POSTGRADUATE

How should South Africa redesign education, industrial policy, and fiscal incentives to harness artificial intelligence for productivity growth while limiting labour market disruptions?

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1. Introduction

Artificial intelligence is increasingly influencing how businesses produce goods, provide services, manage information and make decisions. Technologies such as machine learning, robotics, predictive analytics and generative AI can help firms reduce production costs, improve decision-making, develop new products and increase output from existing resources (Brynjolfsson & McAfee, 2014; OECD, 2025). From an economic perspective, AI may raise labour productivity by enabling workers to produce more within a given period, improve total productivity by using capital and labour more efficiently, and create new products and industries (*Aghion et al.,* 2019; OECD, 2026). Nevertheless, these benefits depend on whether firms can adopt the technology effectively and whether workers possess the skills required to use it. Acemoglu and Restrepo (2019, 2020) explain that automation can displace labour from tasks, while the creation of new tasks can generate employment opportunities. Similarly, Acemoglu and Johnson (2023) argue that technological progress does not automatically produce shared prosperity. The overall effect therefore depends on the balance between displacement, productivity improvements and the emergence of new work (International Labour Organization [ILO], 2025).

For South Africa, the question is not simply whether AI should be adopted, but how it can be used to accelerate economic development without deepening existing labour-market problems. Statistics South Africa reported an official unemployment rate of 33.6% in the second quarter of 2026, with approximately 8.5 million people unemployed and 16.7 million employed. Youth unemployment among people aged 15–34 reached 47.4% in the same quarter (Statistics South Africa, 2026). These figures demonstrate that the introduction of labour-saving technologies must be considered within an economy already struggling to create sufficient employment opportunities. AI could help businesses expand, improve public services and develop new products, but poorly designed adoption could also intensify pressure on workers performing routine administrative, customer-service, clerical and data-processing tasks (ILO, 2025; OECD, 2026). However, exposure to AI does not necessarily mean that an occupation will disappear, since many jobs are more likely to be transformed than fully automated (ILO, 2025).

The challenge is complicated by South Africa's structural economic constraints. The Organisation for Economic Co-operation and Development (OECD, 2025) identifies subdued growth, infrastructure constraints, limited investment and skills challenges as barriers to stronger economic performance. The World Bank (2026) also highlights weaknesses in the country's digital skills pipeline, including gaps between education provision and employers' skills requirements. AI cannot independently resolve these problems. A firm experiencing unreliable electricity, expensive logistics, weak management and limited access to finance may struggle to benefit from sophisticated digital technologies (OECD, 2025). Similarly, a learner who lacks foundational literacy, numeracy or reliable internet access cannot easily take advantage of advanced AI training (UNESCO, 2023; OECD, 2026). The economic benefits of AI therefore depend on complementary investments in infrastructure, education, competition, institutions and industrial development (*Aghion et al.,* 2019; World Bank, 2026).

This essay argues that South Africa should redesign education, industrial policy and fiscal incentives as connected parts of an inclusive productivity strategy. Education reform must prepare people to work with AI and adapt when occupational tasks change (OECD, 2026). Industrial policy must encourage firms to adopt technology in ways that expand productive capacity, strengthen domestic industries and create new employment opportunities (Rodrik, 2004; *Aghion et al.,* 2019). Fiscal incentives must reduce the cost of responsible technological investment while ensuring that public support produces measurable economic and social benefits (OECD, 2025). These reforms should be supported by worker consultation, transition assistance and a monitoring framework that evaluates productivity alongside employment, wages and inequality (Acemoglu & Johnson, 2023; ILO, 2025).

2. The economic relationship between AI, productivity and employment

Productivity measures the amount of output produced from a given quantity of inputs. Labour productivity is commonly measured as output per worker or per hour worked, while total factor productivity captures the efficiency with which capital, labour and other inputs are combined (OECD, 2001; Syverson, 2011). AI may improve productivity by automating repetitive tasks, assisting workers with research and analysis, improving inventory management, detecting production faults and supporting more accurate forecasts. Romer's (1990) endogenous growth framework emphasises

the role of ideas and technological knowledge in generating long-term economic growth. Similarly, Aghion, Jones and Jones (2019) explain how AI can influence innovation and economic growth through its effects on production and knowledge creation. From this perspective, AI can contribute to development when technological knowledge is translated into innovation, investment and more efficient production.

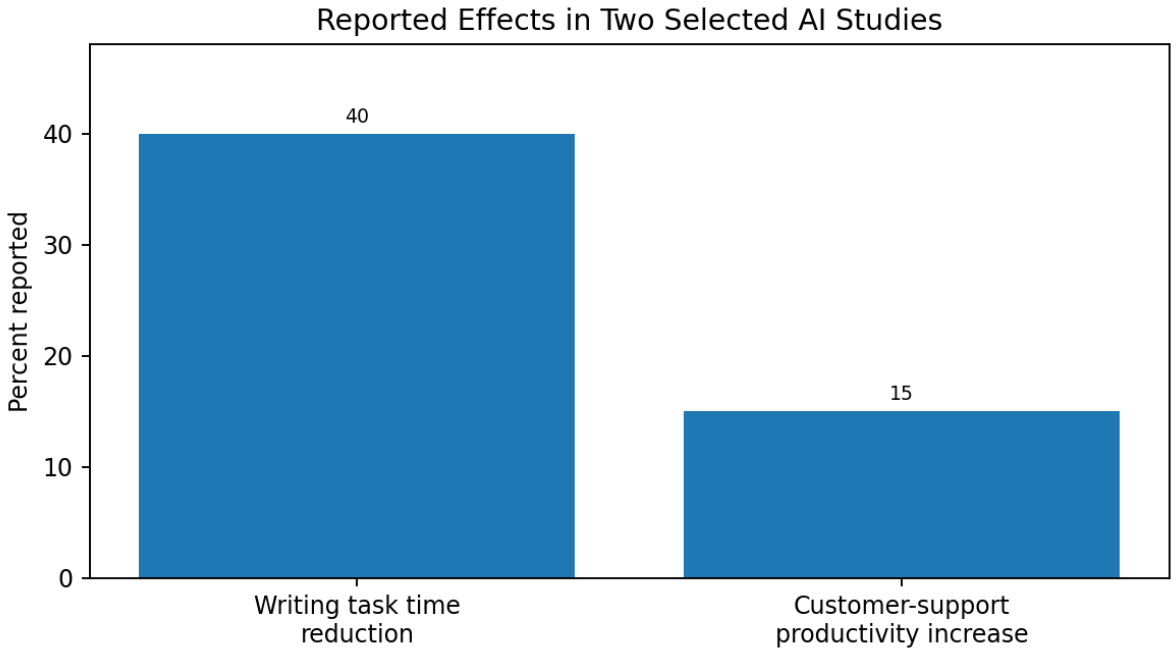
However, the relationship between technology and productivity is not automatic. Brynjolfsson, Rock and Syverson (2021) argue that general-purpose technologies often require complementary investments in organisational change, human capital, data systems and management practices before their full productivity effects become visible. This adjustment process can delay measurable productivity gains, even when firms have adopted new technologies. A business that purchases AI software but does not redesign its workflows or train its employees may therefore experience limited benefits. This is particularly relevant for South African small and medium-sized enterprises (SMEs), which may face financial, technical and managerial barriers to adoption (OECD, 2025). Bloom, Sadun and Van Reenen (2012) further demonstrate the importance of management practices in explaining differences in firm productivity, reinforcing the need to combine technological investment with organisational improvements.

