The Political Economy of African AI:

A Primer on Concepts, Contexts, Considerations and Capitalism

Scott Timcke, Sandra Makumbirofa, Andrew Rens, Nawal Omar and Hanani Hlomani

RESEARCH ICT AFRICA

Workshop17
17 Dock Road
V&A Waterfront
8001
Phone: +27 21 447 6332
www.researchictafrica.net

Table of Contents

Acknowledgements

We are grateful for conversations with Roland Banya, Alison Gillwald, Hanani Hlomani, Relebohile Mariti, Samantha Msipa, Liz Orembo, Andrew Partridge, Zara Schroeder, and Araba Sey. We appreciate Fabio De Masi accepting our invitation to present some of his work to the research team. We want to thank Ben Anderson for providing a careful review of our ideas and their presentation. His feedback helped bring out the best version of this primer. Alan Finlay, Jamie Fuller, and Natalie Simon provided valuable editorial support.

Chapter 5 draws upon Timcke, S. (2024, May 15). AI Regulation Paradigms and the Struggle over Control Rights. *The Bulletin of Technology & Public Life*. https://doi.org/10.21428/bfcb0bff.ae40312a, published under the CC BY 4.0 licence.

This research is part of the African Just AI Project and is made possible by the International Development Research Centre (IDRC) research grant.

Foreword

The latest general-purpose technology Artificial Intelligence (AI) has become ubiquitous. It increasingly underpins our everyday activities, and oftentimes without our awareness. AI has become so pervasive, in fact, that it is at the top of numerous agendas of multilateral agencies, development banks, academia and donors, who have thrown their weight behind the promise of AI solving some of humanity's greatest challenges. On the African continent alone, scores of actors from regional institutions, national and local governments are scrambling to produce donor and multilateral-driven AI blueprints to realise this promise.

As yet, the evidence to support the hype around AI's developmental potential is modest. On the contrary, there is good reason to be cautious about how AI may derail developmental agendas. Historically, the opportunities and harms associated with advanced data-driven technologies have been highly unevenly distributed, both within and between countries, and especially in the majority world. Digital inequality, data injustice and economic disparities, it would appear, are on the rise, and they reflect and deepen structural inequalities in the global economy. Without addressing the foundational inequalities that constitute advanced data-driven technologies, adjectival discourses of 'rights-preserving,' 'responsible,' 'good,' and 'ethical-by- design' AI will fail to address one of the wickedest underlying policy problems of our of time – the digital inequality paradox.

The paradox lies in the fact that as more people are absorbed into the digital ecosystem, digital inequality widens (and by extension, socio-economic inequalities do, too). Digital inequality is not simply a disparity between those who have and those who lack connection to digital services. There is a widening gap between those who passively consume a limited number of basic services, and those who have the technical and financial resources to put data technology to full and productive use. Amongst this latter group are the small elite able to innovate and contribute to the prosperity of nations and economic growth. Those within the small elite are also capable of amassing a personal wealth greater than that of nations.

Research ICT Africa (RIA), an applied digital policy research centre, is committed to addressing the ever-pressing concern raised by the digital inequality paradox. Over the past two decades, the focus of RIA's work has evolved according to advancements in digital technologies, from a focus on telecom reform to internet, data and now AI governance to which this primer contributes. During this time, we have contributed to a series of critical discussions on the regulatory strategies required to reduce digital inequality, particularly in countries with legacies of structural adjustment, neo-colonialism, and underdevelopment. And, in joining these discussions, we have brought with us the complementary theories, methodologies and analytical tools offered by political economy. As a result, our contributions to the literature on digital inequality have typically challenged dominant narratives in the nexus of Information Communication Technologies (ICT) and development.

More notably, RIA attributes the relatively poor ICT policy outcomes in Africa, particularly regarding poverty alleviation, to the paucity of critical research acknowledging the political context in which economic reforms occur. Purely economic approaches that present advanced data-driven technologies narrowly as drivers of growth and productivity, and that are based on the modelling of competitive markets and the institutional endowments of mature economies, are ill-suited to the context of most developing economies. Orthodox narratives tend to overlook the

institutional and resource constraints characteristic of many majority world nations, particularly in Africa, and which are necessary to overcome to achieve even limited economic objectives, never mind broader social welfare outcomes.

With the purpose of collecting and analysing evidence for social welfare and maximising policy formulation and institutional building informed by public interest principles, RIA's work draws on an intellectual tradition going back several centuries to classical political economists including David Ricardo, John Stuart Mill, Karl Marx and later Joseph Schumpeter. We have further engaged the contributions of Pan-African theorists, such as Amilcar Cabral, Walter Rodney and Franz Fanon, whose political and economic analyses illuminate the perpetuation of colonial power relations. Together with the seminal work of Immanuel Wallerstein, which identifies the structural foundations of imperialism, these heterodox perspectives have formed the foundations of African political economy and feminist and decolonial perspectives on development. Moreover, being practically involved in digital policy development and institution- building, RIA has had the privilege of working with Robin Mansell, Bill Melody, Rohan Samarajiva, Brian Levy and Pablo Spiller and J.P. Singh who have variously written about these challenges over the last three decades.

Like previous digital general-purpose technologies such as the internet, AI systems are neither politically neutral nor a panacea for growth and equitable economic development. By contrast, AI is by design a closed, elitist, and highly concentrated technology. Although a powerful and dynamic tool that *could* be leveraged to benefit the continent and promote economic justice, if developed unchecked, AI will perpetuate the unequal status quo. That is, AI threatens to facilitate the continuation of economic exclusion, impoverishment, and the uneven distribution of economic opportunities.

As AI policies, plans and frameworks develop at the highest levels of the UN and become centre pieces of international agendas from security and peace to climate change and sustainable development, we must remember at the core of AI is data. In our current social organisation, data has become commodified and turned into private assets, a process that can and should be challenged from the perspective of economic justice. The data upon which AI is built needs to be transparent and treated as a public good, non-rivalrous and non-excludable, to avoid the exacerbation of data-related harms and economic inequalities. AI is also a complex social production that frames and shapes our perception of reality. It offers a socially, culturally, and industrially produced version of the world in its constitution. The challenge is that what is shown through AI is the result of a complex process of selection, and if large portions of the global population, particularly in economically disadvantaged regions, are excluded or marginalised in these processes, we run the risk of irrevocably deepening global economic inequality and perpetuating cycles of poverty and lack of opportunity.

As is required for effective policy making, RIA is constantly bringing together multidisciplinary teams to tackle the complex and dynamic global digital system that increasingly marks contemporary economy and society. In the context of a generous International Development Research Centre (IDRC) think-tank grant that produced the African Just AI Project, this primer seeks to contextualise AI within the political economy of Africa and its potential impact on economic justice. In the long tradition of understanding the key policy issues of the day through a political economy lens, the primer is the outcome of an internal seminar and learning series, led and carefully curated by Dr Scott Timcke, to familiarise ourselves across disciplines with some of

the seminal political economy literature and debates. RIA staff participated in the series of seminars to understand opaque power relations and complex interests, and to gather the correct evidence for new and innovative forms of governance and institutional arrangements required to deal with the complex and dynamic digital environment that is today's political economy.

Alison Gillwald (PhD)

Executive Director

Research ICT Africa

May 2024

1 Introduction and Objectives

Governments, think tanks and firms anticipate that artificial intelligence (AI), and the role of digital technology more broadly, will have a significant impact on Africa's development, particularly due to the fact that African countries rely on imported AI-systems. The development of AI is already taking place in a very specific global context. In its current form. Large technology companies, like Meta, colloquially known as 'Big Tech' generate tremendous revenues by exploiting the unpaid labour of their users, then commodifying those users' data for brokerage.

These same firms create and implement automated decision-making algorithms to make work more productive; but the routine sorting and prediction done by algorithms is used to leverage inequalities for vast profits. These firms lobby governments to rewrite tax codes, booking profits in tax havens, while also exploiting clickworkers in the Majority World. The firms amassed significant war chests throughout the 2010s. At one point Apple had USD 246 billion in cash reserves. With the aid of cheap money, cash reserves like these were used for stock buy-backs even while sector-wide layoffs in the United States (US) neared the 100 000s in late 2022 and early 2023. These dynamics are not unique to the US. They are found in all major centres of power, including Europe and China, all of which are themselves competing at the global level for their model of economic governance to prevail.

However, as well as a potential risk for greater inequality, there is also potential opportunity in AI and digital technology tools. A number of international landmark documents and charters from the continent recognise these as powerful tools to implement the 2030 Agenda for Sustainable Development and Africa's Agenda 2063.

With these stakes in mind, this primer covers some preliminary elements required to attain a better working familiarity with a critical political economic analysis of AI in African post-colonial settings for practical policy purposes. The goal is to consolidate major political economy approaches and concepts required by policy researchers and makers to better conceptualise the increasingly complex politics and economics around AI in Africa as it is shaped by the forces and tensions of global capitalism. The primer moves from general issues to those especially acute for Africans. Its aim is to focus on how Africa relates to, and participates in, global technological developments. The purpose of the primers is to enable greater understanding and knowledge of global political economy as context for AI in and for Africa with intention of enabling better policy analysis and formulation and greater agency in global governance.

1.1 Definition of AI

AI has been described in multiple, sometimes conflicting ways requiring a working definition of AI for the purposes of this primer. AI can be understood as the application of statistical methods to vast datasets, enabling the extraction of meaningful patterns and relationships. Statistical methods, like causal inference, are often used in this process to identify the most impactful independent variables in the data. Sometimes the interactions of software subsystems can give rise to unanticipated outcomes. This understanding draws attention to how some AI systems make inferences about future actions, which are used to guide decisions by third parties or in the calculations undertaken by the AI system.

The Alan Turing Institute offers another useful definition of AI. They write that AI is "the design and study of machines that can perform tasks that would previously have required human (or other

biological) brainpower to accomplish". From this definition, it is immediately apparent that the purpose of AI is to provide a replacement for human labour.

These definitions highlight how AI is a by-product of human labour and judgement (it is created by humans), that is situated in organisations and societies. It is this aspect which is of greatest interest to the world of social policy.

1.1.1 Types of AI products, systems and services

AI products, systems and services can be classified into many different types according to their functions and applications. Some examples of these types are:

- Cognitive behavioural manipulation systems, which are AI systems that influence human behaviour, emotions, or decisions through various techniques like 'nudging' (also known as choice architecture), persuasion, or deceptive design.
- Scoring systems, which are AI systems that assign values to individuals or groups based on certain criteria, like creditworthiness, employability, or risk. These systems can affect access to essential public or private services, like loans, education, or health care.
- Biometric identification systems, which are AI systems that use biometric data, like fingerprints, face, voice, or the iris, to verify the identity of a person. This can be done remotely and in real time. These systems can be used for various purposes, like State surveillance, law enforcement, or border control.
- Biometric classification systems, which are AI systems that use biometric data to categorise individuals into groups based on certain attributes, like gender, age, ethnicity, or health status. Depending on their use, these systems can compromise human dignity and privacy while perpetuating discrimination and prejudice.

1.2 Objective of this primer

Our core objective in this primer is to provide policy researchers and makers with concepts to help them think through and then explain social inequality in relation to new technologies like AI and what policies are required to prevent harms and uneven distribution opportunities between and within countries in the African context. We do this from the perspective that AI is related to historical change, and therefore our understanding of AI needs to be grounded in an understanding of the forces that shape this change.

In discussing these concepts, we also seek to address some high-level questions:

- How can an understanding of the social origins of institutions shape our analytical imagination?
- How might this knowledge contribute to the skillsets of policy researchers?
- How might this imagination help the work of policy researchers that must offer advice on a shifting global terrain?
- What is AI changing and how do we raise awareness so that AI does not only serve the interests of the most powerful?

At the end of most sections, we provide a short list of scholarly books and articles that may be helpful to consult.

1.3 The political economy of AI: seven ideas to think about

"Political economy" has two senses. It can refer to a particular political economy of a country, industry or technology. It also refers to the kind of analysis that identifies the dynamics of political economy. While political economy theory has its roots in classical economic theorists like David Ricardo and Karl Marx, its popularity in this second sense has waxed and waned in academic and policy research. The field certainly made a resurgence after the 2008 Great Recession as people sought to better understand the role of economic power and hierarchies of influence in bringing about that crisis in capitalism. Now with appropriate concern about the role of AI in re-shaping power relations between states, markets and citizens; the future of work and the labour process, as well as how AI might restructure firms and the provision of government services; applying a political economy lens can help policy researchers think more clearly about the interplay between power, classes, and technological change. Through coming to fully perceive how the various statistical rules and weights of AI have political ramifications, this appraisal can help them take steps to avert another capitalist crisis of similar or greater magnitude.

