

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 (AI) is increasingly able to perform tasks involving prediction, language, pattern recognition, planning and decision support. These capabilities can raise productivity by helping workers produce more output with the same resources, reducing errors, improving logistics and enabling new products and services. However, the gains are not automatic: firms need skills, reliable infrastructure, useful data, organisational change and investment. Without these conditions, AI may deepen existing inequalities between large and small firms, skilled and less-skilled workers, and well-connected and underserved communities.

South Africa must approach this transition against a difficult economic background. Statistics South Africa reported an official unemployment rate of 31.4% in the fourth quarter of 2025, with 7.8 million people unemployed (Stats SA: 2026). The challenge is therefore not simply to adopt new technology; it is to raise productivity while expanding access to decent work. AI may complement workers in some occupations, automate parts of others, and create demand for new skills. The International Labour Organization finds that generative AI is more likely to transform or augment many jobs than eliminate entire occupations, although exposure differs across tasks and groups (Gmyrek, Berg and Bescond: 2023). This is a global assessment, not a precise forecast for South Africa.

This essay argues that South Africa should pursue a coordinated, employment-conscious AI strategy built around three connected reforms: education and lifelong learning that equip people to use and supervise AI; industrial policy that directs adoption towards productive domestic capabilities; and fiscal incentives that reward innovation, skills development and measurable public benefit. These reforms should be supported by worker consultation, social protection and transparent evaluation. The discussion considers education and skills, industrial policy, fiscal incentives and labour-market safeguards before presenting recommendations.

2. Education and skills development

2.1 Build foundational digital capability, not only specialist AI skills

An AI-ready workforce requires more than a small group of data scientists. Most workers need foundational digital literacy, numeracy, problem-solving, communication and the ability to evaluate information critically. Specialist roles also require advanced mathematics, software engineering, data science, cybersecurity and domain knowledge. Education policy should therefore create a skills ladder: basic digital confidence at school; applied digital and technical skills in TVET colleges; advanced research and engineering at universities; and short, accessible learning opportunities for adults already in work.

The Department of Basic Education should progressively embed computational thinking, data literacy, responsible use of AI and digital safety across subjects rather than treating AI as an isolated computer-studies topic. This must be matched with teacher development and appropriate assessment. Learners should understand that AI-generated material can be inaccurate or biased, and should learn to verify claims, protect personal information and disclose AI assistance when required. UNESCO advocates a human-centred, ethical and equitable approach to educational technology (UNESCO: n.d.). AI tools should support teaching, not become a low-cost substitute for qualified educators.

Infrastructure is a prerequisite. Schools cannot benefit equally from digital curricula if some lack reliable electricity, devices, connectivity or technical support. Government should prioritise underserved rural and township schools, libraries and community learning centres. Shared digital learning hubs can extend access where equipping every institution immediately is unaffordable. Public procurement should require accessible content, data protection and maintenance plans, not merely the delivery of hardware.

2.2 Strengthen TVET, universities and workplace learning

TVET colleges should work with employers, sector education and training authorities (SETAs), municipalities and local industry to update programmes in mechatronics, industrial maintenance, logistics, renewable energy, agricultural technology, health information systems and data handling. AI training should be applied to real occupational tasks. For example, a manufacturing student could learn how predictive

maintenance software identifies equipment failure, while an agricultural student could interpret sensor data and understand when human inspection remains necessary.

Universities should expand quality programmes in computer science, engineering, statistics and AI, but also connect these fields with law, economics, health, agriculture and the humanities. South Africa needs people who can develop systems and professionals who can use them responsibly in specific sectors. Bursaries, bridging programmes and paid internships can widen participation for students facing financial or educational barriers. Employer co-designed courses should not be so narrow that graduates become dependent on one vendor or software product.

Adult learning is equally important. Workers cannot be expected to finance retraining alone, particularly when wages are low or employment is insecure. SETAs and employers should support modular courses that can be completed while working, with recognised credits and clear routes to qualifications. Training should be assessed by demonstrated competence and improved job prospects, not only by the number of people enrolled.

3. Industrial policy: turn AI adoption into domestic productivity and jobs

3.1 Prioritise sectors where South Africa has productive capabilities

AI policy should be linked to industrial policy rather than treated as a separate technology programme. South Africa has opportunities to apply AI in mining, manufacturing, agriculture, logistics, financial services, energy and healthcare. In mining, predictive maintenance and computer vision may reduce equipment downtime and improve safety. In agriculture, weather analytics and precision irrigation can help farmers use water and fertiliser more efficiently. In manufacturing, AI-enabled quality control can reduce waste. In logistics, forecasting and route optimisation can improve the movement of goods. In healthcare, decision-support tools may help manage records and identify risks, provided clinical responsibility and patient privacy remain protected.

The aim should not be to subsidise every AI project. Public support should focus on problems with clear economic or social value, realistic implementation capacity and potential for local spillovers. A company that imports a complete system and uses it to replace workers may raise its own efficiency but generate limited domestic technological

capability. A project that also trains local technicians, collaborates with a university, develops locally relevant applications and enables small suppliers to participate may create broader benefits. Industrial policy should assess not only whether AI is installed, but whether it strengthens domestic skills, supplier networks, exports and productivity.