Research demonstrates that productivity gains differ across tasks and workers. Experimental and workplace studies have found that AI assistance can improve performance in activities such as customer support and professional writing (Noy and Zhang, 2023; Brynjolfsson, Li and Raymond, 2025). Noy and Zhang (2023), for example, found that generative AI improved speed and quality in selected professional writing tasks. Brynjolfsson, Li and Raymond (2025) reported productivity improvements in a customer-support setting, with particularly important effects for less experienced workers. These findings suggest that AI can strengthen workers' capabilities and reduce the time required to complete certain tasks. Nevertheless, task-level improvements do not automatically translate into economy-wide productivity growth, while automation may displace some workers even as new tasks emerge (Acemoglu and Restrepo, 2019; ILO, 2025). The economic outcome therefore depends on how firms reorganise work, distribute productivity gains and support affected employees.

Figure 1: presents selected findings from studies of AI-assisted work.

The results illustrate the potential for AI to improve performance, but the studies use different tasks, methods and outcome measures. Their estimates should therefore not be interpreted as directly comparable or as forecasts of the productivity improvements South African businesses will necessarily achieve.

Figure 1. Selected reported effects of AI assistance on productivity-related outcomes



Sources: *Noy and Zhang (2023); Brynjolfsson, Li and Raymond (2025). These studies use different measures and settings; results are not directly comparable.*

Study setting	Reported finding	Interpretation
Professional writing	Noy and Zhang (2023) found that ChatGPT reduced task completion time by about 40% and improved output quality by about 18% in their experiment.	AI can assist with structured writing tasks, although results may differ for more complex or specialised work.

Customer support	Brynjolfsson, Li and Raymond (2025) found an average productivity increase of approximately 15% in their customer-support setting.	AI assistance can help workers resolve customer issues more efficiently.
Software development	Selected experimental research has reported improvements in coding-task performance, but effects depend on the task and worker experience.	AI can assist with some programming activities, but it should not be assumed to improve every development task.

Sources: *Noy and Zhang (2023); Brynjolfsson, Li and Raymond (2025). Results refer to specific study settings and are not universal forecasts.*

A central distinction is between automating an entire occupation and automating some of its tasks. The International Labour Organization (ILO, 2025) estimates that approximately one in four workers globally is employed in an occupation with some degree of exposure to generative AI. However, exposure does not mean that all these workers will lose their jobs. Many occupations include tasks requiring human judgement, accountability, communication and contextual understanding. The ILO therefore emphasises that job transformation is a more plausible outcome for many occupations than complete elimination.

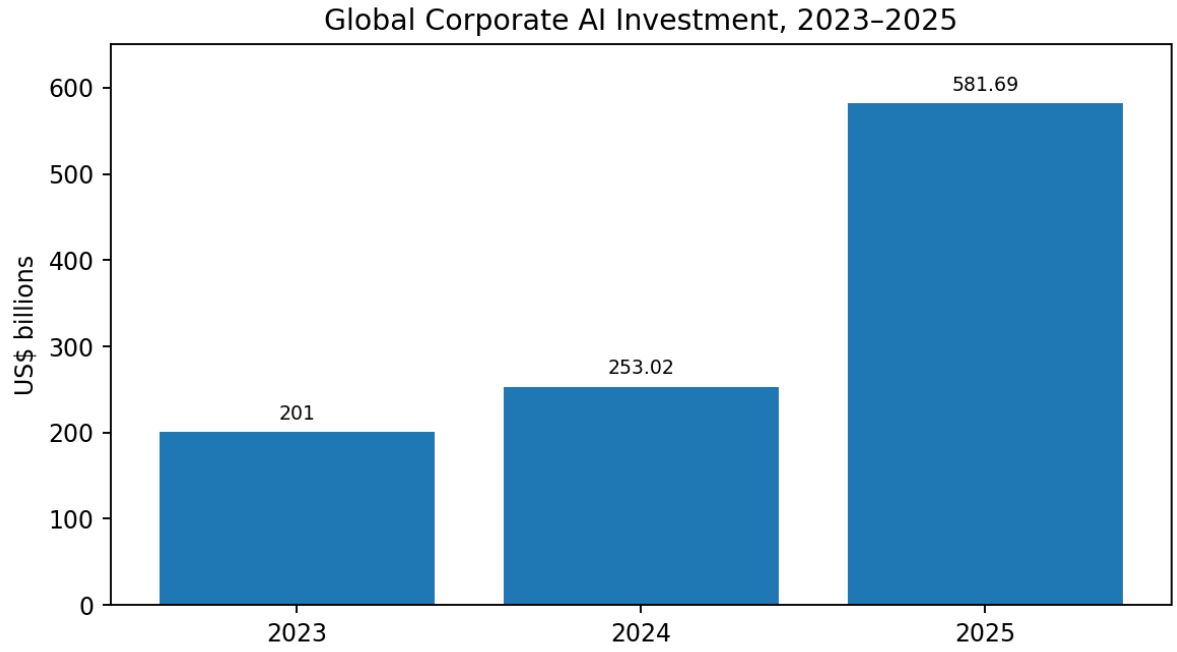
International evidence also cautions against if every AI application raises productivity. AI systems may generate inaccurate information, reproduce bias, require additional verification or perform poorly on tasks beyond their capabilities (NIST, 2024; OECD, 2025). Dell'Acqua *et al.* (2025) found that AI improved performance on tasks within its capabilities but reduced the likelihood of correct answers on a complex task beyond those capabilities. Workers may therefore become more productive when AI handles routine activities but less effective when they rely excessively on unreliable outputs. Firms should evaluate AI systems according to their actual contribution to output

quality, cost reduction and worker performance rather than treating adoption itself as proof of innovation.

The scale of global investment demonstrates why South Africa cannot ignore this technology. Stanford University's Institute for Human-Centred Artificial Intelligence reported that global corporate investment in AI reached approximately US$581.7 billion in 2025, compared with about US$253.0 billion in 2024 and US$201 billion in 2023 (Stanford HAI, 2026).

Figure 2 shows the rapid increase in reported global corporate AI investment. The expansion highlights the growing importance of AI in international business and technological competition. Nevertheless, global investment totals do not establish whether the benefits are broadly shared or whether the same productivity improvements can be achieved in countries with different infrastructure, skills and industrial conditions.

