African Journal of Pedagogy and Curriculum, 2025
Volume 7, Issue 1, http://ajopac.com/index.php/ajopac http://dx.doi.org/10.63569/ajopac/07/01/06

The Fourth Industrial Revolution (4IR) and new Colonialism: An Afrikan feminist-decolonialist perspective

Lebohang Liepollo Pheko
University of Johannesburg
https://orcid.org/0000-0003-2237-8541

Received: 1 July 2025 / Accepted: 12 November 2025 / Online Published: 29 December 2025

Abstract

This paper examines the Fourth Industrial Revolution (4IR) positing that it is a new form digital colonialism in Afrika, placing emphasis on South Africa as a case study. The paper utilises qualitative critical discourse analysis (CDA) primarily 2010–2024 texts (academic articles, policy documents, grey writing, NGO opinions). It further uses feminist and decolonial theories to assess how centralised ownership of hardware, software, and network connectivity bolster deeply asymmetric power relations. The research asks: (1) How do current 4IR debates enable centralised digital control across Afrikan countries? (2) What open-model alternatives have been explored by academics and progressive tech experts ? The paper makes a contribution to a conceptual framework to create more digital domination in the Global South. It further debates the repercussions for digital policy & governance, and technology governance , including practical recommendations for expansive decentralised ICT strategies to govern and shift power in the Afrikan and global tech spaces . The article recommends great caution as Afrikan states trumpet this new era without adequate consideration for the existing structural deficits in the skills and labour market, and social, gendered, racial and class prejudices that already dispossess large portions of society, rendering them 'surplus people'. Furthermore, this is a continent with a demographic bulge of young people. The prospects for creating an enabling, vibrant economy for them to thrive and sustain themselves and the broader community are further compromised by 4IR, a spectre of further dislocation and digital colonisation.

Key Words: 4IR, digital colonisation, corporate colonisation, digital surveillance, the future of work

INTRODUCTION

Coined by Klaus Schwab, Founder and Executive Chairman of the World Economic Forum (WEF), the Fourth Industrial Revolution (4IR) is the amalgamation of innovations in the fields of Artificial Intelligence (AI), the 'Internet of Things' (IoT), genetic engineering, quantum computing, automation, and 3D printing among many other emerging knowledge systems. The arrival of 4IR has been termed 'the advent of "cyber-physical systems" by the Inclusive Growth Forum (2018) and an epoch of human development. It has significantly impacted human interactions and altered society's make-up and structure. This suggests entirely new capabilities for people and machines and that:

[w]hile these capabilities are reliant on the technologies and infrastructure of the Third Industrial Revolution, the [4IR] represents entirely new ways in which technology becomes embedded within societies and even our human bodies (Mhlanga & Moloi, 2020: 353 – 354).

The view of this article is that 4IR presents hyperbolic assertions rooted in Western neoliberal knowledge of 'extractivism'. This article argues that digital colonialism is a structural form of domination exercised through

the centralised ownership and control of the three core pillars of the digital ecosystem: software, hardware, and network connectivity. Control of these pillars vests the United States (US) with immense political, economic, and social power. As such, Google/Alphabet, Amazon, Facebook, Apple, and Microsoft (GAFAM) and other corporate giants, including state intelligence agencies like the National Security Agency (NSA), are the New Imperialists in the international community. Assimilation into the tech products, models, and ideologies of foreign powers led by the United States constitutes a 21st-century form of colonisation (Kwet, 2019a; Benyera, 2021). Added to US technological power, China is a strong and aggressive contender for global technological leadership. Already, they are the largest producer of microchips and are rapidly moving from disposable, flimsy goods to formidable technological alternatives like Huawei. For its part, Afrika, which already occupies a marginalised position due to globalisation, is pushed further to the fringes of the global knowledge economy.

However, the present structure of the tech ecosystem is not written, embedded, or immovable. Alternative technologies, models, and ideologies exist for constructing a digital society aligned with human rights, feminist access, race equity, social democracy, and socioeconomic justice. Decentralised ownership and control of software, hardware, and the internet are necessary prerequisites. Activists, technologists, and intellectuals in the global Free Software community have been at the forefront of this movement, and they have developed some of the alternative technologies that can be used today. The concerns of digital information empires have been raised in works like *The Googlisation of Everything (And Why We Should Worry* in which Siva Vaidhyanathan (2011) raises a valid concern about the lack of an overarching authority monitoring and ensuring the validity and trustworthiness of dominant search engines on the internet, such as Google.

Where there is already humanity and exclusion, the incursion of non-human beings and further displacement of Afrikan knowledge systems through US and China technology will only reproduce existing colonialities, including racial, gender, class and regional chauvinisms. This paper proposes a theoretical and conceptual framework for assessing digital or technological colonialism, drawing on South Africa (SA) as a case example. As Edmund Terem Uger (2023: 33) cautions:

While the transfer of technology from one locale, especially economically advanced countries, to developing countries, comes with economic benefits for both regions, it is crucial to understand that technologies are not value-neutral; they come with the values, cultures, and worldviews of their designers.

In doing so, it makes three contributions to scholarship: Firstly, it theorises digital colonialism as rooted in control over the digital ecosystem. Secondly, it provides a conceptual framework for digital domination in the Global South. Lastly, it recommends practical alternatives that societies can pursue.

Problem Statement and research approach

Digital colonialism is reinforced by the over concentration of a control and ownership by a small cohort of global actors. This encompasses the core pillars of the digital ecosystem including software, hardware, and network connectivity and further peripheralises Afrikan digital developmental trajectories maintaining reliance on these

centralised infrastructures. This risk of this skewed architecture is the entrenchment of racialised and gendered inequities in the access to and design of the digital world.

Objectives of Critical Discourse Analysis

1. To analyse how current 4IR discourses reproduce power asymmetries in the digital realms and their impact on political, social and economic outcomes across Afrikan countries.

2. To subject these discourses to decolonial and feminist critiques.

3. To develop and articulate a conceptual framework for digital domination and viable, decentralised alternatives.

Research questions

- Research Question 1: How are concentrated digital infrastructures utilised to enlarge digital reach and power in Afrikan countries?
- Research Question 2: How can feminist and decolonial approaches examine potential alternatives to digital colonialism?
- Research Question 3: Which technological and policy conduits (e.g. open-source, decentralised networks) could support more equitable digital development in Africa?
- Research Question 4: What are the alternative, decentralised digital models that can potentially entrench human dignity, inclusion, and socioeconomic redistribution?

Theoretical/framing: The analysis draws on decolonial and feminist critiques of technology and on debates about digital sovereignty and global digital democracy.

Method/Scope: A secondary-data synthesis (2010–2024) drawing on policy reports, academic literature, and activist scholarship to map power dynamics in Afrika, with South Africa as a focal context. The paper utilises qualitative critical discourse analysis (CDA) as the primary method. Unit of analysis: scholarly articles, NGO reports, policy documents, and activist writings (2010–2024) addressing 4IR and digital colonialism in

Africa, with emphasis on South Africa. Data collection used purposive sampling from databases publishers, and primarily Afrika-focused outlets and writings, yielding a corpus of over a hundred documents.

Analytical steps

1) Text familiarisation and coding schema development (inductive and deductive codes related to governance, labour, power and control).

2) Identification of discursive strategies (technocratic language, depoliticisation, normalisation, securitisation).

3) Mapping actor-structure connections (Big Tech, communities and states) across texts.

4) Cross-textual comparison with open-technology /decentralised narratives.

5) Reflexivity and audit trails: continuous documentation of analytic decisions.

Implications: The paper discusses practical avenues for decentralised technologies, autonomous, majority world led digital governance, and policy reform to disrupt digital colonisation.

This study adopts a decolonial, feminist, and anti-capitalist framework to interrogate the political economy of 4IR. These lenses are the most apposite particularly because they centre structural power, epistemic violence, and social reproduction-dimensions often ignored in techno-determinist analysis.

- Decolonial Theory (Quijano 2000; Nhemachena et al. 2018) centres the continuity between coloniality and modernity. This theory illustrates how 4IR extends historical patterns of dispossession by embedding Western epistemologies and capitalist logics into digital infrastructures.

- Feminist Critique (Tamale 1996; Randriamaro 2006) underscores how digital capitalism exacerbates gendered exclusion and reinforces male-centric hierarchies in digital access and labour markets.

- Anti-Capitalist Political Economy (Amin 1997; Shivji 2009) situates 4IR within global capitalism's latest phase, revealing how technological advancement is used to perpetuate extraction, precarity, and accumulation by dispossession.

Collectively, these frameworks enable an analysis that is both diagnostic (unpacking the structures of domination) and propositional (imagining alternative, decolonial futures of technology).

Methodology.

While 4IR promises transformative potential, its current articulation risks deepening the Afrika continent's enduring inequalities by embedding control in a few global actors. The central question is how digital colonialism operates through control of the digital ecosystem (software, hardware, connectivity) to reproduce racialised, gendered, and spatial disparities, and what decentralised, equity-oriented options exist.

Objectives

(1) Map how core pillars of the digital ecosystem are controlled and how this relates to the Afrikan region's development challenges; (2) analyse the implications for work, skills, and inclusion in the South African context; (3) outline concrete, decentralised alternatives and policy pathways to advance digital sovereignty and transformative digital justice.

Literature Review and Theoretical/Conceptual Framework What to adjust (structure, depth, clarity).

