

HARNESSING ARTIFICIAL INTELLIGENCE FOR INCLUSIVE PRODUCTIVITY: REFORMING EDUCATION, INDUSTRIAL POLICY AND FISCAL INCENTIVES IN SOUTH AFRICA

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1. INTRODUCTION

South Africa stands at a critical juncture. The official unemployment rate rose to 33.6% in the second quarter of 2026, and youth unemployment reached 47.4%, a labour market crisis of historic proportions.¹ Simultaneously, Artificial Intelligence (AI) and automation are accelerating globally, threatening routine and manual jobs in precisely the labour-intensive sectors, including manufacturing, mining, agriculture and business process services that have historically absorbed South Africa's lower-skilled workforce. Yet AI also presents an opportunity, if harnessed deliberately, it could drive productivity growth, expand higher-value employment, and begin to dismantle structural inequalities that have persisted since the democratic transition.

The global context sharpens the imperative. While advanced economies debate AI's impact on already-tight labour markets, South Africa must absorb AI into an economy in which a third of the labour force is idle. The African Union's Continental Artificial Intelligence Strategy, with which South Africa's national policy framework expressly aligns, insists that AI must serve developmental priorities such as poverty reduction, food security and healthcare access, rather than merely commercial ones.² South Africa's policy response must therefore be distinct from the regulatory preoccupations of the European Union or the innovation-first model of Silicon Valley.³ It must be a developmental AI policy that treats productivity growth and labour absorption as complementary, not competing, objectives.

¹ Statistics South Africa, Quarterly Labour Force Survey: Quarter 2, 2026.

² African Union, Continental Artificial Intelligence Strategy: Harnessing AI for Africa's Development and Prosperity (endorsed by the AU Executive Council, 45th Ordinary Session, Accra, 18–19 July 2024).

³ J D Sachs, G F Trumbull & M A Delaney, "The New Industrial Policy and the Future of American Innovation" (2023) 52(4) *Issues in Science and Technology* 32.

The question is not whether South Africa should adopt AI, but how it can do so in a manner that augments rather than displaces labour, particularly for the historically marginalised. This essay argues that South Africa requires a coherent, human-centred policy architecture spanning three domains. First, education must be redesigned to produce stackable, industry-aligned competencies from the foundation phase through lifelong learning, while closing the digital divide that threatens to exclude the majority from AI's benefits. Second, industrial policy must pivot from generic incentive schemes to sector-specific AI adoption pathways that prioritise job retention alongside productivity gains, working through the existing master plan framework. Third, fiscal incentives must be restructured to reward firms that invest in worker reskilling alongside technology, while social protection cushions transitional displacement. Underpinning all three is institutional coordination, the AI governance structures now taking shape must be endowed with real budgetary authority, not merely advisory status.

2. THE STAKES: A LABOUR MARKET UNDER ALGORITHMIC PRESSURE

South Africa's labour market is uniquely vulnerable to AI-driven disruption. The manufacturing sector, which contributed close to a quarter of GDP at its peak, has shrunk to roughly 13%, with investment remaining below the threshold required for sustained industrial growth.⁴ Deindustrialisation has proceeded alongside premature automation in sectors that still employ significant numbers of semi-skilled workers. The automotive industry illustrates the trajectory, automation has displaced assembly-line workers, welders and quality-control inspectors while creating demand for robotics maintenance specialists and data analysts.⁵ Similar trends are evident in mining, where mechanisation has reduced labour absorption, and in agriculture, where precision farming threatens seasonal employment.

The risk is not merely technological but deeply distributional. AI's labour-market effects will fall unevenly across race, gender and geography. Women are over-represented in the clerical, retail and service occupations most exposed to automation, while rural workers lack both the connectivity and the institutional access needed to benefit from

⁴ Department of Trade and Industry, Industrial Policy Action Plan 2017/18–2019/20 (dti, 2017) (on manufacturing's declining GDP share and the investment threshold for sustained growth).

⁵ B I Chigbu and F H Nekhwevha, 'The Extent of Job Automation in the Automobile Sector in South Africa' (2022) 43 *Economic and Industrial Democracy* 477.

new digital roles. Without deliberate intervention, AI adoption will concentrate benefits among capital owners and highly skilled workers while deepening informality and unemployment among the low-skilled majority, reproducing the economic exclusions of the past.

The Presidential Commission on the Fourth Industrial Revolution (PC4IR) recognised this danger, recommending a skills ecosystem built on "stackable competencies, which are micro-credentialed, industry-aligned and allow people to enter and exit the system at multiple points as part of a lifelong learning process."⁶ That diagnosis remains painfully relevant, South Africa's problem is not a shortage of policy documents but a persistent gap between ambition and execution, compounded by fragmented institutional accountability.