Figure 2. Global corporate AI investment, 2023–2025



Source: *Stanford HAI (2026). Values are global corporate AI investment estimates.*

Year	Reported investment (US$ billion)
2023	201.00

2024	253.02
2025	581.69

Source: *Stanford Institute for Human-Centred Artificial Intelligence, AI Index Report 2026. Figures are reported global corporate AI investment estimates.*

Global corporate AI investment increased by approximately 129.9% between 2024 and 2025, demonstrating the growing scale of private-sector investment in AI technologies (Stanford HAI, 2026). The figures include mergers and acquisitions, minority-stake investments, private investments and public offerings, rather than only expenditure on AI equipment or software. The 2025 increase followed growth of approximately 25.9% between 2023 and 2024, although investment estimates may be revised as data coverage changes (Stanford HAI, 2026; Stanford HAI, 2025). However, South Africa should not measure its success by attempting to match the investment totals of much larger economies. Its objective should be to direct available resources towards AI applications that address domestic productivity constraints, strengthen local firms and improve the quality of employment (OECD, 2025; Aghion, Jones & Jones, 2019).

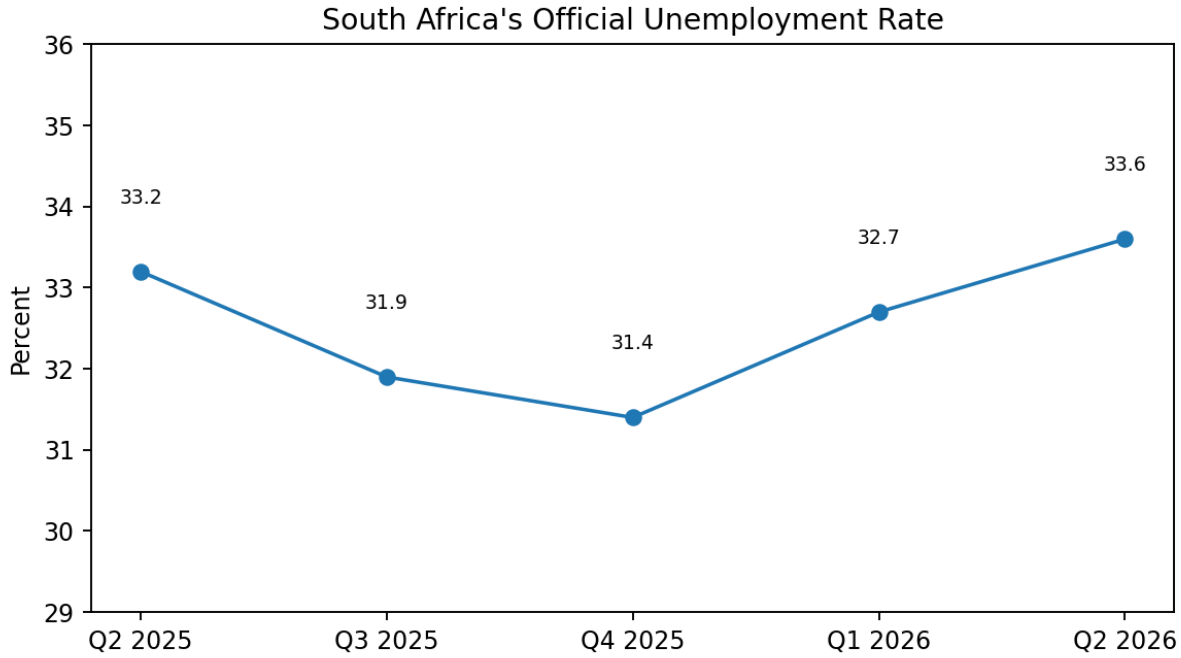
3. South Africa's economic starting point

South Africa's labour-market conditions make the design of AI policy especially important. The unemployment rate reached 33.6% in the second quarter of 2026, while youth unemployment among people aged 15–34 reached 47.4% (Statistics South Africa, 2026). The country also faces large differences in access to quality education, digital infrastructure and formal employment. These conditions mean that AI policy must address both the productivity of existing workers and the creation of opportunities for people who remain outside employment.

Figure 3 illustrates the recent movement in South Africa's official unemployment rate. Although the rate declined during the second half of 2025, it rose again during the first half of 2026 (Statistics South Africa, 2025a, 2025b, 2026a, 2026b). The increase from 31.4% in the fourth quarter of 2025 to 33.6% in the second quarter of 2026 highlights the persistence of the labour-market challenge (Statistics South Africa, 2026a, 2026b). This pattern reinforces the importance of linking technological investment to broader

economic expansion, skills development and employment creation (OECD, 2025; ILO, 2025).

Figure 3: South Africa's official unemployment rate, selected quarters, 2025–2026



Source: *Statistics South Africa, Quarterly Labour Force Survey releases, as cited in the supplied essay.*

Quarter	**Official unemployment rate**
Q2 2025	33.2%
Q3 2025	31.9%
Q4 2025	31.4%
Q1 2026	32.7%
Q2 2026	33.6%

Source: *Source: Statistics South Africa (2025a, 2025b, 2026a, 2026b).*

The main economic indicators informing this essay are summarised in Table 1. They show why South Africa requires a strategy that connects technological adoption to skills development, industrial investment and inclusive job creation.

Table 1: Key statistics informing South Africa's AI policy

Indicator	**Reported value**	**Policy significance**
Official unemployment rate, Q2 2026	33.6%	AI adoption must be accompanied by job creation and transition support.
Unemployed people, Q2 2026	Approximately 8.5 million	Many people require access to productive economic opportunities.
Youth unemployment, ages 15–34, Q2 2026	47.4%	Training and entry-level employment pathways are urgent.
Global corporate AI investment, 2025	US$581.69 billion	AI is becoming a major focus of global investment.
China's share of global industrial robot installations, 2024	Approximately 54%	Technology adoption can be linked to industrial development at scale.
Workers globally in occupations with some generative AI exposure	Approximately one in four	Exposure signals potential task change, not certain job loss.

Sources: *Statistics South Africa (2026); Stanford HAI (2026); International Federation of Robotics (2025); ILO (2025).*

South Africa also faces constraints in investment, infrastructure and productive capacity (OECD, 2025). AI adoption requires complementary investment in computing equipment, connectivity, secure data systems, staff training and organisational

redesign (Brynjolfsson, Rock % Syverson, 2021). Without reliable electricity and affordable broadband, firms and educational institutions may struggle to use these technologies consistently. The government should therefore treat digital infrastructure as part of the country's productive infrastructure alongside electricity, rail, ports, water and transport (World Bank, 2023).

The appropriate response is neither to resist AI adoption because of possible job losses nor to encourage rapid automation without considering its social consequences. South Africa should support technology adoption while strengthening workers' capacity to adapt and ensuring that public incentives encourage productive investment, domestic innovation and employment opportunities (Acemoglu & Restrepo, 2019).

4. Redesigning education for an AI-enabled economy

Education reform should be the foundation of South Africa's AI strategy because technology is most valuable when people have the skills to use it productively (OECD, 2025). The priority is to strengthen foundational literacy, numeracy, problem-solving and scientific reasoning in schools (World Bank, 2026). Advanced digital skills cannot compensate for weak reading comprehension or mathematical understanding. Learners need to interpret information, assess evidence, recognise errors and understand the limitations of AI-generated outputs. These capabilities are important not only for software developers and data scientists, but also for teachers, artisans, entrepreneurs, health workers and employees in administrative occupations (OECD, 2025).

