POLICY ACTION NETWORK

AI AND DATA IN SOUTH AFRICA'S FINANCE SECTOR: TOWARD FINANCIAL INCLUSION

SUMMARY

Despite the finance sector's ever-increasing portfolio of 'inclusive' financial solutions which promote access to financial services for a broader segment of the population, the use of AI and advanced data processing by the industry have the potential to widen inequalities and create opportunities for manipulation and exploitation of customers through detailed data collection and analysis.

This Topical Guide examines possible implications of the increasing use of AI and data in the South African financial services industry. It proposes a human rights-based approach to AI development in this sector, focusing on microcredit and fintech.

The Guide identifies some of the benefits and risks associated with the direction of current AI development in this field and concludes by offering recommendations to reduce potentially exploitative practices and promote meaningful financial inclusivity.

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ABOUT THIS TOPICAL GUIDE

This series of PAN Topical Guides seeks to provide key research insights and policy considerations for policy-makers, and other interested stakeholders, on how data-driven systems and technologies, including AI need to be developed, used and safeguarded in a manner that aligns with the transformation objectives of South Africa. Each Guide outlines ways in which South Africa may respond to the growth of data-driven systems and technologies, including AI, to foster and inculcate a more inclusive and equitable society, rather than deepen divides.

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INTRODUCTION

This Guide discusses some implications that artificial intelligence (AI) may have for South Africa's financial sector. Challenges are bifurcated, South Africa has a sophisticated, technologically advanced banking sector that serves 40% of the adult population, but must grapple with widespread financial exclusion[1] and rising household indebtedness (50% of gross income in 2003, 78% in 2015).[2] This suggests the financial sector does not adequately cater for the needs of the people it serves. Indeed, reforms aimed at deepening the financial system (as AI is expected to do) have not succeeded in enabling broader access. Data-driven technologies in key transformation segments risk entrenching discriminatory practices, including through the use of predatory lending and borrowing practices.[3] AI thus steps into a sector that has 'reflected and reinforced two separate economies in South Africa'.[4]

The National Treasury draft paper on financial inclusion does not list AI as an inclusionary tool, yet it could assist in realising a number of the paper's priority policy pillars.[5] AI is uniquely positioned to solve traditional limiting factors including, mistrust of institutions, lack of documentation and inappropriate products, which hamper broader adoption of financial products.[6] Conversely, AI may unwittingly entrench these limitations. AI can drive efficiencies and cost effectiveness, unlocking more opportunities to service financially excluded people.[7] At the same time, care must be taken to ensure that emerging applications do not enable further exploitation of vulnerable groups.[8] AI's disruptiveness can significantly affect the regulatory environment, which emphasises stability and consistency through well established, comprehensive legislation.[9] Its adoption therefore creates new policy opportunities and risks. Improving the range, quality and availability of financial services through AI must remain the priority and policy development should focus on the *suitability* of products, specifically meeting the needs of the poor to drive down poverty.

HUMAN RIGHTS AND FINANCIAL SERVICES

In South Africa all sectors are mandated to follow the rule of law established by the Constitution. The introduction of AI should remain constitutional and within the bounds of constitutionally protected rights. Potential issues arise through the ways 'big data'[10] and machine learning are used. Both involve accessing and analysing vast, aggregated and 'anonymous' datasets to identify patterns about consumer behaviour in which 'data subjects'[11] may not even recognise themselves. These patterns can 'turn seemingly innocuous data into sensitive, personal data', which consumers have limited rights to; can be reconstructed to identify consumers;[12] and can promote unintended reproducible or automatically reinforced biases as a result of skewed distributions in training data.[13] As a technology created by humans, AI remains susceptible to human faults and flaws – only that AI tends to amplify these flaws, leading to elevated privacy, dignity and discriminatory concerns. As an example, limited loan history and demographic data may inadvertently lead to discrimination on the basis of race and gender, with no clear reason or basis provided by AI algorithms as to why a decision was made.[14] Moreover, these decisions can be fully automated, highly personalised and instantaneous, leaving the consumer unable to determine whether the assessment was fair and representative.[15] Where limited or no data exists, a dataset used to develop a new service or product may rely on data that excludes a vulnerable group, inadvertently replicating past discrimination.[16]

