

Artificial Intelligence, Productivity and Employment in South Africa: A Literature Study on Education, Industrial and Fiscal Policy Responses

By

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1.Introduction

Artificial intelligence (AI), particularly generative AI, is increasingly able to perform or assist with tasks involving language, information processing, prediction and decision support. These capabilities could help firms improve efficiency, develop products and services, and use resources more effectively. For South Africa, where growth and job creation remain weak, AI presents a potential opportunity to raise productivity and strengthen the competitiveness of domestic industries. However, the effects will depend on whether firms can adopt technology effectively and whether workers have access to the skills and support needed to adapt.

The policy challenge is therefore not simply to encourage AI adoption. It is to ensure that adoption contributes to productive investment and broad-based opportunity rather than concentrating benefits among firms and workers already well positioned to use the technology. This is especially important in a labour market where unemployment is already high. Exposure to AI does not automatically mean that a job will disappear technology may automate some tasks, complement others, or change the skills required to perform a role. Nevertheless, transitions can be difficult when workers have limited access to training and when the economy does not generate enough alternative jobs.

This essay argues that South Africa should coordinate three policy areas. Education policy should build foundational digital capabilities and support lifelong learning; industrial policy should help firms, especially small and medium-sized enterprises (SMEs), adopt AI where it addresses real productivity constraints; and fiscal policy should encourage additional innovation while sharing the costs of worker transition. The three areas should be assessed together against two outcomes: stronger productivity and credible pathways into employment.

2. South Africa’s Starting Point: Labour-Market Pressure and the Productivity Challenge

2.1 Labour-market conditions

South Africa is entering the AI transition with a severe employment challenge. Statistics South Africa’s Quarterly Labour Force Survey (QLFS) reported an official unemployment rate of 33.6% in the second quarter of 2026, representing approximately 8.5 million unemployed people. The same release reported a combined unemployment-and-potential-labour-force measure (LU3) of 43.8% and a broader labour-underutilisation measure (LU4) of 46.3% (Stats SA, 2026). These indicators describe different forms of labour-market difficulty and should not be treated as interchangeable: the official rate is the clearest headline measure, while the broader measures include additional forms of underutilisation.

This baseline matters because workers who lose tasks or jobs during technological change may not move quickly into new employment. However, high national unemployment alone does not prove that a particular worker displaced by AI will face a specific probability or duration of unemployment. That claim would require evidence tracking displaced workers over time. The defensible conclusion is narrower: in a labour market with limited job absorption, a poorly managed transition could make it harder for affected workers to find alternative work, particularly if new roles require skills, they do not yet possess.

Sectoral employment figures must also be described carefully. The QLFS covers employment across industries and sectors, while the Quarterly Employment Survey focuses on the formal non-agricultural sector. These surveys measure different populations. Any claim about formal

job losses should therefore be supported by the appropriate survey rather than inferred from QLFS sectoral estimates (Stats SA, 2026). This distinction is important for policy design because South Africa's labour market includes formal employment, informal work and people outside employment who want to work.

2.2 Productivity and growth

South Africa also needs faster and more inclusive economic growth. National Treasury's 2026 Budget Review projected real GDP growth of 1.6% for 2026; this is a forecast, not a final measured outcome (National Treasury, 2026). The Budget Review also identifies infrastructure and logistics constraints as factors weighing on economic activity. These constraints matter for AI because software cannot, by itself, compensate for unreliable electricity, weak connectivity, costly transport, limited finance or poor management practices.

Productivity refers to how efficiently labour, capital and other inputs are converted into goods and services. AI could contribute to productivity when it improves decisions, reduces avoidable downtime or allows workers to focus on higher-value tasks. Yet adoption is not the same as successful implementation. Firms need appropriate data, reliable infrastructure, staff training and organisational changes before AI tools can produce lasting gains. Policy should therefore target these complementary conditions rather than assume that buying software will automatically raise productivity.

2.3 AI exposure is not the same as job loss

Evidence on AI's labour-market effects requires a distinction between task exposure and actual job displacement. The International Labour Organisation's global index estimates that around one in four workers worldwide are in occupations with some exposure to generative AI, with clerical occupations among the most exposed. The ILO stresses that transformation of jobs is generally more likely than the complete disappearance of occupations (ILO, 2025). Exposure indicates that tasks could be affected; it does not measure how many jobs have already been lost or predict a certain number of future redundancies.

