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1. Foreword

Some challenges that are present today in Artificial Intelligence (AI) development are helpfully unambiguous: African stakeholders and the international community must conspire to make it possible for AI to drive economic growth and unleash new forms of economic opportunity on the continent. This is an exciting time in AI development, especially with the emergence of large language models like Google's PaLM2 and Open Al's GPT-4, which forms the foundation of generative AI. The general-purpose nature of this technology is key: the same technology that can help predict natural disasters and speed up cancer research can also generate massive productivity gains and catalyze economic development. But to capitalize on this promise, forwardthinking policymakers and those that seek to establish sound AI policies must have a plan to harness AI, starting in the macroeconomic environment.

AI is already being used to address a wide range of African and global humanitarian challenges, from predicting floods and earthquakes and improving maternal health outcomes, to protecting endangered species and safeguarding food security. All of this foundational scientific work must now be applied to the urgent task of economic development in Africa. AI can help improve productivity and job outcomes across sectors like manufacturing, agriculture, financial services, and natural resources that are key to African economic growth. And we are seeing Africa's entrepreneurs and businesses begin to harness AI across a wide variety of domains.

This paper highlights specific opportunities and challenges for the wider African society to leverage AI and leapfrog ahead, driving economic and social growth. We believe that emerging economies, including African economies, have the potential to sprint ahead in achieving sustainable economic gains through digital transformation.



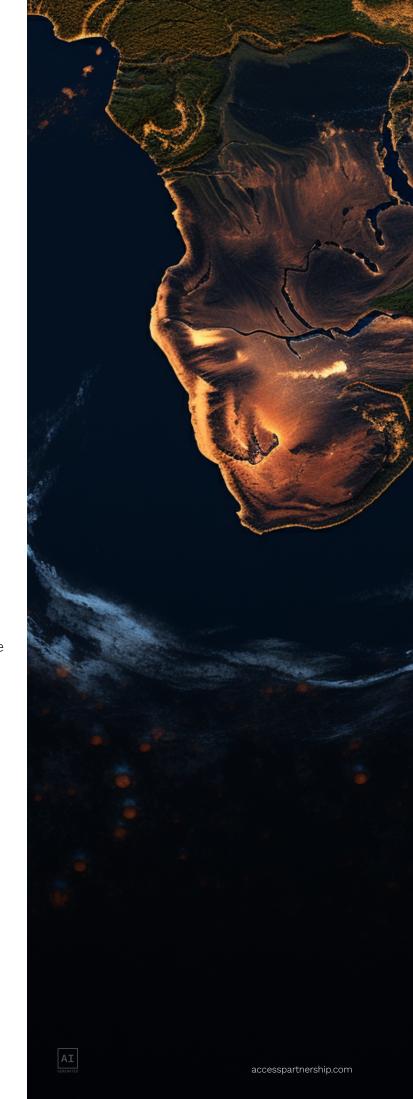
1. Foreword

As with any transformational technology, AI comes with complexities and risks which are still evolving as the technology develops and uses evolve and expand. Therefore, we believe that getting AI right for Africa must be a collective effort between the technology industry, researchers, governments, entrepreneurs, businesses, non-profit organizations, and citizens to promote responsible use and mitigate risks. Policymakers and industry must be focused on mitigating risks from AI and building public trust as they are to unlock productivity benefits and prepare African entrepreneurs and traditional industries to harness Al. A comprehensive agenda on opportunity, responsibility, and security is needed to drive African AI leadership. This paper aims to address the knowledge gaps about the impact of AI in Africa, in line with our mission to ensure that everyone has access to transformative technologies, such as AI, while promoting fair competition and consumer choice.

We know from experience that by pursuing AI boldly and responsibly, AI can deliver on the potential to assist and improve the lives of people in Africa (and everywhere else). And we are excited – determined – to invite thoughts from the readers as we continue to build a deeper analysis of the opportunities and challenges for AI on the world's youngest and, by extension, the most promising continent.

Gregory Francis,

CEO, Access Partnership



2. Introduction

The term Artificial Intelligence (AI) was coined in 1956 by John McCarthy, a cognitive scientist and Stanford computer science professor, who proposed the possibility of replicating human intelligence "so precisely...that a machine can be made to simulate it". The concept of AI builds on this pioneering idea, generally referring to computer software that "learns" from data, behaves intelligently, and mimics human cognition and perception. As such, AI covers a wide range of models and processes, including "deep learning," "machine learning" and "natural language processing", that depend on the use of large amounts of data to train software in patterns and create corresponding outcomes. In this paper, we refer to AI as a catch-all term for techniques that enable computers to learn from data and behave intelligently, especially those that integrate machine-learning techniques, including deep learning.

The latest wave of AI innovation and deployment has the potential to be transformational by not only changing the very nature of how technology advances through accelerating scientific breakthroughs, but also by creating new economic opportunities and jobs never thought of before. Technological shifts, such as the printing press, the industrial revolution, electrification, and the internet have a history of driving social and economic changes – both positive (such as higher living standards, reduction of disease and mortality, alleviation of extreme poverty, and increased quality of life) and negative (disruption, inequality, and insecurity).

As we stand at the threshold of the generative AI revolution, it will be critical to take early steps to harness the power of AI to improve economic capabilities for regions like Sub-Saharan Africa. AI will be critical to Africa's future socio-economic growth, enabling current and future generations of Africans to live in a more prosperous, healthy, secure, and sustainable world. At the same time, AI, if not developed and deployed responsibly as part of an integrated tech and economic agenda, also presents significant risks.