3.2 Develop innovation networks and support small firms

South Africa's National AI Policy Framework, published by the Department of Communications and Digital Technologies in 2024, identifies AI as a potential contributor to economic development and provides a foundation for a fuller national policy (DCDT: 2024). The OECD.AI policy dashboard also records the framework and the establishment of the AI Institute of South Africa and related university-based hubs (OECD.AI: n.d.). These initiatives can be strengthened by connecting universities, the Council for Scientific and Industrial Research, TVET colleges, start-ups, established firms and public agencies around defined challenges.

Regional innovation hubs should not become buildings that distribute grants without measurable outcomes. Each hub should specialise in locally relevant problems, provide shared computing and testing facilities where feasible, support commercialisation and help small and medium-sized enterprises (SMEs) assess vendors and implement suitable systems. SMEs often lack the capital and in-house expertise to adopt AI even when it could improve their operations. A shared advisory service, diagnostic support and small implementation vouchers may help them adopt tools without taking on excessive debt.

Public procurement can create demand for local innovation. Government departments and state-owned entities purchase services in document processing, maintenance, fraud detection and service scheduling. Where AI is appropriate, tenders can include open standards, interoperability, cybersecurity, explainability and skills-transfer requirements. Contracts should not lock public institutions into a single supplier or permit sensitive personal data to be used without a lawful basis. Procurement should reward solutions that work reliably in South African conditions, including multilingual and low-connectivity settings.

4. Fiscal incentives: reward additional investment and public value

4.1 Improve existing instruments before creating expensive new ones

Fiscal incentives can reduce the cost and risk of innovation, but poorly designed subsidies may reward investments firms would have made anyway. South Africa already has a research and development (R&D) tax incentive under section 11D of the Income Tax Act. SARS states that eligible companies can qualify for a 150% deduction on approved operational R&D expenditure incurred in South Africa, subject to statutory requirements and approval (SARS: n.d.). The policy debate should therefore not assume that a 150% deduction is an entirely new proposal. The question is whether existing instruments are accessible, timely, well monitored and effective in encouraging additional research.

The Department of Science, Technology and Innovation, SARS and National Treasury should publish regular evaluations of the incentive: the value of claims, the size and sector of beneficiaries, processing times, additional R&D undertaken, skills created and resulting commercial or public outcomes. If smaller firms face disproportionate administrative barriers, government could simplify guidance and provide application support without weakening eligibility checks. Incentives should target genuine uncertainty and technological advancement, rather than ordinary software purchases being relabelled as research.

4.2 Make adoption support conditional and proportionate

For firms adopting existing AI tools, a targeted, time-limited technology adoption grant or voucher could support feasibility studies, cybersecurity, worker training and implementation by SMEs. This is a new policy proposal, not an existing universal tax benefit. Eligibility could prioritise firms that demonstrate a credible productivity problem, contribute some of their own funds, train affected workers and report outcomes. Grants should be capped, independently audited and phased out if they fail to generate additional benefits.

Tax support for AI investment should distinguish between research, adoption and labour displacement. Research incentives support new knowledge; adoption assistance helps firms implement technologies; training support helps workers adapt. Combining all three into one broad tax concession risks subsidising capital-intensive firms without improving

worker capabilities. Where public support assists automation, firms receiving substantial assistance should consult workers and provide a transition plan, including redeployment or accredited training where feasible.

Fiscal choices must recognise South Africa's constrained public finances. Incentives reduce revenue or require direct spending, so each proposal has an opportunity cost. Government should compare them with alternatives such as foundational education, electricity reliability, broadband, public transport and basic research. An incentive should continue only if independent evaluation shows additional investment or public benefits that justify its cost. Taxpayers should not permanently subsidise commercially viable firms that would invest without assistance.

5. Limiting labour-market disruption

5.1 Focus on tasks, transitions and job quality

Predictions that AI will either destroy all work or create enough new jobs to compensate for every loss are too simplistic. The effect depends on which tasks can be automated, how firms reorganise work, whether demand expands and whether workers can move into new roles. The ILO's global analysis suggests generative AI is more likely to augment many occupations than fully automate them, while warning that job quality and unequal exposure matter (Gmyrek, Berg and Bescond: 2023). South African policymakers should use this as a framework for assessing risk, not as a numerical forecast for local employment.

Employers introducing AI should assess which tasks will change, which jobs may be affected, and what training or redeployment is possible before making major staffing decisions. Large employers receiving public incentives could be required to prepare an AI transition plan in consultation with employees and recognised unions. The plan should describe the intended use, anticipated impacts, training opportunities, data safeguards and appeal mechanisms for decisions affecting workers. This would encourage early adjustment rather than leaving employees to respond only after retrenchment is announced.