The second priority is to integrate digital literacy and AI awareness across the curriculum. This should not mean requiring every learner to become a programmer. Instead, students should learn how digital systems work, how algorithms can generate biased or inaccurate results, how to protect personal information and how to use AI tools responsibly (UNESCO, 2023; OECD, 2025). Learners should be taught to verify AI-generated information, acknowledge assistance where required and understand the ethical implications of using automated systems. UNESCO (2023) emphasises a human-centred approach to generative AI in education and research, including attention to privacy, inclusion, age appropriateness and pedagogical value.

AI should also be used to strengthen teaching rather than replace teachers. Properly designed tools can help educators prepare learning materials, provide additional practice, translate explanations into accessible language and identify areas where learners require support (UNESCO, 2023). Nevertheless, AI tools cannot replace the professional judgement, social support and classroom relationships that effective teaching requires. Schools must also ensure that learners without devices or reliable connectivity are not disadvantaged by AI-dependent teaching methods (UNESCO, 2023).

A third priority is to reform technical and vocational education and training. South Africa needs technicians, electricians, renewable-energy specialists, industrial maintenance workers, robotics technicians, data technicians and employees who can maintain digital equipment. TVET colleges should work with employers to update curricula, provide modern equipment, expand work-integrated learning and offer recognised short courses in digital manufacturing, data handling, cybersecurity and AI-assisted operations (OECD, 2026; World Bank, 2026).

Germany offers a useful lesson through its dual vocational training model, which combines classroom instruction with workplace learning (OECD, 2025a). Its relevance lies not in copying the entire German system, but in strengthening cooperation between South African colleges and employers. Businesses should participate in curriculum development, provide workplace placements and help assess whether training produces the competencies required by industry (OECD, 2025a; World Bank, 2026).

Universities must also adapt their programmes. Economics, commerce, engineering, education, health sciences and public administration students should be taught how AI affects their disciplines (OECD, 2025b). Economics students, for example, should understand data analysis, forecasting, model limitations and the effects of automation on wages and productivity. Business students should learn how to evaluate AI investments, redesign workflows and manage digital risk. Engineering students should gain practical experience in automation, control systems and industrial data. Universities should also expand interdisciplinary research linking AI to South African challenges such as logistics inefficiencies, energy reliability, agricultural productivity, health-service delivery and municipal administration.

A fourth priority is lifelong learning. Because technology changes faster than traditional qualifications can be redesigned, workers need affordable opportunities to update their skills throughout their careers (OECD, 2026). The government should work with employers, unions, TVET colleges and universities to establish modular training programmes that allow people to earn recognised credentials while employed. Short courses should be available in areas such as data analysis, digital administration, AI-assisted customer service, cybersecurity, equipment maintenance and entrepreneurship. Training should be linked to real vacancies and sectoral investment plans rather than being measured only by the number of participants enrolled (World Bank, 2026).

Finally, education reform must address unequal access. Rural communities, township schools, low-income households and learners with disabilities require affordable connectivity, accessible devices and appropriate learning support (UNESCO, 2023). Public investment should prioritise schools and colleges with the greatest infrastructure gaps. If AI skills remain concentrated among affluent households and major urban centres, technological change may widen existing inequalities instead of supporting inclusive development (UNESCO, 2023; World Bank, 2026).

5. Redesigning industrial policy to build productive capacity

Education reform will have limited economic impact if the economy does not create enough productive jobs for people to use their skills. South Africa therefore needs an industrial policy that encourages AI adoption while expanding domestic production, innovation and employment (UNIDO, 2024; UNCTAD, 2025). The objective should not be to subsidise every firm that purchases AI software. It should be to support investments that improve productivity, strengthen domestic value chains, expand exports, develop local capabilities and create sustainable economic opportunities.

The first industrial-policy priority is to identify sectors in which AI can address existing productivity constraints. In agriculture, AI-enabled forecasting, soil monitoring, precision irrigation and pest detection may improve yields and reduce waste. In manufacturing, predictive maintenance, automated quality inspection and digital production planning can reduce downtime and improve product consistency. In mining, AI may improve equipment maintenance, resource planning and worker safety. In logistics, digital scheduling and predictive systems can improve warehouse operations

and freight coordination. In financial services, AI can support fraud detection, customer assistance and risk management (UNCTAD, 2025). These applications should be selected according to their feasibility, potential productivity gains and likely employment effects.

The second priority is to help SMEs adopt technology. Smaller businesses may struggle with initial costs, cybersecurity, limited technical expertise and uncertainty about returns on investment (OECD, 2026). Government-supported technology extension services could provide SMEs with practical assessments, training, shared digital tools and access to approved technology providers. These services should help businesses identify problems that AI can solve, compare implementation costs and assess whether a proposed system is likely to improve performance. UNIDO (2024) documents industrial-policy approaches that combine SME assessments, technical assistance, training and financing to support digital transformation.

Shared facilities could further reduce barriers to adoption. Public universities, TVET colleges, science councils and industry associations could establish regional digital innovation centres where smaller firms can test AI applications before investing in them. These centres could support prototyping, software testing, worker training and advice on data protection. UNIDO (2024) highlights the role of digital capability centres and public–private partnerships in helping manufacturers and SMEs implement new technologies. The purpose would be to build practical technological capacity among local businesses rather than making firms permanently dependent on consultants or foreign software suppliers.

Third, South Africa should develop domestic capabilities in AI-related goods and services. This does not require attempting to manufacture every component of the global AI supply chain. Instead, the country could concentrate on realistic opportunities such as specialised software, business-process services, industrial data analytics, cybersecurity, language technologies, digital public services and AI applications for African markets. UNCTAD (2025) emphasises the importance of strengthening domestic innovation systems and technological capabilities so developing economies can capture more of the benefits of AI. South Africa’s universities, technology firms and research institutions can contribute by developing solutions for local languages, public-service challenges, mining, agriculture and financial inclusion.

China’s experience illustrates the scale of investment that can accompany industrial automation. The International Federation of Robotics reported approximately 295,000 industrial robot installations in China in 2024, representing about 54% of global installations (IFR, 2025). South Africa differs substantially from China in market size, industrial structure and public financing capacity. The lesson is not that South Africa should reproduce China’s investment model, but that technology adoption is more effective when connected to industrial development, infrastructure, skills and firm-level upgrading (UNIDO, 2024; UNCTAD, 2025).

Germany provides a lesson through the relationship between manufacturing, vocational training and applied research. Singapore demonstrates how coordinated digital infrastructure and support for business adoption can strengthen firms’ capacity to use new technologies (Infocomm Media Development Authority [IMDA], 2025). India’s experience with digital services and a large technology workforce also illustrates opportunities for developing exportable digital capabilities (UNCTAD, 2025). These cases are not directly transferable because each country has different institutions, resources and economic conditions. Table 2 summarises the most relevant lessons for South Africa.

Table 2: International experiences and their relevance to South Africa

Country	Relevant policy experience	Possible lesson for South Africa
Germany	Vocational education linked to workplace learning and industrial skills	Expand apprenticeships, work placements and employer participation in training.
Singapore	Coordinated digital capability development and business adoption support	Offer practical assistance and training to SMEs alongside digital infrastructure.

China	Large-scale industrial automation and manufacturing investment	Link AI adopted domestic production, industrial upgrading and export capability.
India	Development of digital services and technology-related skills	Build competitive local capabilities in software, data analytics and digital services.