This paper aims to take stock of what we currently know (and don't know) about the potential societal and economic impacts of AI in Africa and provide the foundation for a discussion with key stakeholders across the government and business sectors to chart the way forward.

In this paper, we cover the potential benefits of AI for Africa (Section 3) as well as the myths and risks associated with AI (Section 4). Realizing the AI innovation potential requires a holistic AI strategy that focuses on unlocking opportunities through innovation and inclusive economic growth, ensuring responsibility and trust, equipping traditional industries with skills and partnerships to harness AI, and protecting socio-economic security. The final section of this paper seeks to bring these ideas together into a concrete set of policies and actions African governments can take to drive adoption of responsible AI in a way that is consistent with economic goals (Section 5).

It is important to note that this paper provides an initial assessment of Al's potential role in driving economic growth. Ideas generated from discussions around this paper will be incorporated in a future report, which will provide a comprehensive assessment of economic benefits, key risks, and detailed policy recommendations for emerging markets looking to capitalize on Al development and deployment.



An AI representation of Dr. John McCarthy, distinguished cognitive scientist and Stanford professor, working on his computer.

3. The socio-economic opportunity of AI in Africa:

Sizing the value for select economies

Africa's population is exceptionally young compared to other world regions: only 3% of sub-Saharan Africa's population is over 65 while a staggering 44% are below 14, compared to 18% and 17% respectively among OECD countries.1 This "demographic dividend" could be a major driver of future economic growth, but only if the region tackles its low level of labor productivity. A recent World Bank study found that productivity, as measured by output per worker, has lagged in Africa even as other developing countries have achieved varying but steady gains in productivity.2 In contrast, Africa's labor productivity trajectory has been influenced largely by commodity price movements, and has not experienced sustainable improvements. While boosting productivity requires a multi-faceted approach, including tackling issues ranging from property rights through to education reform, digital technologies such as AI can be an important lever in closing the productivity gap.

AI can play a key role in improving sub-Saharan Africa's economic growth, not only by enhancing productivity and job outcomes across a wide variety of sectors, including agriculture, manufacturing, education, and healthcare, but also by improving creative processes and generating new leapfrogging opportunities. These sectors have the potential to move up the value chain as companies can begin to produce more complex and valuable products and services enabled by AI. Both large and small businesses, as well as workers of all skill levels, have a strong opportunity to derive significant benefits from the wider adoption of AI applications. For example, larger organizations would be able to automate procedure-based processes that would require significant work hours, while smaller businesses may be able to access complex data analysis at scale. Workers themselves would also benefit from having mundane tasks being automated, leaving them with more room and time for other exciting and essential work. At the same time, it is critical to acknowledge that societies will face inevitable disruptions and potential costs as they transition to AI. As more tasks incorporate AI, new skills will be needed and some skills will become redundant, requiring investments in upskilling and reskilling.

What is the potential size of this value in Africa? Providing a "top-down" estimate of AI's benefits to African economies is difficult given the wide scope of different AI applications. Instead, this research takes a "bottom-up" approach, focusing on a set of specific AI applications in key sectors of Sub-Saharan economies to understand the potential benefits. This paper provides a preliminary estimate, and by no means is an exhaustive estimate of the potential benefits brought by AI. Still, the potential impact is staggering.

A preliminary assessment by Access Partnership estimates (details in the appendix) that AI applications could support up to USD136 billion worth of economic benefits for four sub-Saharan countries (Ghana, Kenya, Nigeria, and South Africa) by 2030, based on current growth rates and scope of analysis (Exhibit 1).3 To put this in perspective, this figure is higher than Kenya's current GDP and represents 12.7% of the 2022 GDP for these four economies. This number represents incremental benefits to economies (measured in terms of economic benefits such as cost savings or revenue gains) in 2030 in a scenario where the relevant AI applications are fully adopted, as compared to a state of no AI adoption.

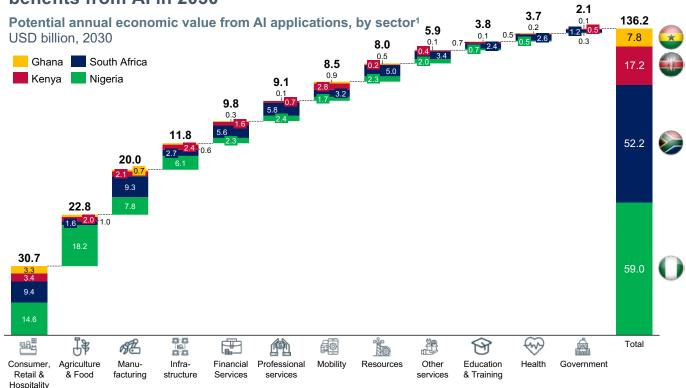
In the following sections, we describe some of these benefits in key areas such as consumer, retail & hospitality, agriculture, financial inclusion, education, healthcare, and public services.