People usually understand political economy as a theoretical and applied framework that guides attention to several key areas. This helps to better grasp the sum of social relations and their meanings. There are many schools of thought in the field, and they have an intensive, healthy intramural debate. Nevertheless, these schools tend to be unified around a concern of what existing social relations mean for the prospect of substantive social change. Typically, the key objective of a political economic analysis is to use the history of material organisation to explain relations, processes, institutions, and organisations. With this agenda, here are seven ideas to think about with respect to the political economy of AI.

1.3.1 Economic orders are constructed

First, political economy points to how economic orders are constructed by different groups within that order; how these groups negotiate, bargain and struggle against one another; and what resources they gather to defend or advance their particular projects and interests. AI-powered products are now among those resources. Also, by being attentive to the role of wealth, how it is deployed in the market and how it is acquired, people can understand how the commoditisation of AI and the privatisation of data will mean that some groups will have dramatically more resources than others. Differentials like this beget social inequality.

1.3.2 Politics is about high stakes

Second, the field of political economy is open and honest about the ruthlessness of politics and the overriding power of economic interests. Adopting AI to automate parts of the labour process benefits some groups to the detriment of others, for instance. So, it is a misleading to claim that AI can automatically create a better life for all. With so much 'AI hype' in public discourse pushing glowing one dimensional narratives (whether in marketing rhetoric or nationalistic proclamations), a political economy lens provides useful counterpoints that can clarify and elevate discussion by introducing new topics to public affairs.

1.3.3 The uneven geography of AI

Keeping social inequality in mind, our third point concerns how AI is implemented unevenly in different countries across the world. The adoption of AI is not a single process: there are multiple starting points, and points of disconnection and delay due to many factors including

infrastructure, skills, resources, needs and interests. It is even differently experienced by people across the world who seek different things, and approach AI from different cultural and political contexts. This means that when we talk about AI, both from a capacity to implement and from an effects perspective, we are not necessarily all talking about the same thing. With most colonised spaces subject to unequal exchange in the 19th and 20th Centuries, and without diminishing the energies of post-independence governments to rectify that problem, unequal development remains a distinctive feature of our world system. It therefore remains a distinctive feature when considering the implementation of AI.

1.3.4 Who is deemed to have expertise?

Fourth, the political economy of AI can help us see which actors are deemed to have appropriate expertise. "Faced with disorienting technological change," Seth Lazar and Alondra Nelson recently wrote, "people instinctively turn to technologists for solutions." However, they add that "the impacts of advanced AI cannot be mitigated through technical means alone; solutions that do not include broader societal insight will only compound AI's dangers". Due to patterns of prejudice, bigotry, and the North-South world system, some groups' voices will not be listened to when it comes to AI dangers. Conversely, powerful shareholders are reluctant to disclose information about the inner workings of their AI products, products we already know can and do perpetuate racism and other inequalities. The consequences of adopting AI are too great to leave this matter with executives in New York and technologists in San Francisco. Due consideration and lawmaking by democratically elected representatives can channel AI enterprises to address human needs.

1.3.5 Hidden labour

AI models are developed using human labour – in the case of popular systems substantial human labour – but this is largely hidden from public view. AI systems are built on technologies reliant on rare earth metals, many of which are extracted by miners working in inhumane and dangerous conditions. Generative AI is trained using the creative work of thousands of artists, writers or software creators, who have not consented to the use of their work. Because AI systems are trained on data generated by humans they may produce racist, sexist, explicit and abusive outputs. To prevent this, Reinforcement Learning from Human Feedback (RLHF) involves humans identifying undesirable outputs to feed back into the system so that it does not produce them. RLHF is labour intensive and routinely outsourced to undercompensated workers in developing countries who suffer psychological trauma from exposure to undesirable content. Concealment of human labour in technologies that are proclaimed to be carried out by machines is termed 'fauxtomation'.

1.3.6 Experiences of profound technological change

Sixth, the political economy of AI can remind citizens about prior previous experiences of profound technological change. As with other great industrial transformations which shook up whole social orders, AI will have reactionary and revolutionary components as people try to make sense of and adapt to changing circumstances. Advocates of 'the status quo but more efficient' may not have the imaginative capacities to anticipate the potential and pitfalls that AI introduces and could be swept aside as forces overtake them. Undoubtedly AI will lead to a "recalibration of the burdens of risk between capital and labour"; some people may turn to AI to strictly enforce hierarchy, stratification and mobility, while others think about liberation. Put differently, the politics of AI will likely intensify in the coming decades as the stakes become more acute.

1.3.7 Identifying major changes

Lastly, we endorse Henry Bernstein's methodology for analysing the dynamics of social relations, processes, and change. He focuses on four aspects: property rights over productive resources; the division of labour with forms of cooperation and conflict between and among different groups; the distribution of income and wealth and the mechanisms for extraction and accumulation; and the patterns of consumption and investment along with their associated meanings. In a succinct manner, Bernstein directs researchers to ask four questions:

- Who owns what?
- Who does what?
- Who gets what? and
- What do they do with it?

We recommend that policy researchers prioritise these questions when designing their studies.

These seven ideas can help improve public deliberation around AI and inequalities, in part by avoiding common intellectual cul-de-sacs that bring about platitudes. One challenge in Africa is to realise that AI systems are not politically neutral or a panacea for growth and development; AI's statistical rules and weights are situated judgements from those that work in Big Tech firms beholden to shareholder primacy. Historically State-commissioned transnational companies in imperial centres were powerful, like the Dutch East India Company, which carried out colonial trade. Big Tech surpasses them. Though it arguably represents a new mode of production with specific and new implications for economy and society, AI is not a break with history. There are strong continuities in this phase of advanced capitalism. The field of political economy shows how AI systems are contestable, in part because they are also social systems. This idea alone can bring energy for currently subordinated groups to pursue projects of negotiation, bargaining and struggle for a fairer political economy in which to live and work.

1.4 Suggested readings

Anita Gurumurthy and Nandini Chami's The Intelligent Corporation: Data and the digital economy.

Scott Timcke's Algorithms and the End of Politics.

Shakir Mohamed, Marie-Therese Png, and William Isaac's Decolonial AI: Decolonial Theory as Sociotechnical Foresight in Artificial Intelligence.

Tiziano Bonini and Emiliano Treré's Algorithms of Resistance: The Everyday Fight against Platform Power.

2 Key Concepts and Approaches

The section covers some fundamental characteristics of the political economy. We intend to help readers identify key concepts and considerations to give them a sense of how to plan a political economic analysis. One key set of questions involves 'continuity and discontinuity'. Put differently, what changes, and why? What stays the same, and why? What appears like a change, but is not? And what looks like continuity, but is not? Part of answering these questions entails asking, how do moving components constitute something larger? These are the elemental questions of social change.

As we have mentioned, there is healthy debate in the field. Most political economists have a commitment to democracy including the eradication of poverty and injustice. Due to the need for effective effort to achieve these goals, what they might mean and how to achieve them are also subject to robust debate.

Another reason for this productive debate is that until very recently there were few academic programmes training political economists. Without a standard 'professional' trajectory into the field, political economy has tended to be relatively more inclusionary than other academic disciplines. In the field you will find sociologists, economists, philosophers, public policy researchers, engineers, accountants, and civil society activists among many others. The goal is to use these disciplinary differences to productively generate new useful insights into matters of public concern.

2.1 What is political economy?

Political economy is less a set of testable economic propositions than a theoretical framework that has building blocks, applications, and extensions. Put differently, this is a field of study that seeks to understand the relationship between economic systems and political structures in a social setting. The field focuses less on any one particular method. This is because too frequently there is a tendency to define questions by the available methods, rather than use frameworks to create the appropriate method.

It is a critical approach, so it is not simply descriptive, but also seeks to understand the power dynamics and inequalities that form in economic systems. Political economy is the study of relationships between peoples, societies, markets and states. Inquiries about how production, trade, law, custom, and government affect the distribution of national income and wealth are core areas in the field of political economy. More subtle than overt forms of suppression, economic constraints exert a significant influence on how people act, and on intellectual liberty by stifling potential dissent at its inception. They place thinkers and scholars in a vulnerable position, subject to the whims of political, economic, and institutional powers.

The political economy of post-colonial Africa is characterised by its colonial legacy, its dependency on external actors, its uneven development, its social fragmentation, and its resistance movements. By understanding the relations of power, interests, and institutions in a particular context, it is possible to better understand the factors that shape political outcomes. For example, if a particular group has a lot of power and is interested in preserving the status quo, it is likely to be able to block reforms that would benefit other groups. Conversely, if a particular group has little power and is interested in change, it is likely to have difficulty achieving its goals. This applies as

much to local governance structures, as it does to national or regional political structures, or market sectors as it does to trade blocs.

2.1.1 Feminist political economy

Regrettably women and gendered minorities still face frequent exclusions and disadvantages. This is one reason why feminist political economy is a leading branch in the field. The issues that women face are multifaceted and deeply rooted in societal norms and structures that perpetuate gender inequality. Though steady progress has been made towards incorporating feminist perspectives in various domains, the internet as a whole still harbours outdated gender-biassed values. This is problematic, given that machine-learning algorithms rely heavily on online data for training. Together with the programmer's bias, this leads to serious repercussions for women, particularly when considering the intersectionality of their identities.

Research has shown that gender biases are prevalent in word associations, particularly in employment and leadership positions. As AI increasingly permeates our daily lives, we must collectively address the challenges of shaping algorithmic decisions and scrutinise the validity and authenticity of AI-driven decisions. This highlights the ongoing need for a more inclusive and diverse approach to data analysis, especially when developing machine-learning algorithms. By being more mindful of gender biases and striving for greater balance and equality in our data sources, we can create algorithms that are fairer, unbiased, and reflective of our society's diverse range of perspectives and experiences.

2.1.2 Several major trends in political economic analysis

In addition to long-standing concerns with economic power and hierarchies of influence, since 2000 there have been several major trends in political economic analysis. These are:

- the globalisation of political economic research;
- the growth of historical research;
- return to resistance and alternatives;
- closer attention given to transitions involving technology and labour;
- recognition of environmental factors and the 'carbon budget'; and
- the expansion of activism and struggles for independence.

2.2 The social setting of AI and why it matters

The social setting of AI refers to the institutional context that influences and shapes how AI is used and experienced. To gain a better understanding of this aspect, there are several points to take into consideration.

2.2.1 AI technologies are not independent or autonomous agents of social change

AI does not simply change the world according to its properties. On the contrary, the conception, design, adoption, uses, and counter-uses of an AI product is always the outcome of a series of existing pressures and limits. It would be incorrect to say that AI merely reflects already existing social conditions. AI is more dynamic. Sociologists would say that it has a 'constitutive' rather than 'determining' or 'dependent' role in society.

2.2.2 AI does not have inherent political meanings

Like other communication technologies, AI does not have inherent democratic or authoritarian political meanings. The properties of AI products are not fixed. Consider how newspapers have served both revolutionary and reactionary political movements at different points. The same is true for platforms in recent years. The point is that AI can serve different political projects. Members of those projects can decide which affordances to cultivate as well as what those affordances mean to those members. But this does not mean that AI should ever be described as neutral, nor that its impact on humans depends on the stated intentions of those that deploy AI. Rather, how a particular AI system is developed, its costs, risks and redistribution of power are all inextricably political in favouring some groups, often at the expense of others. Understanding the politics of an AI system requires considerations of its technological affordances but in the situation and moment in which it is embedded.

2.2.3 Taste factors into which AI products succeed or fail

AI products or platforms do not randomly attract users or audiences. Users and audiences look for pleasure and meaning, and their geographical, social, and cultural backgrounds and identities influence their choices. Even though identity is not fixed, there are some patterns and preferences that can be observed among different groups of users and audiences. For example, young people tend to like TikTok. There are industries that specialise in finding and predicting these sorts of behaviours and tastes at very refined levels. The users and audiences of different types of AI products and platforms also change over time due to factors like trends, marketing, and innovation. Business decisions also factor into which AI products succeed or fail. In other words, these factors can shape taste. And so we should also consider how the features and strategies of the AI products and platforms themselves shape the users and audiences they target or create.

