.co.za (accessed 2023-07-12).

[70] Cakwebe (8 February 2023) https://www.fanews.co.za/article/short-term-insurance/15/general/1217/cybercrime-one-of-2023-s-biggest-risks-to-sa-businesses/36294 (accessed 2023-05-31).

internet of things and robotics", which have all combined to change ways of doing business. He issues the following warning, however: "Simultaneously, however, the developments have run parallel to the rocketing of cybercrime".[71] Cakwebe cites a review of cyberattacks[72] by the organisation for "Small and medium sized enterprises" (SME). According to this review one in three respondents suffered a cyberattack, with a breakdown of percentages as follows:

> "malware (30%), phishing (26%), ransomware (25%), denial of service (13%) and theft of funds (13%). This is despite more than 60% of SME's believing that they were not viable targets for cybercriminals."

The last-mentioned article by Cakwebe also espouses "basic cyber-security components like firewalls and anti-virus software" as well as training employees in this regard as being necessary stepping stones towards a "well-rounded cyber-security posture".[73] Of course, once security is reasonably foolproof, the need for the intervention of the criminal law and courts becomes less important.

5 7   The effect AI advisory systems (4iR) may have on evidence

This aspect raises an interesting conundrum for a trial judge being confronted by "expert evidence" coming from an AI system. Should this machine be seen as a true expert witness because of its undoubted and deep background knowledge in almost any area? How exactly should its expert "qualifications" be tested and evaluated? On the other hand, should such evidence not perhaps be treated in terms of the cautionary rule and not be accepted as evidence in court unless supported by an "independent" (human?) expert?

South Africa has recently had an unfortunate experience with regard to AI evidence. Reported in the weekly *Sunday Times* newspaper under the headline "Magistrate Rebukes Lawyers Over ChatGPT 'Bogus Cases'", the presiding magistrate found that counsel had simply repeated "in parrot fashion" research done by a chatbot, without verifying those sources for themselves.[74] In the defamation case concerned, lawyers acting for a plaintiff in a defamation case[75] in Parkwood, Johannesburg, had tried to use eight non-existent "judgments" generated by the ChapGPT website

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[71] *Ibid.*

[72] Published in the "*FA review*"". The present author has to confess ignorance as to the true meaning of this acronym – does it represent "Financial Advisor", "Financial Advisory" or "Fiscal Agent"?

[73] *Ibid.*

[74] Rabkin "Magistrate Rebukes Lawyers Over ChatGPT 'Bogus Cases'" (9 July 2023) https://www.timeslive.co.za/sunday-times/news/2023-07-09-magistrate-rebukes-lawyers-over-chatgpt-bogus-cases/ (accessed 2023-12-22).

[75] *Michelle Parker v Amanda Forsyth* Regional Magistrates Court Johannesburg (unreported) 2023-06-29 Case No 1585/20.

www.techtarget.com, without checking the real existence of these "sources". The court remarked as follows:

> "Despite their best efforts, however, the Defendant's attorneys were unable to access any of these cases. The Plaintiff's attorneys were unable to furnish them with copies of the cases either."[76]

In the end, plaintiff's counsel was forced to concede that "the names and citations are fictitious, the facts are fictitious, and the decisions are fictitious".[77] Fortunately for the plaintiff, the matter turned only upon the procedural matter of costs, and the court decided not to make a punitive order in this regard.

Again, the EU seems to have taken the lead in this area. Mention has been made[78] of its draft directive on "New Product Liability" where article 8 deals with "Disclosure of Evidence" and article 9 with "Burden of Proof". A fresh source of uncertainty arises because Continental Europe generally subscribes to the inquisitorial system of proof, whereas most English-speaking countries subscribe to the accusatorial system of proof. The latter system contains a mass of exclusionary rules because of its genesis in a jury-based system, although South Africa has not used the jury system since the 1950s.[79] Would one new worldwide set of treaty-based rules ever cover both systems of proof satisfactorily?

Some of these matters might be dealt with in terms of the EU's latest AI legislation as will be seen under the following heading.

6   CONCLUSION – THE NEED FOR SPECIALISED LEGISLATION

A question that has recently come to the fore is whether the pace of development in AI should be "paused".[80] Sender and Bekker give a brief overview of developments in computing, including the comparatively recent appearance of the Internet, "big data" and machine learning, leading later to "deep learning" and finally to easily useable tools such OpenAI's ChatGPT 3.5. The last-mentioned is a popular example of a "large language model" (LLM) that can simulate human "brain synapses and cognitive processes". In this way, an LLM can respond to human questions asked in natural language.

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[76] *Parker v Forsyth supra* par 88.

[77] *Parker v Forsyth supra* par 87.

[78] See heading 5 5 above.

[79] According to rumour, this transpired because no jury (composed of lay persons) would convict anyone of IDB (Illicit Diamond Buying). People felt that diamonds were God's gift to all people and not only to the De Beers Diamond Company.

[80] Sender and Bekker "To Pause or Not to Pause AI? That Is the Question – We Are at a Transformative Moment in Human History" (9 July 2023) *Daily Maverick* https://www.dailymaverick.co.za/article/2023-07-09-to-pause-ai-or-not-to-pause-ai-that-is-the-question-we-are-at-a-transformative-moment-in-human-history/ (accessed 2023-07-12).