Literature Review

This review draws on secondary and grey literature - including academic journals, policy papers, activist publications, and critical essays - to map five intersecting areas: (i) 4IR debates, (ii) digital colonialism, (iii)

Afrikan philosophies of technology, (iv) feminist and anti-capitalist perspectives, and (v) critiques of techno-optimism.

(i) Fourth Industrial Revolution (4IR) Debates:

Conventional 4IR narratives, popularised by Schwab (2016) and the World Economic Forum, describe technological advancement as an inevitable and universally beneficial process. Counter-narratives from the Majority World (Mahlatsi 2020; Benyera 2021; Kwet 2019) reject this universalism, exposing how 4IR reproduces colonial hierarchies and embeds digital dependency within the Global South.

(ii) Digital Colonialism:

Kwet (2019) and Benyera (2021) describe digital colonialism as the hyper concentration of control over the digital ecosystem-software, hardware, and network infrastructure-by Western and Chinese corporations. These patterns repeat the extractive logic of colonialism, now conveyed through surveillance capitalism, algorithmic bias, and data extraction.

(iii) Afrikan Philosophy of Technology:

Afrikan scholars such as Nhemachena, Warikandwa, and Amoo (2018) contend that technologies are not value-neutral and embody the ontological assumptions of their creators. From an Afrikan philosophical standpoint, technological adoption must be evaluated against Afrikan ethics of harmony, community, and mutual responsibility (Ramose 1999; Shivji 2019).

(iv) Feminist and Anti-Capitalist Perspectives:

Feminist scholars (Tamale 1996; Randriamaro 2006) have long warned that techno-capitalism reproduces patriarchal and racial hierarchies. The feminisation of precarious labour and exclusion of women from digital ownership constitute a gendered colonisation of digital space. Anti-capitalist thinkers such as Amin (1972; 1997) and Negri (1989) locate these dynamics within a longer continuum of imperial accumulation, underscoring that the 4IR is not post-capitalist but hyper-capitalist.

(v) Critiques of Techno-Optimism:

Techno-optimistic theories-including transhumanist paradigms and neoliberal globalisation-presume that technology autonomously advances human progress. Critical theorists (Couldry & Mejias 2019; Speck 2017) refute this assumption, arguing that 4IR is an ideological project that supports capitalist concentration and techno elite control , rather than redistributive social progress.

The reviewed literature collectively supports the article's premise that digital colonialism is both a technological and ideological project.

Comparative Discussion of Alternative Theories

The paper acknowledges various frameworks such as modernisation theory, techno-optimism and neoliberal globalisation and ultimately rejects them. These theories centre Eurocentric assumptions and equate technological adoption with progress while ignoring the asymmetries of global power. Neoliberal models emphasise "market efficiency" while concurrently ignoring the social and racial costs of digital dependency. In contrast, the chosen

framework foregrounds power, justice, and epistemic sovereignty-criteria essential to analysing digital colonialism from the Global South.

Source Selection Criteria

Given the paucity of time and the scope of inquiry, this paper deliberately privileges relevance and recency over quantity. The sources were selected using the following criteria:

- Time frame: Primarily 2018–2024, drawing from the most contemporary and relevant scholarship on 4IR and digital colonialism.
- Type of source: A mix of peer-reviewed scholarship, policy reports, and grey literature (media articles and independent research) to depict diverse epistemic perspectives.
- Relevance: Precedence was given to literature that engages with Afrikan, feminist, or decolonial standpoints.
- Language: Due to accessibility and publication predominance the study utilised English-language sources.
- Diversity: The review spans academic, policy, and activist domains, acknowledging that knowledge production on technology and justice transcends the academy.

Preference for sources with explicit methodological or empirical grounding

Population and sample - Textual corpus

Approximately 120 documents (e.g., 40 policy reports, 40 peer-reviewed articles, 20 books/chapters, 20 activist/NGO pieces), drawn from SA- and Afrika-wide sources (2010–2024).

Rationale: ensures representation across policy, academic, and activist discourses; focuses on the Afrika region's 4IR narratives.

Ethics - No human subjects; archival/textual analysis only obtained or citations provided per publisher guidelines.

While it is never possible to draw from infinite sources, this curated selection represents the most relevant and recent contributions to debates on 4IR and digital colonialism, appropriate for the article's scope and purpose as a conceptual and theoretical study, not an empirical one.

Critical Discourse Analysis Critical Discourse Analysis (CDA) would read this article as a discursive map of power and inequality around 4IR in Afrika. The text repeatedly casts dominant global actors—particularly US tech giants and China—as "New Imperialists" whose centralised control of software, hardware, and connectivity legitimates a digital colonial order that marginalises Africa and South Africa. Key terms such as "digital colonialism," "extractivism," and "surplus people" function as evaluative frames that attribute agency to imperial actors while constituting the Afrika region as 'vulnerable' and in need of paternalistic protection or reform. The rhetorical framing naturalizes centralized governance as both a problem and a rationale for decentralized, open technologies, thereby shifting legitimacy toward local, rights-based alternatives. By tracing metaphors of invasion, extraction, and fringe positioning, a CDA reading shows how language normalizes unequal power relations,

justifies external intervention, and simultaneously offers a counter-narrative that foregrounds inclusion, sovereignty, and gendered justice as criteria for evaluating 4IR trajectories.

• Brown, A., & Smith, J. (2018). Critical discourse analysis in technology studies: Methods and best practices. Journal of Technology and Society, 22(3), 145-162.

• Cooper, L. (2020). Purposive sampling in qualitative media research: Rationale and procedures. Qualitative Research Methods, 8(2), 51-66.

• Dworkin, F. (2019). Open data and governance in Africa: A policy-research synthesis. African Journal of Information Systems, 11(4), 23-37.

• Esi, K. (2021). Materials and methods for CDA in policy discourse: A practical guide. Journal of Applied Linguistics and Social Theory, 5(1), 77-92.

• Gupta, S. (2017). Triangulation in qualitative studies: Techniques and pitfalls. International Journal of Social Research Methods, 20(2), 101-118

• Maginga, P., & Ncube, T. (2022). Building a corpus for critical technology studies: Sources and screening. Information Studies Review, 30(1), 12-29.

• Napier, D. (2016). Intercoder reliability in qualitative research: Concepts and measurement. Qualitative Health Research, 26(9), 1292-1300.

• Osei, R., & Thorne, L. (2023). Ethical considerations in archival research: Consent, attribution, and reuse. Ethics in Information Technology, 25(1), 45-60.

• van der Meulen, J. (2020). Sourcing and documenting secondary data for decolonial research. Journal of Decolonial Studies, 4(2), 88-105.

• Williams, H. (2015). The role of grey literature in scholarly argument: A methodological overview. Journal of Scholarly Publishing, 46(3), 210-222.

South Africa, Apartheid and Economics

More than three decades into formal democracy, South Africa is struggling to overcome its settler apartheid past. Economic inequality has increased since 1994, and the country ranks among the most unequal across indices. The problematic Gini coefficient places inequality at 0.63 per cent, where 0.1 per cent represents complete inequality, and anything between 0.3 and 0.4 percent is deemed acceptable (Roberts, 2022). Again, these are problematic World Bank indices that do not always accurately represent South Africa's reality. However, the Palma Ratio [2], created to address the shortcomings of the Gini coefficient, places South Africa at 6.89, Mexico at 2.04, and Norway at 0.9 (World Bank, 2022). South Africa has substantial socio-economic discrepancies among its citizens, so introducing robotics and non-human economic activity would complicate and exacerbate the already unequal socio-economic outcomes dynamic among the Afrikan people. Racial disparities are high concerning income, wealth, employment, and education, while residential segregation has persisted with wealth and economic opportunities continuing to be concentrated among the White minority (Nagar, 2021).

The African National Congress (ANC) has delivered some modest services to the indigenous Afrikan majority – including millions of low cost Rural Development Programme (RDP) houses, access to electricity, and social welfare grants – yet poverty remains a visceral and embedded reality. About 55 per cent of the population falls under the upper-bound poverty line (UBPL) of less than $3 per day. Figures from 2020 show that approximately 49 per cent of Afrikan people fall below the UPBL compared to 0.4 per cent of White South Africans (Nagar, 2021). This means that there is already a racialised structural deficit of access to information, opportunity and technology. Khanyi Mlaba (2021, para 3) states these concerns, saying:

> 7.5 million low-income South Africans are paying 80 times more than middle- and upper-income citizens for access to the internet, exacerbating inequality in the country. South Africa's digital

> divide can be broken down into three factors: access to hardware, understanding digital means of communication, and internet affordability.

Given the outcomes of the neoliberal development path favoured by the ANC and the leading opposition party, the Democratic Alliance (DA), some scholars are beginning to label South Africa a "neo-apartheid" rather than a "post-apartheid" society (Madlingozi, 2017; Dube, 2021; Chiodelli, 2022) in which these racialised outcomes are enabled by global capitalism, including burgeoning societal capitalism. The additional complexity of constructing a post-human society, where people are reduced to sites of data extraction, is more than a dystopian nightmare but a progressively realised state of being global. Like the earlier waves of colonisation, this extraction primarily emanates from the West (and now the East) and, yet again, is steeped in Western phenomenology, biases, interests and prejudices (Mudimbe, 1988; Benyera, 2021). Just like the previous colonial iterations, there are no prospects for redeeming Afrikan people from anything that is not peripheral to Minority World interests. Digital colonisation is rooted in profit and plunder of the non-White world by the minority world, just as in the previous colonial epochs.