3.1 Transforming consumer-facing industries

Consumer-driven industries, especially retail, food and accommodation, provide much needed goods and services to the general population. With its wide reach, this sector has a strong opportunity to capture significant economic benefits offered by digital technologies, including AI. However, limited modernization constrains its ability to deliver higher quality of services to customers. For example, in Nigeria, 97% of retail sales are driven by small, traditional open-air kiosks while 77% of retail goods sold in Kenya are bought from similar types of stores.4 South Africa is relatively modernized with modern supermarkets representing around 70% of retail sales - however, e-commerce is still relatively nascent, accounting for just 1.3% of retail sales as of 2020.5

Retailers and other consumer-facing businesses, especially smaller-sized ones, can leverage AI to boost their reach as well as improve their cost-effectiveness. For example, through digital marketing tools coupled with AI-driven analytics, businesses can leverage historical customer patterns and trends to identify potential new customers. Such tools tend to be provided either free or at relatively low cost, making them accessible to most small and medium-sized enterprises and enabling them to expand their reach. Google Ads, one of many online tools that businesses can use, provides AI-powered digital marketing solutions such as creating targeted advertising campaigns to online users.6 To drive the adoption of such tools, Google also launched Google for Small Business for African businesses, which provides free

Sub-Saharan Africa could gain up to USD136 billion worth of economic benefits from AI in 2030



^{1.} These estimates do not represent GDP or market size (revenue), but rather economic impact, including productivity gains, cost savings, time savings, and increased revenues. Al applications refers to two groups of applications: (1) Conventional applications of AI, such as analytics-driven tools in marketing and sales or operational-centric efficiencies in manufacturing that could arise from predictive maintenance and improved manufacturing yields from optimization; and (2) Generative AI, which involves the use of applications that are built upon foundation models and neural networks, which include capabilities to process and model outputs such as images, video, audio, and computer code.

Note: These are preliminary estimates. Numbers may not sum due to rounding.

SOURCE: Access Partnership analysis

courses on how to use digital marketing tools. Other technology companies have also or are planning to provide digital resources to small businesses. Al technologies also support the hospitality industry by enhancing customer experiences through chatbots or virtual assistants that can address queries or make travel bookings instantaneously. Overall, Albased technologies could bring up to USD30.7 billion worth of economic impact by 2030 to Kenya, Ghana, Nigeria, and South Africa's consumer, retail, and hospitality sectors.

3.2 Re-imagining the future of agriculture

Agriculture accounts for 17.3% of sub-Saharan Africa's gross domestic product (GDP) and supports the livelihood of more than half of the employed population, almost twice the global average.⁷ Despite this, more than 60% of the region's population is experiencing food insecurity at a moderate or severe level8, reflecting symptoms of poor agricultural yield and harsh climatic conditions, an issue that requires even more urgent attention given the exacerbating effects of climate change. Sub-Saharan Africa could double its agricultural output by improving the yield and reducing postharvest loss, improving food security and reducing the region's dependence on food imports.9

AI can help alleviate such challenges by enabling improved crop yields, better weather forecasting, the research and development of new drought-resistant crops, and supporting optimization of water use. Our initial estimates suggest that such applications could support up to USD23 billion of economic impact by 2030 should farmers in Kenya, Ghana, Nigeria, and South Africa adopt and deploy these tools. One example of leveraging AI in the agriculture business is AI-powered drones that monitor crops for pests and diseases, and AI-powered algorithms can help farmers to make better decisions about planting,

harvesting, and irrigation - improving crop yields and boosting agricultural productivity. Mineral - X, for example, uses AI to build the world's first detailed "operating manual" for plants to promote sustainable agriculture by bringing together diverse sources of information that until now were simply too complex or overwhelming to be useful.¹⁰ Lastly, the Pan-African research organization AKADEMIYA2063 developed the Africa Agriculture Watch (AagWa), a web-based tool that uses AI and satellite sensing to aid the production of staple foods including maize, cassava, and sorghum across 47 African economies.11 The application forecasts and monitors the production and yield of key crops based on imaging and machine learning algorithms, enabling stakeholders to manage their agricultural output in times of crisis or upswing. These AI applications distill a wide range of information to formulate practical advice for smallholder farmers, especially in times of crisis.

3.3 Enabling financial inclusion across communities

Financial inclusion remains a key issue for the sub-Saharan African region. 45% of the population (aged 15 and above) remained unbanked in 2021, despite the spread of mobile phones that could enable digital wallets and money transfer products such as M-Pesa.¹² Informal economies and cash transactions continue to dominate financial activities - for example, 65% of all South African payments remained cash-based in 2022, despite 85% of the population being banked.¹³ Finally, only between a third and a fifth of small-to-medium enterprises (SMEs) in the region have a bank loan or line of credit.14 High transaction costs and low levels of financial literacy continue to impede broader financial access.

Al technologies can be used to develop new financial products and services that AI-powered creditworthiness analysis has the potential to support and expand access to financial services, especially for smaller businesses.

are accessible to people in low-income countries. For example, AI-powered financial advisors are expected to bring greater financial literacy and provide better quality of services to low- and middle-income countries. including marginalized communities that are often disproportionately unbanked in these countries. Al-powered creditworthiness analysis can support the issuance of microloans to help small businesses grow, while Al-powered underwriting supports insurance provision to help people protect themselves from financial shocks. Google's anti-money laundering AI applications, featured in its cloud-based tools, enable banks to detect suspicious activity while minimizing false positives, creating efficiencies for investigation teams.¹⁵ Banks in Africa are also investing in AI, with the African Development Bank providing around USD1 million to the national banks of Ghana and Rwanda as well as the consumer watchdog agency in Zambia to establish AIdriven customer management systems.16 Overall, AI-based technologies could potentially bring up to USD10 billion worth of economic benefits to Kenya, Ghana, Nigeria, and South Africa.