These risks necessitate human rights-based oversight to avoid exacerbating existing in-equalities and discriminatory practices.[17] In South Africa, consequences can be far reach-ing; a failed loan application could lead to inad-equate amounts to live on, causing debt spirals that place strain on one's ability to access constitutionally protected socioeconomic rights, including housing, food and water.[18]

Developing AI in ways that are explainable, understandable and build trust will go a long way toward mitigating these potential concerns. Consensus amongst researchers is that prin-ciples of fairness, transparency, accountability and control must be taken into account.[19]

DIGITISATION: ADVANCEMENT OR TAKING ADVANTAGE

South Africa's Intergovernmental Fintech Working Group (IFWG)[20] describes identification as key to unlocking participation in all aspects of life, not just finance. Digital identification grants the individual access to financial services. Globally, over a billion people have no form of officially recognised identity, and, of those who do, over half are unable to make use of their identity digitally.[21] Yet, even as new technology ensures more citizens have such identities, there is a sense of irony in that increased access to digital data can lead to opportunistic exploitation of the people most in need of the access.[22] Because of the rapidity at which it processes data and provides information, AI could compound this problem.

As an example from a prominent court case (using less capable technologies), predom-inantly illiterate social grant beneficiaries found themselves part of a dispute where the payment service provider (PSP) tasked with digitising and administering their grants, was accused of predatory marketing. Many found their grants at the mercies of unscrupulous policies, schemes and charges that were often deducted before receiving funds into their accounts. Moreover, the companies offering these schemes had gained access to confiden-tial personal details via an alleged data leak. Digitisation of the payment system had creat-ed a new avenue for exploitation.[23]

Importantly, this incident was not isolated, and the problem not limited to PSPs. Findings from a University of Pretoria Law Clinic Report noted that, in one company, low-income employees were approached and coaxed into signing loan agreements in unfamiliar languages. Though debtors made incremental payments, garnishee orders were issued to collect on exponentially rising debts.[24] Access to AI-processed datasets can generate detailed insights to understand and entice customers through targeted offerings, under the guise of legitimacy. Even where sinister motive is absent, the algorithms analysing these datasets can produce unpredicted and unanticipated results. National standards incorporat-ing algorithmic checks and balances would contribute to greater responsibility and account-ability.[25]

CREDIT AND CONSUMER PROTECTION

Since 1994, redressing past discriminatory practices has been a focal point of the South African government. Under the previous dispensation, access to financial services for previously disadvantaged people was principally administered by Mashonisas (informal township-based moneylenders). A 1992 exemption to the Usury Act,[26] for the first time, allowed the vast majority of the population access to formal credit. However, loans granted were exempt from interest-rate restrictions and discriminatory practices flourished. This largely unregulated microlending environment was characterised by high interest-rates, automatic loan payment deductions and other abusive practices – leading many further into debt.[27] Subsequently, gradual measures were enacted to aid transformation. The National Credit Regulator, established in 2006, was mandated to develop an accessible credit market focusing on the needs of the historically disadvantaged.[28] Government support remained limited to legislation and facilitation, and service delivery was outsourced with unintended consequences.[29] As noted above, the South African Social Security Agency's outsourcing to third party PSPs of payment technology development and implementation remains a striking example.[30] Indeed, high rates of predatory lending have meant technological initiatives intended to uplift impoverished households instead led to increased debt, or even more dire consequences. The labour disputes leading to the Marikana massacre were partially attributed to over-indebtedness caused by predatory and abusive lending and debt collection practices that left mineworker take-home pay practically non-existent.[31] This highlights the necessity of plugging any potential regulatory deficiencies with strong pro-poor safeguards to ensure that AI does not enhance any power and information asymmetries existing between consumer and company.[32]