3. REDESIGNING EDUCATION FOR THE AI ERA

South Africa's education system requires fundamental redesign across three tiers, namely, basic education, technical and vocational education and training (TVET), and higher education, underpinned by a new national architecture of lifelong learning and digital inclusion.

The Department of Basic Education's gazetting of the Coding and Robotics curriculum in June 2024 was a necessary but insufficient first step. The curriculum is scheduled for Foundation Phase implementation in 2026, with phased rollout across the General Education and Training band through to 2032.⁷ For a technology evolving as rapidly as AI, this timeline is too gradual, and reports that implementation may not be mandatory are troubling. Government should accelerate rollout to all primary grades by 2027, accompanied by massive investment in digital infrastructure at historically disadvantaged schools. Without such investment, AI-enhanced education will remain a privilege of affluent urban schools, reproducing the spatial inequalities of the past. Universal broadband access by 2030, through an accelerated SA Connect programme

⁶ Presidential Commission on the Fourth Industrial Revolution, Report and Recommendations (The Presidency, 2020) 14.

⁷ Department of Basic Education, Curriculum and Assessment Policy Statements: Coding and Robotics (Grades R–9) (gazetted June 2024).

and connectivity obligations attached to spectrum licensing, should be treated as foundational infrastructure, as essential as electricity and water.⁸

The curriculum must also move beyond coding mechanics to computational thinking, ethical reasoning and AI literacy. This requires teacher training at scale, and it requires a clear distinction between teaching AI literacy and merely using AI as a pedagogical tool, a distinction that matters when many teachers themselves lack digital fluency and when imported AI tools often embed Eurocentric knowledge hierarchies that conflict with South Africa's decolonial educational aspirations.⁹ A redesigned basic education system should integrate AI ethics, data-privacy awareness and indigenous knowledge systems alongside technical skills.

The post-school education and training system must become the primary vehicle for mid-career reskilling. TVET colleges remain underfunded, poorly connected to industry demand, and stigmatised as second-tier pathways. The PC4IR's proposal for a dedicated artisan development programme should be revived and expanded to include AI-adjacent trades, such as industrial robotics technicians, data-annotation specialists, AI systems monitors and predictive-maintenance engineers, with curricula co-designed with industry through the Sector Education and Training Authorities (SETAs).¹⁰ Crucially, the Skills Development Levy system under which employers with an annual payroll above R500,000 contribute 1% of payroll to SETAs and may reclaim 20% as a mandatory grant, should be reformed so that discretionary grants flow preferentially to AI reskilling programmes with measurable job-retention outcomes, rather than generic compliance training.¹¹

Universities, finally, must shift from static degree programmes towards stackable micro-credentials that allow workers to accumulate qualifications without exiting the labour market. The AI hubs already established at several universities should be networked into the national AI institute recommended by the PC4IR, with a mandate

⁸ PC4IR (n 5) (identifying reliable, affordable broadband connectivity as foundational to 4IR readiness).

⁹ S Heleta, 'Decolonisation of Higher Education: Dismantling Epistemic Violence and Eurocentrism in South Africa' (2016) 1 Transformation in Higher Education a9.

¹⁰ PC4IR (n 5) (proposing a national artisan development programme and university-based AI institutes).

¹¹ Skills Development Act 97 of 1998; Skills Development Levies Act 9 of 1999; South African Revenue Service, 'Skills Development Levy' (2025).

to train across society and ensure positive social impact.¹² Such an institute could drive the development of Afrocentric AI models incorporating indigenous knowledge systems and local languages, while digital literacy is mainstreamed across all disciplines, not only computer science, so that graduates in the humanities, social sciences and education can engage critically with the AI systems that will shape their professions.

4. INDUSTRIAL POLICY: AUGMENTATION, NOT JUST AUTOMATION

South Africa's industrial policy has shifted from Industrial Policy Action Plans to Sector Master Plans, with plans now covering automotive, steel, clothing and textiles, sugar, poultry, forestry, furniture, creative industries, tourism and agriculture. The dtic's 2024 Industrial Policy and Strategy Review correctly identified digital transformation and green industrialisation as key forces shaping future policy choices, warning that "agility is essential amid the turbulence; and rigid plans risk obsolescence."¹³ Yet the independent evaluation of the master plans by Trade and Industrial Policy Strategies found that they treated employment growth almost exclusively as a function of higher sales, with virtually no measures to promote labour-intensive activities at scale.¹⁴ In an AI era, when productivity gains can be achieved without proportional employment creation, that omission is dangerous.