3.4 Personalizing education

Educational development in the region continues to improve, but existing gaps provide strong opportunities for AI to accelerate this pace. For example, while the literacy rate among the adult population has improved from just 59% in 2010 to 67% in 2020, it is still significantly lower than the global rate of

87%.¹⁷ In Nigeria, the most populous country in sub-Saharan Africa, around 20% of primary school children drop out of education as of 2020, signaling a gap in education provision.¹⁸ Today, sub-Saharan Africa has almost the same number of tertiary graduate enrolments as Brazil, a country with 1/6th the population of the region.¹⁹ One of many factors contributing to this trend includes the lack of personalized attention given to struggling individuals, especially for those from less privileged backgrounds.

Al can play a strong role in bridging the literacy divide through the use of text and visual-to-audio applications. Read Along, Google's Albased reading tutor app and website that can help track and correct reading skills is one of many tools the deployment to support child literacy. Over the past three years, more than 30 million kids have read more than 120 million

Read Along provides support to child literacy through Diya, the in-app and Al-enabled reading buddy which listens and tutors pronunciation for speakers.

stories on Read Along. Al can also be used to personalize learning, provide real-time feedback, and assess student progress. For example, Al-powered tutors can help students to learn to read or how to do math equations at their own pace, and Al-powered assessments can provide teachers with insights into student learning. Al-enabled analytics can also support educators by automating repetitive evaluations, administration, and lesson preparation – Schoolinka, a Nigeria-based ed-tech firm, helps teachers evaluate children's literacy levels and curate personalized learning curriculums.²⁰ Al's potential can be maximized by addressing some of these gaps in connectivity, such as the

lack of access to mobile or Internet devices and promoting data affordability in Africa.

3.5 Democratizing access to healthcare

Access to healthcare services remains stratified across populations, mainly due to a lack of expertise or talent. More than 400 million in sub-Saharan Africa lack immediate access to healthcare.²¹ This trend differs across countries – at least half the population of Chad and Somalia do not have access to healthcare, and close to 20% experience the same challenge in South Africa. Lack of investments in infrastructure and low levels of productivity of healthcare institutions could be key reasons for this trend, alongside the limited reach of healthcare services in rural areas.

AI-powered algorithms can help to deliver more services to a broader population by expanding access to effective diagnosis and treatment provided by specialists. For example, AI-powered medical imaging can help doctors identify diseases more accurately and provide timely intervention – including doctors who meet their patients remotely. Instead of traveling to city centers, patients living in rural areas can go to their local clinics to receive

Google's partnership with
Jacaranda Health is expected to
enable practitioners who have
minimal expertise on traditional
ultrasound machines to still
play a role in maternity care.
By simply sweeping a handheld
probe across the mother's belly,
they would be able to acquire
and interpret ultrasound images
and triage high-risk patients.

specialist treatment, as local nurses can send information on scans and assessments to physicians living thousands of miles away. Alpowered platforms can assist these physicians in diagnosing these faraway patients, even sending to other doctors for separate opinions. Another potential use case is the early detection of possible infections, such as the use of AI to identify likely tuberculosis (TB) patients for follow-up testing.²²

3.6 Widening the reach of public services

Governments in sub-Saharan Africa have made significant progress in public service delivery, particularly in e-governance – the UN's E-Government Development Index indicates that the continent has doubled its performance score from 0.2 in 2003 to almost 0.4 in 2020.²³ Despite that, the figure is still below the world average of 0.6 in 2020, showing that sub-Saharan Africa still has a long way to go.

AI technologies can be used to underpin essential public services as well as operations. For example, AI-enabled analysis of tax records can detect fraud and evasion more effectively than traditional methods of transaction monitoring, anti-money laundering (AML) or due diligence (DD). Cloud technologies are also expected to support deployment of AI technologies, as public service agencies can upload data onto cloud servers and leverage

During the pandemic, the government of Togo used machine learning to analyse satellite imagery, enabling it to identify geographic areas with vulnerable populations that required urgent economic support.

off-site computing power processes remotely for AI-driven analytics. These agencies can harness their massive amounts of data to train machine learning models and identify patterns or issues, from detecting potholes for municipal-level issues, to helping file unemployment claims. Provision of public services to citizens can also be made more efficient through AI-powered chatbots which can address open-ended questions online. Natural-language processing and translation tools can also expand access to public

resources, especially for populations that exclusively speak local languages or dialects. Lesan, an Ethiopia-based startup, actively helps to collect and curate local language content to train and build translation tools to enable readers to access a wider variety of content online. These tools could potentially be used to translate governmental content into other ethnic languages — a use case that could prove to be useful in language-diverse countries, such as South Africa, which has 12 official languages.



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4. Developing and deploying AI responsibly:

Myths and risks surrounding AI

The pace of AI research breakthroughs is now being matched by real-world applications, offering new possibilities for boosting productivity and insight across virtually every field. At the same time, AI is shining a new light on old and difficult questions. Therefore, it is crucial to study the impact of AI on society. However, there has been limited research focused on Africa on several key AI-related topics (*Table 1*), creating a need to conduct deeper research to understand local impact and inform decision-making.