The current regulatory framework's strong transformation focus seeks to: (i) redress past discriminatory practices; (ii) provide access and inclusivity to financial services; and (iii) protect the rights of vulnerable groups. The Financial Sector Regulation Act[33] regulates and supervises financial service providers with the aim of improving market conduct, protecting customers and providing for the protection and promotion of constitutionally protected rights. The National Credit Act[34] (NCA), enacted to address reckless and predatory credit lending practices, calls for a fair and non-discriminatory marketplace.[35] It requires responsible credit granting and the promotion of black economic empowerment and ownership through making credit available to the historically disadvantaged. Finally, the Consumer Protection Act[36] (CPA) affords consumers numerous protections in the promotion of a 'fair, accessible and sustainable marketplace for consumer products and services'.

AI's efficiencies and predictive capabilities present an opportunity to more fully realise these legislative objectives. Pre-emptive policy discussion will help maintain this transformative trajectory. Indeed, through AI, highly personalized products, better suited to individual circumstance, can be developed, providing a wider range of services and opening the sector to more people.[37] Technology has already expanded banking capabilities into grocery stores, post offices and retail outlets, and introduced mobile banking, agent banking, internet banking, e-wallets and geo-payments. Broader penetration is tangible; the Financial Sector Charter of 2004[38] aimed to have at least 80% of all South Africans within 20km of a transaction point. The Financial Sector Code of 2012 adjusted this objective down to 5km for 85% of individuals (it achieved 74% in 2013).[39] Further innovation through AI can have marked benefit, however, it remains important to caveat these potential successes with other discussion points in this guide. Access to financial services has not always translated into beneficial usage, with many of these solutions having high dormancy rates.[40]

Dealing in Data

AI will profoundly reshape finance. We can anticipate a future where the operational efficiencies derived from data use are necessary for sustaining cost advantage; precise risk calculation and efficiencies replace mass production with tailored experiences; and the dependence on human ingenuity is replaced by augmented performance.[41] AI's key disruptive advantage lies in its ability to allow for more efficient allocation of resources, which, in theory, can improve productivity and service delivery.[42] AI is the perfect workhorse. Unlike its human contemporaries, it can automate routine transactions, perform comprehensive risk assessment and trade securities without ever needing to rest or recover.[43] Moreover, AI is bringing solutions to traditional problems, including through the removal of paperwork, replacing the need for physical 'know your customer' documentation with photographs, and providing online platforms that offer accessible financial education.[44] However, as financial infrastructure is remade and recast, policy-makers should remain mindful that AI is boldly moving the financial sector into uncharted waters.[45]

More sophisticated and opaque data processing techniques may increase the difficulty in detecting predatory practices. Research indicates that 'the extraction of money works as the perfect reward signal for a learning algorithm [and] we can expect AI systems to improve rapidly in their ability to identify and profit from misbehaviour.'[46] Furthermore, in dealing with consumers, extraction is considered a one-way process that connotes a 'taking from' rather than either a 'giving to,' or a reciprocity of 'give and take', with AI processes typically occurring without dialogue or consent.[47] In South Africa, the CPA could be relied upon to mitigate potentially one-sided practices benefiting from data extraction (bait marketing), however, in its current form it might not be equipped to deal with the nuances AI presents. Further, these protections are only of value to consumers who are aware of unfair interactions and their rights under the CPA. Awareness of basic consumer rights should continue to be promoted through policy, especially for vulnerable groups. The Protection of Personal Information Act[48] (POPIA) has gone some way towards mandating this by requiring informed consent; that is, one should know why and for what reason data is being collected.[49] Such consent should be aligned to CPA requirements of understandable and just contract terms, through plain language. Government and the financial sector are already active in the financial literacy space. Data and AI-related education could be an extension of their efforts, with policy mandating AI and consumer communication in local languages; something rarely catered for.[50]