The International Monetary Fund's 2026 analysis estimates that around 22% of employment in sub-Saharan Africa is exposed to AI. It estimates that roughly 13% of all jobs in the region are at significant risk of replacement, while close to 10% could benefit through augmentation. These are model-based regional estimates, not observed job losses or a direct forecast for South Africa (IMF, 2026). The report also identifies constraints—including electricity, digital infrastructure, skills and institutional capacity—that influence whether countries can adopt AI and capture its benefits.

For South Africa, routine administrative, clerical and customer-support tasks are reasonable areas for monitoring because they involve information processing that AI may assist with or automate. But it would be too strong to conclude from exposure estimates alone that entry-level employment ladders are already being severed. The policy implication is to identify vulnerable tasks and occupations, consult employers and workers, track actual changes in hiring and redeployment, and provide training before transitions become crises.

2.4 Policy context and coordination

South Africa has taken steps toward an AI policy framework, but the draft National AI Policy published for public comment in 2026 was withdrawn for revision after concerns were raised about fictitious sources in its reference list. Government stated that the policy would be

reworked to establish appropriate national standards for ethical AI use (SAnews, 2026). The withdrawal does not, by itself, prove that no relevant laws or strategies exist. Rather, it highlights the importance of coordinating existing policies and ensuring that any future national AI policy is credible, implementable and connected to employment, skills, industry and fiscal planning.

The policy problem addressed here is therefore one of coordination and delivery. Education institutions cannot design relevant training in isolation from employers' changing needs; firms cannot adopt AI effectively without skills and infrastructure; and fiscal incentives should not subsidise investments that would have happened anyway. A joint approach can connect these decisions and make the distribution of benefits and adjustment costs more visible.

3. Education Policy: From Digital Access to Adaptable Skills

3.1 Build capabilities, not only coding skills

Education is essential to helping workers adapt, but it should not be presented as a guarantee that every displaced worker will find a new job. Training improves people's ability to compete for changing work; employment outcomes also depend on the number and quality of jobs available. South Africa's approach should therefore connect foundational learning, vocational education and adult training with the sectors and employers expected to use new technologies.

At school level, digital policy should build on literacy, numeracy, critical thinking, problem-solving, data awareness and safe technology use. These capabilities are more durable than training learners in a narrow set of software tools that may quickly change. Digital access also requires devices, reliable connectivity, teacher support and accessible learning materials. Where infrastructure is weak, curriculum changes alone will not provide equal opportunity.

In post-school education, technical and vocational education and training (TVET) colleges, universities and Sector Education and Training Authorities (SETAs) should work with employers to update course content. Depending on local demand, relevant modules could include applied data analysis, digital customer-service systems, automated equipment maintenance, cybersecurity and the practical use of AI tools. Employer participation is important, but curricula should also provide transferable skills so that learners are not tied to one firm or platform.

3.2 Create recognised routes for lifelong learning

Workers already in employment may not be able to leave work for a multi-year qualification. South Africa should expand access to short, stackable learning programs that allow people to build skills in stages. To be credible, these micro-credentials should have clear learning outcomes, quality assurance, recognition by relevant employers or education bodies, and pathways into further study. A short course should not be treated as valuable merely because it mentions AI.

A practical reform would be to use a portion of SETA discretionary grant funding for employer-matched vouchers for accredited digital and technical training. Employers would contribute to training costs and identify the workplace tasks the training is intended to improve; workers would receive portable credentials; and public support would be conditional on reporting completion and subsequent employment outcomes. Funding should prioritise workers and

smaller firms that face genuine barriers to training, rather than subsidising courses that employers would have funded anyway.

South Africa should adapt rather than copy such models: its own system must account for uneven access to providers, differences in employer capacity and the need to connect training to local job opportunities. Evaluation should compare participants' outcomes with a credible baseline and report not only enrolment but also completion, skills gained, job placement, wage progression and internal redeployment.