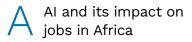
Table 1: Overview of existing research to date

Country/region	Impact on employment	Impact on productivity	Societal impact	Risks (including privacy)
Broader Africa	Limited research	Existence of headline reports such as How is Al being utilized in Africa? by Strathmore University	Existence of headline reports such as State of AI in Africa by AI Media Group	Limited research
Ghana	Limited research	Limited research	Limited research	Limited research
Kenya	Limited research	Existence of headline reports such as <i>AI in Kenya</i> by Paradigm Initiative.	Limited research	Existence of headline reports such as <i>AI in Kenya</i> by Paradigm Initiative.
Nigeria	Limited research	Existence of headline reports such as AI for Economic Development in Nigeria by Citris Policy Labs	Limited research	Existence of headline reports such as AI for Economic Development in Nigeria by Citris Policy Labs
South Africa	Reports such as <i>The</i> Future of Work in South Africa by McKinsey & Co (2019)	Limited research	Limited research	Limited research

Legend: No color – Limited coverage, Amber – Some coverage, Green – Extensive coverage

4.1 Tackling the myths associated with AI

This lack of evidence of the impact of AI in the African context is one of many reasons for concerns amongst African policymakers regarding AI. While some concerns are justified, based on the existing analysis in Africa and elsewhere, it is worth challenging some of these beliefs. This section covers the top three myths associated with AI.

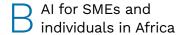


Al enables the automation of certain tasks and roles, creating a perception that Al could displace many workers and create large employment losses. However, Al is more likely to augment human capabilities and skills, enhance productivity, create new job roles, and even transform existing ones. At the same time, with advances in AI technologies, AI will allow human workers to focus more on higher-value activities that require creativity, critical thinking, emotional intelligence, and problem-solving skills.

For example, a recent study²⁵ concluded that occupations in the US that are more exposed to AI experience no visible impact on employment – the study found that AI-exposed establishments created new tasks while substituting human labor in a subset of tasks. A similar study in Europe found that AI-enabled automation leads to job creation for high-skill occupations and younger workers.²⁶ Preliminary research covering Africa also suggests that

artificial intelligence could have a strong positive impact on employment²⁷. Similarly, generative AI will change the focus within jobs, rather than replace them entirely - and there is potential for most workers to use generative AI to some degree in their work²⁸. For example, our recent studies estimated that in India, Indonesia, and the Philippines, almost half of the workers will potentially use generative AI for between 5-20% of their regular work activities - in effect, unlocking USD621 billion (India), USD243.5 billion (Indonesia), and USD79.3 billion (Philippines) in productive capacity in these emerging markets. However, the actual impact for a particular sector or country will depend on factors such as the economic mix of the sector/ country, pace of technological development, the adoption of AI by businesses, the skills of the workforce, and the policies of governments. Therefore, governments have a critical role to play in this space to ensure that the jobs market is impacted positively. There is also a need to conduct more research to contextualize the impact of AI on the African jobs market.

AI will also change the way jobs are found and done. For example, AI could lead to more efficient job market matching, which leads to lower unemployment. AI has vastly expanded the range of time- and resource-saving possibilities when screening and shortlisting candidates, drafting job descriptions and improving job portals. However, it is key to note that AI adoption can only be successful with a focus on reskilling and upskilling programs to adapt the workforce to the evolving job market. This will ensure that AI will not only create jobs for the highly skilled but will benefit a wider spectrum of job roles.



Al's reach is no longer restricted to only large corporations. Major strides in Al tech mean that a broad spectrum of organizations and people can now tap into its potential. While some highlevel AI technologies might incur substantial costs and demand significant resources, a range of AI implementation options exist.

Not every approach necessitates substantial budgets or extensive resource allocation. The democratization of AI has ushered in a new era where open-source tools, libraries, and frameworks are available, enabling resource-constrained organizations to leverage AI's potential. For example, Open Health Stack provides building blocks for creating next-gen healthcare apps, which provide secure, offline-capable, data-driven solutions for healthcare workers in low-resource settings.²⁹

Additionally, cloud-based AI services have democratized access further by rendering Al usage more cost-effective and feasible for enterprises, even without substantial infrastructure investments. Notably, cloud service providers offer an array of AI tools and platforms, making it possible for businesses of all scales to harness AI capabilities. By capitalizing on cloud-based Software-as-a-Service (SaaS) and Machine Learning-as-a-Service (MLaaS), small and medium enterprises (SMEs) can achieve scalability of AI solutions in a cost-effective manner, with the added perk of not requiring extensive technical know-how. In addition, inherent digital security features are woven into the software, ensuring a safe and secure digital footprint.

Al's transformative influence spans across diverse sectors, including healthcare, finance, agriculture, manufacturing, and education. With a smart approach to harnessing AI, emerging markets are uniquely poised to reap the technology's economic, productivity, and competitiveness benefits – helping level the playing field with larger players in more established markets. AI applications could allow a medium-sized company, say in Ghana, to compete with large conglomerates in established markets, such as the US,

Germany, or China, by gaining access to some of the same production, distribution, and market analysis tools that were once the exclusive provenance of the largest global conglomerates. While those larger global companies will also see productivity gains from AI, the most significant economic gains and productivity enhancements from Al could occur in emerging markets. Africa could achieve large gains from AI due to a larger pool of younger workers (who are more likely to adopt AI³⁰ and are already familiar with AI and other technologies) and lower burden of organizational legacy infrastructure that impedes the ability to adopt, experiment, and iterate with AI technologies — making it easier to leapfrog established players in many economic sectors.

