The Impacts of Emerging Technologies in the Future of Law and Legal Practice: A Case of Kenya

By: ***Benjamin Arunda****

Abstract

The internet was a game changer in every industry. It gave everyone access to everything and to everyone else. It redefined privacy and transformed communication, transaction and information. It is the reason this decade is often referred to as "the information age". The legal industry too has felt the influence of the internet. Law is widely seen as a tool for social engineering. Law does not and cannot exist in a vacuum; it exists and advances the relationships or transactions between states, intra-state agencies, states and their citizens, and among citizens. Contemporary technologies have affected these various aspects of relationships, and emerging technologies such as Artificial Intelligence (AI), Blockchain and Data Analytics are poised to deepen the impacts. As such, law has to metamorphose to meet the changing nature of transactions or relationships.

This paper discusses how these technologies will impact the future of law and the practice of it, with a particular focus on Kenya. Spanning across decades and jurisdictions, many lawyers, judges and other legal officers will experience disharmonies in written and unwritten laws in solving unique technology-related disputes. The available systems for dispensation of justice may also have to be recalibrated to exploit the strengths of the new technological infrastructures and innovations. Kenya's deliberate efforts to technological advancement is demonstrated by the pursuit of the Konza Technopolis Project, the establishment of a Blockchain and Artificial Intelligence Taskforce and the partial digitization of service delivery such as eCitizen and virtual courts. Adoption of more emerging and revolutionary technologies will likely have entrenched legal implications.

* *Certified Blockchain Expert (CBE), author of Understanding the Blockchain, Lead Blockchain Consultant at Chain Advice Blockchain Advisory, B.Com – Finance, ACCA-Skills, Student of Law at The University of Nairobi.*

Introduction

In February 2017, President Uhuru Kenyatta announced the establishment of a Blockchain and Artificial Intelligence Taskforce under the Ministry of ICT to champion the exploration of opportunities presented by emerging technologies. The taskforce released its report with recommendations in July 2019 after two years of exploration, and in summary stated, "The Fourth Industrial Revolution will result in massive transformations in the labour force, economy and productivity of our society."[1] Although none of the recommendations have been implemented, the fact that they have been communicated in the report means there is high likelihood of implementation in the future. The industry-specific recommendations will be discussed later in this paper. In underscoring Kenya's forward-leaning approach in leveraging emerging technologies for social and economic development, The Taskforce Report states that "emerging technologies have already allowed governments to leapfrog legacy infrastructure systems, generate economic growth and promote social inclusion for citizens."[2] The increasing use of robotics such as drones in photography and factory-floor and warehouse robots, NLP in language translation, cryptocurrencies in financial inclusion, and AI in customer service in Kenya is a sign of gradual penetration of these technologies in core industries. The role of emerging technologies in transforming legal transactions across industries is significant and its impacts in shaping the future of law are enormous. However, it is still a concern whether lawyers and law firms are ready to adopt these technologies as tools for achieving efficiency and mitigating costs.[3]

Kenya's increasing receptiveness in mobile money, smart phone literacy and internet penetration is key in its adoption of new technologies. At 87.2% internet penetration, Kenyans have the highest access to internet in Africa.[4] As

[1] Ministry of Information, Communication and Technology, *Emerging Digital Technologies for Kenya: Exploration and Analysis*, (Kenya, July 2019) 9 [1] (The Taskforce Report).

[2] *Ibid* [1]

[3] Kariuki Muigua, 'Legal Practice and New Frontiers: Embracing Technology for Enhanced Efficiency and Access to Justice', June 2020, 6.

[4] J. Clement, 'Share of internet users in Africa as of March 2020, by country' (Statistica, 18 November 2020)

at 30 September 2019, the mobile SIM card penetration level was at 112% with the number of active mobile subscriptions growing from 52.2 million in June to 53.2 million.[5] The growth in mobile subscriptions is attributable to the increasing accessibility of mobile network signals with up to 93% of the Kenyan population having access to 3G networks.[6] During the Covid -19 pandemic, Kenya's Judiciary turned to technology to minimize disruption of court processes and ensure efficient delivery of justice while also adhering to guidelines from World Health Organization that limit public gatherings.[7] Multiple courts held virtual hearings with parties allowed to file their petitions via a judiciary e-filing system. According to Kariuki Muigua, "Arguably, this has disrupted the profession in a way not experienced before."[8] The provisions and directions for e-filing are contained in the Gazette Notice No. 2357.[9] The increased internet coverage and access to communication gadgets such as smart phones by Kenyans made it possible for most people including advocates, students of law and parties to the trials to attend proceedings virtually.

Since the inception of the internet, there has been evolutionary and revolutionary innovation of new technologies hinged on the inherent capabilities of the internet. As at 2020, the top emerging technologies sparking conversations around key industries included: 5G, AI, Internet of Things (IoT), Serverless Computing, Virtual and Augmented Reality (AR/VR), Advanced Biometrics, Blockchain and Cryptocurrencies, Natural Language Processing (NLP), 3D Printing, Holograms, Robotics, and Quantum

<https://www.statista.com/statistics/1124283/internet-penetration-in-africa-by-country/> accessed 19 January 2020.

[5] Communications Authority of Kenya, 'First Quarter Sector Statistics Report for the Financial Year 2019/2020' (CAK, July – September 2019), 7.

[6] *Ibid* 7 [1].

[7] Beatrice Hongo and Julie Marks, 'Pandemic prompts innovation by Kenya's justice system' (United Nations Office on Drugs and Crime (UNODC)) <https://www.unodc.org/easternafrica/Stories/pandemic-prompts-innovation-by-kenyas-justice-sector.html> accessed 19 January 2021 [1].

[8] N 3, 2.

[9] Gazette Notice No. 2357, 'Practice Directions on Electronic Case Management', Cap. 21 of the Civil Procedure Act.

Computing.[10] Most of these technologies will have significant impacts on key industries such as Finance and Banking, Agriculture, Ecommerce and Logistics, Manufacturing and others. In every industry there is a legal implication accompanying every transaction, thus a change in the nature of those transactions will subsequently affect the relevant law and the practice of it. As Willem Gravett opines,

> *"The legal profession is at a crossroads. Just as the other professions are undergoing tremendous upheaval, so it must be with the law. The legal world of tomorrow will bear little resemblance to that of the present. It will change more in the next twenty years than it has during the past two centuries."*[11]

The modern lawyer has to learn to cope with technological changes and use them in attaining effectiveness in the legal practice. For instance, using Wi-Fi, advanced online search tools, web conferencing, and Voice over Internet Protocol (VoIP) in communicating with clients, in legal research, in operations management at the law firms, in collaboration with global partners and in collecting, processing, managing and securing data.[12] Further, T du Plessis asserts that in litigation practice, lawyers may be required to have skills for using support tools and technologies for automated litigation and lack of such skills may hinder their client representation.[13]

Legal practice, especially commercial law, has over the years become industry specific with some lawyers or law firms specializing on particular industries. Industry-specific regulatory bodies have also been created across different jurisdictions to regulate activities in those particular industries. For instance, in Kenya the regulators include the Insurance Regulatory Authority (IRA), the Capital Markets Authority (CMA), the Central Bank of Kenya (CBK), the

[10] 'Ranking Influential Emerging Technologies for 2020' (Connected World, 15 July 2020) <https://connectedworld.com/ranking-influential-emerging-technologies-for-2020/> accessed 19 January 2020, [2].
[11] Willem Gravett, 'Is the Dawn of Robot Lawyer upon us? The Fourth Industrial Revolution and the Future of Lawyers.' PER/PELJ 2020, 23, 6.
[12] T du Plessis, 'Competitive Legal Professional's Use of Technology in Legal Practice and Legal Research' (2008) PER 21, 38 [2].
[13] *Ibid* 38 [3].