Source: *Author's synthesis of international policy approaches. These are illustrative comparisons rather than claims that policies can be transferred without adaptation.*

Fourth, industrial policy should be connected to public procurement. Government is a major purchaser of information technology, professional services and administrative systems. Procurement can create demand for locally developed digital products, if contracts remain competitive, transparent and based on measurable performance (OECD, 2024). Public agencies could test AI tools for document management, translation, service enquiries, fraud detection and maintenance planning. Contracts should include requirements for data security, interoperability, staff training and performance evaluation (OECD, 2025).

Finally, industrial policy should account for labour-market effects. Firms receiving substantial public assistance for AI adoption should be expected to explain how the investment will affect tasks, training and employment. Where automation is likely to displace workers, businesses should be encouraged to consider redeployment, retraining, natural attrition and the creation of complementary roles before implementing large-scale redundancies. This does not mean preventing all labour-saving innovations. Rather, it means using public support to encourage firms to improve productivity while managing the transition responsibly (ILO, 2025).

6. Redesigning fiscal incentives for productive and inclusive AI adoption

Fiscal policy can influence the pace and direction of AI adoption through tax incentives, grants, public investment and procurement. However, South Africa faces fiscal constraints, so incentives must be carefully targeted and evaluated. A strategy that

provides broad, permanent tax concessions to businesses simply because they purchase AI technology could reduce revenue without guaranteeing productivity growth, domestic innovation or employment creation. Research on R&D tax incentives suggests that tax relief can stimulate additional investment, but its effectiveness depends on policy design and the extent to which it changes firms' behaviour (Hall & Van Reenen, 2000; *Bloom et al.,* 2002).

The first principle should be additionality: public support should encourage investment that would otherwise not occur or improve the quality and social benefits of planned investment. Temporary investment allowances or accelerated depreciation may be appropriate for qualifying digital equipment, cybersecurity infrastructure, industrial automation and computing systems. However, eligibility should depend on clearly defined conditions, and support should be reviewed regularly. Firms should not receive substantial benefits for replacing existing equipment when the investment produces little additional productivity or capability. Hall and Van Reenen (2000) emphasise the importance of evaluating whether fiscal incentives stimulate additional research and development rather than merely subsidising expenditure that firms would have undertaken anyway. In South Africa, the existing Section 11D research and development tax incentive provides a policy mechanism that could support qualifying scientific and technological innovation, subject to the applicable approval requirements (SARS, n.d.).

The second principle is to reward worker training alongside technology investment. A firm applying for AI-related tax relief or a grant could be required to submit a workforce development plan that identifies affected occupations, training needs, expected productivity outcomes and arrangements for redeployment. Incentives could be larger where businesses provide accredited training, paid apprenticeships or recognised digital qualifications. Such conditions would help ensure that public resources support both capital investment and the human capabilities required to use it. This approach is consistent with the wider economic argument that technological change does not automatically translate into broadly shared gains; outcomes depend partly on complementary investments, organisational choices and the development of workers' skills (Acemoglu & Restrepo, 2019; *Brynjolfsson et al.,* 2021).

The third principle is to improve access for SMEs and start-ups. Smaller businesses may not have sufficient taxable profits to benefit from tax deductions, even when they have strong growth potential. Competitive grants, partial cost-sharing schemes, shared technology facilities and technical assistance may therefore be more effective than tax relief alone. Support should be capped, time-limited and linked to credible business plans. Programmes should also make application procedures accessible to firms that lack specialist tax advisers or consultants. A combination of direct support and tax relief is already used across many economies to promote business R&D, although the balance between the instruments varies (OECD, 2024).

Research and development incentives should encourage locally relevant innovation. South African universities and businesses could collaborate on AI applications for agriculture, public health, renewable energy, manufacturing, logistics and local-language technologies. Grants should be awarded through transparent, competitive processes and evaluated according to research quality, commercial potential, knowledge transfer and public value. Evidence reviewed by *Bloom et al.* (2002) indicates that R&D tax incentives can influence firms' research investment, while Hall and Van Reenen (2000) show why evaluations should examine the additional research generated by public support. South Africa can build on its existing Section 11D framework while ensuring that publicly supported innovation contributes to domestic technological capability and addresses local development needs.

Fiscal incentives must also consider the risks of supporting automation without encouraging new productive activity. If the tax system makes labour relatively expensive while providing generous relief for capital-intensive automation, firms may have incentives to substitute machines for workers even where the social cost of unemployment is high. Acemoglu, Manera and Restrepo (2020) argue that differences in the taxation of labour and capital can encourage excessive automation when firms adopt labour-saving technologies that generate limited additional productivity. Their findings concern the United States and should not be treated as direct estimates for South Africa, but they provide a useful warning about designing tax systems that unintentionally favour capital substitution. This does not mean that automation should be penalised indiscriminately. It means that tax policy should avoid favouring one input over another without considering productivity, training and employment consequences.

The government should establish a transparent evaluation framework for all major AI-related fiscal programmes. Evaluations should examine whether supported firms increased productivity, expanded output, improved wages, created or preserved jobs, developed local suppliers and provided recognised training. The assessment should also estimate the cost per additional job or training outcome and identify whether the same benefits could have been achieved with less public spending. If programmes fail to produce measurable results, they should be redesigned or discontinued. This approach is consistent with the broader evaluation literature, which demonstrates the importance of testing programme outcomes rather than if public expenditure necessarily produces its intended effects (Hall & Van Reenen, 2000; OECD, 2024).

Public investment remains essential because private incentives cannot substitute for foundational infrastructure. Reliable electricity, affordable broadband, modern transport, secure public data systems and strong research institutions all support AI adoption. South Africa should prioritise infrastructure that benefits multiple sectors and improves the operating environment for firms of different sizes. In a fiscally constrained economy, this requires careful project selection, transparent procurement, credible maintenance plans and stronger coordination between national, provincial and local governments. These investments should complement firm-level incentives by addressing wider constraints that individual businesses cannot efficiently resolve on their own.

7. Protecting workers and managing labour-market transitions

An inclusive AI strategy must recognise that productivity gains can coexist with job displacement. Some tasks will become less labour-intensive, and some occupations may contract even if the overall economy expands. The challenge is to make transitions less disruptive and to ensure that workers can share the benefits of technological progress. Acemoglu and Restrepo (2019, 2020) show that automation can reduce labour demand for existing tasks, while the creation of new tasks can generate opportunities for workers. Autor (2015) similarly argues that technology changes the composition of work rather than simply determining the total number of jobs. The implications for employment depend on how these displacement effects interact with new tasks and broader economic demand.

The first measure should be early consultation between employers, workers and unions. Before introducing systems likely to substantially change job tasks, firms should explain the intended benefits, identify affected roles and consult employees on training and implementation. Consultation can help identify opportunities for redesigning work instead of eliminating positions. It can also help workers understand new expectations and raise concerns about surveillance, algorithmic management, privacy and unfair performance evaluation. Kellogg, Valentine and Christin (2020) show that workplace algorithms can influence how employees are directed, assessed and disciplined, highlighting why the governance of these systems should consider workers' interests as well as managerial objectives.