The European Union's (EU) General Data Protection Regulation[51] takes this one step further by prohibiting machine-only decision making, where such decisions produce legal effects for consumers. Having independent algorithm auditors vet AI decisions is important. Some researchers have gone as far as to describe AI adoption as more akin to the re-calibration of society than technological advancement. Indeed, Google's business model (emulated by numerous fintech companies and start-ups), serves to 'predict and modify human behaviour as a means to produce revenue and market control' and functions by 'incursions into legally and social undefended territory until resistance is encountered',[52] resulting in data enriched corporations that have no need for any institutionalised reciprocities with their employees and customers

META-DATA, PRIVACY AND POPIA

POPIA governs data protection and privacy in South Africa and aims to protect personal information processed by public and private bodies. Despite POPIA's extensive definition of 'personal information', it may not extend to meta-data. Meta-data includes the automatic records of everything people do when engaging with their devices, without having to access underlying 'personal' data. One example relates to the spending habits and history contained on a device, such as the places one shops and the times and days one is likely to shop and spend money.[53] In China, an AI-powered app, operating without any human assistance, issues millions of loans by scrutinising factors, including, the speed at which one enters their date of birth and their phone's battery power, to determine their ability to repay a loan.[54] Meta-data analysis scrutinises and recognises millions of weak features that human minds simply cannot comprehend.

Locally, meta-data usage tends toward optimising customer and transactional experience. Banks, which house extensive data, benefit from selling anonymised, aggregated data to third parties. As more comprehensive profiles of our personal lives and financial circumstances are developed, highly targeted click-through advertising campaigns can be deployed.[55] Viewed in conjunction with the rise of mobile and card-less payment solutions, such as SnapScan, meta-data becomes an enabler for ever more seamless transaction processes that encourage spending.

Where unscrupulous practitioners are able to pinpoint financial weaknesses and vulnerabilities, inappropriate applications could operate to the detriment of the uninformed. An area where guidance is needed from the Information Regulator relates to questions around where meta-data can be better addressed under POPIA, particularly with regard to advertising and marketing controls. Such guidance would support NCA and CPA objectives,[56] which both expressly prohibit advertisements and promotional materials designed to mislead or deceive consumers. It may even be worthwhile considering limitations similar to the ban on tobacco advertising.

Monopolies, Competition and Jobs

First-mover advantage gained from ground-breaking AI technologies can drive monopolistic, oligopolistic and anti-competitive behaviour.[57] The financial sector, led by a few large banks, tends to support this monopolistic trajectory: (i) banks can draw on large data sets to draw better insights and gain a competitive advantage;[58] (ii) banks can absorb the most promising fintech start-ups into their ecosystems through investment and acquisition;[59] and (iii) those that remain independent likely depend on these banks as key clients.[60] Backed by AI, financial sector growth may remain exclusionary, rendering mid-sized firms obsolete and denying small and informal businesses an opportunity to carve out their own niche.[61] The governing party in South Africa has called for sector-specific and second-tier banks as a means to improve financial service access and affordability, and to support inclusive growth. Regulators should be vigilant of oligopolistic behaviour that limits access to services, particularly for small and medium enterprises.[62]

There are conflicting views about how AI might affect the job market. Some believe AI is creating millions of more specialised, meaningful and skilled jobs. For example, the introduction of the automatic teller machine increased the number of bank tellers, who 'no longer had to spend time counting out bills [and] could focus on providing a better customer service experience'.[63] The alternative view sees AI as increasing inequality and exploiting highly skilled workers, whose job quality suffers when performing repetitive and dull jobs, including tagging and

moderating content to train AI datasets. A growing industry (estimated at 20 million globally in 2019), comprised largely of third-party contractors working outside of traditional labour protection laws, are believed to be inequitably reimbursed for roles that are essential to the proper functioning of AI systems.[64] End users remain none-the-wiser to the fact that their AI systems are still very much human owned and operated. It remains to be seen whether AI is creating meaningful job opportunities, or any jobs at all, as accelerated job cuts are anticipated.[65]