2.2.4 History matters

The meanings attached to AI and platforms change in response to different historical circumstances. The unique conjunction of economic, political, and social dynamics of the mid-20th Century contributed to the rise of mass audiences who shared and participated in the same cultural production at the same time. Mass audiences no longer exist in the sense it was used then because we are in a different historical conjuncture with a different set of circumstances (e.g. audiences now tailor their news diets to their own preferences at different times, and the ways in which media are produced are more diverse). Additionally, different places attach different meanings to AI. For instance, AI has a very different meaning to developers situated in Silicon Valley, or to an advertising executive sitting in Johannesburg, compared to poor women in a rural village in Uganda, and much of these meanings are historically informed.

2.2.5 The 'quality' of AI products is not determined by their technical features alone

Judgements about the quality and value of AI products are also shaped by the social and cultural contexts and expectations of the people who create and use them. For instance, different generations of computer programmers have different challenges and solutions that affect their standards and perceptions of quality. There are also significant differences between computer programmers and users in terms of their needs and preferences. These kinds of differences also exist across countries, markets, firms, and so on. The key point is that the supposed benefits of an AI product are not natural or universal, but constructed and regulated by expectations and needs in specific social and cultural contexts. The way we define and judge a good AI product reflects

more about our society's history than our ability to technically assess a product in an objective way.

2.2.6 AI is not a neutral force of production

AI is a complex social production that frames and shapes our perception of reality. It offers a socially, culturally, and industrially produced version of the world in its constitution. What is shown is always the result of a complex process of selection.

2.2.7 Arguments about AI's inherent properties deflect attention away from AI's relation to power and ideology

Debates about the inherent properties of AI – such as 'is AI sentient' – which often excite public curiosity and are used to market AI products, are distractions from important questions about how AI is involved in legitimating or creating inequalities or why AI is being constituted in such a way that AI products reinforce the dominant bloc of social interest in our societies. To put it differently, when we become too fixated on talk about inherent properties, we compromise our ability to analyse the relationship of AI to power and to examine the ways that these products may be interpreted as serving dominant interests.

2.2.8 Institutional settings matter a great deal

Consider the crucial differences between private and public organisations. There are different overarching legal considerations, different purposes of accounting, and different goals to advance. Typically, public services are different from private ventures that seek to return value to shareholders. Because the market is about creating and allocating wealth, there is no consideration of the public beyond popular appeal or the creation of large market segments. By contrast, a liberal democratic State's idea of the public involves a mandate to protect options that may not always be popular. The institutional setting of AI matters a great deal.

2.3 What is capitalism?

As there is much confusion about the term, let us begin by describing what capitalism is not. Capitalism is not simply about 'fair' and equal economic exchange, vast social inequality that comes from the acquisition of enormous wealth, the presence of mature markets or routine commercial transactions. For example, markets are important institutions that have been around for thousands of years and have served many useful purposes, well before capitalism emerged in the 18th Century.

Rather, capitalism is a mode of production in which:

- Those who own and control capital use it to generate profits by exploiting labour and nature. For example, coltan mining in the Democratic Republic of the Congo uses child labour and destroys gorilla habitats;

- Those who own and control capital have considerable informal, indirect, and covert influence over political decisions such that those decisions typically favour them. For example, Pfizer was able to influence the European Union (EU) to block global efforts to authorise patented COVID-19 vaccines.

Capital can take many forms, as money, machines, land, intellectual property (IP) or assets. Capitalists derive incomes through rents (charging for using something rather than doing work) and dividends, which in turn partially depend on the intensity of the exploitation of workers.

A number of consequences follow from routine politics favouring those who privately own productive facilities, discussed below.

2.3.1 Worker exploitation and conflicting interests

Resources required for human existence include water and land, but these are not freely or even equally available for people to use to support themselves. Instead, people are subject to the rights and limitations of property which is unequally and unequally distributed. Those who have property charge others for access to that property, a charge referred to as rents even when it is not referring to land.

As workers cannot gain income from rents (because they do not own property which they can rent to others) those without capital have no choice but to sell their labour. Regardless of how skilled they are – or what fee they can charge for their labour – if workers do not sell their labour then they will eventually run out of money and starve. In short, workers are dependent upon markets for all aspects of their lives. Academics describe this as social reproduction exclusively through markets. As it is the capitalist's prerogative to set the contractual terms for work, they can pay workers less than the total value of the products workers create with their productivity. This process is called exploitation.

Recalling Bernstein's methodology (Section 2.1.1), the most important actors in the capitalist system are workers, the labouring class. This is because they do the productive work to make the goods the society enjoys and repeat this work daily. Even while they create products, workers have no rights over these items; they have little to no formal influence on where these products will circulate and for what purpose. The working class is not automatically the most oppressed group in society, or subject to racial or gender injustices (although empirically oftentimes racial and gender characteristics mean that these kinds of workers are the most subordinated, stratified, and segregated). However, because they possess the skills to make products, they have leverage to strategically withhold those skills to negotiate for better conditions for themselves and across the wider society. Put differently, they are central bargaining agents whose efforts can bring reprieve for an array of injustices, not just in the workplace.

Most workers have liabilities and must work to service debts. Markets are used to discipline labour with a precarious underclass, which is used as a warning to make labour comply. In effect, workers are compelled into work. By contrast, capitalists can choose to work, if they wish. But there is a big difference between choice and structural compulsion.

Conflicts emerge because these groups do not have the same set of economic interests. In her book, The Origin of Capitalism, Ellen Meiksins Wood explains that "the capitalist system is a system of class conflict, in which the working class is pitted against the capitalists in a struggle over the distribution of wealth". As capitalists have structural advantages, they tend to accrue wealth at the expense of workers, and at greater rates. The concentration of wealth through assets means that widening social inequality is a byproduct of capitalism functioning as intended.

2.3.2 Capital guides investment decisions

We have already alluded to some asymmetries of power in a capitalist political economy. One of the most consequential asymmetries involves who has the 'right' to control investment in an economy. As they have capital and own the means of production, capitalists can (re)shape an entire economy through their investment strategies. Even while they are in competition with one another, as a collective, capitalists have implicit control rights over the shape of the entire economy. In the late 20th, early 21st Century, these control rights became globalised, which in turn posed a problem for national regulators. What this means for AI is that a global capitalist class has the control rights to decide what AI products to develop, when and where to deploy them, as well as to decide on the terms of use of these products. There are regulatory efforts to curtail this power, but these efforts face an uphill battle because of the considerable influence capitalists have on governments.

2.3.3 Implicit oppression and exploitation

One key difference between capitalist and feudal societies is the relative explicitness of oppression and exploitation. In feudal societies, the oppression is explicit – people know what levies they must provide their liege. In capitalism, oppression is implicit because it is organised by impersonal markets and contracts which allow self-interested actions to lead to negative welfare outcomes. The exact terms are not known to all participants, which shapes how differently placed people comprehend or understand their situation and the situation of others. This partial comprehension of injustice caused by capitalism enables people to rationalise the benefits of capitalism. Chief amongst such claims is that self-interested behaviour by powerful actors will somehow result in outcomes that benefit those with the least power.

2.3.4 Intellectual property

Data has been commodified and turned into private assets. This is relevant to AI because, given the current technologies, without data, there is no AI. This process of commodification is not natural, and so this means the assumption can be revised. Unlike other goods, data is non-rivalrous and naturally non-excludable. Despite this, there have been numerous claims asserting ownership of data. Various arguments have been advanced using copyright, patent, and trade secret protection.

Historically, trade secrets have been knowledge-like formulae that could not be patented or protected by copyright. Now we are seeing claims by large corporations that a database of 20 million items that no human could comprehend is somehow a trade secret. This is problematic and may not succeed legally. Unfortunately, the lack of legal support for these claims has not discouraged efforts to assert ownership of data. This directly contradicts the idea of people having control over their personal data and tends to alienate what should be subject to common use by applying an ownership logic.

Some inputs used to develop AI systems are, unlike data, subject to copyright, including images, texts, and software. These have been used without permission of their copyright holders to develop AI systems. With their vast resources Big Tech platforms are able to take the risk of being sued for using such inputs without permission or if it becomes untenable to undertake the massive task of clearing rights.

But should there be a right to make some uses of copyright images etc. to develop AI systems? While denying Big Tech the right to use copyrighted content as inputs might seem equitable, it

could put African AI in a difficult position as firms lack comparative research departments. This highlights the complex interplay between law and political economy in the realm of AI.

2.3.5 Unequal exchange and the international division of labour

The concept of unequal exchange is based on the idea that trade between developed and developing countries involves a transfer of value from the latter to the former. This transfer occurs because of the differences in wage levels and productivity between the two regions, which are not reflected in the prices of the goods exchanged. Unequal exchange is a form of exploitation that benefits the high-wage country workers and consumers at the expense of the low-wage country producers.

Building upon the idea of implicit oppression and exploitation, this kind of international trade is said to be free (because there is no formal compulsion) and fair (because prices are set by markets); nevertheless, in reality, trade reinforces the uneven development of productive forces and the dependency of developing countries on developed countries. Unequal exchange is thus a key component of the international division of labour, which shapes the global digital economy and its social and ecological impacts. As Christian Fuchs argues, the production and consumption of digital technologies are based on various forms of exploitation, ranging from slave labour in mineral extraction, to hyper-exploited wage labour in electronic manufacturing, to precarious and unpaid labour in software development and digital media. These forms of exploitation are often hidden or ignored by the dominant narratives of digital innovation and progress.

2.3.6 Extractivism

AI is a key driver of resource extraction of critical materials in Africa. The metals required to make critical components like batteries, sensors, chips and servers for the production and operation of AI systems include rare earth elements, cobalt, lithium, copper, gold and platinum. Africa is rich in these materials and has become a major source and supplier for global AI development.

However, resource extraction of critical materials poses significant challenges and risks for Africa's development and environment. These challenges and risks include environmental degradation, human rights violations, labour exploitation, conflict financing, corruption, and tax evasion. Therefore, it is crucial to examine how the political economy of AI affects the patterns and impacts of resource extraction of critical materials in Africa. It is also important to explore how Africa can harness AI for sustainable and inclusive development that respects its people's rights, dignity, and aspirations.

2.4 Information society, knowledge economy or algorithmic capitalism?

Are theoretical labels *that* important? Not really. When reading the scholarly literature on computation and social change in the post-war era it may be daunting to see so many theoretical terms, like information society, post-industrial society, knowledge society, and network society, or algorithmic capitalism, cognitive capitalism, high-tech capitalism and surveillance capitalism. While these terms have different meanings, foci and indeed different explanations about mechanisms and causes, what is more important to recognise is that these are situated efforts to describe and analyse social change and computation. Some terms put more emphasis on one particular aspect, for instance.

The emergence of new products galvanised an interest in the social and economic implications of these innovations. Matching the pace of industrial transformations, academics developed

concepts and theories to explain apparent continuities and discontinuities. Depending on their evidentiary base, many of these theories share some common features, like the recognition of the increasing importance of information, knowledge, and networks in various domains of social life, the transformation of production processes and occupational structures, and the emergence of new forms of social organisation and cultural expression. However, they also differ in their emphases, perspectives, and nature of their critiques of society.

Regardless of labels, scholars tend to agree about these changes:

- Information has become a key resource and driver of social change, with both positive and negative effects on democracy, participation, innovation, development, and other aspects of social life;
- The balance of power in the economy has shifted from manufacturing to information services, requiring new skills, creativity and intelligence, and creating a division of labour that borders on stratification according race, class, gender and geography;
- Databases, which are critical to knowledge, have become a source of value and power for individuals, organisations, and countries, and their creation and use are crucial for economic growth, social development, and global competitiveness;
- Networks are the dominant form of social organisation and interaction, enabled by information communications technologies (ICTs) that allow for global connectivity, communication, and coordination thereby affecting various aspects of social life from work and productivity to identity and friendship.

More important than theoretical labels or names of theories are the methodologies, concepts and methods used to identify social changes. The next section introduces a few of these.

2.5 Suggested readings

Calestous Juma's Innovation and Its Enemies: Why People Resist New Technologies.

Janet Wasko, Graham Murdock, and Helena Sousa's The Handbook of Political Economy of Communications.

Robin Mansell and William Edward Steinmueller's Advanced Introduction to Platform Economics.