The second measure should be practical transition support. Workers whose roles are substantially changed should have access to career guidance, recognised training, job-placement services and assistance in identifying alternative occupations. Public employment services should strengthen their capacity to match job seekers with vacancies and training opportunities. AI-related transition programmes should build on existing systems rather than establishing fragmented initiatives with limited coordination. The International Labour Organization (ILO, 2023) stresses the value of connecting public employment services with active labour-market policies, training institutions and social protection systems. In addition, Card, Kluve and Weber's (2018) meta-analysis of more than 200 evaluations finds that the employment effects of active labour-market programmes vary over time and by programme type, with human-capital-oriented interventions tending to produce more positive medium-term outcomes than immediate outcomes. This evidence supports careful programme design and ongoing evaluation rather than assuming that any training initiative will be effective.

Third, South Africa should improve access to apprenticeships, internships and work-based learning. Young people often struggle to obtain their first job because employers require experience that they have not had the opportunity to acquire. Employers adopting AI could be encouraged to offer entry-level placements in data administration, digital support, software testing, equipment maintenance and other emerging roles. These placements should provide structured training and meaningful work rather than becoming a source of low-paid labour without progression. Comyn and Brewer (2018), in their review of work-based learning, identify structured

apprenticeships, internships and traineeships as potentially valuable routes into employment and recommend greater engagement with employers to expand such opportunities.

Fourth, worker protection must extend to the quality of employment. AI may improve productivity while increasing work intensity, monitoring or insecurity. Policymakers should therefore consider whether automated management systems are transparent, whether workers can challenge important decisions, and whether personal information is handled lawfully. Employers should remain accountable for consequential decisions even when these decisions involve algorithmic tools. The analysis by *Kellogg et al.* (2020) illustrates how algorithmic systems can strengthen workplace monitoring and control, making transparency, worker voice and appropriate safeguards important components of an inclusive AI policy.

Fifth, social protection should support people during transitions. Where workers lose employment because of major technological restructuring, access to employment services, appropriate income support and affordable training can reduce the economic cost of adjustment. Social protection should be designed to encourage a return to productive employment without assuming that every displaced worker can immediately secure another job. The ILO (2023) argues that employment services, active labour-market policies and social protection are more effective when coordinated within a broader institutional framework. In South Africa, where unemployment is already exceptionally high, transition programmes must be linked to credible sources of labour demand and wider efforts to encourage business growth.

Finally, government should monitor how AI affects different groups. The consequences may differ according to age, gender, education, occupation, income and location. Young workers may face difficulties entering occupations in which AI automates entry-level tasks, while experienced workers may need assistance updating their skills. Rural communities may be excluded if connectivity and training remain concentrated in major cities. Disaggregated data will allow policymakers to identify these patterns and direct support to the people most affected. Gmyrek, Berg and Bescond (2023) emphasise that generative AI's employment implications are likely to differ across occupations and groups, reinforcing the need for policies that monitor job quality and support fair transitions.

8. Implementation, governance and evaluation

South Africa should implement its AI strategy through coordinated action by government, education institutions, businesses, labour organisations and research bodies. Education authorities should lead foundational learning, digital literacy and curriculum reform, while higher education and vocational institutions should expand applied AI training and workplace learning. Industrial and trade authorities should identify sectoral opportunities and support technology adoption by SMEs, while National Treasury should design fiscal incentives with clear eligibility rules and measurable outcomes. Labour authorities, employers and unions should develop transition arrangements and ensure that worker rights are respected. The OECD (2026a) identifies coordination, institutional responsibility, digital infrastructure, skills and accountability as important conditions for translating AI policy objectives into effective implementation. These priorities are particularly relevant to African countries, where policy ambition must be matched by practical implementation capacity.

Implementation should be phased. The initial phase should establish a baseline of AI adoption, infrastructure access, skills shortages and occupations potentially affected by technological change. It should also identify pilot sectors and create common standards for data protection, procurement and programme evaluation. The next phase should expand training, SME support and carefully targeted incentives based on evidence from the pilots. Later phases should scale programmes that demonstrate results and discontinue those that fail to improve productivity or inclusion. The OECD (2026b) highlights the value of clear institutional responsibilities, risk management, experimentation and post-deployment assessment in government AI adoption. A phased approach would allow South Africa to test policies, identify implementation problems and adjust interventions before committing substantial public resources.

Evaluation should measure economic and social outcomes rather than counting only the number of AI tools purchased or training courses delivered. Labour productivity should be assessed through output per worker or hour where suitable data are available. Firm-level evaluation should examine output, costs, product quality, export performance and business survival. Labour-market evaluation should track employment, real wages, job transitions, training completion and the quality of new work. Distributional measures should examine whether benefits reach SMEs, women,

young people and workers outside major urban centres. *Pastor-Merino et al.* (2026), studying Spanish firms, find that AI adoption is associated with stronger sales, value added and growth, with greater benefits where AI is integrated across multiple business functions. However, their findings also indicate that larger and more innovative firms may capture greater benefits, reinforcing the need to measure both productivity outcomes and differences between firm groups.

Table 3: Proposed indicators for monitoring South Africa's AI strategy

Policy objective	**Suggested indicator**	**What it would reveal**
Raise productivity	Output per worker or hour worked	Whether AI is improving productive efficiency.
Expand employment	Employment and job-creation rates in supported sectors	Whether adoption contributes to additional work opportunities.
Improve job quality	Real wages, training access and employment stability	Whether workers share in productivity gains.
Strengthen skills	Accredited training completions and workplace placements	Whether training leads to recognised capabilities and work experience.
Support SMEs	Adoption rates, productivity changes and survival rates among supported firms	Whether public assistance reaches firms facing adoption barriers.
Improve industrial capacity	Domestic supplier participation, exports and local innovation	Whether AI strengthens productive capabilities in South Africa.

Protect public finances	Cost per additional job, training outcome or unit of productivity gain	Whether public incentives deliver value for money.
Promote inclusion	Outcomes disaggregated by age, gender, income group and location	Whether benefits are broadly distributed.

Source: *Author's proposed monitoring framework, informed by OECD (2026a, 2026b), Pastor-Merino et al. (2026) and Aldasoro et al. (2026).*

The framework should also include fiscal accountability. Government should publish the total cost of AI-related incentives, the number and type of beneficiaries, the additional investment generated and the measured results. Independent evaluation should test whether supported firms would have made the investment without assistance and whether benefits justify the cost to taxpayers. Where feasible, evaluations should compare supported firms with similar firms that did not receive assistance, while accounting for differences that may affect the results. The OECD (2026b) reports that systematic measurement of the financial and non-financial impacts of AI in government remains limited across the countries it examines, illustrating the importance of stronger evaluation systems. These measures would help ensure that AI policy remains economically effective and fiscally responsible.