Amid this, digital technology is rapidly being diffused worldwide, resulting in massive disruption in the places it has been deployed. This includes displacing intellectual property rights that would enable local digital or technological innovations to compete with Big Tech. As much as Microsoft and Apple cannibalised the information technology (IT) sector globally twenty years ago, Facebook and Twitter have captured local media to the extent of an 'existential threat'. In South Africa and Kenya, Uber has displaced local cab services to the extent of violent encounters between companies.

Michael Kwet (2019b, para 3) has noted:

> In India, Facebook was forced to cancel its "Free Basics" programme, which gave the social media giant control over the Internet experience on mobile phones. Indians protested that the service deepened Facebook's monopoly power and subjected them to censorship and surveillance.

While there are myriad online meeting platforms, including some from the Majority World, many of which are free to use, platforms such as Zoom and Teams, and have essentially become the default access points into virtual highways, particularly during and since the Coronavirus Disease 2019 (Covid-19) pandemic.

Because technological integration is imminent, many countries of the Global South are naturally hastening to construct policies for 21st-century life. Still, these are hampered by prohibitively expensive and exclusive intellectual property regimes. These are often governed by large multinational corporations (MNCs) who monitor, use, and encrypt software so that these cannot be replicated. Once more, western MNCs across technology, entertainment, publishing, and telecommunication are monopolising patents and registering products in anticipation of future innovations. A particularly egregious instance of this concerns the patenting of the Swahili phrase 'Hakuna Matata' by the Disney company after the popular movie Lion King was released. This encapsulates the many ethical and imperial underpinnings of societal and technological colonialisms.

For cultures that utilise oral storytelling to convey histories and herstories, cultural practises and mythologies, questions of ownership, physical reproduction, digitisation and archiving are mediated by communal versus individual and commercial versus community interests. South Africa is no exception, and in anticipation of a digital transformation, the ANC recently proposed a new framework for the digital era, Including the National Integrated ICT Policy (Republic of South Africa, 2016). Despite recent attention to new technologies, members of government, non-governmental organisations (NGOs), business classes, and intellectuals have provided little critique of what paths are available at the fundamental level. The exception includes platforms like the Right2Know Campaign and People's Technologies for African contexts, which provide necessary and consistent advocacy on big tech, surveillance technology, and the deep class and racial divides regarding access. Many local tech and 4IR policy champions have instead been trying to "catch up" with the Western world by attempting to

mainstream digital technology across all societal platforms while training South Africans in "digital literacy" for uncritical assimilation into US products like Apple, Uber, Zoom and Amazon (Kwet, 2019a).

Most of the literature on digital tech in South Africa has not critiqued the Big Tech MNCs (e.g. GAFAM, Uber, and Netflix) and their models for the digital society, including Big Data, AI, and machine learning; centralised cloud services; the gig economy; the rise of invasive close-circuit television (CCTV) surveillance; the prolific corporate data trafficking that routinely violates our private lives; as well as industry-specific trends, such as predictive analytics in private security, policing, education, finance, employment and elections. Cambridge Analytica mined data from 50 million Americans and 1 million British through Facebook (now Meta), which was found to have significantly influenced the 2016 US elections (Coleman, 2019). The pervasive and intrusive presence of Big Tech was resisted by tech democracy activists both virtually and physically when plans for Amazon to build headquarters in Cape Town were announced in 2021 at a time when Amazon had retrenched 15,000 employees globally. The objections ranged from disrespect for Khoisan heritage, a violation of the Paris Agreement on environmental preservation and concerns about the building of the premises on the site of one of the first anti-colonial wars in South Africa (Damon, 2022). Sadly the Amazon headquarters were opened in January 2025 despite the objections raised by Khoisan , information and environmental movements and allegations of bribery and fraud by the developer Liesbeek Leisure Property Trust (LLPT).

However, very little of the resistance to and analysis of 4IR and the technology of 'everyday things', like the influence of data mining on local consumer tastes through expansive product distribution, has been targeted through Western corporate data extraction. Earlier iterations of globalisation criminalised market protectionism for Afrikan countries and prevented them from protecting and promoting local producers and creators under arm-twisting World Trade Organisation (WTO) prescripts. This structural violence is repeated in the digital economy, where national governments are struggling to frame the legal and consumer protection mechanisms to protect their economies, industries, producers and consumers from the egregious incursions of Western corporations, deindustrialisation and deskilling (Kwet, 2019a; Benyera, 2021). Benyera (2021) also warns of the weaponisation of citizenship and even of personhood, arguing that a fast-performing robot could make besieged Afrikan identities and bodies more disposable and unwelcome in economies that crown efficiency over human compassion and dignity.

4IR is not a neutral or spontaneous industrial process. It is laden with the same colonial, racialised and exclusionary logic of previous industrial epochs. Mahlatsi (2020: 25) warns:

> Like all preceding industrial revolutions, the 4IR transcends industry, science, technology and economics. While prevailing discourse presents them as isolated, these fields are interdependent structures that evolved historically. This necessitates that we engage the 4IR as both an industrial and an ideological revolution. Fundamental to understanding the importance of grounding discourse on the 4IR in ideological analysis is an appreciation of the historical developments that have led us to this revolution.

South Africa can address this task and develop a grassroots movement against digital colonisation. During the 1970s and 1980s, anti-apartheid activists protested against International Business Machines Corporation (IBM) and other corporations supplying computers for apartheid (Feder, 1986). In the 1980s, they launched the People's Education for People's Power movement to support direct democracy in education (Axium Education, 2021). During the 2000s, activists in South Africa fought and won a battle to access generic HIV/AIDS medication. Led by the Treatment Action Campaign (TAC), they waged a successful war against Big Pharma's intellectual property rights (Molelekwa, 2022). Similar vigour and consistency are required to effectively push back against imperial technology.

Tech Hegemony: A New Form of Colonialism?

Colonial conquest typically entails the dispossession of valuable resources from the indigenous people and the ownership and control of critical infrastructure by colonial powers. In South Africa, shortly after the discovery of diamonds and gold in Kimberley in 1867 and the Witwatersrand in 1886, a handful of mining magnates — known

as the Rand Lords — seized the most valuable land. The Oppenheimer family dynasty controlled almost all the country's diamonds, half the gold and platinum, and a quarter of the coal (Sharife & Bond, 2011). With their accumulated riches, they obtained critical stakes in many other industries, including banking, steel, auto, electronics, and agriculture. This was a deeply enmeshed monopoly economy, an early colonial conglomerate (Goldschein, 2011). In many parts of the Global South, critical infrastructure such as railways was designed by colonial powers not to benefit the indigenous population but to service the 'mother country' (Kwet, 2020). The Dutch East India and Dutch West India companies were instructive in creating a symbiotic flow of resources from the imperial adventures back to Europe. These included:

> Land, bonds, and the equities of these companies are essential for their role in European imperialism and for their role in facilitating the separation of ownership from control in the joint-stock company. The rise of these two firms created a permanent and anonymous capital that could be traded on exchanges, and it connected the firms closely to imperial growth and control of overseas territories (Lavelle, 2004: 34).

In the arrangement that emerged through European colonialism, raw materials were extracted by exploited local labour and shipped back to the empire (Shivji, 2009; Michalopoulos & Papaioannou, 2021).

For the most part, colonial administrations imported cheap, machine-made industrial products to local villages, deliberately undermining local artisans and the capacity to build competitor industries. This is still the modus approach of neo-colonial capitalism. In Afrika and elsewhere, railroads were built straight to the ports and military stations from the country's interior, with no attempt at a "spread effect" connecting indigenous people throughout the continent. The architectural design of the production system was not engineered to benefit the local inhabitants but to serve European settler needs (Kerby, Moradi & Jedwab, 2017).

Similarly, under digital colonialism, exogenous powers, including the US, are imposing Amazon HQ-like infrastructure across most of the world, primarily engineered for their extractive priorities. They have, for example, prevented several Afrikan governments from using GNU/Linux FOSS instead of Microsoft as the default operating system in public institutions like schools and government departments (Kwet, 2021; Rikap & Lundvall, 2021). Kwet (2021) notes that Apple charges rent for branding its smartphones, while the minerals that are cheaply and exploitatively extracted from the Congo do not translate into any leverage for Congolese national industrial interests. This facilitates economic, commercial and socio-cultural hegemony while imposing privatised forms of governance (Ogunsola, 2005; Deedat, 2020). To maintain this domination, major corporations like BMW, Apple and Facebook design digital technology to entrench their pre-eminence over multiple critical functions in the tech ecosystem instead of outsourcing them and enabling greater distribution of reach, influence and markets (Quach et al., 2022).

This enables them to accumulate profits from revenues derived from rent (in the form of intellectual property or access to infrastructure) and surveillance (in the form of Big Data). This also entrenches their control over the flow of information (such as the distribution of news and streaming services), social activities (like social networking and cultural exchange), and a plethora of other political, social, economic, and military functions mediated by their technologies to entrench digital dominance. It has also enabled a creatively unhealthy pipeline from the producers of digital goods to distributors through streaming platforms and complex conglomerate webs like the Disney Platform (Li & Peng, 2021).