Al, privacy, and security in Africa

Since AI systems rely on large data sets for learning, there is concern about the collection and processing of personal and sensitive data (such as medical and financial). Besides concerns about data breaches, there is also concern about how AI tools (such as facial recognition, hiring algorithms) and generative Al tools (such as generating misinformation) could create potential privacy issues. Similarly, there are concerns that bad actors with access to AI will be able to launch cyberattacks more frequently. All of this could impact economic output - cybercrime reduced GDP within Africa by more than 10%, at a cost of an estimated USD 4.12 billion in 2021³¹.

In reality, AI also has the potential to enhance privacy and security measures. AI can be used to develop robust security systems, detect anomalies, and protect sensitive data. However, responsible AI development and deployment requires careful consideration

of privacy safeguards and ethical principles, such as data minimization, transparency, and user consent. There is also potential for AI to improve cybersecurity of businesses and individuals by better predicting and detecting threats. It provides faster responses to the cybersecurity incidents, ultimately reducing the cost of data breaches for businesses.³² For example, in a recent study, we estimated that costs associated with cybersecurity risks in Australia can be reduced by 49% in 2030 from the deployment of AI and online cybersecurity training³³.

4.2 Tangible AI risks that need to be mitigated

Al can be a powerful driver of progress that boosts Africa's socio-economic growth, just as it holds the capacity to amplify existing societal issues. To ensure the responsible adoption of AI and exploit its benefits to the fullest, governments should remain vigilant about the risks like the social and digital divides arising from inequitable access to the technology, malevolent misuse aimed at confounding and fragmenting society, and the absence of structured support to guide SMEs on their path toward digital transformation.

A Social divide due to lack of skills

One of the foremost challenges in Africa's AI adoption is the potential exacerbation of the current social and digital divides. As AI technologies become more prevalent across industries, their benefit could inadvertently favor segments of the population with more resources and access to technology. A sizeable portion of Africa's population still lacks access to quality education and digital infrastructure, exemplified by the continent's internet penetration rate of 36% - merely half of the global average.³⁴ Limited internet

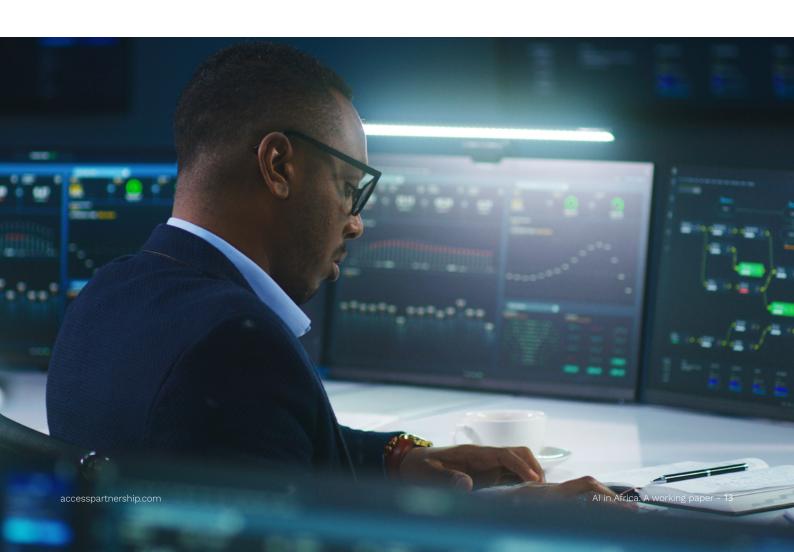
connectivity and inadequate educational and financial support produce disparity in Africans' opportunities to learn and hone the technical skills needed to utilize AI tools and services. The adoption of AI then could marginalize those who are unable to acquire the relevant skills to engage with AI systems, thereby further excluding the already excluded.

In order to ensure the benefits of AI technologies are equitably distributed and foster social inclusion, African countries need to focus on enablers of sustainable AI adoption, viz., infrastructure, data ecosystems, technical skills and education, and governance.³⁵ As of 2023, no country in Africa has yet been able to reach the G20 threshold from 2011 for the level of digital skills³⁶. This would require access to reliable networks, affordable data, and accessible devices. African countries will also need to focus on bringing AI education to local communities

at all levels of education. This would include specialized programs, such as classroom programs focused on school-going populations and AI upskilling for the working population, to general digital literacy programs for the broader population.

Challenges to information quality and abuse by bad actors, including mis- or disinformation

While AI-driven systems can enhance access to information and promote communication, there are also known limitations in ensuring they are consistently accurate, robust, and representative. Models may sometimes misrepresent facts or inaccurately identify insights. For some topics, there are data voids, that is, there isn't enough reliable information about a given subject for the model to learn about it and then make good predictions. In these cases, we see an increase in low-quality



or inaccurate information generation. Gaps, biases and stereotypes in training data can result in a model reflecting those in its outputs as it tries to predict a plausible response. This is a known challenge across large language models (LLMs), and reinforces the importance of robust approaches to testing.