5.2 Strengthen transition support and social dialogue

SETAs, TVET colleges, employers and labour organisations should develop short courses for workers in occupations undergoing rapid change. Training support should be portable across employers and linked to recognised credentials. Where feasible, companies should redeploy experienced workers into roles that combine their occupational knowledge with AI tools. For example, a logistics worker may be trained to supervise automated scheduling, resolve exceptions and monitor service quality rather than being treated as having no value once routine scheduling is automated.

Social protection remains necessary for workers who cannot be redeployed quickly. Existing employment services and unemployment support should be connected more closely with career guidance, skills assessment, vacancies and training. Government could pilot temporary wage support or training allowances in sectors facing verified technological restructuring, but should assess costs and avoid paying firms to eliminate jobs without credible transition plans. Social dialogue through institutions such as NEDLAC can help negotiate fair processes and identify sector-specific risks.

AI systems used in recruitment, performance monitoring, scheduling or dismissal also require safeguards. Employers should explain significant automated decisions, provide meaningful human review and protect workers' personal data. Algorithmic tools can reproduce bias when trained on incomplete or historically discriminatory data. Labour protections should therefore focus on transparency, accountability and the right to challenge consequential decisions, while allowing responsible innovation. Women, young people, workers with disabilities and people in regions with weak digital infrastructure should be included in impact assessments because benefits and risks may not be evenly distributed.

6. Implementation and accountability

A coordinated approach needs clear responsibilities. The Department of Basic Education should lead school-level digital capability, while the Department of Higher Education and Training and SETAs should coordinate TVET and adult learning. The Department of Science, Technology and Innovation should support research and evaluation; the Department of Trade, Industry and Competition should align incentives and sector strategies; and National Treasury should assess fiscal costs and value for

money. The Department of Communications and Digital Technologies should coordinate digital infrastructure and AI policy. These bodies should publish a joint implementation plan rather than operating separate programmes with overlapping mandates.

Progress should be measured against public indicators: school and TVET access to reliable connectivity; teacher and lecturer participation in assessed digital training; completion and employment outcomes for AI-related courses; SME adoption and survival; additional private R&D; productivity and export performance in supported sectors; workers retrained or redeployed; and the cost per successful outcome of each incentive. Baselines should be published before programmes expand. Data should be disaggregated where possible by gender, age, disability, province and firm size to reveal who is benefiting.

The labour-market baseline illustrates why evaluation must include both productivity and inclusion. Stats SA reported unemployment of 32.9% in the first quarter of 2025, 31.9% in the third quarter and 31.4% in the fourth quarter (Stats SA: 2025; Stats SA: 2026a). These figures show the scale of the employment challenge, but they do not demonstrate that AI caused changes in unemployment. Any future assessment should avoid attributing labour-market movements to AI without credible evidence and should compare supported firms and workers with suitable benchmarks.

7. Conclusion

South Africa should redesign education, industrial policy and fiscal incentives as parts of one productivity and employment strategy. Education reform must build universal digital foundations while expanding technical and advanced skills. Industrial policy should support AI applications in sectors where they can raise productivity, improve public services and deepen domestic capabilities. Fiscal incentives should encourage genuinely additional research and responsible adoption, while requiring evidence of results and avoiding permanent subsidies to investments that would occur anyway. Finally, worker consultation, retraining, redeployment and fair decision-making safeguards are essential to ensure that productivity gains do not come at the expense of workers' dignity and security.

The central finding is that AI itself cannot guarantee inclusive growth. Outcomes depend on institutions, infrastructure, skills, firm behaviour and the distribution of gains. A coordinated policy that measures both productivity and employment outcomes offers a more credible route than either resisting AI or subsidising it indiscriminately.

8. Recommendations

1. Adopt a national AI skills pathway. Set age-appropriate digital and AI literacy outcomes in schools, fund teacher development and prioritise reliable connectivity and devices in underserved schools.
2. Make TVET and adult training occupationally relevant. Co-design modular, recognised courses with employers, SETAs and unions; publish completion, certification and employment outcomes rather than counting enrolments alone.
3. Target industrial support at measurable public value. Select sectoral AI projects in mining, manufacturing, agriculture, logistics, energy and healthcare through transparent criteria, with local skills transfer, SME participation and privacy safeguards.
4. Evaluate and improve the existing section 11D R&D incentive. Publish annual data on claims, beneficiaries, additional research, processing times and outcomes; simplify access for smaller firms while retaining robust verification.
5. Pilot a capped SME AI adoption voucher. Fund diagnostics, implementation support, cybersecurity and worker training, with co-funding, independent evaluation and sunset clauses. Do not create an unrestricted tax deduction for routine technology purchases.
6. Require AI transition plans for large firms receiving substantial public support. Plans should include worker consultation, task-impact assessment, training, redeployment options and transparent review of consequential automated decisions.
7. Establish a cross-government AI productivity scorecard. National Treasury and relevant departments should report annually on productivity, innovation, training, employment transitions, inclusion and the fiscal cost per outcome, and discontinue programmes that do not demonstrate value.

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