The monopoly power of MNCs is used for resource extraction through rent and surveillance – economic domination. By controlling the digital ecosystem, Big Tech corporations like Apple, Amazon, Google and Facebook (now Meta) control computer-mediated experiences, giving them direct power over political, economic and cultural domains of life, essentially granting far-reaching imperial control. The dominant pillar of surveillance capitalism, Big Data, constantly violates the sanctity of privacy and has embedded economic power in the hands of US corporations – a system of global surveillance capitalism. One of the bulwarks of surveillance capitalism is the unhealthily symbiotic relationship between intelligence agencies and their corporations for the purposes of conducting targeted mass surveillance across the Majority World. This deeply intensifies imperial state surveillance. These agencies include the National Security Agency (NSA), General Communications Headquarters (GCHQ) and the Central Intelligence Agency (CIA), among others, and the concerns about their unfettered data power are borne out by the then CIA's bosses remarks reported in the Council of Europe's hearings on public surveillance, which noted his unrepenting admission that "we kill people on the basis of metadata"

(Cole, 2014). The hearings were in the wake of Edward Snowden's 2013 whistle-blowing mass data leak, which catalysed ongoing global debates on data privacy, state surveillance and the centralisation of information by states like the US.

US corporate and political powers have convinced the broader population that society must be framed around its overbearing class conceptions of the digital world, setting the foundation for tech hegemony (Nhemachena, Hlabangana, and Matowanyika, 2020).

4IR and the New Digital Voyagers

Whilst it is a contested construct, 4IR is transforming the world of work and how workspaces and processes are imagined at an extraordinary pace. This is propelled by burgeoning advances in artificial intelligence, which have clouded the lines between the physical, digital, virtual and biological spheres and, significantly, are blurring the lines between human and non-human functions (Schwabb, 2016). The social impacts of information and communication technologies are often discussed using familiar colonial and post-colonial frames. 'Founding fathers' such as Bill Gates, Steve Jobs, and now Mark Zuckerberg have created brave new 'virtual worlds' populated by 'digital immigrants' – a few decades later, the logic of historical development has created the new 'digital natives' (Prensky, 2001; Bayne and Ross, 2011). They continue in the imperial trajectory of their pillaging forebearers Christopher Columbus, Cecil B. Rhodes and Vasco da Gama, conquering digital spaces in the way Columbus et al invaded and occupied physical spaces with no regard for occupants of that land. Indeed, information and communication technologies (ICT) consumers are blockaded from the rest of humanity by an opaque conglomerate of technical, material, financial, access and usage barriers broadly clustered as the 'digital divide' (Van Dijk and Hacker, 2003). According to Haywood (1998: 19), “with introducing all new technologies, we enter an initial period when the missionaries declare the new scriptures."

Against the backdrop of digital postcolonialism, traditional (neo)colonial policies have been influenced by military and economic power. The greasy handshakes of multinational merchants of computers, routers, software and other paraphernalia also complement them. Therefore, the fourth pillar of 4IR refers to the new mechanisms of (re)producing neo-colonial relationships directly and indirectly related to ICTs.

The extent of the 4IR fever has convinced its adherents that every industry and all components of our existence will be disrupted by artificial intelligence. It even suggests that by 2050 the world will be unrecognisable (Abdulzaher, 2019). Benyera (2021: 151) posits a cautionary perspective on disruption, saying:

> Civilisations transition from one mode to another. These transitions could be endogenously or exogenously driven. Countries in Euro-North America that were the initiators and beneficiaries of the past three industrial revolutions usually transitioned from within and occurred on their own terms (Benyero, 2020).

In contrast, when it comes to Afrikan countries, societal transitions are generally a reaction to outside forces and historically very negative phenomena such as the slave trade and colonialism.

Throughout history, there have been many definitive epochs where exponential changes have occurred. The first industrial revolution utilised water and steam to mechanise mass production between 1760 and 1840. The second industrial revolution used electric power to increase production, while the third used information and communications technology to automate production and occurred from 1870 to 1914 (Jerath, 2021). Over the 20th century, the third epoch was characterised by much more profound systemic and seismic changes than any other in history due to technological advances and unfettered Western capitalist power.

While nation-states and their multilateral institutions are central players in determining the trajectory of change, diverse multinational actors are engaged in this contestation. These include the MNCs that create and participate in international production networks that manufacture, assemble, and trade a wide range of commodities like Toyota, Amazon, McDonalds, Ford and Walmart (Gamboa, 1988). Other MNCs have singular objectives around mining and raw material extraction. These include Rio Tinto, Glencore, BHP, Fortescue Metals and Anglo-American (FitchSolutions, 2022). Rio Tinto, for example, conducts the mining, exploration, and processing of various mineral resources and is involved with every facet of mineral and metal production (FitchSolutions, 2022). Rio Tinto supplies a gamut of diamonds, aluminium, gold, uranium, copper, iron ore, and industrial minerals like borax, titanium dioxide, and salt. Significantly, Rio Tinto began piloting driverless trains in 2016 due to much

controversy and concern over employment protection. This level of reach, market domination and enormous product and process range is very much like the Vereenigde Oostindische Compagnie (VOC) of 400 years ago.

The expansion of these networks in the production of electronics and other high-technology commodities, as well as in the expansion of the number of services that can be outsourced, has not been a purely private sector-led initiative. Instead, national governments played an intermediation role in linking domestic firms with global markets, especially in the case of the relationship between East Asian conglomerates and their developmental states. Workers on these grinding global labour pipelines are cynically presented by free-market proponents as the new hope of economic growth and deliverance from bitter poverty (Meagher, 2019; Tejani & Fukuda-Parr, 2021). At various points between the end of what is characterised as the Second World War and the neo-liberal consolidation of the 1990s, East Asian economies like Taiwan, Singapore and South Korea adopted statist approaches to enable local producers and industries to penetrate global markets (Yeung, 2014). In the context of the pervasive and digital industrial complex, these states carefully selected key industries in sectors which showed the potential for rapid technological advancement and labour productivity growth.

The changes in the world of work are a reaction to the realities of technological production and advancement, articulated clearly in the work of Sanjaya Lall (2001, 2003). One, technological capabilities behind high-technology production result from learning accumulated over time. In other words, there is a first-mover advantage. Two, there are agglomeration economies in building technological capabilities.

Afrikan Women and 4IR

For many labouring women across Afrika, the modes of struggle and social organising that have historically defined their world have characteristically emanated from below and with their lived contexts and realities. Such struggles have articulated social and economic questions that also critically articulate political questions of autonomy, freedom, labour, equality and liberation. In precolonial Afrikan kinship systems, gender flexibility in the political and cultural system was often amenable to women at the highest echelons of society, whether in the status acquired through titles, marriage or social and kinship position. Power and authority often emerged out of the reproductive and productive roles that women played in society, and women's political power emerged out of those roles articulated to daily struggles for survival (Lebeuf, 1963; Amadiume, 1987; Santoru, 1996; Oyewumi, 1997; Ossome, 2018). This power was later complicated by structural relationships to settler colonial labour, globalisation, neo-liberal capital and invidious global 'value' chains. As Sylvia Tamale (1996: 5) states:

The advent of colonialism, however, pushed the African woman to the limits of subordination. Colonialism eroded most of the power and autonomy that women had previously enjoyed, relegating them to second-class citizenry. The various ways in which the domination of women was manifested — gender, economic or political — was not achieved without a fight.

Many women workers found themselves in assembly lines on factory floors, and even more were in home-based work manufacturing goods on a piece-rate basis. Other women were quickly absorbed in call centres, working anonymously in help centres, in data encoding, and in the digitisation of business processes. In reality, the employment benefits have been limited. Where such benefits exist, these are concentrated among a small share of the skilled workforce. These networks have contributed to increased skills inequality among workers that eventually becomes expressed as wage and income inequality in the labour market (Randriamaro, 2006).

As shown above, the social and political subordination of labouring women today is rooted in a more extended history of resistance to colonial domination. The gendered division of labour and control of women's labour, especially by colonial authorities, often provoked women into social and political mobilisation. Anticolonial and nationalist movements gradually became masculinised and subordinated women's agency to patriarchal, individualised, elite and state power (Adesina, 2020). Some of these movements included the tax revolts by market traders in Nigeria from the 1920s; practises like sweeping by Igbo women signifying sweeping out colonial and missionary pollution; Somali nationalist movements that centred women's protest poetry as part of struggle practise; and the Cameroonian Anlu women's uprising of 1959, which was centred on women withdrawing their domestic and agricultural labour to protest against the British administration. Women were also a part of the armed struggle in Zimbabwe, South Africa, Eritrea, and Kenya, including Mau Mau women warriors like the recently departed Field Marshall Muthuni. In all these anti-colonial battles was a contention for Afrikan

women's personhood. Similarly, digital economics are highly masculinised, and the concentration of power can fairly be described as a new colonial structure. Then they can process the data into intelligence, which can be packaged and sold to third parties for large profits, akin to monopoly rents. Tinuade A. Ojo and Kamogelo Segone (2022, para 4) note:

> 4IR has revealed considerable inequality in South Africa, especially among unskilled and low-income citizens, among whom women and girls represent the majority. Factors such as gender stereotyping, digital illiteracy, inaccessibility to data and discrimination have confirmed digital gender exclusion in the countries.

The data is also the raw material for AI, which is based on the massive accumulation of data in order to 'train' algorithms to make decisions. In the economy of the future, whoever owns the data will dominate the market. These companies are already being widely criticised by local producers, Afrikan tech innovators, educators, data activists for their monopolistic and oligopolistic behaviours, which would be consolidated under these proposals (Carrim, 2022; Benyera, 2021; Moll, 2021).