Kenya Revenue Authority (KRA), Law Society of Kenya (LSK), the Pharmacy and Poisons Board, and the Engineers Board of Kenya among many others.[14] These regulatory bodies are established by Acts of Parliament such as the Central Bank of Kenya Act Cap. 491 established the CBK as the banking industry regulator. The impacts of technology on these industries, especially those that affect transactions and professional practice, will have to be factored in by legislators in future amendments to the regulatory acts. Various aspects of law will be disrupted by the adoption of these technologies. For instance, massive adoption of robotics in factory floor roles that would otherwise be done by humans may deny many Kenyans their economic rights highlighted in Article 43 of the Constitution.[15] In future, employment laws may have to be reviewed and harmonized with the changing nature of workplace globally. Discussed below are how the various emerging technologies are impacting law and legal practice in different industries:

Finance and Banking Laws

In Kenya, and in most countries, the financial services industry is highly regulated and has a lot of barriers to entry. From taxation to insurance to banking, this industry operates under the watch of multiple regulators. Furthermore, this industry is poised to be significantly disrupted by most of the emerging technologies. Up to 66% of Africans remain unbanked despite traditional banking services finding their way into rural areas. In Kenya, mobile banking has increased access to banking with most people who cannot access traditional banking services using Mpesa or Airtel Money services. It

[14] The Central Bank of Kenya Act (Cap. 491), The Insurance Act (Cap. 470), The Capital Markets Act (Cap. 485a), The Kenya Revenue Authority Act (Cap. 469), Law Society of Kenya Act (Cap. 18), The Pharmacy and Poisons Act (Cap. 244), Engineers Act 43 of 2011, Engineers Registration Act (Cap. 530) and others.

[15] The provision of Article 43 of the Constitution of Kenya on social and economic rights is also buttressed by other provisions such as Article 55 (c) that states that "The state shall take measures, including affirmative action programmes, to ensure that the youth access employment". The creation of employment is key in granting economic liberation to the youth. The provisions of law on employment should, however, envision the negative impacts of increased technological adoption by key industries that ought to employ the youths, on roles that require semi-skilled labour such as factory floor and warehouse jobs. The conversation of the impacts of technology should be factored in when discussing the creation of jobs for the youth, because the global workplace is fast metamorphosing.

is important to note that the establishment of Mpesa was only possible because the CBK granted a regulatory compromise allowing a telecommunication company to provide banking services. The CBK Act did not have any express provisions that would prompt it to license a telecommunication company to offer financial services. At the juvenile start of Mpesa, Kenya's banking industry was performing fairly well although about 19 percent of Kenyans of the overall 35 million people in 2006 had access to banking services.[16] More Kenyans had access to mobile phones than to banking services. Statistic from Financial Access Survey in 2006 found out that for every Kenyan who could access a bank account, two others could access a mobile phone.[17] It was during that period that Mpesa applied for a license to operate in the financial service industry.

The CBK, after months of engagements, allowed Safaricom to launch its mobile money transfer service, Mpesa, into the market without the requisite regulatory license.[18] The banking industry players argued that it was unfair to allow a telecommunication company to operate in the same market without having the banking license.[19] The advancement of mobile phone technology and its subsequent penetration into the Kenyan populace impacted the banking industry outside the scope of regulatory provisions of the CBK Act. This kind of regulatory compromise or adjustments may be necessary in the wake of leapfrogging technological advancements.

There could be similar impacts on the banking industry by emerging technologies such as Blockchain, cryptocurrencies, big data and AI. For instance, the disruptive impact of Blockchain-based cryptocurrencies such as Bitcoin and Ethereum in the banking industry is already being felt globally.[20]With approximately $1 trillion market capitalization of the over

[16] Alliance for Financial Inclusion, 'Enabling mobile money transfer: The Central Bank of Kenya's treatment of M-pesa.' 2010, 2.
[17] *Ibid* 2.
[18] *Ibid* 2.
[19] *Ibid* 2.
[20] Benjamin Arunda, *Understanding the Blockchain: An In-Depth Overview of Blockchain and its Use Cases in Government, Banking, Insurance, Healthcare, Law, Manyfacturing, Education and Other Industries*. (GMN, 2018), p.19.

8000 cryptocurrencies listed on the coin rating site Coin Market Cap[21], the financial services regulators can no longer ignore these cryptography-based currencies. Although Blockchain technology has been associated with several benefits such as transparency in transactions, the uncertainties associated with cryptocurrencies are immense and require robust and up-to-date regulatory provisions to mitigate the risks. Adoption of cryptocurrencies pose a threat to the centralization of banking services that allows regulators to play the watch-dog role; and further such currencies may foster money-laundering and financing of terrorism activities.[22] Most countries do not have express regulatory provisions to regulate crypto-related activities thus most central banks have only managed to issue cautionary statements to that effect.[23] In the Banking Circular No. 14 of 2015, the CBK cautioned financial institutions against dealing in virtual currencies stating that they unregulated, untraceable and anonymous.[24] In the United States of America, the Security Exchange Commission (SEC) has not issued any industry-specific regulations to guide the crypto industry. In a recent spurt by SEC Commissioner Hester Peirce, she blamed the bureaucracy at the SEC for its slowness in responding to financial innovation. She stated:

> *"While we've been very slow in giving guidance, there is more and more interest from a wide spectrum of people, both inside the crypto space as*

[**Blockchain Technology:** This is a distributed ledger technology that uses independent nodes to validate transactions other than relying on a central institution such as a bank. The technology was created in 2008 by a pseudonym called Satoshi Nakamoto, and subsequently launched a cryptocurrency (a currency secured by cryptography) called Bitcoin that has grown in value to over $500 billion market cap within 10 years.]

[21] 'Today's Cryptocurrency Prices by Market Cap' <https://www.coinmarketcap.com> accessed 23 January 2021.

[22] Library of Congress (LOC), 'Regulation of Cryptocurrencies Around the World' (LoC, 30 December 2020) <https://www.loc.gov/law/help/cryptocurrency/world-survey.php> accessed 23 January 2021, [4].

[23] *Ibid* [3].

[24] Banking Circular No. 14 of 2015 from CBK to all Chief Executives of Commercial Banks, Mortgage Finance Companies and Microfinance Banks (18 December 2015).

Also see: CBK, 'Public Notice: Caution to the Public on Virtual Currencies Such as Bitcoin' (December 2015).

> *well as inside the traditional financial institutions who are asking us for guidance. The landscape is changing so quickly."*[25]

The SEC has in the recent past instigated legal suits against companies in the crypto industry that fundraised in the US such as Telegram which raised over $1 billion in the ICO of Gram token which ended up halting its token issuance[26], and Ripple in Civil Suit No. 10832 in the United States.[27] What makes cryptocurrencies difficult to sufficiently regulate is the confusion as to whether to treat them as assets or securities. In Civil Suit No. 08 of 2019 at the Milimani Commercial and Tax Division, where the issue of contention was whether or not a cryptocurrency called Kenicoin was a security and falls within the regulatory scope of the Capital Markets Authority (CMA). The applicant was involved in fundraising through ICO of Kenicoin. In disposition, Judge M.W. Muigai ruled that:

> **"The balance of convenience tilts in favour of Investor/Consumer protection through, inquiry, investigation and regulation of crypto currency/Kenicoin as security under Capital Market Authority, the defendant whose mandate is to regulate Capital markets and securities."**[28]

By that ruling, the honourable judge set a precedent that identifies cryptocurrencies as securities and are within the regulatory scope of the CMA. The buildup of discussions on the potential of Blockchain and cryptocurrencies in deepening financial inclusion in Kenya broke through into the Blockchain and Artificial Intelligence Taskforce Report released in 2018. The taskforce, in its recommendations, highlighted that Blockchain could be

[25] Kevin Reynolds, 'SEC Will be Forced to Give Crypto Guidance Despite Bureaucracy, Risk Avoidance: Peirce.' (Coindesk, 10 October 2020) <https://www.coindesk.com/sec-will-be-forced-to-give-more-guidance-about-crypto-peirce> accessed 23 January 2021, [1].