Vishnu Padayachee's (ed) The Political Economy of Africa.

3 The Rise of the US Tech Sector

Silicon Valley in the US is widely regarded as the global hub of technological innovation, entrepreneurship, and digital culture, at least in triumphant narratives about the success of the sector. Policy makers in other countries have perceived its success as an exemplar to which to aspire, in Africa policy entrepreneurs have attempted to brand Nairobi as a similar site of innovation through the term Silicon Savannah.

However, its origins and evolution are not well understood by many external policymakers who seek to emulate or collaborate with its ecosystem. In this section we provide a brief history of Silicon Valley, highlighting some of the key factors that shaped its development. This history shows that its success is both more ambiguous than its proponents claim and less reducible to a formula that can be copied.

3.1 The origins of Silicon Valley innovation

Silicon Valley emerged from a unique combination of geographical, cultural, and institutional factors that fostered experimentation, collaboration, and disruption. We have identified four main drivers behind these processes.

3.1.1 The infrastructure legacy of the military-industrial complex in the Bay Area

The San Francisco Bay Area was a major base for the US military during World War II and the Korean War, but was largely abandoned after the threat of nuclear strikes prompted the relocation of military facilities to more remote areas. This left behind infrastructure like airfields, factories, and laboratories, that were repurposed by hardware companies like Hewlett Packard and Xerox.

3.1.2 The role of academic institutions

Stanford University and the University of California, Berkeley, received substantial federal funding for cold war research in fields like engineering, computer science and physics. Their graduates were attracted to stay in the area because of the high quality of life and the availability of opportunities in the emerging technology sector. Stanford also played a crucial role in fostering links between academia and industry, through initiatives like the Stanford Industrial Park and the Stanford Research Institute.

3.1.3 The influence of the counterculture movement and anti-establishment politics

In the 1960s, the hippie movement rejected the conformity and consumerism of mainstream US society and embraced alternative lifestyles, values and forms of expression. The Bay Area became a hotspot for this movement, which celebrated experimentation, cooperation, creativity, and individualism. The hippie and counterculture ethos also influenced the development of personal computing, as exemplified by the Homebrew Computer Club, a group of hobbyists who shared their passion for building and using microcomputers. The future founders of Apple, Microsoft, and other influential companies were linked to the club.

The anti-establishment ethos survived in the free and open-source software movement. Open source was not simply either a technological or economic innovation but, at least for its most committed proponents, free software creators, an attempt to change the political economy of the digital sector by empowering individual software creators rather than corporations.

3.1.4 The openness of the internet

The internet originated from a project funded by the Defense Advanced Research Projects Agency (DARPA), which aimed to create a distributed network of computers that could withstand a nuclear attack. The network was initially restricted to academic and military institutions, but was gradually opened to the public in the 1980s and 1990s. The internet was based on an open protocol called TCP/IP (Transmission Control Protocol/Internet Protocol), which allowed any device to communicate with any other device without requiring a central authority or intermediary. This enabled a "dumb network" with "smart edges", where most of the innovation and value creation occurred at the end-user level.

These drivers created an environment for innovation in Silicon Valley. Still, Silicon Valley's early success also depended on external factors that were beyond its influence, like global market trends, geopolitical events, regulatory frameworks, and consumer preferences.

3.2 Maturation of Silicon Valley innovation

The maturation of Silicon Valley began in the late 1990s. This era was marked by the dot-com boom and bust, the emergence and dominance of the internet platforms, and the challenges and opportunities posed by new technologies from the 2010s like AI, blockchain, and metaverse. There are several notable developments in this respect.

3.2.1 The monetisation of the internet

The dot-com boom was fueled by the first generation of internet startups that aimed to make money from online services like e-commerce, payments, and auctions. Some of these startups, such as eBay, PayPal and Amazon, survived and became monopolies, while many others failed or were acquired, like GeoCities which was purchased by Yahoo for USD 3.57 billion. Even when innovations originated elsewhere in the world, Silicon Valley-based companies had access to capital through US capital markets, themselves benefiting from steadily lowering federal interest rates. For example VeriSign bought Thawte, which originated in South Africa, for USD 575 million. As a consequence, the technology was not only owned and provided from Silicon Valley but an innovative company was removed from the South African technology sector so that spillover effects of learning and skills development were lost.

What was to become one of the most influential startups was Google, which was founded by two Stanford students who created an innovative method for searching, but had no clear business model. Under pressure from investors, Google adopted advertising as its main source of revenue. This decision became the template for most other internet companies. This model also created a new choke point in the decentralised network, much like how search engines became the gateways to accessing information and services online. Innovators came to learn that regardless of the utility of the product they developed, they were still disciplined by capital.

3.2.2 The regulation of the internet

The dot-com boom attracted the attention of government agencies who sought to regulate the internet. Established industries like Hollywood and software developers like Microsoft also sought to protect their IP rights and business models from digital disruption. Innovators faced legal battles and regulatory challenges as industries and regulators tried to use litigation (e.g. as was the case with Napster) and legislation (e.g. the Digital Millennium Copyright Act) to kill or constrain their business operations. Civil society groups tried to intervene in these conflicts to safeguard

human rights and public goods from online harms. In the case of MGM v Grokster the Electronic Frontier Foundation achieved a partial win. The developers of the file-sharing software were found liable by the court because they intended that their software would be used for copyright infringement. But the court in MGM reaffirmed the principle established in Sony v. Universal City Studios, which is that software that has substantial non-infringing uses, but can also be used for infringement, does not give rise to copyright liability. This is just one example of a conflict between incumbent and disruptive business models that affected human rights in ways not taken into account in Schumpetarian accounts of innovation economics.

3.2.3 The liberation of the internet

In response to the attempts to regulate or control the internet, many innovators and activists advocated for a free and open internet that would enable innovation, expression, and participation, without interference or censorship. They invoked the First Amendment as a constitutional guarantee for free speech online; they cited Section 230 of the Communications Decency Act as a legal shield for internet intermediaries from liability for user-generated content; they quoted John Gilmore's famous aphorism that "the net interprets censorship as damage and routes around it"; they embraced Stewart Brand's vision that "information almost wants to be free"; and they declared their independence from governments in John Perry Barlow's manifesto. They dreamed of an unregulated space where anyone could create and share anything without fear or restriction.

3.2.4 The transformation of the internet

The dot-com bust in 2002 marked the end of an era for many internet startups that failed to survive or scale. However, it also paved the way for a new wave of innovation that was enabled by two technological factors: open-source software and cloud computing. Open-source software allowed developers to collaborate and contribute code without proprietary or legal barriers; cloud computing allowed startups to access computing resources without investing in hardware or infrastructure. These factors lowered the entry barriers and increased the efficiency and scalability of tech innovation. They also facilitated the rise of social media platforms, like Facebook, which emerged as a dominant player in connecting people online. Alphabet (Google), Facebook, Amazon and Apple became the dominant tech platforms that used surveillance to collect data and sell attention. While open source enabled new entrants into the technology sector despite the dominance of proprietary software companies such as Microsoft it did not prevent these entrants finding new means of controlling new markets.

3.3 The rise of platforms

In the 2010s Silicon Valley witnessed the emergence of platforms. A platform is a digital product or service that enables other products or services. Facebook is a digital product and service that enables other services, for example. These platforms sought to remake the digital economy by embracing rentership and displacing incumbent intermediaries. This is often done to circumvent existing social protection policy and standing compacts with labour. These developments are typically discussed in different ways.

3.3.1 The sharing economy

Startups like Uber and Airbnb exploited regulatory arbitrage to offer alternative services in transportation and accommodation markets. They claimed to empower users and service, but they also faced criticism for undermining labour rights, safety standards and tax obligations.

3.3.2 The unicorn economy

Startups like SpaceX and WeWork achieved massive valuations without going public or proving their profitability. They relied on abundant capital from quantitative easing and venture funding to pursue aggressive growth strategies and achieve market dominance. They demonstrated that with enough money, they could become monopolies without going public.

3.3.3 The crypto economy

Startups like Bitcoin and Ethereum leveraged blockchain technology to create decentralised networks that enabled peer-to-peer transactions without intermediaries or authorities. They dreamed of money without government but also faced challenges like volatility, scalability, security, and – in response to these challenges – regulation.

3.3.4 The metaverse economy

Startups like Roblox and Decentraland created virtual worlds that enabled immersive and interactive experiences for users but in which users laboured to create the value. They aimed to create new walled gardens where everyone wanted to be, but also faced questions about ownership, governance and ethics.

The increasing dominance of a handful of technology platforms that dominated first the US and then the global economy was not due entirely or even primarily to digital technologies. Tax regulation in the Global North facilitated corporations over a certain size to arrange global revenue flows to massively reduce their tax liability. That in turn resulted in greater capital availability that was used to acquire potential competitors. Competition regulation, referred to as antitrust regulation in the US, had been rendered ineffective in the 1980s due to a revisionist theory of competition that confined its inquiries to effects on consumer prices. As platforms became dominant, they were able to amass vast amounts of data, and hold the attention of the majority of users and extract profit – a phenomenon known as surveillance capitalism. Platform dominance is not an inevitable result of technologies but is due to the institutions, including regulations, that enable it.

3.4 The current landscape

Google is the undisputed leader in the search engine market, controlling about 90% of the global market. Despite a decline in the quality of its search results due to factors like algorithm changes, spam, and bias, Google has maintained its dominance over its competitors. Even with the rise of Microsoft's ChatGPT, an advanced AI model that powers Bing and other services, Google's market share remains largely unaffected. This shows the power and influence of Google in the digital sector and the challenges faced by its rivals.

3.4.1 Legal challenges and shifts in focus

The US government is attempting to limit the power of tech giants like Google and Amazon through legal action. In 2019, the US Department of Justice and the Federal Trade Commission launched investigations into Google, Amazon, Facebook and Apple for possible monopoly

practices. However, these investigations have been slow and inconclusive, partly due to the complex nature of the cases, the resources of the companies, and pressure from both major political parties. Meanwhile, the US government has also been concerned about the rise of China and its technological ambitions, which pose a challenge to the US hegemony in the global arena. The US has accused China of stealing IP, engaging in unfair trade practices, and threatening national security through its tech companies like Huawei and TikTok. This rise of China and the ensuing technological competition have complicated efforts to regulate Big Tech, as these firms are seen as both allies and adversaries by the US government.

3.4.2 Global anti-monopoly efforts

European countries have been proactive in regulating US technology companies with measures like the General Data Protection Regulation (GDPR) and the Digital Markets Act (DMA). The GDPR, which came into effect in 2018, is a comprehensive data protection law that gives users more control over their personal data and imposes strict fines for violations. The DMA, which came into effect in 2022, aims to curb the market power of large online platforms and promote fair competition. These measures have been welcomed by many as a way to protect consumers and foster innovation in the digital sector. In contrast, progress on antitrust regulation has been slower in the US due to intense lobbying by tech companies, ideological differences among lawmakers, judicial hurdles and public opinion.

3.4.3 Regulation vs domestic competitiveness and domestic concerns

Countries and regions such as the EU that are outside of the US can regulate US tech companies without harming their own firms, hoping to create a level playing field for their tech companies. The US, however, has to consider the domestic impact of such regulations. Issues like Google's data collection practices, Facebook's alleged role in election interference, working conditions at Uber and Amazon, and Apple's App Store dominance are concerns within the US that affect millions of users, workers, and businesses. These issues raise questions about the social responsibility, accountability, and ethics of tech companies. However, these issues also reflect the trade-offs between regulation and innovation, privacy and convenience, democracy, and efficiency. The US has to balance these trade-offs while also maintaining its dominance in global technology.

3.4.4 International role of US tech companies

US tech companies play a significant international role that benefits the US, spreading the power and influence of the US government globally. The early dominance of US tech companies in the internet sector made it difficult for foreign governments to regulate the digital sector. Corporations like Google, Amazon, Facebook, and Apple have shaped the internet according to their own interests and values, creating a network that is largely controlled by US laws and norms. This network has enabled US tech companies to access vast amounts of data from users around the world, gain insights into their behaviour and preferences, influence their opinions and choices, and generate enormous profits. This network has also allowed the US government to monitor and manipulate information flows across borders, conduct surveillance and espionage activities on foreign targets, exert soft power through cultural products, and impose sanctions on adversaries.