Even more concerning is the potential for malicious misuse by bad actors. This same incredibly beneficial technology could be misused by bad actors to produce disinformation or deep fakes. During an election, for example, AI-generated fake images of candidates have the potential to mislead voters and undermine the integrity of the electoral process. This is not a new phenomenon. Kenyan journalists have found how easily manipulated social media algorithms could be with deliberate campaigns by the "disinformation-for-hire" industry.37 Similarly, there have been cases of misinformation spreading during the recent elections in Nigeria³⁸. With over 40 elections planned till end of 2024 in Africa³⁹, it remains critical to support multiple approaches to tackling misinformation and disinformation. This includes voter education, helping voters find authoritative information about the election, ensuring campaigns have strong security protections in place; protecting platforms from abuse; and investing in factchecking. AI tools can be helpful to this effort. For example, Full Fact, a UK based organization fighting misinformation through fact checking and campaigning, has been developing AI fact checking technology since 2015 to help increase the speed, scale and impact of fact checking⁴⁰.

Lack of mechanisms to onboard SMEs on AI transformation journey

Small-and-medium enterprises (SMEs) form the backbone of the African economy, accounting for 95% of all registered businesses and about 50% of the total GDP in sub-Saharan countries. 41 Their importance to African economies suggests that their successful integration of AI can significantly influence overall economic growth. For example, AI can supplement SME skills (e.g., simplifying financial management, automating stock management) and potentially improve their business performance and sustainability. However, many SMEs face barriers when attempting to embark on the digital transformation journey – let alone the more unfamiliar path of an AI transformation journey. Limited access to resources, technical expertise, and financial constraints can hinder their adoption of AI tools and processes. By 2040, Africa is poised to have the world's largest working-age population. Preparing for their seamless integration and absorption into the workforce hinges on the creation of quality jobs. 42 A starting point for this endeavor can be equipping African SMEs with digital and technological fluency so that the opportunities presented in them can attract the continent's burgeoning pool of young talent. To do so, SMEs need an enabling environment that provides them with essential stepping stones to venture into their digital transformation journeys.

5. Harnessing the potential of AI for Africa: Potential steps for policymakers to consider

To fully unlock AI's economic potential in Africa, governments must take a forward-leaning approach to adopting and deploying AI while ensuring that workers are equipped with a broad set of skills that enables them to adapt to an AI-driven economy, and that downside risks are mitigated. Governments themselves must also procure and use AI tools in a way that shows other industries in emerging markets how to harness AI for economic growth.

Google's Digital Sprinters framework provides guidance to key policy and business actions to capture the benefits of emerging digital technologies, including AI. The framework includes four pillars:





Creating physical capital by enhancing connectivity to the internet and digital infrastructure





Uplifting human capital by investing in people through talent and skills development





Building a regulatory ecosystem that promotes competitive and open markets.





Accelerating technological innovation and supporting the growth of next-generation technologies, mainly artificial intelligence and cloud computing

All four pillars call for reforms and greater investment by governments and the private sector to harness the potential of AI and the broader digital transformation.

This paper does not attempt to provide a comprehensive set of policy actions to enable AI in each country or across each pillar. Instead, suggests prominent highlights to interesting areas being pursued in other countries to mitigate the three risks that may help inform the approach locally.

5.1 Human capital: Preparing the workforce for AI

It is imperative that African countries invest in capacity-building of the labor market in conjunction with infrastructure development to maximize the benefits of AI when the stage is ready. Enhancing the AI preparedness of the workforce will require building upon digital literacy first and then fostering digital fluency in AI. In recognition of the importance of digital literacy and the danger of a widening digital divide, India has rolled out the Pradhan Mantri Gramin Digital Saksharta Abhiyann (PMGDISHA) initiative, which provides training to rural households so that at least one person in every family can be digitally literate.43 Indian Prime Minister Narendra Modi has also committed to upskilling the workforce in advanced technologies and processes, which will necessitate cross-government efforts to update educational and vocational policies. 44 Similarly, President Bongbong Marcos of the Philippines also issued a directive to review and update the school curriculum in ways that primary and secondary school education can help lift the digital literacy of students. In the Philippines, the government is currently developing a skills framework for Al and data analytics to map out the sectorspecific and cross-sectoral skills that will be required of an AI-enabled workforce.⁴⁵ Recently, the National Information Technology

Development Agency (NITDA) in Nigeria launched a series of trainings and lectures to develop programming skills in Artificial Intelligence and Machine Learning through National Centre for Artificial Intelligence and Robotics (NCAIR), in conjunction with Google Developers Group (GDG), to benefit 1,227 beneficiaries across 10 cohorts⁴⁶.

The implication for policymakers in Africa is that they should consider prioritizing the development of comprehensive training and education programs in partnerships with academia and industry leaders. These programs could target various segments of the population, including vulnerable groups, to bridge the digital divide and empower all citizens with the ability to apply and leverage AI technologies across a variety of situations. As done in many countries in SSA, policymakers could continue to explore ways for cross-sectoral collaboration to develop online courses and platforms for upskilling.