What is evident is that the effects of AI need to be carefully monitored to ensure the technology is not just masking existing inequalities.[66]

With so much at stake, it would be beneficial for policy-makers, academics, developers and financial sector leaders to work together to develop guidelines that take into consideration South Africa's unique challenges and stress the ethical development of future AI products that serve to meaningfully augment human processes, rather than to automate and replace them. This may go a long way towards building a better trust relationship with AI. In this regard, the European Commission has developed a comprehensive framework as to what trustworthy AI might look like.[67]

FINTECH IN SOUTH AFRICA

The term 'fintech' is an abbreviation of 'financial technology' and it refers to software and other modern finance technologies used to automate, improve, augment, streamline, digitise or disrupt financial services and products. Increased adoption can be credited to the digitisation of banking services and the creation of the Internet, which have established a '24-hour marketplace for financial services' where 'money transfer, lending, loan management and investing [are expected to be] effortless, secure and scalable, ideally without the assistance of a person or [the need to] visit a bank'.[70] Fintech products and services achieve this for both day-to-day tasks and technically complex activities through back-end and front-end software, hardware, algorithms and applications for computers and other mobile tools.[71]

In South Africa, fintech penetration remains relatively low. As of May 2019, the largest fintech segment, payments (comprising 30% of all fintech products) only accounted for 3% and 6% of all transactional values and volumes respectively. Yet fintechs, representing 0.4% of market, have issued 1.5% of all loans in the segment.[72] These numbers are indicative of a future industry where fewer players are able to achieve more than their traditional alternatives, with less resources. Though the addressable market for fintech is large, the financial sector nevertheless remains dominated by traditional financial services providers with low quality inclusionary products. This is an opportunity for fintechs to leverage AI to access unserved consumer segments.[73] Fintech is likely to grow rapidly in coming years; in 2017 forecasted growth was 71% for South Africa, ranking the country third behind only China and India.[74]

RIGHTS-CENTRIC GOVERNANCE

The Ruggie Principles and AI

To ensure AI is harnessed in a truly inclusive manner, the United Nations Guiding Principles on Business and Human Rights (Ruggie Principles)[75] may guide the assessment of rights implications and risks, prior to AI's adoption. As internationally developed and agreed-upon standards for business and human rights, the three-pillar framework of "protect, respect and remedy"[76] proposes private organisations re-align their operations in a manner that respects human rights.[77] Compliance with the Ruggie Principles would oblige financial institutions to conduct human rights impact assessments beforehand, rather than after the fact when violations may have occurred. Such analysis could serve as the basis for collaborative and meaningful consultation with affected groups and stakeholders, identifying potentially discriminatory elements that businesses might otherwise be unaware of.[78] It has been noted that rights-based functions were not addressed in a recent consultancy report prepared for the South African government pertaining to the importance of digital technologies to society and their potential in South Africa.[79]

King IV, Stakeholder Engagement and Technology and Information Governance

Ruggie Principles risk assessments could complement the King Code on Corporate Governance for South Africa's (King IV) corporate governance principles and practices relating to stakeholder engagement and technology and information governance. Compliance with King IV is mandatory for all companies listed on the Johannesburg Stock Exchange[80] and organisations are required to foster ethical culture, leadership and legitimacy 'exemplified by integrity, responsibility, accountability, fairness and transparency'. Such principles mirror AI reports on ethical development.[81] Amongst other things, King IV compels governing bodies to comply with the Constitution and approve policies that adopt non-binding rules, codes and standards

in ways that support being ethical and a good corporate citizen.[82]

The technology and information governance principles in King IV promote ethical and responsible usage, as well as the creation of an information architecture that supports, inter alia, integrity, the protection of privacy of personal information and the continual monitoring of security of information.[83] When engaging with stakeholders, organisations are required to adopt a stakeholder-inclusive and sustainable approach that is attuned to the contextual opportunities and challenges in which they operate. One key principle is that regard must be had for legitimate and reasonable needs, interests and expectations of (material) stakeholders.[84] It would seem that the integrity of King IV reporting would be enhanced by adopting human rights-based assessments, which explore the implications of AI more directly with vulnerable groups who stand to be affected, whether by: (i) their exclusion from participation due to financial circumstance; or (ii) the effect the technology may have on their daily lives.