[26] Securities Exchange Commission (SEC), 'SEC Halts Alleged $1.7 Billion Unregistered Digital Token Offering' (SEC, For Immediate Release, 2019-212) <https://www.sec.gov/news/press-release/2019-212> accessed 27 January 2021.

[27] Securities and Exchange Commission v Ripple Labs Inc., Bradley Garlinghouse, and Christian A. Larsen, Civ. 10832 at the United States District Court, Southern District of New York (Filed on 22 December 2020).

[28] Wiseman Talent Ventures v Capital Markets Authority [2019] eKLR.

used to reduce cost of transactions.[29] Among the actionable steps that the Taskforce recommended is the full implementation of the Financial Technology Legal and Regulatory Sandbox.[30] This informs the argument posited in this paper that the legal frameworks reforms is necessary in the implementation of emerging technologies.

The conversations around the establishment of Central Bank Digital Currencies (CBDCs)[31] by central banks across the world has sparked a discussion on the shifts in the global financial regulatory environment. The widespread adoption of the CBDCs and the consequent obsolescence of fiat paper money would be ideal in mitigating the risks of tax evasion, financing of terrorism, money laundering and other illegal activities.[32] China's central bank is currently testing a digital currency in Shenzen in its issuance of 10 million yuan in form of the currency to 50,000 locals.[33] Most countries are currently considering the use of CBDCs or actually in the early stages of creating one. In Kenya, the CBK held discussions with international banks in the last quarter of 2020 to explore the possibility of creating and issuing a CBDC.[34]

The increasing growth of financial technologies (popularly known as Fintechs) in Kenya and globally will require an adjustments or provisions of law to advance innovation and to regulate their use. In Kenya, there has been a rising number of digital lending platforms such as Tala, Branch and 110 others, most of which charge too high interest rates compared to those standard bank

[29] N 1, p 17.
[30] N 1, p 17.
[31] CBDC is a digital form of a national fiat currency issued by the central bank instead of printing physical cash.
[32] Michael Bordo and Andrew Levin, 'Central Bank Digital Currency and the Future of Monetary Policy.' Working Paper No. 23711, National Bureau of Economic Research, August 2017, p. 4.
[33]'Shenzen residents test digital currency' (BBC News, 13 October 2020) <https://www.bbc.com/news/business-54519326> accessed 23 January 2021, [1].
[34] Bitange Ndemo, 'Dawn of Central Bank Digital Currency' (Business Daily, 5 November 2020) <https://www.businessdailyafrica.com/bd/opinion-analysis/columnists/dawn-of-central-bank-digital-currency-2731070> accessed 27 January 2021, [13].

interest rates and also use crude means in debt recovery.[35] According to study by the Digital Lenders Association of Kenya (DLAK), at least 71% of Kenyans have taken a digital loan in the last half of 2020.[36] The industry uses illegal means not sanctioned by CBK Act or other enabling legislations in collecting data in the digital lending industry and the unsecure way of managing and processing that data.[37] Early in 2020, the CBK clamped down of the digital lenders and prevented them from listing credit defaulters for loans below $9 (Ksh.1000) on the Credit Reference Bureaus (CRB).[38] The CBK Amendment Act Bill No. 21 of 2020 was introduced in Parliament of Kenya in July 2020 seeking to provide a long-term solution to the problem by putting the digital lenders under the regulatory scope of the CBK.

In the insurance industry, Blockchain can be used in transactions of catastrophe swaps and bonds; in detection of fraud and prevention of risks; in financial audit and reporting; and in prevention and management of claims.[39] The scope of impacts of technological advancements in the finance and banking industry is wide and it's inevitable that these impacts will require regulatory adjustments and introduction of new laws to regulate affected transactions.

Tax and Customs Laws

Tax laws have transmuted over the last few decades as human activities, cultural assimilation, political acculturation, governance structures, and nature of business metamorphosed. Globalization, industrialization and digitization

[35] Paul Gubbins, 'Digital Credit in Kenya: Facts and Figures from FinAccess 2019,' FSD Kenya, December 2019.

[36] 'Case Study: Digital Lending Grows in Popularity in Kenya' (GeoPoll) <https://www.geopoll.com/resources/digital-lending-kenya-dlak/> accessed 27 January 2021.

[37] Sarah Ombija and Patrick Chege, 'Time to Take Data Privacy Concerns Seriously in Digital Lending' (CGAP, 24 October 2016) <https://www.cgap.org/blog/time-take-data-privacy-concerns-seriously-digital-lending> accessed 27 January 2021, [5].

Also see: Joy Makena, 'The Regulation of Digital Credit in Kenya: The Case for Consumer Protection', March 2018, Strathmore University Law School.

[38] Alex Hamilton 'Kenyan Central Bank Plans Digital Lender Clampdown' (Fintech Futures, 28 July 2020) <https://www.fintechfutures.com/2020/07/kenyan-central-bank-plans-digital-lender-clampdown/> accessed 27 January 2021 [3].

[39] N 20, p.74-80.

have dramatically changed the nature of tax laws globally.[40] Governments across the world have responded to the economic transmutations by formulating and implementing tax reforms; for instance, to reduce tax rates to promote trade and development, increase particular tax rates to discourage certain societal pleasures such as alcoholism and sports betting or gambling, and expand tax base and holistically standardize other taxes to enhance government operations. According to Jeffrey Owens,

> *"Tax Policy issues have moved up the global political agenda…At the same time many governments around the world are looking for higher tax revenues as part of their efforts to reduce budget deficits, but to do this in ways which reduce the complexity of tax systems and reduce the growing inequalities in income and wealth"*[41]

The conversation about tax policies is at the center of any effective government. Ensuring that tax policies are harmonized with the social and economic development of a country and its populace is instrumental in establishing a perception that individual taxpayers, corporate entities, and governments are interacting in a legally and equitably sound administrative framework.[42] This segment of the paper focuses on both the impact of technology in tax administration of existing tax avenues and on the role of emerging technologies in creation of new tax avenues.

Firstly, it discusses how technology has helped tax agencies to collect and administer tax efficiently thus increase tax revenues significantly. In Kenya, in particular, the Kenya Revenue Authority has shared on its website the various forms of tax fraud which include: use of forged books of accounts and cooked statements; failure to register as a tax entity, furnish tax returns, pay taxes, keep taxes, and withhold taxes; obstruction, bribing and impersonating as tax officials; and aiding and abetting tax crimes.[43] The KRA has also shared

[40] Jeffrey Owens, 'Tax Policy in the 21st Century: New Concepts for Old Problems'. Robert Schuman Center for Advanced Studies, Issue 2013/5, September 2013, [Highlights [2]].
[41] *Ibid* 1.
[42] *Ibid* 4.
[43] Kenya Revenue Authority, 'Reporting Tax Fraud' < https://www.kra.go.ke/en/tax-fraud> accessed 3 February 2021.

on its website the various actions that lead to commission of tax evasion or tax fraud. Some of them include: Manifest fraud – this is where the shipping agents creates a loophole for false declaration by illegally altering manifests before uploading them to the Customs Manifest Management System (MMS); importers and port clearing agents using fake customs security bonds to clear transit goods; Customs Mis-declaration – Some importers and customs clearing agents may fraudulently declare wrong goods to evade payment of duties; Smuggling – import or export of goods secretly in violation of the law; Use of fake export entries to fraudulently claim VAT refund; Use of fake bank payment receipts to fraudulently validate entries for import taxes; and under-declaration of taxable income by taxpayers, among others.[44] Majority of these fraudulent activities, as is observable and adducible, are as a result of system vulnerabilities, lack of transparent systems or opaqueness in systems, dishonesty of taxpayers and tax administrators, and poor management of various data points. Although KRA has increasingly reduced instances of fraud and increased tax revenue collection by digitization of services,[45] there are still several loopholes and vulnerabilities that can be exploited by fraudsters.