3.4.5 US government's defence and trade agreements

Despite tensions between tech companies and regulators within the US, the US government defends the interests of its tech companies internationally, often threatening countries that plan to tax and regulate these companies. The US has opposed the efforts of countries like France, India, and Australia to impose digital taxes on tech companies that operate in their jurisdictions. It has also criticised the attempts of countries like Germany, Turkey and Vietnam to impose content restrictions on tech platforms that host user-generated content. It has argued that these measures are discriminatory, protectionist, and violate international trade rules. The US has also ensured favourable protections for its tech companies in trade agreements with other countries. For example, the US-Mexico-Canada Agreement includes provisions that limit the liability of tech platforms for user-generated content, prevent data localisation requirements, and prohibit customs duties on digital products.

2.4.6 Tech and US global influence

The US has used technology to increase its global influence. The privatisation and commercialisation of the internet has helped spread its influence. The US government supported the development and expansion of the internet to promote its values involving democracy and markets around the world. It also encouraged the participation of private actors, especially tech companies, in the governance and innovation of the internet. It hoped that by creating a global network that is open, interoperable, and decentralised, it could foster a more peaceful and prosperous world order that is favourable to US interests. However, this vision has been challenged by the emergence of new actors, especially China, that have different visions for the internet.

3.4.7 Protection of tech companies and geopolitical rivalry with China

The US has an incentive to protect its tech companies due to the international power they provide, despite domestic challenges. China's rise as a technological rival complicates antitrust measures against US tech companies. China is the only country that can challenge US technological dominance in terms of scale, resources and innovation. It has developed its own internet ecosystem that is largely isolated from the global network. It has also invested heavily in emerging technologies like AI, 5G and quantum computing. Its technological capabilities pose a threat to the US in terms of economic competitiveness, military security and ideological influence.

3.4.8 Digital colonialism and the technological dominance of major powers

Countries are increasingly viewing the dominance of US tech companies as a form of "digital colonialism" and are exploring alternatives. China's ability to challenge US technological dominance is due to its resources, growing economy, and protectionist policies that allowed domestic firms to develop. It has created its own Big Tech firms like Alibaba, Tencent, Baidu and Huawei that can compete with US tech companies in both domestic and international markets. China has also expanded its digital influence in regions like Africa, Asia and Latin America through initiatives like the Belt and Road Initiative and the Digital Silk Road. These initiatives involve building digital infrastructure, providing digital services, and promoting digital cooperation with partner countries. China's digital expansion has been welcomed by some countries to reduce their dependence on US tech companies and gain access to new opportunities. However, China's digital expansion has also raised concerns about its motives, methods and impacts on human rights, democracy, and sovereignty.

3.4.9 EU competition measures

The EU is trying to restrict the power of US tech firms to protect their residents and provide space for European competitors. It has been at the forefront of regulating US tech companies with measures such as fines for anti-competitive behaviour, data protection laws, and digital market rules. The EU has imposed several fines on Google for abusing its dominant position in online advertising, search engines, and mobile operating systems. The EU has also enacted the GDPR, which gives users more control over their personal data and imposes strict fines for violations. The recently enacted DMA meanwhile aims to curb the market power of large online platforms and promote fair competition. These measures are intended to protect consumers from unfair practices, foster innovation in the digital sector, and create a level playing field for European tech companies.

The EU's Digital Services Act (DSA) seeks to address illegal and harmful online content while safeguarding fundamental rights. It introduces a tiered system of obligations for online platforms, promoting transparency and accountability. The DSA also empowers users, researchers, and regulators to participate in platform governance and challenge unlawful practices. However, the DSA's implementation raises several questions, including: ensuring transparency in platform governance; operationalising a risk-based approach to content moderation; facilitating data access for research while respecting privacy rights; providing access to justice for online harms; tackling disinformation without compromising freedom of expression; harmonising the definition of unlawful content across EU member states; positioning enforcement authorities within the regulatory landscape; aligning the Act with other regulations; assessing the Act's global impact; and balancing power shifts resulting from the Act.

3.4.10 Antitrust and competition policy

While not a complete solution, antitrust and competition policy are seen as essential for reimagining a different way of organising technology that benefits the public instead of billionaires and corporate shareholders. Antitrust and competition policy are tools that can be used to address some of the problems caused by tech giants, like market concentration, consumer harm, innovation stagnation, and social inequality. They can help break up or regulate monopolies, prevent mergers that reduce competition, enforce fair trading practices, and promote market entry and diversity. They can also help create a more democratic and participatory digital sector, where users have more choices, rights and voice.

3.5 A political economic analysis of US computation

From a political economic perspective Silicon Valley can be seen as a product and a producer of the contradictions and dynamics of capitalism, especially in its neoliberal and digital forms. From its origins to its present state, it has been shaped by the interplay of class struggle, state intervention, ideological hegemony, and technological innovation. It has also influenced and transformed these factors in various ways, creating new opportunities and challenges for social change.

Silicon Valley was born out of Cold War conditions. These conflicts stimulated the development of new forces of production, like electronics, computing, aerospace and nuclear energy. At the same time, the existing relations of production, based on national monopoly capitalism and overt imperialism, also became unsustainable and unstable in the face of global competition and

resistance. The US government intervened to regulate and support the development of new technologies and industries that could ensure national security and economic growth. Academic institutions played a key role in conducting research and education that facilitated innovation and entrepreneurship. The counterculture movement challenged the dominant ideology and culture that justified war, inequality, oppression and conformity. The internet emerged as a new force of production that enabled communication, collaboration, and creativity across time and space.

With maturation, Silicon Valley was transformed by the logic of accumulation for accumulation's sake. The internet was monetised by adopting advertising as its main source of revenue, which commodified attention and data as exchange values rather than use values. Regulation followed as successive governments sought to protect or extend their interests or agendas. Meanwhile advocates of free trade appealed to principles around free speech to try to maintain a degree of autonomy. Research in computer science created new programming languages, products and services that then challenged or disrupted existing industries. However, these changes also created new conflicts. After sustained criticism from many different actors in the US and worldwide, Silicon Valley is increasingly facing pressures to account for its growing power, influence, and its negative impacts on labour, nature, democracy and human rights.

3.6 Suggested readings

Ben Tarnoff's Internet for the People.

Cathy O'Neil's Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy.

Malcolm Harris's Palo Alto: A History of California, Capitalism, and the World.

Richard Barbrook and Andy Cameron's The Californian Ideology.

Rob Reich, Mehran Sahami, and Jeremy Weinstein's System Error: Where Big Tech Went Wrong and How We Can Reboot.

4 Ideology and Contentious Structural Relationships

Contentious structural relationships are the conflicts and tensions that arise from unequal and exploitative social relations. This section explores some of their manifestations in relation to AI in Africa. We discuss matters related to class as well as social and civic differences which are 'made to matter'. AI is not only a technological phenomenon, but also a cultural and ideological one. As this section demonstrates, AI reflects and shapes the values, beliefs and interests of its creators, users and beneficiaries, as well as its critics, opponents and victims. Therefore, we explore some of the common ideologies around AI, especially those that sustain capitalism as the dominant mode of production.

Capitalism relies on various ideologies to justify, legitimise, and naturalise its existence and expansion. While there is considerable scholarship and research about ideology, for our purposes we are going to set aside protracted scholarly debates. What is more important is ideology refers to the collective set of assumptions and reasoning that guide, motivate and justify actions.

4.1 Common ideologies around AI

In Africa, the discourse about AI is shaped by various ideologies that reflect the aspirations, values, and interests of different stakeholders. Among these ideologies, we want to point to five main ones that influence the development of AI in the continent. These are: neo-modernisation, techno-nationalism, technocratic paternalism, long-termism, and neo-colonialism. These ideologies are not mutually exclusive or exhaustive, but rather coexist and compete in shaping how AI is understood with regards to its benefits and risks. Talking points within these ideological paradigms can serve as rhetorical appeals that reveal the underlying assumptions and expectations of different actors.

4.1.1 Neo-modernisation

Neo-modernisation is the ideology that views AI as a tool for achieving modernisation, development, and progress. It assumes that AI can solve various social and economic problems, like poverty, health, education, and governance, by providing efficient and innovative solutions. It also implies that AI can help Africa 'catch up' with the rest of the world and overcome the legacies of colonial underdevelopment. This ideology often neglects the social and cultural dimensions of AI, such as its ethical, political, and cultural implications. It also tends to ignore the power relations and inequalities that shape the production and distribution of AI. It is often advanced by governments and businesses as a way of achieving development without having to engage politically challenging issues of reparation and redistribution.

4.1.2 Techno-nationalism

Techno-nationalism is the ideology that views AI as a strategic asset for enhancing national security, sovereignty, and competitiveness. It assumes that AI can give a country an edge over its rivals, as well as increase its prestige in the world. This ideology often overlooks the global and transnational nature of AI, like its interdependence, collaboration, and regulation. In Africa this has proven popular with politicians who seek to gain political standing from championing technological projects, and by local entrepreneurs seeking political patronage for their enterprises.

4.1.3 Technocratic paternalism

Technocratic paternalism is the ideology that views AI as a means for improving governance, administration, and service delivery. It assumes that AI can make governance more rational, transparent, and responsive by reducing human errors, biases, and corruption. It also implies that AI can enhance public welfare and trust by providing better quality and accessibility of services. This ideology often underestimates the human and democratic aspects of governance, like participatory deliberation and rights. It also tends to neglect the potential risks and harms of AI, like surveillance, discrimination, manipulation, and exclusion. Technocrats tend to advance technocratic paternalist agendas in an effort to avoid the short-term horizons and complexities of democratic processes.

4.1.4 Long-termism

Long-termism is the ideology that views AI as a catalyst for achieving long-term goals, like sustainability, resilience, and human flourishing. The ideology originated in a utilitarian concern for the greatest good for the greatest number. Philosophers reasoned that the more rational beings that exist over the long term – including humans, post-humans and conscious AI, however speculative the latter two categories – the greater the utility achieved. Thus, relieving current human suffering is a lower-term priority than ensuring the existence of humans over the long term. It also implies that AI can enable human enhancement and transcendence by augmenting our capabilities and experiences. The ideology assumes that AI can help humanity address the challenges and opportunities that lie ahead, like climate change and biodiversity loss. It also assumes that those threats are not existential but that the emergence of a super-intelligent, self-aware AI with different goals to humans is an existential threat. Nevertheless, instead of opposing AI development, proponents of long-termism believe that they should be involved in AI development to solve the 'alignment problem'.

This ideology often overestimates the certainty and predictability of the future, its scenarios, timelines, and outcomes. It also tends to overlook the present and immediate needs and concerns of people, like their livelihoods, well-being, and dignity. Some political leaders have seized on responding to 'existential risks' as a demonstration of their leadership on technology while they overlook the issues related to the 'routine risks' related to capitalist profit-maximisation, such as increasing inequality, surveillance, and breaches of human rights.

4.1.5 Neo-colonialism and imperialism

Applied to AI, neo-colonialism is the ideology that views AI as a tool for maintaining or extending the domination and exploitation of Africa by external actors, like former colonial powers, global corporations, or emerging global powers. It assumes that AI can serve the interests and agendas of these actors by extracting resources, data, and talent from Africa, as well as imposing norms, standards, and values on Africa. It also implies that AI can undermine the autonomy and agency of African countries and people by creating dependencies, vulnerabilities, and inequalities. However, this ideology often ignores the agency and resistance of African actors, like governments, civil society, or social movements. It also tends to oversimplify the complexity and diversity of Africa's relations with external actors, like their cooperation, competition, or hybridity. Critics of neo-colonialism can be found in both developed and developing countries, often in the non-profit and philanthropic sectors.

4.1.6 Ideology and international politics

Ideologies can reflect and influence the global geopolitics of AI development, which is marked by the rivalry and competition between different models and visions of AI. For instance, China (and the EU to a lesser degree) is often seen as an alternative or a rival to the US model of AI development. China's model is based on its authoritarian governance, its state-led industrial policy, its massive data collection, and its rising power. The EU's model is based on its democratic values, its regulatory framework, its human-centric approach, and its multilateral cooperation. These models have different implications for Africa's role and position in the global political economy and in the geopolitics of AI development. Some of these matters are discussed at greater length in Section 5.