4. Industrial Policy: Turning AI Adoption into Productive Growth

4.1 Target real bottlenecks in priority sectors

Industrial policy can influence where AI is adopted and whether its use supports domestic productive capacity. Rather than treating AI as a generic technology upgrade, the Department of Trade, Industry and Competition (the dtic) should work with sector bodies, firms, workers and research institutions to identify specific problems that AI could help solve. Potential applications should be treated as opportunities to test—not as guaranteed productivity or employment gains.

In manufacturing and automotive production, predictive maintenance may reduce unplanned downtime, while computer-vision systems may help identify defects earlier. In agriculture and agro-processing, data from weather services, sensors and satellite imagery may support water management, input planning and yield forecasting. In mining, analytics may support equipment maintenance, operational planning and safety monitoring. In each case, the policy case depends on evidence that the application solves a meaningful problem at an affordable cost.

Successful adoption also depends on complementary inputs: reliable electricity and connectivity, suitable equipment, secure and usable data, management capacity, worker participation and training. Public support should therefore assess the full implementation plan rather than fund software acquisition alone. Projects should set a baseline and measure outcomes such as downtime, defect rates, energy or water use, output per hour, product quality and changes in staffing or job tasks. This will help distinguish genuine productivity improvements from claims made to obtain subsidies.

4.2 Help SMEs adopt technology

Smaller firms may lack capital, technical expertise and bargaining power to evaluate AI products or integrate them into existing workflows. If support is accessible mainly to large firms, adoption could widen the gap between firms that already have digital capacity and those that do not.

The dtic, the Department of Small Business Development and universities or technical institutions could pilot regional Technology Extension Hubs. The hubs would provide practical diagnostic assessments, independent advice on suitable tools, staff training, demonstrations, shared access to selected digital services and support with implementation. They should not assume that every firm needs advanced computing infrastructure; many firms may benefit more from affordable cloud tools, better data practices or workflow redesign.

A pilot should begin in a small number of industrial corridors selected using transparent criteria such as SME concentration, sectoral opportunity, provider capacity and the presence of complementary infrastructure. The program should then be expanded only if independent evaluation shows that firms use the services, productivity improves, and benefits justify public costs. International industrial extension programs may provide lessons, but their results should not be assumed to transfer automatically to South Africa.

4.3 Make public support employment-conscious

Productivity growth does not automatically create more jobs. A firm may produce more with the same workforce, expand output and hire additional workers, or reduce employment if demand does not grow. Public policy should therefore measure productivity and labour outcomes separately.

Where firms receive public technology-adoption support or concessional finance, government should require a proportionate workforce transition plan. The plan should identify tasks likely to change, explain how workers and representatives will be consulted, set out training and redeployment options, and report what happens to affected employees. The requirement should encourage responsible transitions rather than prohibit all labor-saving technology. It should also allow for cases where internal redeployment is not feasible, while requiring transparent consultation and access to available transition support.

5. Fiscal Policy: Rewarding Additional Innovation and Sharing Adjustment Costs

5.1 Use existing R&D incentives accurately

Section 11D of the Income Tax Act provides a 150% deduction for qualifying scientific or technological research and development expenditure, subject to statutory requirements and approval. It is not a general subsidy for purchasing commercial AI software or making routine IT upgrades (SARS, n.d.). This distinction matters: research that develops new knowledge or qualifying technological advances is different from adopting an existing product to improve business operations.

South Africa should retain clear eligibility standards so that the incentive supports genuine research and development. The responsible departments should publish accessible guidance and monitor processing times, application outcomes and participation by firms of different sizes. If evidence shows that eligible smaller firms face disproportionate barriers, government could consider clearer application support or complementary competitive grants. Any proposal to expand grants should identify the responsible programs, available budget, selection criteria and safeguards against duplicate funding. The essay does not assume that particular programs are currently open or funded without confirmation.

5.2 Test whether incentives change behaviour

A key principle in evaluating tax incentives and grants is additionality: whether public support causes activity that would not otherwise have occurred, or changes its scale, timing or quality. If government subsidises a project that a firm would have undertaken anyway, the incentive may transfer public resources without creating a corresponding additional public benefit. This is often described as deadweight loss. However, not every incentive that supports a profitable

firm is wasteful; the question is whether the support changes behaviour enough to justify its fiscal cost.