Labour and Small Business Participation

Policy-makers and technology firms are under pressure to implement initiatives that can enable more equitable participation and sharing of benefits from technological progress. In the global digital labour market, Africans tend to be employed in low wage-earning positions – such as domestic and e-hailing piecework - compared to other regions, including when compared to other developing countries. There is also a significant wage gap between males and females.[85] In the EU and United States (US), there is wide debate about how gig workers participating in the 'platform economy' may get better job security and benefits,[86] as well as easier access to now valuable stock options (although limited to the core workforce).[87] Emerging AI-driven fintech firms should be aware of these labour trends. As a local precedent from another sector, in 2011, the Kumba Iron Ore Envision

share scheme saw 6,200 non-managerial employees each benefit from an after-tax pay-out of ZAR 346,000 (total pay-out exceeded ZAR 2.3billion).[88] In the years preceding, employees were given extensive financial management training. The scheme comprised a fraction of the company's shareholding and was life changing for its beneficiaries. This is a way to ensure that broad-based black empowerment could enrich more than an elite few and pre-emptively address the prospect of large-scale job loss. In light of the financial sector's increasing automation and recent job losses, firms may also look to strategies used during COVID-19 lockdowns to mitigate the impact on affected employees, such as covering pay gaps, providing up-skilling and supporting placement at new firms.[89]

Finally, investment models for the fintech industry may support the sustainable deployment of resources to support a more inclusive and competitive sector. As an example instrument, the 'Section 12J' incentive offered up to a 100% tax break for investing into new ventures, which could have stimulated competition by smaller fintech enterprises in the financial sector.[90] However, financial services were excluded from qualifying under this scheme, and abuse of the instrument led to it being abolished in the 2021 Budget statement.[91] Addressing investment into and operation of venture capital is important for the way fintech and AI-enabled financial services develop in South Africa. Venture capital is considered the backbone of US technology company growth, and humanistic service-focused venture capital has been identified as critical for the future.[92] Policy initiatives supporting similar investment mechanisms that target emerging and previously disadvantaged entrepreneurs with bright ideas and limited capital, will certainly prove beneficial for all involved.

SUMMARY OF RECOMMENDATIONS

1   **Data regulation for AI**: Given the well-documented relationship between weaknesses in data governance and the potential for negative AI outcomes for society, it is critical that the processes and institutions for regulating data be improved to ensure AI promotes inclusive human rights. This recommendation includes equipping the Information Regulator to address the increased collection and reuse of meta-data, the role of informed consent in AI-based applications, and the governance of automated decision making broadly.

2   **Relevance and understandability**: The design of AI-based products, especially those supporting access to social services, should be useable for individuals with low financial and computer literacy. Where algorithms are in use, the reasons for automated decisions should be explainable and understandable, in plain and local languages.

3   **Consumer protection and sustainable credit**: Controls on targeted advertising and marketing practices enabled by AI should be considered. In particular, increased oversight over AI use in credit provision is needed to ensure predatory lending and discriminatory practices are not enhanced. Independent human algorithm auditors could be appointed to assess whether AI is generating unintended and unanticipated discriminatory outcomes.

4   **Corporate governance and AI**: The financial services sector can build on its extensive understanding and experience with existing corporate governance principles to ensure ethical use of AI. For example, synergies exist between King IV and emerging ethical AI frameworks which emphasise fairness, accountability, responsibility and transparency. The need for corporates to conduct ex-ante human rights impact assessment is an important consideration outlined in the Ruggie Principles.