9. Conclusion

Artificial intelligence offers South Africa an opportunity to improve productivity, strengthen industrial competitiveness and develop new economic activities. However, the benefits will depend on the policies and institutions that shape its adoption. In an economy characterised by high unemployment, unequal educational opportunities and constrained investment, technological progress cannot be treated as an automatic route to inclusive growth. If AI is adopted without sufficient attention to skills, firm capabilities and worker transitions, it could deepen existing inequalities. If it is supported by complementary investment and effective institutions, it could improve the quality of work, increase output and create new opportunities. Recent firm-level evidence suggests that AI adoption can be associated with productivity improvements, but that these benefits are uneven and depend partly on complementary investment and organisational capacity (*Aldasoro et al.,* 2026; *Pastor-Merino et al.,* 2026).

South Africa should therefore redesign education, industrial policy and fiscal incentives as parts of one coordinated strategy. Education reform should strengthen foundational learning, expand digital literacy and connect vocational and university training to the changing needs of the economy. Industrial policy should support productive AI adoption by SMEs, strengthen domestic technological capabilities and focus on sectors where technology can improve competitiveness and expand economic activity. Fiscal incentives should reward additional investment, research, worker training and measurable productivity improvements, while avoiding permanent subsidies that produce limited public benefit. Worker protection should include consultation, retraining, job-placement support, fair algorithmic practices and access to social protection during transitions. The OECD's recent analysis of AI governance in Africa also stresses that implementation requires more than a formal policy framework: infrastructure, institutional coordination, local capabilities and workable governance arrangements are essential to turning policy objectives into results (OECD, 2026a).

The central policy objective should be to ensure that AI complements South African workers wherever possible, strengthens firms' productive capacity and contributes to a broader expansion of decent work. Productivity growth matters because it creates the potential for higher incomes and improved living standards, but the distribution of those gains depends on public policy, institutional quality and the bargaining position of workers. South Africa should judge its AI strategy not by how quickly it automates tasks, but by whether it raises productivity while widening access to skills, employment, higher wages and economic opportunity. Accordingly, the success of the strategy should be assessed through transparent and regularly published evidence on productivity, job creation, wages, worker training, SME performance and the distribution of benefits, rather than through technology adoption alone (*Aldasoro et al.,* 2026; OECD, 2026b).

References

Acemoglu, D. and Johnson, S. (2023). Power and Progress: Our Thousand-Year Struggle Over Technology and Prosperity. New York: PublicAffairs. Available at: https://www.publicaffairsbooks.com/titles/daron-acemoglu/power-and-progress/9781541702533/

Acemoglu, D. and Restrepo, P. (2019). Automation and new tasks: How technology displaces and reinstates labor. Journal of Economic Perspectives, 33(2), pp. 3–30. Available at: https://doi.org/10.1257/jep.33.2.3

Acemoglu, D. and Restrepo, P. (2020). Robots and jobs: Evidence from US labor markets. Journal of Political Economy, 128(6), pp. 2188–2244. Available at: https://doi.org/10.1086/705716

Acemoglu, D., Manera, A. and Restrepo, P. (2020). Does the US tax code favor automation? Brookings Papers on Economic Activity. Available at: https://www.brookings.edu/bpea-articles/does-the-us-tax-code-favor-automation/

Aghion, P., Jones, B.F. and Jones, C.I. (2019). Artificial intelligence and economic growth. In: The Economics of Artificial Intelligence: An Agenda. Chicago: University of Chicago Press. Available at: https://www.nber.org/books-and-chapters/economics-artificial-intelligence-agenda/artificial-intelligence-and-economic-growth

Aldasoro, I. et al. (2026). AI Adoption, Productivity and Employment: Evidence from European Firms. European Investment Bank Working Paper 2026/02. Available at: https://doi.org/10.2867/1772538

Autor, D.H. (2015). Why are there still so many jobs? The history and future of workplace automation. Journal of Economic Perspectives, 29(3), pp. 3–30. Available at: https://doi.org/10.1257/jep.29.3.3

Bloom, N., Griffith, R. and Van Reenen, J. (2002). Do R&D tax credits work? Evidence from a panel of countries, 1979–1997. Journal of Public Economics, 85(1), pp. 1–31. Available at: https://ifs.org.uk/publications/do-rd-credits-work-evidence-panel-countries-1979-97

Bloom, N., Sadun, R. and Van Reenen, J. (2012). The organization of firms across countries. The Quarterly Journal of Economics, 127(4), pp. 1663–1705. Available at: https://doi.org/10.1093/qje/qje029

Brynjolfsson, E. and McAfee, A. (2014). The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies. New York: W.W. Norton & Company.

Brynjolfsson, E., Li, D. and Raymond, L.R. (2025). Generative AI at work. The Quarterly Journal of Economics. Available at: https://doi.org/10.1093/qje/qjae044

Brynjolfsson, E., Rock, D. and Syverson, C. (2021). The productivity J-curve: How intangibles complement general purpose technologies. American Economic Journal: Macroeconomics, 13(1), pp. 333–372. Available at: https://doi.org/10.1257/mac.20180386

Card, D., Kluve, J. and Weber, A. (2018). What works? A meta-analysis of recent active labor market program evaluations. Journal of the European Economic Association, 16(3), pp. 894–931. Available at: https://doi.org/10.1093/jeea/jvx028

Comyn, P. and Brewer, L. (2018). Does Work-Based Learning Facilitate Transitions to Decent Work? Geneva: International Labour Organization.

Dell'Acqua, F. et al. (2025). The jagged technological frontier: Field experimental evidence of the effects of AI on knowledge workers' productivity and quality. Available at: https://doi.org/10.1287/orsc.2025.21838

European Commission. (2025). Education and Training Monitor: Germany. Available at: https://op.europa.eu/webpub/eac/education-and-training-monitor/en/country-reports/germany.html

Gmyrek, P. et al. (2025). Generative AI and Jobs: A Refined Global Index of Occupational Exposure. ILO Working Paper No. 140. Geneva: International Labour Organization. Available at: https://www.ilo.org/publications/generative-ai-and-jobs-refined-global-index-occupational-exposure

Gmyrek, P., Berg, J. and Bescond, D. (2023). Generative AI and Jobs: A Global Analysis of Potential Effects on Job Quantity and Quality. Geneva: International Labour Organization.

Government of India. (2026). Union Budget 2026–27: Services Exports and Economic Development. New Delhi: Press Information Bureau. Available at: https://www.pib.gov.in/PressNoteDetails.aspx?ModuleId=3&NoteId=157804&lang=1&reg=3

Hall, B.H. and Van Reenen, J. (2000). How effective are fiscal incentives for R&D? A review of the evidence. Research Policy, 29(4–5), pp. 449–469. Available at: https://doi.org/10.1016/S0048-7333(99)00085-2

Infocomm Media Development Authority (IMDA). (2025). Singapore Digital Economy Report. Singapore: IMDA. Available at: https://www.imda.gov.sg/-/media/imda/files/about/resources/corporate-publications/annual-report/imda-sgde-report-fy2024-2025.pdf

International Federation of Robotics (IFR). (2025). World Robotics: Industrial Robots. Frankfurt: IFR. Available at: https://ifr.org/ifr-press-releases/news/global-robot-demand-in-factories-doubles-over-10-years

International Labour Organization (ILO). (2023). Generative AI and Jobs: A Global Analysis of Potential Effects on Job Quantity and Quality. Geneva: ILO.