Evaluation should therefore establish a baseline, specify the intended change, collect evidence after implementation and, where feasible, compare supported firms or workers with similar unsupported groups. Measures should include additional R&D, technology adoption by firms that previously faced barriers, training completion, worker retention or redeployment, productivity and cost per outcome. An audit pass rate alone is inadequate: a high pass rate could reflect well-targeted support, but it could also reflect weak audit standards.

5.3 Consider a targeted reskilling incentive

National Treasury could assess a time-limited Workforce Reskilling Tax Credit or grant for employers that provide recognised training to workers whose tasks are materially changing. A pilot should be designed before nationwide implementation and compared with simpler alternatives, such as targeted training grants or expanded SETA co-funding. The choice of instrument should reflect administrative cost, access for smaller firms and whether the benefit reaches workers rather than merely lowering employer costs.

Eligibility should require that training is additional, relevant to an identified skill need, delivered by an approved provider and linked to a credible workplace or employment pathway. Support should prioritise non-executive workers and SMEs where the case for public intervention is strongest. Firms should report training completion and outcomes, including redeployment, continued employment, external placement or unsuccessful transitions. A retention condition may help prevent firms from claiming support for training followed immediately by avoidable retrenchment, but it should include transparent exceptions where a worker leaves voluntarily, a role ceases for reasons outside the firm's control, or no suitable internal position exists despite reasonable efforts.

The pilot should have a cap, a sunset date and an independent evaluation before renewal. This limits open-ended fiscal exposure and allows government to compare the cost of the incentive with the cost and outcomes of direct training support. The goal is not to protect every existing task indefinitely; it is to make adaptation more likely and less costly for workers.

6. Making the Policies Work Together

6.1 Coordinate delivery without creating unnecessary bureaucracy

Responsibility for skills, industry, taxation and digital policy is distributed across departments. A joint interdepartmental steering committee could connect National Treasury, the dtic, the Department of Higher Education and Training, the Department of Basic Education and the Department of Communications and Digital Technologies, with participation from Stats SA, relevant public agencies, employers, labour and education providers. Its mandate should be to align existing programs, resolve delivery bottlenecks, publish data and recommend adjustments, not to create another institution with overlapping responsibilities.

The committee should publish a concise annual AI Transition Scorecard. The scorecard should distinguish activity measures, such as the number of courses offered, from outcome measures, such as skills gained, adoption by previously underserved firms, productivity change and employment transitions. Results should be disaggregated where data quality allows, including by age, gender, region, firm size and sector, while protecting personal information.

6.2 Phase implementation and evaluate before scaling

Months 1–12: establish baselines and design: map priority tasks and sectors using available data; consult workers and employers; define credential quality standards; identify existing programs and avoid duplication; and publish the proposed evaluation framework and fiscal limits.

Months 13–24: pilot targeted interventions: launch a limited number of Technology Extension Hubs, test employer-matched training support and evaluate the design of a reskilling incentive. Use existing delivery institutions where possible and publish interim implementation data.

Months 25–36: evaluate and decide: commission an independent assessment of take-up, additionality, productivity and worker outcomes. Scale, redesign or discontinue each intervention according to results, affordability and administrative capacity.

6.3 Measure both productivity and worker outcomes

The scorecard should use a balanced set of indicators. Productivity indicators could include output per hour, downtime, defects, energy or input use, and sectoral productivity where reliable data are available. Skills indicators should include completion, assessment of learning, credential recognition and the share of participants moving into relevant work. Firm-level indicators should measure adoption among SMEs and whether tools remain in use after initial support ends. Labour indicators should track internal redeployment, external job placement, earnings where available and the outcomes of workers who do not secure another role.

Targets should be set after the baseline and pilot design are completed. For example, a fixed target of 1,000 SMEs or a 65% placement rate may be useful only if there is a clear rationale, sufficient delivery capacity and a method for measuring outcomes. Similarly, an 85% additionality audit pass rate should not be used as a headline success measure. The emphasis should be on verified additional activity and public value per rand spent.