4.1.7 The critique of ideology

All critiques of ideology are useful, as they can help policy researchers address some of the questions in Henry Bernstein's methodology. For example, the critique of neo-colonialism can enrich the analysis of AI and resource extraction of critical materials by highlighting the historical and structural factors that shape the patterns and impacts of resource extraction in Africa. These factors include the legacy of colonialism, which created a system of extraction and exploitation of natural resources, like minerals, oil, and land, by foreign powers and corporations. They also include the dependency of African economies on external actors, which makes them vulnerable to fluctuations in global markets, prices, and demand for raw materials. Moreover, they include the uneven development of African countries and regions, which creates disparities and conflicts over the distribution and benefits of resource extraction. Furthermore, they include the social fragmentation of African societies, which weakens their collective bargaining power and representation in resource governance. Finally, they include the resistance movements of African people, which challenge the injustices and inequalities of resource extraction through various forms of protest, activism, and alternative development.

4.2 What are class relations in the context of AI?

Class relations are the social, economic, and political interactions and dynamics that occur between different groups of people. Typically, classes can be identified by their property, interest, and position within a social and economic order. Different classes have different strategies of social reproduction.

To recall some earlier points, in capitalist societies the main classes are the capitalists and workers. Capitalists own and control the means of production. This basically means that they have assets. As they do not derive sufficient income from assets, or possess no assets, workers sell their labour to capitalists. Due to this main economic difference, there is often conflict between these classes because capitalists want to make profits by keeping wages low and asking more from workers, while workers want better wages and working conditions, as well as more control over their labour. These conflicting interests often lead to class antagonism and struggles. Class antagonisms appear in AI enterprises and can be identified in the distribution of profits from AI, and in its impact on society. Other class antagonisms that appear are discussed below.

4.2.1 The labour force in AI development

The AI field relies heavily on skilled professionals like researchers, engineers and data scientists. As discussed earlier, current AI development practices are also reliant on workers – often poorly

supported and compensated workers in Africa – who process data, for example by identifying images that are offensive. This labour is often treated as unskilled and effaced in descriptions of AI products. Labour demands within this sector often include better compensation, improved working conditions, and more significant involvement in organisational decision-making. This can result in conflicts between labour and capital. For example, the gig economy, which is characterised by precarious and frequently low-paying work arrangements, intersects with AI through platforms utilising AI algorithms for job allocation. Workers in the gig economy, often deprived of job security and benefits, may confront heightened exploitation due to AI-driven management techniques.

4.2.2 AI and employment displacement

The widespread adoption of AI and automation technologies can displace jobs in various sectors, including news media and cultural production, leading to disputes with capitalists who aim to optimise efficiency and profits through automation.

4.2.3 Data ownership and surveillance capitalism

Data is treated as a valuable asset in AI development. Ownership and control of data have evolved as central strategies in capitalism. Businesses accumulate large datasets from users causing concerns regarding privacy and generating class-based conflicts.

4.2.4 AI ethics and accountability

Ethical questions and issues related to AI accountability, like algorithmic bias or AI's potential to reinforce discrimination, prompt apprehensions regarding AI's societal impacts. These concerns can lead to clashes involving tech corporations, regulatory bodies, and advocacy groups, signifying struggles based on class interests in AI governance.

4.3 Social differences becoming 'reasons for' social inferiority

Social differences encompass aspects like race, religion, gender, class, and even physical appearance. Certain groups may exploit these differences as a basis for subordinating others, thereby fostering a sense of inferiority. This subordination can lead to the establishment of norms that are subsequently naturalised. This process can result in discrimination and exclusion, profoundly impacting the life opportunities of individuals and groups. Imogen Tyler has written about how technology can become part of larger 'stigma machines' that recreate and amplify inequality.

AI has the potential to both highlight and exacerbate social differences given that these systems are trained on data that reflects our social world, including its biases. These systems may inadvertently perpetuate existing social inequalities if they are trained on biassed data or if data is used inappropriately or decontextualised. This phenomenon is referred to as algorithmic bias. For example, an AI system might approve or disapprove job applicants or loan approvals based on factors like race or gender, rather than other criteria. AI discrimination will become important issues in the coming decades, especially if these systems are automated.

4.3.1 The role of cultural schema

At a more fundamental level, data categories emerge out of a culture's conceptual schema. A conceptual schema refers to the framework of ideas and beliefs that we use to understand the world. This includes our concepts of what kinds of things exist, how they relate to each other, and

how we should interact with them. For example, in some cultures, age might not be just a number but a significant category that determines one's social status and expected behaviour. In others, concepts like 'family' might extend beyond biological relations to include close friends or community members. Accordingly, collecting and categorising data is always an act of interpretation through culturally specific interpretations that reflect our underlying beliefs and assumptions about how the world ought to be ordered and how it is arranged. It is crucial that the development and deployment of AI is done with an awareness of these issues.

4.4 How do racism and patriarchy 'work with' and 'work against' AI?

As suggested, the development and use of AI technology is not immune to social complexities. These include racism and patriarchy, and how these play out in the context of capitalism. . Engineering research has revealed that AI systems often exhibit biases that perpetuate pre-existing inequalities rooted in racism, patriarchy, classism, and discrimination against various societal groups, including ethnic minorities, children, the elderly, and those with less education or lower skill levels. This pattern also holds for cultures, with, for example, ChatGPT reflecting US values. Meta's computer scientists recently found that "existing LLMs [large language models] are still far from being perfect in terms of their grasp of factual knowledge". These kinds of foundational flaws will have disproportionate impact, which is particularly concerning for low- and middle-income countries where the vulnerabilities of marginalised populations are amplified.

Despite being presented as 'neutral', generative language models necessarily reflect the values of groups that wield the most social power in the societies in which those LLMs are developed. Though values and norms are in a constant state of evolution, with significant shifts in what is deemed socially acceptable and discriminatory, it is evident that many historical biases and prejudices persist in the digital realm, where much of the training data for machine-learning algorithms originates. Studies have brought to light disturbing associations, such as the alignment of terms like 'man' with positions of power, while 'woman' is disproportionately linked with subservient roles. Similarly, search engine results often reflect racial bias, with queries for black names yielding ads related to crime, while white names yield contact information. These biases can be traced to deep structures of insidious institutional racism and patriarchy, which then come to be expressed in the programming process and during data categorisation, and also emerge from the design and training methodologies of machine-learning algorithms, including deep learning.

For instance, machine-learning algorithms have the capacity to downplay or even disregard minority groups by diminishing the influence of so-called 'outliers' in the data. These outliers may represent underrepresented genders or other marginalised demographics. One significant challenge in addressing these issues is the lack of transparency within AI systems. Biases arising from machine-learning algorithms can be intricate and challenging to detect and rectify, especially when dealing with complex models like deep learning. These models are notoriously opaque, making it arduous to pinpoint the exact sources of bias. The outcome of learning is essentially vast matrices of numbers used to generate decisions, and probing these matrices to understand which data features led to a particular decision remains a general challenge. Consequently, explanations for why specific decisions were made are often elusive.

This lack of transparency poses substantial risks, particularly in contexts where decision-making is critical but the rationale behind those decisions is unclear. Imagine situations where targeting

decisions are involved, and it is impossible to discern which features are responsible for classifying a person or object as a legitimate target. This opacity underscores the need for increased awareness, research, and ethical considerations in the development and deployment of AI technologies to mitigate the perpetuation of biases rooted in racism, patriarchy, and other forms of discrimination.

4.5 Injustices and inequalities

By design, capitalism produces various forms of inequality that are tantamount to injustice. The most basic kind of inequality is based on class. Another is based on the exploitation that comes from routine business practices. Production for profit creates income and wealth gaps. The resultant precarity is used to discipline workers by creating structural vulnerabilities.

4.5.1 Concentration of power

Social inequality is also caused by monopolies and inheritances, which are both mechanisms to preserve the concentration of wealth through the right to exercise private property. Monopolies and inheritances operate in different realms: the former in the market and the latter in the family. Capitalism can lead to the emergence of monopolies, which are firms that dominate the market and have the power to set prices and wages. Monopolies can rig markets to their favour, exploiting consumers and workers. Inheritance in capitalism allows private property and assets to be passed from one generation to another, which can result in unequal distributions of wealth. Some people may inherit large amounts of capital without having to work for it, while others may start with nothing. Both monopolies and inheritances undermine the principles of justice associated with the equality of opportunity.

4.5.2 How might AI (re)create hierarchies?

AI-systems are trained using data that inevitably mirrors the past, or at least records of past action. When a training dataset incorporates inherent biases from previous human decisions, these biases become codified and amplified within the system. This can lead to the replication of existing biases, be they institutional or interpersonal. Moreover, disparities in training data, such as underrepresentation or overrepresentation, can result in less accurate predictions and consequently, adverse outcomes for certain groups. For example, studies have shown that Africans are not even represented in AI training data. As a consequence, algorithms derived from that data are not developed based on African realities. Automation could potentially result in job losses and reduced income, thereby creating more precarious conditions, unemployment, and inequality. Workers may find themselves marginalised from the market yet still subject to its control. For the wealthy capitalists, there is a concentration of power.

4.6 Suggested readings

Allen Munoriyarwa and Admire Mare's (eds) Digital Surveillance in Southern Africa: Policies, Politics and Practices.

Dorothy Roberts's Fatal Invention: How Science, Politics, and Big Business Re-create Race in the Twenty-first Century.

Ruha Benjamin's Race After Technology: Abolitionist Tools for the New Jim Code.

Shoshana Zuboff's The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power.

Virginia Eubanks's Automating Inequality: How High-Tech Tools Profile, Police, and Punish the Poor.

Safiya Umoja Noble's Algorithms of Oppression: How Search Engines Reinforce Racism.

5 Global Policy Agendas

Several paradigms are currently shaping the governance of AI. These paradigms address legacy issues like cross-border data flows, data trustworthiness, and corporate AI ethics principles like FAIR (Findability, Accessibility, Interoperability, and Reusability). These governance frameworks are being developed primarily in the Global North and China, while advocacy campaigns are being undertaken by commercial and public interest groups. A central question for all these models is whether they serve to entrench the interests of those proposing them, catering to pre-existing objectives. For instance, shared governance between firms and governments often results in firms gaining greater access and influence.

Simultaneously, we are witnessing a shift in the politics of governance within the international system. This shift is partially driven by the consequences of globalisation. Concerns about the vulnerability of long supply chains to disruption have been highlighted, as well as the realisation that foreign investments can inadvertently strengthen global competitors. For example, US investment in China has contributed to the rise of a formidable global competitor. Furthermore, traditional methods of governance are evolving within standard venues. A notable example is the African Union's inclusion in the G20. Much of this evolution is driven by Western powers attempting to consolidate their power and sway these new participants away from other influences.

5.1 China's regulatory project

China is an influential actor in the global AI landscape. This is because the country is one of the leading national investors into AI research and development, as well as having the biggest data market in the world. Through sequential and interactive regulation Chinese agencies are building up knowledge of these systems, their harms, risks, capabilities, and affordances. Building upon their 'great firewall', and expertise gained through the passing of the Cybersecurity Law of 2017, China is a very fast mover in AI regulation. China created rules for recommendation algorithms in 2021, rules for deep synthesis (aka deepfakes) in 2022, and rules for generative AI in 2023. Stakeholders like researchers, academics, firms, and other government agencies provide input, feedback, and recommendations on various aspects of AI regulation, like risk assessment, impact assessment, codes of conduct, data governance, and international cooperation.

Algorithms are the fundamental unit of regulation for Chinese regulators. Secondary emphasis is put on training data (an inversion of the US where training data is deemed more important than a specific algorithm). Thus far regulation is 'vertical'. This means it has been sector specific, not systematic (e.g. regulating food delivery workers but not GPS tracking.) China's regulatory framework is based on a risk-based approach that classifies AI activities into different categories according to their impact and implications for public interest concerns, like national security, public safety, public health, public order, and public morality. Regulators are building regulatory and technical tools to exercise their will and fulfil their mandate. Reports are that the regulators have acquired the knowledge to move beyond metaphors and simple descriptions, for example. The goal is to develop a comprehensive and ambitious regulatory framework for AI, which is currently being drafted.

5.1.1 State-led investment

It seems that the Chinese government aims to balance the promotion of innovation and competitiveness with the protection of security and stability. Its approach to AI is also based on

the principle of State-led innovation for AI. This approach is distinctive and different to the liberal capitalist model advanced by the US and EU. It is based on the ideology of socialism which emphasises the role and responsibility of the State in leading and managing the development and governance of AI. China's approach to AI is also based on the economic system of State capitalism that combines the elements and mechanisms of both a market and planned economy in developing and regulating AI. The Chinese government treats AI as a strategic resource that can bring significant benefits like economic growth, social development and international influence. Its approach to AI is based on the vision of 'responsible AI' that respects human dignity, social harmony, national sovereignty and global peace, at least from their perspective.