A good way to demonstrate the impact of technology on tax compliance and tax administration is by comparing the period before digitization and after digitization. In 2016/2017 financial year after the full digitization of tax procedures, the KRA collected total tax Ksh.1.366 trillion ($12.418 billion) which is Ksh.115 billion ($1.045million) more than the amount collected in 2015/2016 financial year before digitization of the processes.[46] A report by Tax Justice Network – Africa (TJN-A) in 2015 estimated that total tax lost by Kenya through evasion by multinational organizations hit Ksh.639 million ($5.814million) annually.[47]

[44] *Ibid*.
[45] George Maina, 'Kenya: Impact of Technology on Tax Administration' (Rodl & Partner, 23 May 2018) < https://www.roedl.com/insights/impact-technology-tax-administration#> accessed 3 February 2021, [4].
[46] *Ibid* [4].
[47] *Ibid* [8].

Despite the full digitization of tax procedures, there are still uncharted waters of potential technological advancements in improving tax administration and curbing tax fraud. Some of the key emerging technologies that can be used to increase efficiency and curb evasion include: AI, Data Analytics and Blockchain. AI is a broad term that includes cognitive and machine learning such as intelligent assistants like Cortana and Siri, or simple AI like grammar and spell checkers.[48] AI can be used to introduce interlinked digital sensors that monitor, track and detect transactions processes and malpractice on the customs or taxpayers chain of relevant activities. A properly intertwined use of quality data and AI algorithms can be essential, not only in combating tax fraud, but also in increasing efficiency in tax procedures thus increase tax compliance by taxpayers.[49]

Blockchain technology can also be used in advancing tax administration procedures and enhancing transparency to reduce tax fraud. In a joint study conducted by tax specialists and technology experts drawn from public and private sectors convened by PwC, the technology experts emphasized the suitability of Blockchain in tax-based transactions, while the tax specialists agreed that Blockchain could be applied in areas such as transaction taxes like VAT, stamp duties, withholding tax, and insurance premium taxes.[50]

> *"Blockchain could allow us to capture information from many perspectives. The result is more detail, more visibility, more useful information and more certainty"*[51]

Big data refers to the immense amount of data available in this information age, and data analytics is the use of technology to extract value out of that

[48] Deloitte, 'Artificial Intelligence – Entering the world of tax', October 2019, 2.
[49] Cristina Garcia-Herrera Blanco, 'The use of artificial intelligence by tax administrators, a matter of principle' (Inter-American Center of Tax Administrations (C.I.A.T), 2017) < https://www.ciat.org/the-use-of-artificial-intelligence-by-tax-administrations-a-matter-of-principles/?lang=en> accessed 3 February 2021, [4].
[50] PwC, 'How Blockchain technology could improve the tax system', February 2017, 2.
[51] *Ibid.*

data.[52] The increasing demand for tax revenues and tax transparency by governments brings the need for tax authorities to collect quality taxpayer data, link relevant data points, and extract tax-valuable information from that data.[53] Secondly, on the role of emerging technologies in creating new tax avenues, there are several new tech-based revenue generating activities or rather tech-based jobs that create tax opportunities for governments. A food example is the Digital Service Tax (DST) recently introduced by Kenya targeting income from digital economy. According to information provided by KRA, a "Digital Service Tax (DST) is payable on income derived or accrued in Kenya from services offered through a digital marketplace," and "A digital marketplace is a platform that enables direct interaction between buyers and sellers of goods and services through electronic means."[54] The Kenya's tax authority also stipulated that the DST will be paid as follows:

> *"1.5% of the gross transaction value:*
>
> ***1.*** *a) In the case of the provision of digital services, the payment received as consideration for the services; and*
>
> ***2.*** *b) In the case of a digital marketplace, the commission or fee paid to the digital marketplace provider for the use of the platform."*[55]

This is a new tax avenue created in order to respond to the increasing growth of the digital marketplaces globally and in the Kenyan tax jurisdiction. The new DST is an example of how tax authorities can create new tax regimes from emerging technologies and industries to increase the tax revenue base.[56]

---

[52] EY Global, 'How data analytics is transforming tax administration' (EY Global, 27 May 2019) < https://www.ey.com/en_gl/tax/how-data-analytics-is-transforming-tax-administration> accessed 3 February 2021, [2].

[53] *Ibid.*

[54]Kenya Revenue Authority (KRA), 'Digital Service Tax' < https://www.kra.go.ke/en/helping-tax-payers/faqs/digital-service-tax-dst> accessed on 3 February 2021.

[55] *Ibid.*

[56] George Maina, 'Taxation of Kenya's digital marketplace' (Rodl & Partner, 24 November 2020) < https://www.roedl.com/insights/kenya-digital-service-tax-marketplace> accessed 3 February 2021, [1].

Employment and Labour Laws

The transmutation of technology in production across industries has always shaped the nature of employment engagements and the vital issues in employment and labour laws.[57] Technology, particularly information technology, have boosted job search through online job listings such as LindedIn or Indeed Jobs, job screening through online tests, and job-resume matching through online resume databases. These advantageous progresses have, however, reduced the need for certain traditional hiring mechanisms and practices such as job halls and submission of physical resumes.[58] These changes in ICT largely impact the employment or job search or hiring process rather than the availability of the jobs. However, most emerging technologies are poised to have a disruptive effect on the job market by reducing available employment opportunities by replacing workers with automation, AI and robotics, and alternatively increase more tech-based job opportunities.[59]

> "*The impact of technology on work and workers is multifaceted and complex. Technology is not homogenous and at least should be thought of in terms of enabling and replacement technologies: the former complementing the productivity of workers and the latter taking away the need for workers"*[60]

The transformation of work and workforce will not happen at once, rather it is a gradual change that will be experienced over decades. Recently in Kenya, for instance, the United Nations Development Programme (UNDP) donated three robots meant to boost the fight against Covid-19 by mass temperature scanning.[61] This is a typical example of how robotics will outdo humans in

[57] Kenneth G. Dau-Schmidit, 'The Impact of the Emerging Information Technology on Employment Relationship: New Gigs for Labour and Employment Law', University of Chicago Legal Forum, Vol. 2017, 2018, 63, 63.
[58] *Ibid.*
[59] Paul Schulte and John Howard, 'The Impact of Technology on Work and the Workforce', International Labour Organization (ILO), 1.
[60] *Ibid.*
[61] Brian Ambani, 'UNDP donates robots to help Kenya's Covid-19 fight', (Business Daily, 22 January 2021)
< https://www.businessdailyafrica.com/bd/corporate/health/undp-donates-robots-to-help-kenya-s-covid-19-fight-3265800> accessed 3 February 2021, [1-3].