7.Conclusion

AI could help South Africa improve productivity, strengthen selected industries and develop new services, but these benefits are not automatic. The country's high unemployment and infrastructure constraints make it especially important to consider who can adopt the technology, who benefits from it and who bears the cost when tasks change.

A coordinated approach offers a more credible path than treating AI as a stand-alone technology program. Education should build adaptable capabilities and recognised lifelong-learning routes. Industrial policy should support applications that address real bottlenecks and help SMEs access expertise, while requiring transparent workforce transition plans where public support is involved. Fiscal policy should preserve incentives for genuine research and development, test whether support changes behaviour, and pilot carefully targeted reskilling assistance within clear budget limits.

The central test is whether AI adoption produces measurable productivity improvements alongside credible opportunities for workers to adapt. South Africa should scale interventions only when evidence shows that they work, are affordable and can be delivered fairly. This approach does not promise that every job can be preserved; it aims to make technological change more productive, better governed and less likely to deepen existing exclusion.

8. Recommendations

- Create employer-matched vouchers for accredited, stackable digital and technical learning. Use a limited SETA-funded pilot, prioritise workers and SMEs facing genuine training barriers, and evaluate completion and employment outcomes before expanding.
- Pilot regional SME Technology Extension Hubs. Select locations transparently and offer diagnostics, independent advice, implementation support and workforce training. Expand only after independent evaluation demonstrates value.
- Require proportionate workforce transition plans for firms receiving relevant public technology-adoption support or concessional finance. Plans should include consultation, task-impact assessment, training and redeployment options, and reporting.
- Retain Section 11D's qualifying R&D standards while improving clear guidance and monitoring application processes. Consider complementary competitive support for smaller innovators only where a documented financing or access gap justifies it.
- Test a time-limited reskilling incentive against alternatives such as direct training grants. Require recognised training, additionality, reporting and fair safeguards, and cap the pilot's fiscal exposure.
- Establish an interdepartmental AI Transition Scorecard covering productivity, SME adoption, training quality, job transitions and cost-effectiveness. Publish results annually and use them to scale, redesign or discontinue interventions.

Table 1: Evidence on AI exposure and its limitations

Source	Main finding used	Interpretation and limitation
ILO (2025)	Around one in four workers globally are in occupations with some generative-AI exposure; clerical work is among the most exposed.	Global occupational exposure is not a count of actual job losses and does not provide a South Africa-specific forecast.
IMF (2026)	Model-based estimates suggest around 22% of employment in sub-Saharan Africa is exposed; some tasks may be replaced while others may be augmented.	Regional estimates should not be presented as measured South African job losses. Infrastructure, skills and adoption affect outcomes.
Stats SA (2026)	The Q2 2026 official unemployment rate was 33.6%; LU3 was 43.8% and LU4 was 46.3%.	These indicators describe the labour-market baseline, not the effect of AI. Definitions differ and must remain distinct.
National Treasury (2026)	Real GDP growth was forecast at 1.6% for 2026.	This is a forecast, not a final outcome, and does not by itself measure productivity.

Synthesis of ILO (2025), IMF (2026), Stats SA (2026) and National Treasury (2026). The table summarises what each source can support; it does not treat exposure estimates as observed job losses.

Table 2:Policy alignment and proposed evaluation

Policy area	Proposed intervention	Measures for evaluation
Education and skills	Employer-matched vouchers for accredited, stackable micro-credentials, with worker and SME access safeguards.	Completion and assessed learning; credential recognition; redeployment or placement; cost per successful outcome.
Industrial policy	Pilot Technology Extension Hubs offering SME diagnostics, technical advice, implementation help and workforce training.	SME take-up and continued use; changes in downtime, defects or input use; output per hour; cost per firm served.
Fiscal policy	Pilot targeted reskilling support and improve clarity around existing qualifying R&D incentives.	Verified additional training or R&D; worker outcomes; distribution of benefits by firm size; fiscal cost and cost-effectiveness.
Coordination	Annual interdepartmental AI Transition Scorecard and independent pilot evaluation.	Timely public reporting; data quality; productivity and labour outcomes; decisions to scale, redesign or stop.

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