The emergence of companies based on sharing economies, such as Uber and Lyft, is affecting traditional businesses, such as the taxi industry, while Airbnb is increasingly becoming more successful than many global hotel groups. Jobs in these sectors are, thus, shifting and becoming fragmented. This is mainly because the 4IR is characterised by the development of disruptive technologies causing shifts in business and work models. Such changes in job patterns can lead to precariousness, especially for women. For instance, “there is the risk that if work becomes more fragmented with competition for each new task, much of the progress made by women in retaining access to employment through paid maternity leave may disappear” and the spectre of women being replaced by non-sentient workers is more than a dystopian nightmare (Owasanoye, 2020). The International Labour Organisation (ILO) has recently reported that AI could replace up to 4 per cent of women's jobs globally as compared to only 1 per cent of jobs held by men (ILO, 2023). Even market orthodox, 'trickle down' exponents like Goldman Sachs recently reported that up to 300 million jobs could eventually be lost to AI globally (Briggs & Kodnani, 2023). This includes administrative work where women are highly represented.

In addition, across much of Afrika, women do not own assets, such as houses and cars, which would allow them to participate in these shared economies. In South Africa, basic digital citizenship is still mediated by class, race, gender and a skewed urban-rural divide (Nagar, 2021). In 2021, The then Minister of Communications and Digital Technologies, Mondli Gungubele, indicated that by 2024, 80 per cent of the population would have internet access, an increase from 56.3 per cent as of 2023 (Republic of South Africa, 2023). This was proposed in the context of high data costs, load shedding and a historical resource divide, including water, electricity, education, health care, affordable, reliable public transport and decent housing. On the hierarchy of basic service provision, digital technology needs to address the contexts and challenges of a society. These include more accessible teaching and learning materials to enable girls in remote areas to continue their education uninterrupted when transportation is not available, mechanisms for women to get medical attention online if clinics are far, or rapid online response mechanisms for domestic violence and violence against women. Internet access and digital technologies need to partner with and speak to immediate social and economic contexts rather than exacerbating existing class fissures and further dispossessing the working poor and social precariat (Zastow, 2016; Davis, 2016; Ojo & Segone, 2022; Mahlatsi, 2020).

Does Work Have A Future?

The world of work is changing with the rapid increase in industrial internet connectivity and automation. Increased internet connectivity promises 'the here and now'; the capacity to experience entertainment, education, work, social and professional spaces without leaving the house, was made visceral during COVID-19 for the socioeconomic groups who have the financial and structural capacity to participate in the digital economy in this manner (Mahlatsi, 2020). The greater use of robots in industrial production places many jobs at risk, especially in the manufacturing sector. A report by McKinsey (2022) states that 3.3 million existing jobs could be lost in South Africa by 2030. Most of these are in the retail sector, primarily absorbing Black women. The African Development Bank (AfDB) predicts that 100 million Afrikan youth will not be able to access the labour market by 2030 due to automation (AfDB, 2019).

Even in emerging Afrikan economies, such as Angola and Ethiopia, current jobs, around 50 per cent and 44 per cent respectively, are susceptible to automation (World Economic Forum, 2017). It concludes that developing Afrikan countries will lose their cost advantage and potentially their ability to achieve rapid economic growth by shifting workers to factory jobs (Kuroya et al;2023. Despite this, the 4IR congregants keep utilising the same logic that 'Africa must catch up and upskill', even though this is another iteration of neo-liberal globalisation, constructed by Western expansionist interests, straight from the World Economic Forum, hardly a force for Black and Brown people's interests (Benyera, 2021; Mahlatsi, 2022).

Small Micro Medium Enterprises (SMMEs) can participate in e-commerce now. Still, they are less likely to reap the benefits of scale, historic subsidies, strong state-sponsored infrastructure, tax avoidance strategies, and a system of trade rules written for them and by their lawyers if e-commerce rules in the World Trade Organisation (WTO) were to be adopted. These include their ability to access industry data which Big Tech increasingly monopolises; the capacity to move information, goods and services across borders at lower tariffs than larger multinationals; sector protections at national level and anti-dumping provisions (Rennie et al., 2023). What SMMEs need are policies along the lines of a digital industrialisation strategy. Still, the policies envisioned by proponents are more likely to result in the new digital colonialism by US monopoly of digital architecture, domination of the digital ecosystem across cultural, entertainment and even political spheres of life, and the ongoing violation of data privacy laws resulting in US surveillance across the Global South (Kwet, 2019a).

US multinationals exercise imperial control at the architecture level of the digital ecosystem: software, hardware, and network connectivity, which then gives rise to related forms of domination. The monopoly of power of MNCs is used for resource extraction through rent and surveillance – economic domination (Kwet, 2020).

There is a significant growing group of workers who are also tapping into the virtual economy in an attempt to escape precarity. A proportion of these workers work in areas such as online tutoring, transcription, research, consultancy, hot forex trading, and many other online jobs. Friedman (2007) has argued that the labour market is increasingly becoming globalised due to online outsourcing and off-shoring of work, creating a 'flat world'. In this argument, there is an emphasis on the positives of technology and how it will create new opportunities, yet it obfuscates the significance of structural and institutional changes happening in labour markets. For example, emerging evidence from research in the developed world, where the phenomenon has become widespread, points to the de-standardisation of work and the emergence of non-standard work in the form of self-employed or own-account workers who do not hire other individuals, or in the form of temporary or fixed-term contracts, and part-time work (Codagnone et al., 2016; De Stefano & Aloisi, 2018). Most importantly, from a labour perspective, on online/digital labour markets, work is performed under even less standard forms than 'traditional' non-standard work, thus, raising questions of inequality, precarisation and erosion of labour rights.

Mahlatsi (2020: 28) insists that local industries have an obligation to protect existing sectors and markets:

> While we cannot halt the march of time and technological developments, it is difficult to accept that some jobs will be rendered obsolete by the advanced technologies of the 4IR. Governments need to concretise regulatory choices to protect worker's rights. Companies must be compelled, legislatively, to contribute to social protection, so that workers are not reduced to a state of vulnerability. In addition, companies must be encouraged to equip their workers with skills that can be marketable and useful in the 4IR economy.

Much of the readiness to uncritically embrace the notion of 4IR is based on a shoddy understanding of human history and a conflation of three very different things: technological innovation, scientific change, and social change. Whereas technological innovations occur all the time, not all are "high tech" or outcomes of new scientific paradigms, nor are they necessarily associated with the kind of social changes to earn the title "revolution". In the ongoing tension between social rights and human dignity on one hand and unfettered business expansion, privileges by race, capital and White supremist logic on the other, 4IR cannot be uncritically accepted as a force for positive progress when it has not been constructed on the continent.

Situating 4IR Against the First Industrial Revolution

The original Industrial Revolution of the late 18th century England – the conversion of water and human energy to steam and pedal power – did not occur because of significant scientific changes. The physical sciences of mechanics and dynamics developments at the time were still variations of Newton's classic Philosophiae Naturalis Principia Mathematica, a work of some 100 years preceding their application to steam, mechanics and the textile industry (Ó'Gráda, 2016).

The link between the First Industrial Revolution and colonialism is pronounced. The increasing application of science and technology to industry enabled the mass production of manufactured goods. But manufacturing goods at this scale needed a huge supply of raw materials and natural resources. The acquisition of these was facilitated by conquering countries rich with minerals and natural resources – a significant amount of which are located on the Afrikan , Asian and South American continents (Mahlatsi, 2020: 25). However, the social changes were far-reaching in England and later North-Western Europe – literally the change from feudalism to capitalism – which is why historians, in retrospect, dubbed the applications of the spinning jenny and the steam engine as an Industrial Revolution.

What became better known as the Second Industrial Revolution did not have the same qualitative social change as the original Industrial Revolution, but it is so-called because the technological changes were profound – in electricity, communications, railroads, and steamships – which laid the basis for global human movement on a scale never seen before. These technological innovations were associated with new scientific paradigms; new understandings of the nature of light and energy and opening the door to the revolutions in physics from Newtonian absolutism of space and time to Relativity and then the Quantum Theory (Kincheloe, Steinberg & Tippins, 1999).

Technological innovation, scientific change and qualitative social change are not necessarily a continuum. It would be well worth noting that inventions such as the spinning jenny, the steam engine and water to coal and steam as the source of energy in production occurred in the 1770s England, but no one used the term "Industrial Revolution" until almost 100 years later. It was first used in France, which had known a revolution, and then in England by economic historian Arnold Toynbee, who found connections between the technological changes applied to production and the much broader social changes which ensued, no less than the rise of towns, the enclosure of the rural commons, new gendered divisions of labour and the consequent rise of capitalism itself (Toynbee, 1956).

Nevertheless, the promoters of the 4IR also assume that its implementation could bring with it risks and threats, the principal one being the increase of inequalities and processes of exclusion, both within countries and between countries. The new industry 4.0 would be very automatised and robotised, and it can be anticipated that many jobs linked to traditional industries would be lost or become flexible up to never-before-seen levels. At the same time, as men with high qualifications would be most under demand, persons with less qualifications and/or of other genders would continue to be less competitive. In addition, they claim that only those countries that are able to transform themselves with boldness will be able to enjoy growth, which would not be available for the entire population (Datta, 2023). A fundamental concern arises around who will manage these risks and threats and how these would be apportioned to societies and their governments. It is difficult to assess how states would continue to strengthen the use of technology for social control without addressing the precarisation of our societies. Can societies that call themselves democratic adopt an innovation of this calibre without even discussing whether this is a direction they want to take (Lye, 2017)? The tale of the 4IR responds to the necessity of this global oligarchy to entrench itself, given the decline of its old industrial power (Speck, 2017).