efficiency and speed of most job roles. For example, a health officer scanning potential Covid-19 patients can only scan one person at a time, which extremely low compared to the capacity of the scanner robots that can scan 10 to 100 people every minute from a distance of 3.5 metres.[62] In plain terms, these robots, if deployed in masses, can lead to displacement of certain health workers. Development and automation of surgery through deployment of surgical robots, such as Da Vinci robots used in bariatric, urological and gynaecological surgical procedures, may reduce work for some doctors.[63] Some of the companies in the surgical robotics industry include Johnson & Johnson, Stryker, Da Vinci, and Medtronicare.[64]

Study by Overseas Development Institute (ODI) and Association of Kenya Manufacturers (AKM) found that although empirical evidence show that rapid automation and digitization in manufacturing could reduce the number of jobs, new findings indicate that adoption of these emerging technologies could actually create more jobs by boosting production and increasing exports.[65] The KAM has stated that emerging technologies are fast changing operations in the global market.[66] The Chief Executive of KAM, Phyllis Wakiaga, in encouraging manufacturers and government to adopt automation, further stated:

> *"Technological developments have changed the operations of the global market, which means that Kenya has to keep up with these trends in order to realize the Big 4 Agenda and Vision 2030. It is important that the collaboration between the National and County Governments, Industry and Academia is strengthened to fully unlock our potential in*

[62] *Ibid*.
[63] Global Data, 'What are the main types of robots used in healthcare' (Medical Device Network, 2 January 2020) <https://www.medicaldevice-network.com/comment/what-are-the-main-types-of-robots-used-in-healthcare/> accessed 3, January 2021 [4].
[64] *Ibid* [3-4].
[65] Kawira Mutisya, 'Kenya's manuafacturers urged to embrace robotics, artificial intelligence' (The Exchange, 30 November 2018) <https://theexchange.africa/countries/kenya/kenyas-manufacturers-urged-to-embrace-robotics-artificial-intelligence/> accessed 3 February 2018 [2].
[66] *Ibid*.

> *the digitalization age. Additionally, fostering research, development and innovation will boost the competitiveness of Industry."*[67]

All these emerging instances and practices have legal implications that may need legislators to adjust existing laws or make new laws to accommodate the changes. Adoption of robotics in manufacturing, healthcare and other industries will have to be regulated. These regulations will impact the legal practice by introducing a new set of laws and unique jurisprudence.

Environmental Laws

Environmental conservation has become the crux of many discussions that revolve around sustainability and climate change. Human activities are making the earth age so fast that it may be unbearable in a few decades if not checked. Emissions from transportation vessels, fuel consumption by stationary equipment, industrial processes, solid waste disposal and other human activities continue to pollute the environment.[68] The emissions mostly comprise of carbon-monoxide, nitrogen oxides, Sulphur oxides, particulate matter and volatile organic compounds.[69] The level of emissions vary from developed and developed countries due to differing levels of industrialization and population.[70]

In March 2019, at the Second Global Session of the United Nations Policy Business Forum and the United Nations Environmental Assembly, a number of initiatives were launched aimed at uniting the global efforts to leverage the frontier technologies in monitoring the state of the global environment.[71] Some of the initiatives launched include a resolution to develop an environmental data strategy of global scale by 2025; the Working Group of the United Nations Science Policy Business Forum adopted a report titled 'The case for a digital ecosystem for the environment: bringing together data, algorithms and insights for sustainable development' that highlighted clear calls to action; and

[67] *Ibid* 6.
[68] Halit Heren, 'Impact of Technology on Environment', Curtin University, 29 October 2016, 1.
[69] *Ibid.*
[70] *Ibid.*
[71] The International Telecommunication Union (ITU), 'Frontier Technologies to Protect the Environment and Tackle Climate Change', 2020, p 8.

the launch for a vision for the World Environmental Situation Room which will promote transparency in access and sharing of data on statistical and geospatial environmental fronts that support policy and action for sustainable development.[72] These establishments provide for the use of frontier technologies such as Blockchain for transparency and security in data sharing, data analytics in extracting value from big data, and AI in ensuring collection of data by smart devices and communication of data points.

According to Patricia Espinosa, United Nations Climate Change Executive Secretary, "Climate change is an existential crisis and represents the greatest challenge facing this generation… Technology, if harnessed correctly, offers enormous potential in our efforts to address climate change."[73] The role of technological innovation in tackling climate change is crucial. Although technology is largely seen as having a positive impact on environmental sustainability, there are some technological innovations that actually pose a threat to the environment.

First, on the positive impact of technology on the environment, key technologies that feature include transport vessels that use clean energy such as electric cars, AI and robotics. Research has shown that electric cars are more environmentally friendly compared to petrol or diesel cars.[74] Electric cars emit less air pollutants and greenhouse gases compare to the petrol or diesel cars thus are better placed to boost efforts to tackle climate change.[75] The use of robotics, AI and Blockchain have a potential of reducing human activities at the workplace by replacing them with automation. Reduced human activity will have a consequent effect of lowering pollution; for instance, as a result of reduced commutation of masses of people, pollution from transportation may decline.

[72] *Ibid*.
[73] *Ibid* 10.
[74] Marta Moses, 'Benefits of Electric Cars on the Environment' (eDF, 15 February 2020) <https://www.edfenergy.com/for-home/energywise/electric-cars-and-environment> accessed 5 February 2021, [1-3].
[75] *Ibid*.

Second, on the negative impact of emerging technologies on environment, increased industrialization to produce electric vehicles, smart phones and other smart devices may be counterproductive.[76] Increased industrialization will be commensurate to high energy consumption, and with limited production of clean energy into the national grid, for instance in Kenya, it may further pollute environment. Another imminent avenue for massive environmental pollution is 5G internet. The increasing over-dependency on wireless technologies in the telecommunications industry to expand reach of connected devices is to blame for the growing exposure to electromagnetic waves.[77] The proponents of Internet of Things (IoT) are now developing even shorter high frequency 5G electromagnetic wavelengths, with 5G masts mounted at closer ranges to power super-fast internet connectivity.[78] It is argued that the widespread adoption of 5G may have profound environmental pollution and pose public health risks. Radiofrequency radiation (RF) has been recognized as a new form of pollution to the environment despite being aggressively pursued by internet bigwigs.[79]

The position of this paper is that, legislators ought to put into consideration these emerging potential environmental pollutants when making new environmental laws, or appropriately reform the existing laws to adequately bridle use of such technologies in order to prevent pollution and protect public health from degradation. Article 69 (1) (g) of the Constitution of Kenya states that "The State shall eliminate the processes and activities that are likely to endanger the environment." Parliament is responsible for enacting legislation that shall give full effect to this provision.[80] An independent inquiry may be necessary to establish the facts of the possible endangerment of RF from 5G masts on the environment. Article 42 of the Constitution of Kenya; Article 24 of the African Charter on Humans and People's Rights (ACHPR); and Article 12 (2) (b) of the International Covenant on Economic, Social and Cultural Rights (ICESR) guarantee the right to a clean and a healthy environment. It is

[76] *Ibid.*
[77]Cindy Russell, '5G wireless telecommunication expansion: Public health and environmental implications.' SD-ER, Vol., 484, 484.
[78] *Ibid.*
[79] *Ibid.*
[80] Article 72, Constitution of Kenya (2010).

possible to envision that an infringement of this fundamental right by emission of RF pollutants into the environment may be challenged at the Environment and Land Court.[81] An applicant seeking redress for such pollution may not have "to demonstrate that a person has incurred loss or suffered injury"[82] as a result of the RF from 5G masts. In KM & 9 others v Attorney General & 7 others (the Owino-Uhuru Case), where the petitioner was seeking redress under Article 70, the court's determination on whether the rights of the petitioners guaranteed by Article 42 were violated, stated:

> *"The Constitution gives Kenyans access to court even where there are only threats of violation. In the instant petition, I am satisfied that the Petitioners did not just demonstrate that their rights under the stated articles were likely to or were threatened to be violated. They proved the actual violation which was to their personal life, the environment (soil and dust) where they stayed and the water (sanitation) which they consumed…"* [83]

Landed Property and Intellectual Property Laws

Chapter 5, from Article 60 to 68 of the Constitution of Kenya, 2010, provides for classification of land, land policy principles, regulation of land use and property and legislation on land. The level of corruption and nauseating rot in the lands registries across Africa, particularly in Kenya, has been the cause of irregular and illicit land transactions that has bedeviled many Africans and Kenyans. Counterfeit land titles and shady land transactions are rampant in Kenya. According to Transparency International, "corruption in the lands sector can generally be characterized as pervasive and without effective means of control".[84] For instance, in Ghana, an estimated 80% of land has no appropriate ownership documentation.[85] This is land that could easily be grabbed or illicitly transacted. In 2018, in a case where two men were charged

[81] Article 70 (1), Constitution of Kenya (2010).
[82] Article 70 (3), Constitution of Kenya (2010).
[83] KM & 9 others v Attorney General & 7 others (2020) eKLR, Petition No. 1 of 2016, [134].
[84] Working Paper No. 4 of 2011, 'Corruption in the Land Sector', Transparency International, p. 2.
[85] Georg Eder, Digital Transformation: Blockchain and Land Titles. 2019 OECD Global Anti-corruption & Integrity Forum, 21 March 2019, p 4 [1].

in Kenya for corruption in lands, an investigation conducted by the Ethics and Anti-Corruption Commission (EACC) found that Kenya's Ministry of Lands and Physical Planning had irregularly allocated and registered land in the names of the accused persons, and further colluded with agents at the National Land Commission (NLC) to allegedly siphon taxpayer money to entities and individuals to whom the land was allocated.[86]

Emerging technologies such as Blockchain could be used to bring an end to corruption in the lands sector. Blockchain is known as a distributed ledger that is essential in achieving transparency and immutability in transactions. The three key aspects of Blockchain in land rights include:

> *"1. Public Registries, facilitating the recordkeeping of relevant transactions.*
> 2. *Tokenized trading: Property is tokenized and traded.*
> 3. *Specific development project ICOs, financing projects through cryptocurrencies."*[87]

By implementing these Blockchain-in-land-rights elements, governments can curb illegal land transactions by ensuring that there is a single source of truth, that is, a Blockchain-based digital lands registry of titles. Ghana's Ministry of Lands and Natural Resources partnered with IBM to establish a Blockchain-based registry of land titles.[88] Systemic issues in the lands sector such as accountability, opaqueness of transactions, incoherence of data sets pertaining to any single of land, and delays or proliferation of deceit in management of land records can be solved by use of an appropriate Blockchain architecture.[89] In order to use of Blockchain in creating an immutable land title registry, first, the title deeds have to be digitized and land allocation and registration harmonized to correctly reflect public, private and community land ownership. This may require the endorsement of a legislation in order to take effect. In

[86] Jesse Chase-Lubitz, 'Kenya Arrests 17 for Corruption Over US$3 Billion Railway' (OCCRP, 13 August 2018) < https://www.occrp.org/en/daily/8448-kenya-arrests-17-for-corruption-over-3-billion-railway> accessed 5 February 2021, [2].
[87] N 84.
[88] N 84, p. 4 [2].
[89] Vinay Thakur, M.N. Doja and Yogesh Dwivedi and others, 'Land Records in Blockchain for Implementation of Land Titling in India', IJIM Vol. 52, 8 June 2019.

2018, The Law Society of Kenya (LSK) filed a lawsuit and won to bar The Ministry of Lands and Physical Planning from digitizing land title register indicating that the process risked being corrupted.[90] The initiative was meant to make it easy for people to access land titles especially for community land. According to Patricia Kameri-Mbote, Intellectual Property (IP) is fast becoming a vital aspect of international trade.[91] The Constitution of Kenya guarantees protection for the intellectual property rights of Kenyans.[92] Entrenching this right in the constitution demonstrates the progressive reforms that Kenya have gone through to recognize new developments in the economy, for instance, where musicians can earn from their talent.

As emerging technologies gain momentum, and as telecommunication industry grows with more people owning mobile phones in Kenya than those that do not, data is becoming invaluable in daily business operations. NKOR, an Ethereum-based innovation designed for safe recording, tracing and sharing of data, is seeking to revolutionize the commercial aspect of protection rights and IP.[93]

According to World Intellectual Property Organization (WIPO), Blockchain can be used in IP registration and protection especially in IP-heavy industries such as in digital content, technology and medical research, innovation and development.[94] Government agencies in charge of IP may need to streamline the relevant laws in order to boost adoption of Blockchain in IP registration

[90] Thomson Reuters Foundation, 'Land registry digitization could invalidate thousands of cases - LSK' (The Star, 8 May 2018) < https://www.the-star.co.ke/news/2018-05-08-land-registry-digitisation-could-invalidate-thousands-of-cases-lsk/> accessed 5 February 2021, [1-2].

[91] Patricia Kameri-Mbote, Intellectual Property Protection in Africa: An Assessment of the Status of Laws, Research and Policy Analysis on Intellectual Property Rights in Kenya. International Environmental Law Research Center (IELRC), IELRC Working Paper 2005 - 2, p 1 [3].

[92] Article 11 (1) (c), Constitution of Kenya (2010).

[93] N 21, p. 109-110.

[94] Birgit Clark, 'Blockchain and IP Law: A Match Made in Crypto Heaven?' (WIPO, February 2018) < https://www.wipo.int/wipo_magazine/en/2018/01/article_0005.html> accessed 5 February 2021, [5].

and protection. WIPO further acknowledged the challenge of a non-supportive regulatory environment, stating thus:

> *"There are various potential hurdles to large-scale legal application (including questions of governing laws and jurisdictions, data security and privacy concerns)."*[95]

ICT and Data Privacy Laws

The ICT industry has gone through some of the most disruptive transformations by new innovations. In this fourth industrial revolution, ICT is at the center of almost every commercial engagement whether directly or indirectly. The expanding mobile and digital financial services have driven the massive growth in Africa's ICT sector.[96] Statistics show that about half of the global mobile money accounts were in Africa as at 2018 and is poised to experience the fastest growth through to 2025.[97] Advancing Kenya's ICT infrastructure is instrumental in modernizing business process, increasing production, and positioning Kenya on the global arena. The Konza Technology City[98], among other projects overseen by the Ministry of ICT, are advancing Kenya's ICT landscape. Goal 9 of the Sustainable Development Goals (SDGs) states "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation".[99] This goal, also vitally supported by the United Nations Industrial Development Organization (UNIDO), emphasizes the importance of building a supportive ICT infrastructure which is also key in promoting innovation and sustainable industrialization.

---

[95] *Ibid.*

[96] Njuguna Ndun'gu and Landry Signe, 'The Fourth Industrial Revolution and digitization will transform Africa into a global powerhouse.' Foresight Africa, 61.

[97] *Ibid.*

[98] "Konza (Konza Technopolis) is a key flagship project of Kenya's Vision 2030 economic development portfolio. Konza will be a world-class city, powered by a thriving information, communications and technology (ICT) sector, superior reliable infrastructure and business friendly governance systems." –Konza.go.ke

[99] Li Yong, 'How infrastructure is crucial in achieving the SDGs in the era of the Fourth Industrial Revolution' (ITU News, Emerging Trends, 14, June 2017) < https://news.itu.int/ict-infrastructure-crucial-achieving-sdgs-era-fourth-industrial-revolution/> accessed 6 January 2021, [5].