Kellogg, K.C., Valentine, M.A. and Christin, A. (2020). Algorithms at work: The new contested terrain of control. Academy of Management Annals, 14(1), pp. 366–410. Available at: https://doi.org/10.5465/annals.2018.0174

Monteiro, H., Hlacs, A. and Boéchat, C. (2024). Digital Transformation of Public Procurement: Good Practices and Lessons Learned. Paris: OECD. Available at: https://doi.org/10.1787/9aad76b7-en

NASSCOM. (2025). Strategic Review of India's Technology Sector. New Delhi: NASSCOM. Available at: https://www.sebi.gov.in/sebi_data/attachdocs/oct-2025/1759742511998.pdf

National Institute of Standards and Technology (NIST). (2024). Artificial Intelligence Risk Management Framework: Generative Artificial Intelligence Profile. NIST AI 600-1. Gaithersburg, MD: NIST. Available at: https://doi.org/10.6028/NIST.AI.600-1

Noy, S. and Zhang, W. (2023). Experimental evidence on the productivity effects of generative artificial intelligence. Science, 381(6654), pp. 187–192. Available at: https://doi.org/10.1126/science.adh2586

OECD. (2024). Corporate Tax Statistics 2024. Paris: OECD Publishing. Available at: https://www.oecd.org/tax/tax-policy/corporate-tax-statistics-database.htm

OECD. (2025a). AI Adoption by Small and Medium-Sized Enterprises. Paris: OECD Publishing. Available at: https://doi.org/10.1787/426399c1-en

OECD. (2025b). The Effects of Generative AI on Productivity, Innovation and Entrepreneurship. Paris: OECD Publishing.

OECD. (2025c). Vocational Education and Training Systems in Nine Countries. Paris: OECD Publishing. Available at: https://doi.org/10.1787/1a86eb6c-en

OECD. (2025d). What Should Teachers Teach and Students Learn in a Future of Powerful AI? Paris: OECD Publishing. Available at: https://doi.org/10.1787/ca56c7d6-en

OECD. (2025e). Digital Transformation of Public Procurement. Paris: OECD Publishing. Available at: https://doi.org/10.1787/79651651-en

OECD. (2026a). Digital Government Outlook 2026. Paris: OECD Publishing. Available at: https://doi.org/10.1787/0496b2bc-en

OECD. (2026b). Developing Vocational Education and Training with Artificial Intelligence. Paris: OECD Publishing. Available at: https://doi.org/10.1787/e9f76b4e-en

OECD. (2026c). Skills in the AI Age. Paris: OECD Publishing. Available at: https://doi.org/10.1787/972bd15e-en

OECD. (2026d). Empowering SMEs in the Age of AI: 2026 OECD D4SME Survey. Paris: OECD Publishing. Available at: https://doi.org/10.1787/bf5a9816-en

OECD. (2026e). AI Governance in Africa. Paris: OECD Publishing. Available at: https://www.oecd.org/en/publications/oecd-artificial-intelligence-case-studies_c517fcf5-en/ai-governance-in-africa_1ff55135-en.html

Organisation for Economic Co-operation and Development (OECD). (2001). Measuring Productivity: OECD Manual—Measurement of Aggregate and Industry-Level

Productivity Growth. Paris: OECD Publishing. Available at: https://doi.org/10.1787/9789264194519-en

Pastor-Merino, C. et al. (2026). Does AI boost firm productivity? A web scraping and LLMs approach. Telecommunications Policy. Available at: https://doi.org/10.1016/j.telpol.2025.103138

Rodrik, D. (2004). Industrial Policy for the Twenty-First Century. Cambridge, MA: Harvard University. Available at: https://drodrik.scholar.harvard.edu/publications/industrial-policy-twenty-first-century

Romer, P.M. (1990). Endogenous technological change. Journal of Political Economy, 98(5, Part 2), pp. S71–S102. Available at: https://doi.org/10.1086/261725

South African Revenue Service (SARS). (n.d.). Research and Development Incentive: Section 11D. Available at: https://www.sars.gov.za/businesses-and-employers/my-business-and-tax/research-and-development-incentive/

Stanford Institute for Human-Centered Artificial Intelligence (Stanford HAI). (2025). AI Index Report 2025: Economy Chapter. Available at: https://hai.stanford.edu/ai-index/2025-ai-index-report/economy

Stanford Institute for Human-Centered Artificial Intelligence (Stanford HAI). (2026). AI Index Report 2026: Economy Chapter. Available at: https://hai.stanford.edu/ai-index/2026-ai-index-report/economy

Statistics South Africa. (2025a). Quarterly Labour Force Survey, Quarter 2: 2025. Pretoria: Statistics South Africa. Available at: https://www.statssa.gov.za/publications/P0211/Media%20Release%20QLFS%20Q2%202025.pdf

Statistics South Africa. (2025b). Quarterly Labour Force Survey, Quarter 3: 2025. Pretoria: Statistics South Africa. Available at: https://www.statssa.gov.za/?PPN=P0211&SCH=74048&page_id=1856

Statistics South Africa. (2025c). Quarterly Labour Force Survey, Quarter 4: 2025. Pretoria: Statistics South Africa. Available at:

https://www.statssa.gov.za/publications/P0211/Media%20Release%20QLFS%20Q4%202025.pdf

Statistics South Africa. (2026a). Quarterly Labour Force Survey, Quarter 1: 2026. Pretoria: Statistics South Africa. Available at: https://www.statssa.gov.za/?PPN=P0211&SCH=74511&page_id=1856

Statistics South Africa. (2026b). Quarterly Labour Force Survey, Quarter 2: 2026. Pretoria: Statistics South Africa. Available at: https://www.statssa.gov.za/publications/P0211/P02112ndQuarter2026.pdf

Syverson, C. (2011). What determines productivity? Journal of Economic Literature, 49(2), pp. 326–365. Available at: https://doi.org/10.1257/jel.49.2.326

UNESCO. (2023b). Guidance for Generative AI in Education and Research. Paris: UNESCO. Available at: https://www.unesco.org/en/articles/guidance-generative-ai-education-and-research

United Nations Conference on Trade and Development (UNCTAD). (2025). Technology and Innovation Report 2025: Inclusive Artificial Intelligence for Development. Geneva: United Nations. Available at: https://unctad.org/publication/technology-and-innovation-report-2025

United Nations Educational, Scientific and Cultural Organization (UNESCO). (2023a). Global Education Monitoring Report 2023: Technology in Education—A Tool on Whose Terms? Paris: UNESCO. Available at: https://www.unesco.org/gem-report/en/publication/technology

United Nations Industrial Development Organization (UNIDO). (2024). Industrial Development Report 2024. Vienna: UNIDO. Available at: https://www.unido.org/idr/idr2024

World Bank. (2023). South Africa Country Climate and Development Report. Washington, DC: World Bank. Available at: https://www.worldbank.org/en/country/southafrica/publication/south-africa-country-climate-and-development-report

World Bank. (2026). From Demand to Delivery: Strengthening South Africa's Digital Skills Pipeline. Washington, DC: World Bank. Available at: https://www.worldbank.org/en/news/feature/2026/08/14/from-demand-to-delivery-strengthening-south-africas-digital-skills