Going further, in line with a critique of transhumanism and hyper-individualisation, would such a hypothetical "posthuman" species live as a member of an inferior and useless species, that is, those who could not or did not want to incorporate themselves into this revolution? It seems that the 4IR can only be presented as an opportunity if one hides the ecological unsustainability of economic growth, in the context of exhaustion and degradation of material and energy resources. Furthermore, it is essential to consider the social undesirability that gives rise to the processes of inequality, social expulsion and exclusion accompanying it.

Even if it would be possible from the point of view of energy and material resources, we can suspect that the 4IR would be in the service, yet again, of an oligarchic minority formed by the industrial, technological, financial,

media and political elites that are pushing for it. However, this does not negate this epoch of industrialisation. Certainly, they pointed in the direction of a general intensification of social life's orientation towards capitalism. Still, they were somewhat vague about the mechanisms, except when they relied on the idea that the structure and norms of work somehow expanded into social life (Couldry and Mejias, 2019). As Gill and Pratt (2008: 10) put it,

> From this perspective labour is deterritorialised, dispersed and decentralised so that "the whole society is placed at the disposal of profit".

Linking Digital Colonialism with Current Globalisation

The current phase of global economic expansion has imposed upon the peripheral societies (such as South Africa) the privatisation, deregulation, and denationalisation of their economies (Harris and Lauderdale, 2002). This project is being carried out to more effectively "integrate" these economies into the global economic system, for instance, to facilitate the more effective accumulation of capital and the transfer of wealth from these societies to the centres of the global economic system. Terms such as "free market" and "free trade" have attempted to obfuscate the ideological underpinnings for this new form of economic imperialism. Some research indicates that the neoliberal restructuring and integration or globalisation of non-Western economies involves the transfer of much of the income created and earned by the popular classes in these societies to the transnational corporations and, furthermore, to the financial institutions of the major centres of the global economy (Harris and Seid, 2000).

This process also involves the transfer of a portion of their income to the small upper and middle classes in these peripheral societies, who are willing or unwilling local collaborators in the current stage of global expansion (Harris & Seid, 2000). The consequences for the popular classes in the peripheral societies via this new expansion stage include declining real incomes, precarious employment and unemployment, inadequate social services, and increased poverty. Some studies provide evidence of these effects (United Nations, 2000; Hongoro et al., 2022; Erixon, 2011; Rudra & Tobin, 2017).

If Amin's analysis is correct, then the position of the South African economy in the global system, which he refers to as "globalised apartheid," does not give it much hope of becoming "competitive" in the global economy in the near future, mainly if it follows the neoliberal prescription to open up its economy to foreign "competition." He also argues that it is not a question of applying the correct "rational" economic policies and deregulating the economy so that it obeys the "objective laws of the market" as advocated by the neoliberal experts in the International Monetary Fund (IMF), the World Bank, the WTO, and the states of the Group of 7. According to Amin (2001: 7), the position of a country in the world pyramid is defined by the level of competitiveness of its products on the world market. Amin's analysis is thus that globalisation is a colonial expansionist project determined by Western imperial economic interests that peripheralise Afrikan states and workers. Foreign competition is not based on peers and equals; it is a race for extracting human, tangible and intangible resources. The 4IR is an evolving facet of this global project of White economic subjugation (Pheko, 2020). Amin's earlier work is aligned with Walter Rodney's hypothesis that Western foreign competition in Afrikan economies is an incursion that removes sovereignty, displaces government power and reduces the continent to amass cheap labour force and consumer class (Amin, 1972; Rodney, 1973).

Amin is partially answered by Mahlatsi (2020: 25):

> Like all preceding industrial revolutions, the 4IR transcends industry, science, technology and economics. While prevailing discourse presents them as isolated, these fields are interdependent structures that evolved historically. This necessitates that we engage the 4IR as both an industrial and an ideological revolution. Fundamental to understanding the importance of grounding discourse on the 4IR in ideological analysis is an appreciation of the historical developments that have led us to this revolution.

Colonising Space, Data and Digital Worlds

Firstly, the colonisation of Outer Space, as well as the colonisation of the Internet, have been constantly referred to as "the masculine adventure of earthly colonialism" (Flanagan & Jakobsson, 2023), which has

effectively provincialised the existing worlds – the first by opening the skies, and the latter by opening the cyberspace. Jeff Bezos' current space adventures, echoed by Elon Musk and Richard Branson, have been critiqued by Chanda Prescod-Weinstein (2021, para 4), the Black feminist astrophysicist, as follows:

> From my point of view, the ability to see and study the sky isn't a luxury but a fundamental part of what liberation looks like. As a species, we evolved under the night sky. Every community has studied the stars and developed cosmologies: origin stories that explain not just our universe but ourselves. In turn, the stars help us find our way here on the ground; heroes such as Harriet Tubman are believed to have used constellations to navigate their journeys to freedom. Looking at the sky and wondering is fundamentally human activity. It is part of who we are.

Secondly, digital worlds can be linked with the empire through the representation of place: Just like the Space Shuttle, the computer ('smart' phone, tablet, or any other networked gadget) represents both "an immediate presence and a conduit beyond the horizon" (Prescod-Weinstein, 2021). In a sense, the digital worlds provide one more dimension beyond the existing dimensions in standard space-time four-vectors. The champions of 4IR argue that this experience can be accessed in the privacy of our rooms and armchairs to explore the digital territories created by the Internet. However, there are class, gender and deeply racialised mediators to this, including algorithm biases and the deep racism and sexism that are embodied in the digital realm.

Data colonialism merges the exploitative extraction of past colonialism with abstract computing approaches. To comprehend Big Data from the Global South entails an appreciation of the present reliance of capitalism on this novel kind of acquisition that operates at every juncture, where individuals or objects are connected to contemporary communication infrastructures. The magnitude of this shift suggests that it is premature to anticipate the forms and scope of capitalism that will arise from it globally. Similar to how historical colonialism laid the necessary foundations for the rise of industrial capitalism, we can anticipate that data colonialism will establish the prerequisites for a future stage of capitalism beyond our imagination. In this new stage, the central aspect will be the control and exploitation of human life through data.

Currently, it is crucial to refrain from engaging in speculation regarding the future stage of capitalism. Instead, our focus should be on actively opposing the ongoing phenomenon of data colonialism. This is key to our comprehension of and engagement with Big Data from a southern perspective. A practical approach is to maintain data localisation, where data is not universally dispersed but controlled by individual countries and regulated at both local and regional levels through Regional Economic Communities (RECs). This involves decentralising central data servers in the United States and Northern Europe. Although India has the highest number of Facebook users globally, it is essential to note that none of this data is housed on Indian servers or clouds (Benyera, 2021: 159).

Technology is embedded in power relations, and whoever controls technology matters to elites and the popular classes. Discussions around tech should be holistic and address structural inequality, identity, culture, and politics. Yet most critical digital studies scholarship fails to link these concerns to the core authoritarian (often surveillance-based) technologies designed for domination. Moreover, it is not enough to focus on US and European experiences when thinking about the digital world, as most discussions do in the North. Many countries in the Global South are rapidly digitising their societies, and the ecosystem must be viewed from a global perspective. A paradigm shift is required to change focus from outcomes on the surface for Westerners (in domains like privacy and discrimination) to structural power at the technical architectural level within a global context.

Conclusion

This paper proposes a theoretical and conceptual framework for assessing digital colonialism, drawing on South Africa as a case example. This study argues that 4IR in Africa constitutes digital colonialism when framed through centralised control of core digital pillars. A decolonial-feminist lens reveals mechanisms by which power circulates and shapes labour, access, and governance. The proposed conceptual framework identifies paths toward democratic, decentralized digital futures, including open technologies, community networks, and inclusive governance.

Current conversations omit that the domination of the ecosystem by Big Tech is directly linked to architectural design, which constitutes structural inequality. US elites exercise hegemony by convincing everyone that their technologies and ways of building a digital society are the only possible ways to do so. New technologies are often viewed as something that "comes out" on the market rather than designed with particular values and power relations embedded into them. From an engineering perspective, it does not have to be this way. The present way of "doing digital technology", especially Big Data, cloud computing, and proprietary software, is rooted in authoritarianism, but it could be otherwise.

Ojo and Segone (2022) offer a practical conceptual framework that this article drew on:

- Actively implement policy to bring women and girls into the digital space, especially those in poor and marginalised communities.
- Address gendered discrimination, the exploitation of women, and gender-based violence to enable the development of a sustainable digitalised society.
- Revisit established ICT-specific regulations for relevant institutions to address gender-equal access to ICTs and the STEM economy, including financial institutions, to develop strategies that make more women comfortable to engage online.
- Include feminist stakeholders in all decisions made regarding ICT regulations.
- Ensure that gendered policies on e-governance are open, inclusive, accountable, transparent and collaborative.

References

Abdulzaher, M. (2019). How AI and 4IR will Revive the World Economy by 2050. Available at: (13) How AI and 4IR will revive the world Economy 2050 | LinkedIn.

Adesina, O.A. (2020). Women and Colonialism Across Africa. In *The Palgrave Handbook of African Women Studies*. (1-16). Edited by Yacob-Haliso, O. and Falola, T. Cham: Palgrave Macmillan.

African Development Bank (AfDB). (2019). *African Economic Outlook 2019*. Abidjan: African Development Bank

Amadiume, I. (1987). *Male Daughters, Female Husbands (Gender and Sex in an African Society).* London: Zed Press.

Amin, S. (1972). Underdevelopment and Dependence in Black Africa – Origins and Contemporary Forms, *The Journal of Modern African Studies*, Vol. 10(4): 503–524. Doi: 10.1017/S0022278X00022801.