5   **Labour and small business participation**: In light of current and possible job losses in the financial services sector due to automated systems, new ideas for mitigating the impact on affected employees need to be explored by firms, and existing safety nets should be implemented efficiently by government. Instruments for encouraging more equitable recruitment, remuneration, sharing of benefits and investment into emerging fintech enterprises – such as through Section 12J-like incentives - should be (re)considered to ensure there is increased participation by previously disadvantaged individuals and entrepreneurs.

[1] Kirsten, M. 2006. Policy initiatives to expand financial outreach in South Africa. World Bank - Brookings Institute Conference, 2.

[2] The World Bank. 2018. Achieving Effective Financial Inclusion In South Africa: A Payment Perspective. The World Bank, 9.

[3] The Minister of Social Development of the Republic of South Africa & others v NET1 Applied Technologies South Africa (Pty) Ltd & others; The Black Sash Trust & others v The CEO: The South African Social Security Agency & others ZASCA.

[4] Schmulow, A., Woker, T. and van Heerden, C. 2019. South Africa's National Credit Act: successes (and failures) in preventing reckless and predatory lending. Journal of Business Law 122, 122.

[5] National Treasury. 2020. An Inclusive Financial Sector for All. Draft for consultation. Pretoria: Republic of South Africa. http://www.treasury.gov.za/comm_media/press/2020/Financial%20Inclusion%20Policy%20-%20An%20Inclusive%20Financial%20Sector%20For%20All.pdf.

[6] Abrahams, R. 2017. Financial Inclusion in South Africa: A Review of the Literature. South African Accounting Association, 640.

[7] IFWG (Intergovernmental Fintech Working). 2019a. Fintech Workshops Report. IFWG. The IFWG is a joint initiative between South Africa's financial sector regulators and policy makers. It comprises the Financial Intelligence Centre, Financial Sector Conduct Authority, National Treasury, National Credit Regulator, South African Revenue Service and the South African Reserve Bank.

[8] Moodley, N. 2019. Financial inclusion must extend to SMMEs for significant impact. Moneyweb https://www.moneyweb.co.za/news/tech/financial-inclusion-must-draw-in-smmes-to-have-significant-impact/.

[9] Legislation includes: Financial Sector Regulation Act 9 of 2017; Financial Advisory and Intermediary Services Act 37 of 2002; National Payment Systems Act 78 of 1998; National Credit Act 34 of 2005; Banks Act 94 of 1990; Insurance Act 18 of 2017; Financial Markets Act 19 of 2012; Consumer Protection Act 68 of 2008.

[10] In popular understanding, big data refers to extremely large data sets which are increasingly generated in near real-time, and which have significant variety. This data can be computationally analysed to reveal patterns and trends related to a person's behaviour. See Gewirtz, D. 2018. Volume, velocity, and variety: Understanding the three V's of big data. ZDNet. https://www.zdnet.com/article/volume-velocity-and-variety-understanding-the-three-vs-of-big-data/

[11] Terminology for the person to whom the personal information/ data relates to, as set out under the Protection of Personal Information Act 4 of 2013.

[12] See p.13 in EPRS (European Parliamentary Research Service). 2020. The ethics of artificial intelligence: Issues and initiatives. EPRS.

[13] See p.16 in EPRS. 2020.

[14] Moosajee, N. 2019. Fix AI's Racist, Sexist Bias. Mail & Guardian. https://mg.co.za/article/2019-03-14-fix-ais-racist-sexist-bias/.

[15] Truby, J., Brown, R. & Dahdal, A. 2020. Banking on AI: mandating a proactive approach to AI regulation in the financial sector. Law and Financial Markets Review, 112. Also see note 11 on p.16 in EPRS. 2020.

[16] Lin, T. 2019. Artificial Intelligence, Finance, and the Law. Fordham Law Review, 536.

[17] See p.16 in EPRS. 2020. Also see: Adams, R. et al. 2021. Human Rights and the Fourth Industrial Revolution in South Africa. HSRC Press.