Everything seemed acceptable until companies with the necessary human and financial capital embarked on the quest for "Artificial General Intelligence" (AGI). An AGI refers to "an AI agent that is comparable to or 'smarter' than a human".[81]) Sender and Bekker differentiate between two moral approaches: "teleological and deontological perspectives". The first approach requires one to look at the final goal of the enterprise and the final outcomes and consequences in this regard. Will this be "significant advancements and improved quality of life" or "mass unemployment, the exacerbation of social inequalities and a monopolisation of AI power and control"?[82] Sender and Bekker do not (yet) place their bets on which eventuality is most likely to occur. The second approach emphasises "adherence to moral principles and duties". This would involve scrutinising and weighing values such as free research against biases and discrimination based on training data. It also involves the contentious dispute between using open-source and closed-source software (which is also a long-lasting copyright issue).

Mention has already been made of the EU's pioneering role in specialised legislation with regard to AI. In an article entitled "EU Lawmakers Back Transparency and Safety Rules for Generative AI",[83] Lomas describes the latest amendments to the bloc's draft AI legislation, which deals with:

- "real-time" remote biometric identification systems in publicly accessible spaces;
- "post" remote biometric identification systems, with the only exception of law enforcement for the prosecution of serious crimes and only after judicial authorisation;
- biometric categorisation systems using sensitive characteristics (for example, gender, race, ethnicity, citizenship status, religion, political orientation);
- predictive policing systems (based on profiling, location or past criminal behaviour);
- emotion-recognition systems in law enforcement, border management, workplace, and educational institutions; and
- indiscriminate scraping of biometric data from social media or CCTV footage to create facial recognition databases (violating human rights and right to privacy).

Lomas adds that Members of the European Parliament (MEPs) have agreed on a number of important amendments to the EU's latest AI legislation, including "foundational models which underpin generative AI technologies like OpenAI's ChatGPT".[84] Commentators from the digital rights group EDRi[85] are

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[81] What is worrying is that these skills could, *inter alia*, include "computer law", which for the present author means a potential loss in personal job security!

[82] Sender and Bekker https://www.dailymaverick.co.za/article/2023-07-09-to-pause-ai-or-not-to-pause-ai-that-is-the-question-we-are-at-a-transformative-moment-in-human-history/.

[83] Lomas https://techcrunch.com/2023/05/11/eu-ai-act-mep-committee-votes/.

[84] *Ibid.*

worried, however, about "predictive policing", which might amount to "a form of automated racial profiling", especially because of the degree to which "mass surveillance practices" are being used across Europe. The group also lists some other uses of AI, mostly relating to privacy, that "are just too harmful to be allowed".[86]

It is important throughout to bear in mind that, while laudable, the EU's efforts in this regard remain a work in progress that may still be amended before reaching a final form.

Even though South Africa has not yet produced draft legislation in this regard, an interesting local White Paper does provide some pointers to the future. In March 2019, the South African Department of Science and Technology produced a "White Paper on Science, Technology and Innovation".[87] After an introduction setting out the evolution and performance of a National System of Innovation (NSI), the Paper looks to the future and to a final "Coherent and Inclusive National System of Innovation". This should include "investment in science that has enabled knowledge breakthroughs in, for example, biotechnology, *AI*,[88] nanotechnology, synthetic biology and the basic sciences". In Chapter 4,[89] the "Fourth Industrial Revolution" (4iR) is specifically mentioned. Requirements for a successful implementation in South Africa would necessitate "a coordinated national policy response", "new institutional arrangements to manage convergence" as well as expanded research and development "aimed at the enabling technologies". These developments would necessitate research at universities and, it is hoped, would strengthen an appropriate South African strategy for AI. In this regard, a changed regulatory framework, able to address "issues such as the impact of the fast-changing ICT/telecommunication and AI environment" is needed. This should also include a steering committee to look at "potential job losses in affected industries".[90]

Notwithstanding that South Africa has not yet seen any draft legislation in this regard, valuable research (in areas such as AI and programs such as ChatGPT) is being carried out at South African universities like the University of the Western Cape, North-West University and Rhodes University.

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85 European Digital Rights, an association of human rights organisations from across Europe.
86 See, for instance, "Why EU Needs to Be Wary That AI Will Increase Racial Profiling" (22 April 2021) https://edri.org/our-work/optimising-injustice-ai-used-to-predict-crime-will-increase-discrimination-and-surveillance/ (accessed 2023-12-17).
87 Approved by the SA Cabinet and available online at https://www.gov.za/sites/default/files/gcis_document/201912/white-paper-science-technology-and-innovation.pdf or hard copies from the Director-General, Department of Science and Technology, Private Bag X894, Pretoria 0001.
88 Artificial Intelligence (own emphasis).
89 Specifically at par 4.11.4 of the White Paper.
90 *Ibid.*

A universal issue to be resolved in order to pass adequate legislation has been raised in the discussion of tort law under heading 5 5. In the event of "mistakes" by 4iR, should strict liability be imposed upon its owner or the person using the program? Perhaps the company manufacturing or marketing the software, usually with "deep pockets", would form a more attractive target for civil or criminal litigation? Why not cite, or charge, both these groups in order to hold them "individually and severally liable"?

Whatever its end goal, it is clear that the world, including South Africa, is in urgent need of perspicacious and flexible legislation in this regard. The arrival of 4iR will have deep-ranging legal as well as social consequences, probably surpassing that of the arrival of the printing press and of the personal computer.