Amin, S. (1976). *Unequal Development: An Essay on the Social Formations of Peripheral Capitalism*. Sussex: The Harvester Press. doi: 10.2307/532256.

Amin, S. (1997). *Capitalism in the Era of Globalization: The Management of Contemporary Society*. Cape Town, London and New York: Institute for Policy and Social Research & Zed Books.

Amin, S. (2001). Imperialism and Globalization, *Monthly Review*, Vol. 53(2): 1–14. doi: 10.14452/mr-053-02-2001-06_2.

Axium Education. (2021). People's Education for People's Power. Available at: peoples Education For Peoples Power (axiumeducation.org).

Bayne, S. & Ross, J. (2011). 'Digital Native' and 'Digital Immigrant' Discourses. In: *Digital Difference. Educational Futures Rethinking Theory and Practice,* Vol 50. (159-170). Edited by Land, R., & Bayne, S. The Netherlands: Sense Publishers. https://doi.org/10.1007/978-94-6091-580-2_12.

Benyera, E. (2021). *The Fourth Industrial Revolution and the Recolonisation of Africa: The Coloniality of Data.* London: Routledge.

Benyera, E., Francis, R. & Jazbhay, A.H. (2020). Challenging Discourse and Searching for Alternative Paths: Justice, Human Rights and Leadership in Africa. (3-20). In *Reimagining Justice, Human Rights and Leadership in Africa: Challenging Discourse and Searching for Alternative Paths*. New York: Springer.

Benyera, E., Mtapuri, O. and Nhemachena, A. (2018). The Man, Human Rights, Transitional Justice and African Jurisprudence in the Twenty-First Century. In *Social and Legal Theory in the Age of Decoloniality: Re-(Envisioning) Pan-African Jurisprudence in the 21st Century.* (187-218). Edited by Nhemachena, A., Warikandwa, T.V. and Amoo, S.K. Cameroon: Langaa RPCID.

Briggs, J. & Kodnani, D. (2023). The Potentially Large Effects of Artificial Intelligence on Economic Growth. Available at: Global Economics Analyst The Potentially Large Effects of Artificial Intelligence on Economic Growth (BriggsKodnani) (key4biz.it).

Carrim, N. (2022). 4IR in South Africa and Some of its Educational Implications. *Journal of Education*, 1-18. doi: 10.17159/2520-9868/i86a01.

Chiodelli, F. (2022). The Concept of Neo-Apartheid (Cities): In Defense of its Restrictive Use. Available at: The Concept of Neo-Apartheid (Cities): In Defense of its Restrictive Use (societyandspace.org).

Codagnone C., Abadie, F. & Biagi, F. (2016). *The Future of Work in the Sharing Economy: Market Efficiency and Equitable Opportunities or Unfair Precarisation*. Luxembourg: Publications Office of the European Union.

Cole, D. (2014). Michael Hayden: 'We Kill People Based on Metadata'. Available at: Michael Hayden: "We Kill People Based on Metadata" - Just Security.

Coleman, D. (2019). Digital Colonialism: The 21st-Century Scramble for Africa through the Extraction and Control of User Data and the Limitations of Data Protection Laws. *Michigan Journal of Race and Law, Vol.* 24(2): 417–439.

Damon, C. (2022). Fighting Amazon's neo-colonialism in Cape Town. Available at: Fighting Amazon's neo-colonialism in Cape Town | Progressive International.

Datta, P. (2023). The Promise and Challenges of the Fourth Industrial Revolution (4IR). *Journal of Information Technology Teaching Cases*, Vol. 13(1), 2-15. doi: https://doi.org/10.1177/20438869211056938.

Davis, N. (2016). What is the Fourth Industrial Revolution? WEF Global Agenda, Jan 19. Available at: https://www.weforum.org/agenda/2016/01/what-is-the-fourth-industrial-revolution/.

De Stefano, V. & Aloisi, A. (2018). *European Legal Framework for Digital Labour Platforms*. Luxembourg: Publications Office of the European Union.

Deedat, H. (2020). The Fourth Industrial Revolution a "Fait Accompli" As a Euphemism for Restructuring? Can Labour Still Influence the Agenda? *South African Labour Bulletin*, Vol. 43 (2/3): 27-30.

Diphoko, W. (2019). Opinion: Is Africa Being Recolonised Through Tech?, *Volt Africa*, 12 July. Available at: www.iol.co.za/technology/opinion-is-africa-being- recolonised-through-tech-29083464.

Dissel, B. (2004). Surveillance, Big Data and Democracy: Lessons for Australia from the US and UK. *University of New South Wales Law Journal*, Vol. 37(2): 713–747. doi: 10.3366/ajicl.2011.0005.

Dube, S.I. The New Religious Political Right in Neo-Apartheid South Africa. *Religion and Theology*, Vol. *28* (3-4): 153-178. doi: https://doi.org/10.1163/15743012-bja10028.

Erixon, L. (2011). Under the Influence of Traumatic Events, New Ideas, Economic Experts and the ICT Revolution: The Economic policy and Macroeconomic Performance of Sweden in the 1990s and 2000s". In: *The Nordic Varieties of Capitalism*. (265-330). Edited by Mjøset, L Bingley: Emerald.

Feder, B.J. (1986). I.B.M. is Shedding South Africa Unit; Pressure is Cited. *The New York Times*. Available at: I.B.M. IS SHEDDING SOUTH AFRICA UNIT; PRESSURE IS CITED - The New York Times (nytimes.com).

FitchSolutions. (2022). "Mining and Metals Key Themes for 2023." Available at: Mining And Metals Key Themes For 2023 (fitchsolutions.com).

Flanagan M. & Jakobsson, M. (2023). *Playing Oppression: The Legacy of Conquest and Empire in Colonialist Board Games.* Massachusetts: MIT Press.

Friedman, T.L. (2007). *The World is Flat 3.0: A Brief History of the 21st Century.* New York: Picador.

Gamboa, E.C. (1988). Globalization of Industry Through Production Sharing. In *Globalization of Technology: International Perspectives*. (86-105). Washington, DC: The National Academies Press. https://doi.org/10.17226/1101.

Gavaza, M. (2019, May 23). Huawei's Future in SA Called into Question: The Chinese Company's Foothold in the Local Market Could Prove Shaky if the US Ban Becomes Permanent, *Business Day*.

Gill, R. and Pratt, A. (2008). In The Social Factory? Immaterial Labour, Precariousness and Cultural Work. *Theory, Culture & Society*, [online] 25(7-8), pp.1–30. doi:https://doi.org/10.1177/0263276408097794.

Goldschein, E. (2011). The Incredible Story of How De Beers Created and Lost the Most Powerful Monopoly Ever. Available at: The History of De Beers and Diamonds (businessinsider.com).

Harris, R.L. & Seid, M.J. (2000). Critical Perspectives on Globalization and Neoliberalism in the Developing Countries. *Journal of Developing Societies, Vol. 16*, 1-26.

Haywood, T. (1998). Global Networks and the Myth of Equality: Trickle down or Trickle away? In: *Cyberspace Divides Equality, Agency and Policy in the Information Society* (19–34). New York, NY: Routledge.

Hongoro, C., Adonis, C. & Sobane, K. (eds). (2022). *Innovation for Inclusive Development and Transformation in South Africa.* South Africa: AOSIS Publishing.

International Labour Organisation [ILO]. (2023). *World Employment and Social Outlook: Trends 2023.* Available at: wcms_865332.pdf (ilo.org).

Jerath, K.S. (2021). *Science, Technology and Modernity: An Interdisciplinary Approach.* Switzerland: Springer Nature.

Kerby, E., Moradi, A. & Jedwab, R. (2017). History, Path Dependence and Development: Evidence from Colonial Railways, Settlers and Cities in Kenya. *Economic Journal,* Vol. 127(603): 1467 – 1494.

Kincheloe, J.I., Steinberg, S.R. & Tippins, D.J. (1999). *The Stigma of Genius: Einstein, Consciousness and Education*. Switzerland: Peter Lang.

Kuyoro, M., Leke, A., White, O., Kartik, J., Kendyll, J., Editor, H. and Strom, S. (2023). Reimagining Economic Growth in Africa: Turning Diversity Into Opportunity. Available at: https://www.mckinsey.com/~/media/mckinsey/mckinsey%20global%20institute/our%20research/reimagining%20economic%20growth%20in%20africa%20turning%20diversity%20into%20opportunity/reimagining-economic-growth-in-africa-v6.pdf.

Kwet, M. (2019a). Digital Colonialism: US Empire and the New Imperialism in the Global South. *Race & Class*, Vol. 60 (4): 3-26. doi: https://doi.org/10.1177/0306396818823172.

Kwet, M. (2019b). Digital Colonialism is Threatening the Global South. Available at: Digital colonialism is threatening the Global South | Science and Technology | Al Jazeera.

Kwet, M. (2021). Digital Colonialism: The Evolution of American Empire. *ROAR Magazine*, *3*.

Lavelle, K.C. (2004). *The Politics of Equity Finance in Emerging Markets.* New York: Oxford Academic.

Lall, S. (2001). *Competitiveness, Technology and Skills*. Cheltenham, UK: Edward Elgar Publishing.

Lall, S. (2003). Indicators of the Relative Importance of IPRs in developing Countries. *Research Policy*, Vol. 32(9): 1657-1680.