[18] The Constitution s27(1)(b). See also p.127 in Schmulow et al. 2019.

[19] See p.29-33 in EPRS. 2020..

[20] See above: IFWG. 2019a.

[21] See p.14 in IFWG. 2019a.

[22] SAHRC (South African Human Rights Commission). 2017. Human Rights Impact of Unsecured Lending and Debt Collection Practices in South Africa. SAHRC, 41.

[23] See paragraphs 31 and 34 in The Minister of Social Development of the Republic of South Africa & others v NET1 Applied Technologies South Africa (Pty) Ltd & others

[24] See p.41 in SAHRC. 2017.

[25] See p.33-34 in EPRS. 2020.

[26] Usury Act 73 of 1968 (now repealed). Also see: Paradigm Shift. 2010. The Microcredit Sector in South Africa: An Overview of the History, Financial Access, Challenges and Key Players. Paradigm Shift. https://www.gdrc.org/icm/country/za-mf-paradigmshift.pdf.

[27] See above: Paradigm Shift. 2010; Kirsten, M. 2006. Also see: von Fintel, D. and Orthofer, A. 2020. Wealth inequality and financial inclusion: Evidence from South African tax and survey records. Economic

Modelling, 10, 568-578.

[28] See above: Paradigm Shift. 2010.

[29] See p.8 and p.11 in Kirsten, M. 2006.

[30] Kidd, S. 2019. Standing in the Sun: Human Rights Abuses in the Name of Financial Inclusion. Center For Financial Inclusion. https://www.centerforfinancialinclusion.org/standing-in-the-sun-human-rights-abuses-in-the-name-of-financial-inclusion. Also see p.2 in von Fintel, D. and Orthofer, A. 2020.

[31] See p.137 in Schmulow et al. 2019.

[32] See p.2 in von Fintel, D. and Orthofer, A. 2020. Also see: Kidd, S. 2019.

[33] Financial Sector Regulation Act 37 of 2002.

[34] National Credit Act 34 of 2005.

[35] See p.122 in Schmulow et al. 2019.

[36] Consumer Protection Act 68 of 2008.

[37] See p.21 in EPRS. 2020.

[38] The Financial Sector Charter was replaced by the Financial Sector Code.

[39] See p.638 in Abrahams, R. 2017. Also see p.26 in The World Bank. 2018.

[40] See above: Moodley, N. 2019.

[41] World Economic Forum. 2018. The new physics of financial services: How artificial intelligence is transforming the financial ecosystem. World Economic Forum. https://www2.deloitte.com/ro/en/pages/financial-services/articles/new-physics-of-financial-services.html. Also see p.13-14 in University of Pretoria. 2018. Artificial Intelligence for Africa: An Opportunity for Growth, Development, and Democratisation. University of Pretoria.

[42] See p.5 and 8 in University of Pretoria. 2018.

[43] See p.10 in World Economic Forum. 2018; See p.546 in Lin, T. 2019.

[44] See p.14 in University of Pretoria. 2018.

[45] See p.8 in World Economic Forum. 2018.

[46] See p.9 in Russell, S. 2019. Human Compatible: AI and the Problem of Control. London: Allen Lane.

[47] See p.79 in Zuboff, S. 2015. Big other: surveillance capitalism and the prospects of an information civilization. Journal of Information Technology, 79.

[48] Protection of Personal Information Act 4 of 2013.

[49] See p.122 in in Schmulow et al. 2019.

[50] See p.81-82 in The World Bank. 2018. Also see: p.137 in in Schmulow et al. 2019, where credit providers and collection attorneys took advantage of financially illiterate mineworkers. Also see: Nyabola, N. 2019. Living in Translation. African Arguments https://africanarguments.org/category/living-in-translation/, for insights into language and technology.

[51] General Data Protection Regulation 2016/679 Article 22. Also see: p.112 in Truby, J. et al. 2020.

[52] See p.75 and p.78 in Zuboff, S. 2015.

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