5.2 Supporting next gen technologies: Create avenues for industry engagement

Policymakers should leverage resources and expertise from a broader set of stakeholders, such as industry, academia, and civil society, and invite them to actively foster an inclusive AI ecosystem, highlighting that it would be mutually beneficial. To do so, regular channels of communication should first be established between the government and these stakeholders to identify concerns and practical approaches to address them. Once these are identified, policymakers can facilitate partnerships between these stakeholders and SMEs, providing mentorship, technical assistance, and funding to those seeking to adopt and use AI technologies. An example of this is the Google for Startups Accelerator: Africa program, which started in 2018 to support

the startup ecosystem. Other measures of society-wide support that can help SMEs onboard AI technologies in their services and operations include creating and running focus groups comprising SMEs at similar stages of business growth, where they have access to peer feedback and support, supplemented by consulting from larger companies. These concerted efforts can create a favorable ecosystem where the symbiotic relationship between larger corporations and SMEs advances the responsible and equitable adoption of AI, leading to overall economic growth and technological progress across the African landscape.

5.3 Regulatory ecosystem: Promote a proportionate, risk-based approach to govern AI

African policymakers should consider delineating the fundamental components of AI governance as a first stride toward developing robust regulatory frameworks. There is a momentum towards developing such AI frameworks in Africa; for example, the African Union's AI Continental Strategy and Nigeria's National AI Strategy are being drafted. Pursuing proportionate, riskbased approaches can enable responsible development and application of nextgeneration technologies. It also requires careful consideration of the trade-offs between different policy objectives, including efficiency and productivity enhancement, transparency, fairness, privacy, security, and resilience. This will require a multistakeholder approach, wherein government agencies, tech and legal experts, and civil society come together to establish a balanced regulatory environment. An exemplary blueprint for AI governance that has been produced in coordination with industry is the White House Commitments

for AI risk management.⁴⁷ Developed together with leading AI companies, such as Amazon, Google, and Microsoft, the commitments are based on the three principles of safety, security, and trust and outline the responsibilities of AI stakeholders across various stages of technology development and deployment. Kenya and Nigeria have conveyed their endorsement of these commitments, confirming the need for and relevance of such a framework in Africa's context.

This could also be accelerated by building consensus and capacity across governments in Africa. There is a need for dialogue in Africa at a continental level to take the proinnovation AI policy agenda forward and for the private sector to come together to build capacity for governments.

Through this paper, we aim to establish the context for the role AI can play in Africa's economic transformation, and the need to build an ecosystem to enable AI adoption. We invite thoughts from the readers as we continue to build a deeper analysis of the opportunities and challenges for AI in Africa.

6. Appendix: Methodology

The total economic value of benefits from artificial intelligence (AI) was estimated through an evaluation of the economic benefit that comes from various AI applications across multiple industries in an economy.

AI applications refer to tools built upon advanced analytics techniques that rely on artificial neural networks. The resultant use cases of these tools vary across industries and business functions. For example, businesses may derive benefits toward pricing and product promotion, where AI-enabled analytics assist businesses to model optimal product prices as well as to support the identification of targeted marketing collateral and recommendations to consumers. Goods-producing industries, such as manufacturing, may also be able to extend the lifespan of machinery and assets through AI-assisted predictive maintenance, relying on time series data and as well as analogue data points (including audio and imagery from sensors) to identify bottlenecks or system failures. A specific segment of AI applications, called generative AI, refers to applications built upon foundation models, spanning different data types and modalities, including images, video, audio, and computer code. Generative AI is unique in that the resultant models are able to classify, edit, summarize, answer questions, and draft content - in essence, generate output, as compared to conventional AI which assists in analytics-driven assessments.

A three-step methodology was used to understand the potential economic impact created by AI and AI-powered technologies in 2030.

Step 1 included review of several existing research reports on current and emerging AI technologies to identify the most relevant technologies to focus on for this analysis in terms of their potential economic impact. There is a large body of research by academics, development practitioners, non-for-profits as well as the private and public sector on the interaction between technologies and economic development. For example, in 2018, ITU produced a report estimating the impact of over 400 potential use cases of AI on the firms. Similarly, in 2023, we analyzed the impact of generative AI at national level



for Asian countries by analyzing over 2,000 work activities. McKinsey Global Institute also analyzed 63 generative use cases in a 2023 report. A database of impact of these use cases and AI technologies was created using this literature review, which built on our past work for the Digital Sprinter reports for Google.

Step 2 was to map the relevant impact assessments and estimates to the 12 focus sectors and their sources of economic value. Economic value refers to increased value created from a scenario of full adoption of these applications across the entire economy, and includes impacts such as increased revenue or profits, improved productivity, or increased quality. For example, AI-enabled weather monitoring and precision agriculture technologies are associated with providing productivity impacts to the Agriculture and food sector, while applications that drive increased sales and revenue of retail purchases due to Al-powered targeted advertising are associated with increasing revenue within the Consumer, retail, and hospitality sector. In general, impact estimates were generalized into percentage-based revenue increments for each sector. (E.g., based on this mapping exercising and review of literature, AI applications are estimated to generate an increment of up to 3.7% in revenue for the Agriculture and food sector in a scenario of full AI adoption across businesses).

Step 3 was to derive the industry-level impact for the 4 focus countries based on the derived potential sector revenue increments from using AI. Industry revenues for each economy were derived based on national accounts data, which provide sector-level GDP estimates and output-to-GDP ratios. Sector level revenues were then multiplied with their respective AI-impact estimates, (I.e., we calculated the impact of AI on Nigeria's Agriculture and food sector based on its sector revenues multiplied with the estimated 3.7% revenue impact assessed in Step 2). These estimates were then aggregated to produce economy-level estimates.



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