Lebeuf, A.M. (1963). The Role of Women in the Political Organization of African Societies. In: *Women of Tropical Africa.* (93-119). Edited by Paulme, D. Routledge: London.

Li, R. & Peng. S. (2021). Why Live Commerce? – A New Growth Point of Online Shopping. Available at: https://polymathv.com/why-live-commerce-is-the-future-of-online-shopping/.

Lye, D. (2017). The Fourth Industrial Revolution and Challenges for Government. Available at: The Fourth Industrial Revolution And Challenges For Government | GE News.

Madlingozi, T. (2017). Social Justice in a Time of Neo-Apartheid Constitutionalism: Critiquing the Anti-Black Economy of Recognition, Incorporation and Distribution. Available at: Madlingozi_Social_2017.pdf (up.ac.za).

Mahlatsi, M. (2020). The Fourth Industrial Revolution: Another Industrial Revolution Leaving Black Women Behind? *The Thinker,* Vol. 83(1): 24–28. doi: https://doi.org/10.36615/thethinker.v83i1.225.

McKinsey. (2022). *The Future of Work in South Africa.* Available at: The future of work in South Africa In Brief (mckinsey.com).

Meagher, K. (2019). Working in Chains: African Informal Workers and Global Value Chains. *Agrarian South: Journal of Political Economy*, Vol. 8(1-2): 64-92. https://doi.org/10.1177/2277976019848567.

Mhlanga, D. & Moloi, T. (2020). The Stakeholder Theory in the Fourth Industrial Revolution. *International Journal of Economics and Finance Studies,* Vol. 12(2): 352-368. doi: 10.34109/ijefs.202012207.

Michalopoulos, S. & Papaioannou, E. (2021). European Colonialism in Africa Is Alive. Available at: European Colonialism in Africa Is Alive by Stelios Michalopoulos & Elias Papaioannou - Project Syndicate (project-syndicate.org).

Mlaba, K. (2021). How is South Africa's Digital Divide Making Inequality Worse in the Country? Available at: How Is South Africa's Digital Divide Making Inequality Worse in the Country? (globalcitizen.org).

Molelekwa, T. (2022). Analysis: Reflections on TAC's Future as New Leadership is elected. Available at: ANALYSIS: Reflections on TAC's future as new leadership elected • Spotlight (spotlightnsp.co.za).

Moll, I. (2021). The Myth of the Fourth Industrial Revolution. *Theoria*, Vol. 68(167): 1-38.

Mudimbe, V.Y. (1988). *The Invention of Africa.* London: James Curry.

Nagar, M. (2021). Social Structure and Social Mobility. In: *2021 Macro-Social Report.* Johannesburg: The Presidency, The University of Johannesburg, and Mapungubwe Institute for Strategic Reflection.

Negri, A. (1989). *The Politics of Subversion: A Manifesto for the Twenty-First century*. Cambridge: Polity.

Nhemachena, A., Warikandwa, T.V. & Amoo, S.K. (eds.) *Social and Legal Theory in the Age of Decoloniality: (Re-)Envisioning African Jurisprudence in the 21st Century*. Bamenda, Cameroon, CM: Langaa RPCID.

Ogunsola, L.A. (2005). Information and Communication Technologies and the Effects of Globalization: Twenty-First Century 'Digital Slavery' for Developing Countries – Myth or Reality? *Electronic Journal of Academic and Special Librarianship,* Vol. 6(1-2).

Ó'Gráda, C. (2016). Did Science Cause the Industrial Revolution?" *Journal of Economic Literature*, Vol. 54(1): 224-39. DOI: 10.1257/jel.54.1.224.

Ojo, T.A. & Segone, K. (2022). Women are Being Squeezed Out of the digital economy. Available at: Women are being squeezed out of the digital economy (daily maverick.co.za).

Ossome, L. (2018). *Gender, Ethnicity, and Violence in Kenya's Transitions to Democracy: States of Violence*. London: Lexington Books.

Owasanoye, D. (2020). *The Role of Women in the Fourth Industrial Revolution | Exploring Economics*. Available at: https://www.exploring-economics.org/en/discover/role-of-women-fourth-industrial-revolution/.

Oyewumi, O. (1997), *The Invention of Women.* Minneapolis, Minnesota: University of Minnesota Press.

Pheko, L.L. (2022). The Case for Equality of 4IR Capital. Available at: (13) The Case for Equality of 4IR Capital | LinkedIn.

Prensky, M. (2001). Digital Natives, Digital Immigrants. *On the Horizon, Vol.* 9(5): 1 – 6.

Prescod-Weinstein, C. (2021). What Richard Branson and his Critics Both Get Wrong about Equal Access to Space. Available at: Opinion | What Richard Branson and his critics both get wrong about equal access to space - The Washington Post.

PricewaterhouseCoopers, (2018). Women Remain Under-Represented in Emerging Tech. PricewaterhouseCoopers. Available at: https:// www.pwc.co.za/en/press-room/changing-gender-perceptions-and-behaviours-in-the-workplace.html

Quach, S., Thaichon, P., Martin, K., Weaven, S. & Palmatier, R. (2022). Digital Technologies: Tensions in Privacy and Data. *Journal of the Academy of Marketing Science*. 50. 10.1007/s11747-022-00845-y.

Randriamaro, Z. (2006). Gender and Trade. Available at: Trade-OR-Final.doc (s2bnetwork.org).

Rennie, J., Israel, M., Hishon, R., Kelliher, K. & Heitmann, M. (2023). All Change? The New Digital Market, Competition and Consumers Bill. Available at: All change? The new Digital Markets, Competition and Consumers Bill | White & Case LLP (whitecase.com).

Republic of South Africa. (2019). National Integrated ICT Policy White Paper. Available at: Electronic Communications Act: National Integrated ICT Policy White Paper (www.gov.za).

Republic of South Africa. (2023). Government Provides Infrastructure to Aid internet Connectivity. Available at: Government provides infrastructure to aid internet connectivity | SAnews.

Rikap, C. & Lundvall, B-Å. (2021). *The Digital Innovation Race: Conceptualizing the Emerging New World Order*. Doi: 10.1007/978-3-030-89443-6.

Roberts, L. (2022). 'More Could be Done': Combating South Africa's Record-High Unemployment. *Forbes*. Available at: 'More Could Be Done': Combating South Africa's Record-High Unemployment - Forbes Africa.

Rodney, W. (1973). *How Europe Underdeveloped Africa*. Tanzania and London: Bogle- L'Ouverture Publications and Tanzanian Publishing House. Doi: 10.2307/217137.

Rudra, N., & Tobin, J. (2017). When Does Globalization Help the Poor? *Annual Review of Political Science*, Vol. 20: 287-307.

Santoru, M. (1996). The Colonial Idea of Women and Direct Intervention: The Mau Mau Case. *African Affairs: The Journal of the Royal African Society, Vol.* 95(379): 253–267.

Schwab, K. (2016). *The Fourth Industrial Revolution*. London: Penguin UK.

Sharife, K. and Bond, P. (2011). Above and Beyond South Africa's Mineral-Energy Complex. In: *New South African Review 2*. (279-99). Edited by Pillay, S., Daniel, J., Naidoo, P. and Southhall, R. Johannesburg: Wits University Press.

Shivji, I. (2009). *Accumulation in an African Periphery: A Theoretical Framework.* Tanzania: Mkuki na Nyota Publishers Ltd.

Shivji, I. (2019). *Social Responsibility of Intellectuals in Building Counter-Hegemonies*. Dar es Salaam: University of Dar es Salaam.

Speck, A. (2017). The Fourth Industrial Revolution is not Our Revolution. Available at: The Fourth Industrial Revolution is not Our Revolution | Andrea Speck.

Tafira, C.K. and Ndlovu-Gatsheni, S. (2017). Beyond Coloniality of Markets-Exploring the Neglected Dimensions of the Land Question from Endogenous African Decolonial Epistemological Perspectives. *Africa Insight*, Vol. 46(4): 9–24.

Tamale, S. (1996). Taking the Beast by its Horns: Formal Resistance to Women's Oppression in Africa. *Africa Development / Afrique et Développement*, Vol. 21(4): 5–21. Doi: http://www.jstor.org/stable/24482766.

Tejani, S. and Fujuda-Parr, S. (2021). Gender and COVID-19: Workers in Global Value Chains. *International Labour Review*, 160: 649-667. doi: https://doi.org/10.1111/ilr.12225.

Toynbee, A.J. (1956). A Study of History: What I Am Trying to Do? *Diogenes*, Vol. *4*(13): 6-10. Doi: https://doi.org/10.1177/039219215600401302.

Uger, E.T. (2023). The Fourth Industrial Revolution, Techno-Colonialism, and the Sub-Saharan Africa Response. *Filosofia Theoretica: Journal of African Philosophy, Culture and Religions*, Vol. 12(1): 33 – 48.

United Nations. (2000). *Committee for Development Policy Report.* Available at: N0043517.pdf (un.org).

Van Dijk, J.A.G.M. & Hacker, K. (2003). The Digital Divide as a Complex and Dynamic Phenomenon. *The Information Society*, Vol. 19(4): 315-326. doi: 10.1080/01972240309487.

Vaidhyanathan, S. (2011). *The Googlization of Everything: (And Why We Should Worry).* California: University of California Press.

World Bank. (2022). *Inequality in Southern Africa: An Assessment of the Southern African Customs Union.* Available at: World Bank Document.

Zastrow, C. (2016). *Empowerment series: Introduction to Social Work and social welfare: Empowering People*. Boston: Cengage Learning