5.1.2 State stability

The main objective of China's approach to AI is to ensure State information control, in principle and in practice. There appears to be a concern that AI systems, if not regulated according to their model, will erode the political legitimacy of the State. To achieve control of information, China seeks to control the production, distribution, and consumption of information in the country, as well as its cross-border flow. The government regulates the infrastructure that supports or enables AI systems to ensure its security, reliability and efficiency. It protects or enhances the infrastructure that is critical or essential for AI development and use in the country, such as data centres, cloud services, and communication networks. It also monitors or restricts the infrastructure that is vulnerable or risky for AI development and use, like foreign servers, platforms, and applications.

China regulates the product design that influences or determines the behaviour and interaction of AI systems to ensure its alignment with State interests and goals. It faces the tension between innovation and control in developing and governing AI. On the one hand, the government wants to foster innovation and excellence in AI research and development, as well as in AI applications and markets. On the other hand, it wants to ensure control and stability in AI design and use, as well as in AI impact and implication. It has to balance these two objectives and find a trade-off between them. As one analyst recently explained,

> China is the largest producer of AI research in the world, and its regulations will drive new research as companies seek out techniques to meet regulatory demands. As U.S.- and Chinese-engineered AI systems increasingly play off one another in financial markets and international airspace, understanding the regulatory constraints and fail-safe mechanisms that shape their behavior will be critical to global stability.

China's approach to AI within its industrial policy has the potential to shape the future of AI in the country and beyond.

5.2 The EU's regulatory project

The EU has been developing a comprehensive and ambitious regulatory framework for AI that aims to balance the promotion of innovation and excellence with the protection of safety and fundamental rights. In this section, we will examine the main features and objectives of the EU's approach to AI, as well as the challenges and opportunities it presents for the development and governance of AI in Europe and beyond. The European Commission (EC) characterises its project as an "approach to artificial intelligence [that] centers on excellence and trust, aiming to boost research and industrial capacity while ensuring safety and fundamental rights".

The EU's approach to AI is based on the vision of "trustworthy AI" that respects human dignity, autonomy, democracy, equality, rule of law and human rights. The EU considers AI as a strategic technology that can bring significant benefits for society and economy, but also poses potential risks and harms for individuals and groups. Therefore, the EU seeks to foster a human-centric and ethical development and use of AI that ensures safety, accountability, transparency and fairness.

5.2.1 Regulatory innovation

The EU's approach is also based on the principle of "regulatory innovation" that adapts and updates the existing legal framework to address the specific challenges and opportunities posed by AI. The EU recognises that AI is a complex and dynamic phenomenon that requires a flexible and proportionate regulation that covers the whole lifecycle of AI systems, from design to deployment to use. It also acknowledges that AI is a cross-cutting and horizontal technology that affects various sectors and domains, like health, education, transport, security, justice and environment. For this reason, it places considerable emphasis on safety, rights- based regulations and civil liability. Using its high capacity and effective administrative states, the EU aims to create a strategic impact in specific high-tech sectors.

The main instrument of the EU's approach to AI is the Artificial Intelligence Act (AIA), which was proposed by the European Commission (EC) in April 2021 as part of a package that included a review of coordinated plans on AI and an updated digital strategy. The AIA is a legislative proposal that establishes "horizontal rules for development, commodification and use of AI driven products, services and systems within the territory of the EU". It uses a risk-based approach that classifies AI systems into four categories: unacceptable risk, high risk, limited risk, and minimal risk. The AIA defines different requirements and obligations for each category of AI system, as well as different enforcement mechanisms and sanctions for non-compliance.

The AIA prohibits AI systems that pose an unacceptable risk to fundamental rights or public safety, like those that manipulate human behaviour or exploit vulnerabilities, those that implement social scoring or rating systems, or those that use real-time or remote biometric identification systems in public spaces for law enforcement purposes, with some exceptions. These AI systems are deemed incompatible with EU values and principles and are banned from being developed or used in the EU.

5.2.2 From lab to market

The AIA imposes strict obligations for high-risk AI systems that have a significant impact on people's life chances or access to essential services, like those used for recruitment, education, health care, justice, law enforcement, migration, or public administration. These AI systems must undergo a prior conformity assessment before being placed on the market or put into service in the EU. They must also comply with certain quality criteria throughout their lifecycle, like accuracy, robustness, security, human oversight, and transparency. They must also be registered in a dedicated EU database and carry the CE marking, which "indicates that a product has been assessed by the manufacturer and deemed to meet EU safety, health and environmental protection requirements", and thus compliance with the AIA. Moreover, they must provide clear and meaningful information to users and affected persons about their capabilities, limitations and purposes. This process is also known as "from lab to market" and is encapsulated in terms like 'trustworthy AI'.

The AIA imposes transparency obligations for limited-risk AI systems that interact with humans or generate content or assign emotions. These AI systems must inform users about their artificial nature and enable them to opt out from using them. They must also ensure that their output is not misleading or harmful for users or third parties. The AIA does not impose any specific obligations for minimal-risk AI systems that do not pose any significant threat to fundamental rights or public safety, like those used for entertainment or leisure purposes. These AI systems are subject to the existing legal framework and can benefit from voluntary codes of conduct or best practices.

5.2.3 Governance structures

The AIA also establishes a governance structure for overseeing and monitoring the implementation and enforcement of its provisions. One body is the European Artificial Intelligence Board (EAIB). This organisation is composed of representatives from national authorities and experts from various fields. The EAIB is responsible for providing guidance, advice, and recommendations on various aspects of AI regulation, like risk assessment, conformity assessment, standards development, codes of conduct, data governance, and international cooperation. The AIA also assigns roles and responsibilities to national authorities for supervising and enforcing compliance with its rules. It also provides for cooperation mechanisms between national authorities and between national authorities and the EC. The AIA sets out administrative fines for infringements of its rules that can reach up to 6% of global turnover.

5.3 The US's regulatory project

Having written about the history of post-war computation in the US, this section will be relatively brief compared to those discussing other regions. The governance of AI in the US is a complex interplay of laws, policies, and strategies implemented by numerous actors. A series of AI-related initiatives, laws and policies have been developed over time, albeit in different areas depending on the party in power and the sway of various federal agencies like the Federal Trade Commission, the Consumer Financial Protection Bureau and the National Institute of Standards and Technology.

However, the rudder for AI policy comes from the executive branch of government. The Obama administration focused on the urgent management of risks from narrow AI. This administration released two reports outlining its plans for the future of AI. It held the position that current policy should not be influenced by exaggerated claims, but should instead address security, privacy, and safety matters, many of which also had immediate economic implications. The Obama administration established a Select Committee on AI within the National Science and Technology Council in June 2018. This committee included representatives from defence, intelligence, commerce, treasury, transportation, energy and labour. The committee sought "to prioritize and promote AI R&D, leverage Federal data and computing resources for the AI community, and train the AI-ready workforce".

The Trump administration emphasised AI's role in economic growth and competitiveness. During this administration, National AI Research Institutes were established in 2020. These institutes focused on a range of AI research or corporate applications, like machine learning, synthetic manufacturing, and precision agriculture. The Biden administration has sought to return to the policy course established in the Obama administration, focusing on protecting the public from algorithmic discrimination while ensuring privacy protections. In February 2023, President Biden signed an Executive Order directing federal agencies to eliminate bias in their design and use of new technologies, including AI. This was aimed at protecting the public from algorithmic

discrimination. In May 2023, the Biden administration released a blueprint for an AI Bill of Rights, intended to serve as a framework for the use of AI technology by both the public and private sectors, encouraging anti-discrimination and privacy protections.

The governance of AI in the US has also taken shape within the context of global developments in AI law and policy making, as well as public debates about the impacts of AI on society. Margot Kaminski explains that "in the United States, legislators at both the state and federal level have proposed requiring risk assessments and risk mitigation for certain uses of AI systems". However, what seems to be missing in the policy discourse is a political economy analysis that is attentive to how the interplay of financialisation, dominant trade and IP regimes, and technocratic capture of democratic decision-making have helped to consolidate a neo-colonial global AI economic order.

US tech companies with unprecedented levels of market capitalisation have unmatched capacity to invest in computing and physical infrastructures essential for AI innovation. Current trade and IP regimes enable cross-border data flows that lead to the unrestricted enclosure of public knowledge. Despite numerous AI ethics initiatives, deployment of algorithmic intelligence – whether in the market, State or society – is currently based on a profit imperative and utility maximisation. While fear of an AI dystopia has sparked regulatory conversations, much of this focuses on making things palatable for a neoliberal social order through a nominalist rule book, suggesting that rights can exist without substantive discussions about redistribution.

5.4 African regulatory projects

In line with many other countries and regions across the world, AI remains largely unregulated in Africa. Because AI applications and uses continue to rapidly advance, it becomes increasingly difficult to regulate a technology that many still do not understand and one that is metamorphosing daily. This is one reason why this primer suggests that policy researchers look beyond the affordances of any one AI system and instead look at more fundamental relationships. Doing so treats AI as a site in which power is exercised, bargained with, and negotiated.

While progress on AI governance in Africa has been slow, it is on the policy agenda. In 2019, the African Union (AU) endorsed the Sharm El Sheikh Declaration which also established a working group on AI. The working group was assigned the responsibility of developing a unified African standpoint on AI, constructing a framework for enhancing capabilities in the field, and establishing an AI think tank that is in harmony with the AU's Agenda 2063 and the UN Sustainable Development Goals (SDGs). At the time of writing, the working group had not yet produced any deliverables.

South Africa, in collaboration with the Smart Africa Alliance and other stakeholders, published an Artificial Intelligence Blueprint. The blueprint outlines the opportunities and challenges associated with AI in Africa and provides policy recommendations. It is unclear whether this plan was presented to the AU Commission or whether it has had any impact.

In addition, because AI is a data-driven technology, data legislation also affects its applications and growth on the continent. The AU has adopted the Malabo Convention, which mandates the establishment of data protection frameworks by member states. These frameworks include the establishment of national data protection authorities whose purpose is to safeguard fundamental rights and public freedoms, especially in regard to the privacy of personal data. Importantly, the Malabo Convention contains provisions regulating the automated processing of personal

information. As a large portion of AI uses involve automation, this indicates a growing awareness of AI-related concerns.

In 2022, the AU Executive Council formally endorsed the AU Data Policy Framework, a document that formulates a common vision, principles, strategic priorities and key recommendations to guide African countries in developing their national data systems and capabilities to effectively use and derive value from data. The document recognises AI as a data-driven technology and a strategic technology that may aid in the attainment of the continent's developmental goals, notwithstanding the associated risks. To this end the framework emphasises data justice as a key pillar of the data economy, highlighting that the increasing reliance on data, especially for automated decision-making, should not perpetuate historical injustices and structural inequalities. However, the framework also emphasises that any regulations and restrictions on data processing need to be clearly articulated and limited to not interfere with low-risk processing that might be increasingly central to the training of AI through large-scale data processing.

Domestically, no country has dedicated AI legislation yet although several nations have taken initial steps. Mauritius, for example, has implemented licensing procedures for entities providing AI-enabled investment and portfolio management services, demonstrating an early commitment to AI regulation. As of October 2023, approximately 64% (35/55) of African countries have data protection laws that address automated decision-making in their regulations, reflecting an increasing awareness of the importance of AI-related privacy and data protection. Alt Advisory has a good tracker on these issues.

A handful of African countries have adopted national AI strategies or Fourth Industrial Revolution (4IR) strategies that extensively cover AI. These include Egypt, Mauritius, Morocco, Sierra Leone, and Uganda, while Tunisia is in the process of developing a draft policy on AI. Several countries have included AI in their national development plans, which shows that they understand how important AI is becoming for both economic and social growth. Even though AI regulation in Africa is still in its infancy, these national efforts show that there is an awareness of the value of understanding and channelling AI's effects.

5.5 Suggested readings

Anu Bradford's Digital Empires: The Global Battle to Regulate Technology.

Justin Bullock, Yu-Che Chen and Johannes Himmelreich's (eds) The Oxford Handbook of AI Governance.