At the center of a fully, efficiently operational ICT infrastructure is a robust data infrastructure that ensures that data is handled and interpreted appropriately. The more people own mobile phones and or other smart devices, and the more they can access internet connection, data will continue to be grow in value. Africa boasts of the largest number of mobile money accounts,[100] thus most business operations are increasingly becoming data centric.

Data is the new oil in a technology world, thus it is an asset. Foreign companies such as Facebook have often exploited or misused data from Africa. Enforcement of data protection laws will help protect data as an asset.[101] The enactment of the Data Protection Act 2019 which establishes the Office of a Data Commissioner[102] is good progress for Kenya in implementing the

[100] N 96.

[101] Abdi Dahir, 'Africa isn't ready to protect its citizens personal data even as EU champions digital privacy' (Quartz Africa, 8 May 2018) <https://qz.com/africa/1271756/africa-isnt-ready-to-protect-its-citizens-personal-data-even-as-eu-champions-digital-privacy/> accessed 2 January 2021, [1, 2, & 3].

[102] The roles of the Office of the Data Commissioner as highlighted in Section 9 of the Data Protection Act 2019 include:

> (a) oversee the implementation of and be responsible for the enforcement of this Act;
>
> (b) establish and maintain a register of data controllers and data processors;
>
> (c) exercise oversight on data processing operations, either of own motion or at the re
> verify whether the processing of data is done in accordance with this Act;
>
> (d) promote self-regulation among data controllers and data processors;
>
> (e) conduct an assessment, on its own initiative of a public or private body, or at the re
> body for the purpose of ascertaining whether information is processed according to
> or any other relevant law;
>
> (f) receive and investigate any complaint by any person on infringements of the rights u
>
> (g) take such measures as may be necessary to bring the provisions of this Act to the
> public;
>
> (h) carry out inspections of public and private entities with a view to evaluating the pro
>
> (i) promote international cooperation in matters relating to data protection and ensure co
> protection obligations under international conventions and agreements;

guarantees of Article 31 of the Constitution of Kenya that provides that "Every person has the right to privacy, which includes the right not to have –

> *(c) information relating to their family or private affairs unnecessarily required or revealed, or*
> *(d) the privacy of their communication infringed."*

In the Consolidated Petitions No. 56, 58 and 59 of 2019, where the legality of the establishment of the National Integrated Identity Management System (NIIMS) was being contested, an in its determination to the issue of whether there was violation of threatened violation of the right to privacy, the judge of the High Court stated:

> *"We considered in this regard the scope and content of the right to privacy including information, and found that biometric data and GPS coordinates required by the impugned amendments are personal, sensitive and intrusive data that requires protection. Even though there was no evidence brought by the Petitioners of any violations of rights to privacy in this respect, we also found that the impugned amendments impose an obligations on the relevant Respondents to put in place measures to protect the personal data."*[103]

The emerging technologies, including Blockchain, AI, Machine Learning, Big Data and others, all rely on the availability of quality data. The increasing reliance on data by economies through adoption of the frontier technologies will further make data a valuable asset and raw material in Kenya and globally. Legislators must consistently make new laws or reform existing laws to ensure

---

(j) undertake research on developments in data processing of personal data and ensure risk or adverse effect of any developments on the privacy of individuals; and

(k) perform such other functions as may be prescribed by any other law or as necessary of this Act.

[103] Nubian Rights Forum & 2 others v Attorney General & 6 others; Child Welfare Society & 9 others (Interested Parties) [2020] eKLR, Consolidated Petition No. 56, 58 and 59 of 2019, [1029].

that social, political and economic growth is not bridled, innovation is not dwarfed and data theft is curbed.

Conclusion

It is difficult to conclude such as a discussion that extends so widely into every single industry. However, this paper is inclined to give empirical evidence on the possible impacts of the emerging technologies on the development of law and legal practice. This paper has sufficiently established that social, economic and political development is dependent on the availability of appropriate legal infrastructures to enhance such developments. The future of law and legal practice is largely hinged on the level and speed of adoption and development of the various emerging technologies. Further research is needed to establish the extent of impact, the timelines of impact and the nature of impact of these technologies in the development of law and legal practice.

References

Article 72, Constitution of Kenya (2010).

Article 70 (1), Constitution of Kenya (2010).

Article 70 (3), Constitution of Kenya (2010).

Article 11 (1) (c), Constitution of Kenya (2010).

Nubian Rights Forum & 2 others v Attorney General & 6 others; Child Welfare Society & 9 others (Interested Parties) [2020] eKLR, Consolidated Petition No. 56, 58 and 59 of 2019, [1029].

Securities and Exchange Commission v Ripple Labs Inc., Bradley Garlinghouse, and Christian A. Larsen, Civ. 10832 at the United States District Court, Southern District of New York (Filed on 22 December 2020).

Wiseman Talent Ventures v Capital Markets Authority [2019] eKLR, Civil Suit No. 8 of 2019.

KM & 9 others v Attorney General & 7 others (2020) eKLR, Petition No. 1 of 2016, [134].

Ministry of Information, Communication and Technology, *Emerging Digital Technologies for Kenya: Exploration and Analysis*, (Kenya, July 2019) 9 [1] (The Taskforce Report).

Kariuki M., 'Legal Practice and New Frontiers: Embracing Technology for Enhanced Efficiency and Access to Justice', June 2020, 6.

J. Clement, 'Share of internet users in Africa as of March 2020, by country' (Statistica, 18 November 2020) <https://www.statista.com/statistics/1124283/internet-penetration-in-africa-by-country/> accessed 19 January 2020.

Communications Authority of Kenya, 'First Quarter Sector Statistics Report for the Financial Year 2019/2020' (CAK, July – September 2019), 7.

Beatrice H. and Julie M., 'Pandemic prompts innovation by Kenya's justice system' (United Nations Office on Drugs and Crime (UNODC)) <https://www.unodc.org/easternafrica/Stories/pandemic-prompts-innovation-by-kenyas-justice-sector.html> accessed 19 January 2021 [1].

Gazette Notice No. 2357, 'Practice Directions on Electronic Case Management', Cap. 21 of the Civil Procedure Act.

'Ranking Influential Emerging Technologies for 2020' (Connected World, 15 July 2020) <https://connectedworld.com/ranking-influential-emerging-technologies-for-2020/> accessed 19 January 2020, [2].

Willem G., 'Is the Dawn of Robot Lawyer upon us? The Fourth Industrial Revolution and the Future of Lawyers.' PER/PELJ 2020, 23, 6.

T du Plessis, 'Competitive Legal Professional's Use of Technology in Legal Practice and Legal Research' (2008) PER 21, 38 [2].

Alliance for Financial Inclusion, 'Enabling mobile money transfer: The Central Bank of Kenya's treatment of M-pesa.' 2010, 2.

Benjamin A., *Understanding the Blockchain: An In-Depth Overview of Blockchain and its Use Cases in Government, Banking, Insurance, Healthcare, Law, Manyfacturing, Education and Other Industries*. (GMN, 2018), p.19.

'Today's Cryptocurrency Prices by Market Cap' <https://www.coinmarketcap.com> accessed 23 January 2021.

Library of Congress (LOC), 'Regulation of Cryptocurrencies Around the World' (LoC, 30 December 2020) <https://www.loc.gov/law/help/cryptocurrency/world-survey.php> accessed 23 January 2021, [4].
Banking Circular No. 14 of 2015 from CBK to all Chief Executives of Commercial Banks, Mortgage Finance Companies and Microfinance Banks (18 December 2015).

Kevin R., 'SEC Will be Forced to Give Crypto Guidance Despite Bureaucracy, Risk Avoidance: Peirce.' (Coindesk, 10 October 2020) <https://www.coindesk.com/sec-will-be-forced-to-give-more-guidance-about-crypto-peirce> accessed 23 January 2021, [1].

Securities Exchange Commission (SEC), 'SEC Halts Alleged $1.7 Billion Unregistered Digital Token Offering' (SEC, For Immediate Release, 2019-212) <https://www.sec.gov/news/press-release/2019-212> accessed 27 January 2021.

Michael B. and Andrew L., 'Central Bank Digital Currency and the Future of Monetary Policy.' Working Paper No. 23711, National Bureau of Economic Research, August 2017, p. 4.

'Shenzen residents test digital currency' (BBC News, 13 October 2020) <https://www.bbc.com/news/business-54519326> accessed 23 January 2021, [1]..

Bitange N., 'Dawn of Central Bank Digital Currency' (Business Daily, 5 November 2020) <https://www.businessdailyafrica.com/bd/opinion-analysis/columnists/dawn-of-central-bank-digital-currency-2731070> accessed 27 January 2021, [13].

Paul G., 'Digital Credit in Kenya: Facts and Figures from FinAccess 2019,' FSD Kenya, December 2019.

'Case Study: Digital Lending Grows in Popularity in Kenya' (GeoPoll) <https://www.geopoll.com/resources/digital-lending-kenya-dlak/> accessed 27 January 2021.

Sarah O. and Patrick C., 'Time to Take Data Privacy Concerns Seriously in Digital Lending' (CGAP, 24 October 2016) <https://www.cgap.org/blog/time-take-data-privacy-concerns-seriously-digital-lending> accessed 27 January 2021, [5].

Alex H., 'Kenyan Central Bank Plans Digital Lender Clampdown' (Fintech Futures, 28 July 2020) <https://www.fintechfutures.com/2020/07/kenyan-central-bank-plans-digital-lender-clampdown/> accessed 27 January 2021 [3].
Jeffrey O., 'Tax Policy in the 21st Century: New Concepts for Old Problems'. Robert Schuman Center for Advanced Studies, Issue 2013/5, September 2013, [Highlights [2]].

Kenya Revenue Authority, 'Reporting Tax Fraud' < https://www.kra.go.ke/en/tax-fraud> accessed 3 February 2021.

George M., 'Kenya: Impact of Technology on Tax Administration' (Rodl & Partner, 23 May 2018) < https://www.roedl.com/insights/impact-technology-tax-administration#> accessed 3 February 2021, [4].

Deloitte, 'Artificial Intelligence – Entering the world of tax', October 2019, 2.
Cristina G-H. B., 'The use of artificial intelligence by tax administrators, a matter of principle' (Inter-American Center of Tax Administrations (C.I.A.T), 2017) < https://www.ciat.org/the-use-of-artificial-intelligence-by-tax-administrations-a-matter-of-principles/?lang=en> accessed 3 February 2021, [4].

PwC, 'How Blockchain technology could improve the tax system', February 2017, 2.

EY Global, 'How data analytics is transforming tax administration' (EY Global, 27 May 2019) < https://www.ey.com/en_gl/tax/how-data-analytics-is-transforming-tax-administration> accessed 3 February 2021, [2].

Kenya Revenue Authority (KRA), 'Digital Service Tax' < https://www.kra.go.ke/en/helping-tax-payers/faqs/digital-service-tax-dst> accessed on 3 February 2021.

George M., 'Taxation of Kenya's digital marketplace' (Rodl & Partner, 24 November 2020) < https://www.roedl.com/insights/kenya-digital-service-tax-marketplace> accessed 3 February 2021, [1].

Kenneth G. D-S., 'The Impact of the Emerging Information Technology on Employment Relationship: New Gigs for Labour and Employment Law', University of Chicago Legal Forum, Vol. 2017, 2018, 63, 63.

Paul S. and John H., 'The Impact of Technology on Work and the Workforce', International Labour Organization (ILO), 1.

Brian A., 'UNDP donates robots to help Kenya's Covid-19 fight', (Business Daily, 22 January 2021) < https://www.businessdailyafrica.com/bd/corporate/health/undp-donates-robots-to-help-kenya-s-covid-19-fight-3265800> accessed 3 February 2021, [1-3].

Global Data, 'What are the main types of robots used in healthcare' (Medical Device Network, 2 January 2020) < https://www.medicaldevice-network.com/comment/what-are-the-main-types-of-robots-used-in-healthcare/> accessed 3, January 2021 [4].

Kawira M., 'Kenya's manuafacturers urged to embrace robotics, artificial intelligence' (The Exchange, 30 November 2018) < https://theexchange.africa/countries/kenya/kenyas-manufacturers-urged-to-embrace-robotics-artificial-intelligence/> accessed 3 February 2018 [2].

Halit H., 'Impact of Technology on Environment', Curtin University, 29 October 2016, 1.

The International Telecommunication Union (ITU), 'Frontier Technologies to Protect the Environment and Tackle Climate Change', 2020, p 8.

Marta M., 'Benefits of Electric Cars on the Environment' (eDF, 15 February 2020) <https://www.edfenergy.com/for-home/energywise/electric-cars-and-environment> accessed 5 February 2021, [1-3].

Cindy R., '5G wireless telecommunication expansion: Public health and environmental implications.' SD-ER, Vol., 484, 484.

Working Paper No. 4 of 2011, 'Corruption in the Land Sector', Transparency International, p. 2.

Georg E., Digital Transformation: Blockchain and Land Titles. 2019 OECD Global Anti-corruption & Integrity Forum, 21 March 2019, p 4 [1].

Jesse Chase-Lubitz, 'Kenya Arrests 17 for Corruption Over US$3 Billion Railway' (OCCRP, 13 August 2018) <https://www.occrp.org/en/daily/8448-kenya-arrests-17-for-corruption-over-3-billion-railway> accessed 5 February 2021, [2].

Vinay T., M.N. Doja and Yogesh D. and others, 'Land Records in Blockchain for Implementation of Land Titling in India', IJIM Vol. 52, 8 June 2019.

Thomson Reuters Foundation, 'Land registry digitization could invalidate thousands of cases - LSK' (The Star, 8 May 2018) < https://www.the-star.co.ke/news/2018-05-08-land-registry-digitisation-could-invalidate-thousands-of-cases-lsk/> accessed 5 February 2021, [1-2].

Patricia K-M., Intellectual Property Protection in Africa: An Assessment of the Status of Laws, Research and Policy Analysis on Intellectual Property Rights in Kenya. International Environmental Law Research Center (IELRC), IELRC Working Paper 2005 - 2, p 1 [3].

Birgit C., 'Blockchain and IP Law: A Match Made in Crypto Heaven?' (WIPO, February 2018)
< https://www.wipo.int/wipo_magazine/en/2018/01/article_0005.html> accessed 5 February 2021, [5].

Njuguna N. and Landry S., 'The Fourth Industrial Revolution and digitization will transform Africa into a global powerhouse.' Foresight Africa, 61.

Li Yong, 'How infrastructure is crucial in achieving the SDGs in the era of the Fourth Industrial Revolution' (ITU News, Emerging Trends, 14, June 2017) < https://news.itu.int/ict-infrastructure-crucial-achieving-sdgs-era-fourth-industrial-revolution/> accessed 6 January 2021, [5].

Abdi D., 'Africa isn't ready to protect its citizens personal data even as EU champions digital privacy' (Quartz Africa, 8 May 2018) <https://qz.com/africa/1271756/africa-isnt-ready-to-protect-its-citizens-personal-data-even-as-eu-champions-digital-privacy/> accessed 2 January 2021, [1, 2, & 3].