Damian Okaibedi Eke, Simisola Akintoye, and Kutoma Wakunuma's (eds) Responsible AI in Africa.

Susan Brokensha, Eduan Kotzé, and Burgert Senekal's AI in and for Africa: A Humanistic Perspective.

6 What Can African Policy Research Offer?

In this final section we discuss how political economic methodologies can help drive the analysis and comprehension of AI in Africa. We focus on what kinds of studies policy researchers and civil society actors can pursue if they want to produce context-specific and progressive policy solutions for the continent. Finally, we reflect on whether AI can be harnessed to ameliorate some of the legacies of inequality associated with capitalism in its late or advanced stages by considering how political economy analyses can help us envision and enact alternative futures beyond capitalism.

6.1 Selected issues for regulatory projects in Africa

Regulations surrounding AI in Africa convey a nuanced web of interconnected concerns, encompassing both the societal and ethical repercussions of AI and its influence on African labour markets and economies. One dimension of this multifaceted issue revolves around the exploitation of marginalised communities in Africa due to the advancement of AI.

6.1.1 The future of African work

The nature of AI systems and the knowledge domination ingrained in AI development have repercussions for the future of African markets. The globalised trade in digital goods and services has eased the flow of data, reduced trade barriers and encouraged the outsourcing of digital product production and trade. This has expanded global supply chains, but regulatory frameworks governing these data flows and the integration of fresh labour markets remain underdeveloped.

In this evolving policy arena, it is imperative to strengthen the role of African states in safeguarding the rights of workers against the potential dominance of trade agreements that prioritise unrestricted capital movement. While the global gig economy offers prospects for skill enhancement and wealth redistribution, it simultaneously raises concerns regarding labour rights and equitable compensation in an increasingly interconnected world.

6.1.2 The exploitation of low-wage workers

Big Tech companies exploit low-wage African workers to undertake crucial yet often unnoticed tasks supporting potent AI systems. For instance, an investigative report in Time magazine revealed OpenAI's use of a labour force in Kenya for annotating harmful texts used in its ChatGPT software, laying bare the underpaid and exploited conditions of these content moderators; and for years the cobalt rush in Congo has driven a significant number of child labourers into the mining sector. These examples exemplify how the digital revolution has co-opted the global labour division, employing African nations as hubs for labour exploitation to further the interests of capital from the Global North.

An underlying peril associated with AI in Africa lies in the outsourcing of 'human in the loop' functions, like data labelling, to regions where minimum wages are significantly lower. The preparation and engineering of data, which form a substantial part of AI and machine-learning projects, have been delegated to nations where labour costs are comparatively economical. This practice not only perpetuates existing global labour disparities but also raises ethical dilemmas regarding equitable remuneration for the indispensable role played by African labour in AI development.

6.1.3 Greater attention to change and continuity

One theme of this primer is that the foremost aim of political economic analysis is to elucidate the dynamics of social relations, economic processes, institutions, and organisations. It seeks to understand how these elements transform or remain static over time. It is important to note that institutions and firms are in a constant state of flux. For instance, it is more important to examine how implementing an AI strategy in an institution affects the workflow and relations between staff, as well as with outside actors, such as clients and service providers, and affects attitudes to a firm, than whether a firm has an AI policy.

Therefore, the focus of research should be on identifying the factors that drive these changes, rather than merely examining the 'content' of an institution. For instance, the specific details of UNESCO's policy guidelines for content moderation are less significant than the organisation's efforts to rally support around such principles.

6.2 Policy research interventions

Political economy analysis can be used to develop context-specific progressive policy solutions for the continent. It allows for more critical thinking and awareness of the power dynamics and inequalities in economic systems and their inter-relation with AI. It helps to answer questions such as: How might different populations experience the effects of AI and technology? And What might this different experience mean for African populations?

6.2.1 The policy problem

Policy interventions in the realm of AI should be integrated, coordinated, and have both a local and global perspective. As a general-purpose technology, AI permeates all sectors, and involves regulating data, the internet, and digital and data infrastructure. It is crucial to address the underlying structural inequality and injustices that arise from the development, deployment, and outcomes of AI. The development of AI governance frameworks should not be left to globally dominant providers of AI products and services as this will lead to the extraction and exploitation by a select few Big Tech monopolies and their governments. The result will be even more inequitable outcomes and an uneven distribution of both harms and opportunities. This situation is detrimental and needs to be addressed urgently. Therefore, policy advocacy is needed for interventions that promote social and economic justice in response to data-driven technologies like AI. Such interventions can help interrupt the reproduction of biases and inequalities.

6.2.2 Utility and limits of 'soft law'

Africa has several soft law AI governance initiatives. Soft law is a term used as a "shorthand term to cover a variety of non-binding norms and techniques for implementing them". Examples of soft law in Africa include conventions, protocols and charters like the Guidelines and Measures for the Prohibition and Prevention of Torture, Cruel, Inhuman or Degrading Treatment or Punishment in Africa, and the AU Data Policy Framework. The term soft law is a bit of a misnomer, as it can incorrectly convey the sense that there are mechanisms of enforcement of what are really exercises in moral suasion or standard setting for bureaucracies. The goal of soft laws like UNESCO's Draft Guidelines for Regulating Digital Platforms is to argue for the decentralisation of power and share it between a variety of public and private actors, thereby creating structures that incentivise negotiation, bargaining and compacts. Soft law has utility as it can help to build coalitions to move towards a larger legal objective, create sites of trust, and inform mutual

understanding, if not agreement. These can influence individual and institutional behaviour. However, there are limitations of soft law. These limitations include the lack of legal certainty, perceived lack of legitimacy, and easy exit. While the merits of soft law around AI in Africa should not be discounted, policy researchers must have a vision where the making of soft laws is the beginning of regulatory exercises, not its endpoint.

6.2.3 Entrenching economic rights

Policy interventions should go beyond individual privacy rights and data protection, which are based on negative compliance regulation, and include collective rights and common good, which are based on positive regulation. This would create more equitable access to opportunities derived from AI deployment. Moreover, policy interventions should promote data justice in response to data-driven technologies like AI, which can create and reinforce existing biases and inequalities. Additionally, data justice requires addressing the collective harms and the economic injustice arising from the uneven distribution of opportunities related to data value creation, including through AI. This policy agenda can enable more inclusive and equitable data-driven value creation that respects human dignity, social harmony and global peace. Much of this can be accomplished by ending exploitation across the world.

6.2.4 Presence and voice

African policy researchers should seize the opportunities they have to emphasise the importance of incorporating African perspectives into the design of institutions aiming to understand the social impact of AI. This can be achieved through meaningful participation and representation in global policy formulation and governance processes. It is imperative for Africans to be actively involved in agenda-setting, standard-setting, and consensus-building. Merely highlighting AI as the latest challenge of global governance and repeating the rhetoric of the past 30 years about the divides that need to be addressed will not fundamentally transform the currently asymmetrical outcomes of digital development. To ensure significant progress towards achieving the ICT targets set by the SDGs, it is crucial to develop alternative regulatory and governance strategies. These strategies should aim for more equitable and just policy outcomes.

6.2.5 Global institutional order

There is a pressing need for a balanced and equitable global AI governance framework that addresses the long-standing social and global inequalities, which are further amplified by data-driven technologies like AI. Current frameworks associated with ‘Responsible AI’ or ‘AI for Good’ claim to preserve rights, set standards for interoperability, and promote ethics-by-design. While these are necessary, they are not sufficient. The development of enabling governance frameworks has largely been left to globally dominant providers of AI services. This has perpetuated uneven power relations, domination of knowledge systems, and extraction of public resources by a select few global tech monopolies and their governments.

The risks and impacts of datafication correlate with levels of human and economic development, as well as inequalities between and within countries. Therefore, the overarching question for the global governance of AI is: what policies and forms of governance are required to realise digital public goods at the national level? This would allow for a more equitable harnessing of AI for social and economic development, public sector efficiency, private and public value creation, and innovation, as well as addressing environmental challenges. This question should inform the design of institutions aiming to understand the social impact of AI. There is a need for governance

and regulation of AI that promotes human rights and development progress, especially for developing countries and regions like Africa.

6.2.6 Organisations as sites of intervention

Regional and global organisations, such as the African Union Commission and the United Nations, can play a pivotal role in establishing international norms and standards for ethical AI. They are also instrumental in mobilising international resources to address underlying issues of social and economic justice. With the right leadership, these organisations can become better equipped to respond to the complexity of adaptive global systems that underpin AI, working within the human rights framework.

The engagement of international organisations with AI is likely to be normative, focusing on establishing international norms and standards for ethical AI rather than creating hard law or other regulatory forms of governance. This approach can inform other levels of governance arrangements, such as national and cross-jurisdictional arrangements, or whether governance arrangements should be self-regulatory or co-regulatory.

6.2.7 Copyright and AI outputs

One argument for granting copyright to software and algorithms outputs is that it could incentivise the generation of more outputs by AI models. But is that necessary or desirable? This kind of question underscores the need for careful consideration of economic incentives in shaping legal frameworks for AI. The leading global forum on these issues is the World Intellectual Property Organization (WIPO). But throughout its history, almost all its activities have extended exclusive rights and created new sets of rights through its treaties. This approach reflects a broader trend towards expanding IP rights, with important implications for access to information.

Could WIPO refrain from creating new rights over AI outputs? Would that lead those seeking such rights to look elsewhere? Without a definitive international stance explicitly precluding exclusive rights over AI outputs there is the risk of forum shopping, where people try to find an international organisation or treaty process that will grant them monopoly rights. A firm stance could come in the form of a treaty for the public domain. Such an approach would represent a significant shift in international law and could have far-reaching implications for the development and use of AI.

6.2.8 Just AI: Redress, redistribution and reparations for global inequalities

Through a relentless system of accumulation, a global capitalist political economy produces inequality and concentration of wealth, which in turn rigs political systems to safeguard property. Global inequalities are a major challenge for the 21st Century, as they threaten the stability, security and sustainability of the world. While matters of wealth are the most important aspect of global inequality, it also negatively shapes effective use of rights, opportunities and resources. Given the relationship between neocolonialism, unequal exchange, the international division of labour and several other processes, for economic justice to be achieved, the structure and organisation of the international system must be reconfigured, and there must be a transfer of funds from the Global North to the Global South. Reparations and redress can help African countries pursue social policies that safeguard their citizens from any turmoil AI-systems might create.

6.3 Areas for Advanced Study

This primer has provided an overview of some of the key topics and trends in the political economy of AI. However, our coverage has not been exhaustive. Many other areas deserve further attention and research. Some of these areas are:

- cross-border data flows, which involve the movement of data across national boundaries and raise issues of privacy, security, sovereignty and governance;
- global digital public goods, which considers the goods and services that benefit all countries and people;
- global pacts and negotiated economic settlements, which are arrangements that shape distribution within the global economic system as well as the terms of trade deals, redress, debt relief and development aid;
- African technology imports from other regions;
- computational capacity and critical infrastructure, which involves the hardware and software that enable the digital economy, such as servers, networks, cloud computing and AI; and
- opportunities for resource mobilisation through taxing the digital economy, including AI technology companies.

6.4 Final Remarks

At a general level, political economy is a theoretical framework meant to guide research attention to several key areas so that policy researchers may have a better grasp of the totality of social relations as well as the social production of meaning. Ultimately, we are concerned with what social relations mean for the envelope of substantive social change.

Over the past decade, the evolution of AI systems has been accompanied by a steady development of AI governance frameworks. Still, many of these frameworks do not sufficiently address issues related to exploitation. This has resulted in inequitable outcomes and an uneven distribution of both harms and opportunities.

An effective, trusted, and just AI global governance system will need to be underpinned by an integrated, non-siloed, transversal policy agenda. This policy agenda should recognise the role of digital public goods as central to contemporary forms of democratic participation. It would also view these goods as key inputs for economic transformation, human development strategies and rights-preserving regulation. These elements can help redress intersectional inequality and foster integrity within AI-systems. This perspective is informed by commitments to democracy, human rights and alternative forms of stewardship of AI systems.

To sum up, the political economy surrounding AI in Africa is moulded by an intricate interplay of factors, including labour exploitation, global supply chains, and the necessity for robust regulatory structures. Addressing these challenges requires a well-balanced approach that considers the ethical ramifications of AI, labour entitlements, and the role of states in sculpting a just and impartial AI landscape in Africa.