Each master plan should incorporate an AI adoption roadmap that explicitly distinguishes augmentation from automation. In the automotive sector, where automation is already advanced, policy should support the transition of displaced assembly workers into robotics maintenance, quality assurance and supply-chain analytics through reskilling agreements attached to investment incentives; the Automotive Masterplan's localisation and black-supplier targets should be updated to include AI-readiness criteria for component manufacturers. In clothing and textiles, where labour intensity remains a competitive advantage, AI should be directed towards design, supply-chain optimisation and demand forecasting rather than full automation of sewing and finishing.

¹² PC4IR (n 5).

¹³ Department of Trade, Industry and Competition, Industrial Policy and Strategy Review (dtic, May 2024).

¹⁴ Trade and Industrial Policy Strategies, Evaluation of the Industry/Sector Master Plans (TIPS, February 2024).

Small firms face prohibitive barriers to AI adoption, the cost of computing infrastructure, shortage of training data, and absence of in-house expertise. Government should establish AI innovation hubs tied to Special Economic Zones, such as the Tshwane Automotive SEZ, where SMEs can access shared computing infrastructure, technical assistance and sector-specific datasets, with a portion of the dtic's incentive budget redirected towards co-financing SME adoption conditional on job retention and skills transfer.¹⁵ And because the transition will fail without worker consent, any credible AI industrial policy must be negotiated through the National Economic Development and Labour Council, with binding job-retention ratios in sectors receiving public incentives. The master plan governance structures, which already bring together business, labour and government, provide ready-made forums; what is missing is enforcement capacity and the willingness to make AI adoption conditional on a social licence.

South Africa cannot compete in commodity manufacturing with low-wage economies; its industrial future lies in high-value, technology-intensive production integrated with the African Continental Free Trade Area. The PC4IR's recommended state-led research initiative on advanced manufacturing and new materials should be operationalised through the Council for Scientific and Industrial Research, aligning AI-enabled advanced manufacturing with the national AI policy's research pillar.¹⁶

5. FISCAL INCENTIVES: REWARDING RESKILLING, NOT JUST ROBOTS

South Africa's fiscal toolkit contains several instruments that can be recalibrated to steer an inclusive AI transition.

The research and development tax incentive under section 11D of the Income Tax Act allows a 150% deduction on qualifying R&D expenditure and has been extended to 31 December 2033.¹⁷ Yet it remains underutilised, gross expenditure on R&D is still below 1% of GDP, and the pre-approval requirement creates bureaucratic friction that disadvantages smaller firms. The incentive should be expanded in three ways. First,

¹⁵ dtic (n 12) (identifying the scaling up of successful pilots such as the Tshwane Automotive SEZ as key to inclusive industrialisation).

¹⁶ PC4IR (n 5); African Union (n 2) (on continental AI research priorities).

¹⁷ Income Tax Act 58 of 1962, s 11D; National Treasury, Budget Review 2023 (National Treasury, 2023) (extension of the 150 per cent R&D deduction to 31 December 2033); SARS, 'Research and Development Incentive' (2025).

AI-specific R&D (including language technologies for South Africa's official languages, agricultural optimisation for smallholders, and public-health diagnostics) should be placed on a fast-track approval list. Second, the deduction should be converted into a refundable tax credit for SMEs below a taxable-income threshold, so that loss-making start-ups benefit immediately. Third, claims should be conditional on demonstrated skills transfer: firms claiming the deduction should train a specified number of workers in AI-adjacent roles, verified through SETA reporting.

The Innovation Fund has demonstrated strong leverage, mobilising R2.5 billion in combined public and private investment over three financial years, a leverage ratio of approximately 3.7 times the initial public investment.¹⁸ This model should be scaled through ring-fenced funding for AI adoption consortia linking large firms, SMEs and TVET colleges. The Learnership Tax Incentive, extended to 31 March 2027, should likewise be expanded to cover QCTO-certified AI reskilling programmes, with an enhanced deduction for learnerships that move workers from high-displacement-risk occupations into AI-augmented roles.¹⁹

The boldest fiscal intervention would attach explicit conditions to automation-related incentives. Firms benefiting from the new electric and hydrogen vehicle manufacturing incentive (a 150% deduction on production-capacity investments effective from 1 March 2026) should be required to retain and reskill a specified proportion of their existing workforce.²⁰ Firms claiming accelerated depreciation on AI-related capital equipment should submit "just transition plans" showing how displaced workers will be redeployed. This mirrors the risk-based approach of South Africa's national AI policy framework, whose proposed mandatory impact assessments for high-risk AI deployments should explicitly evaluate labour-market effects.²¹

Fiscal policy must also address those who cannot be immediately reskilled. The COVID-19 Social Relief of Distress grant has been extended to March 2026 with R35.2

¹⁸ Department of Science, Technology and Innovation, Reply to Parliamentary Question NW3491 (National Assembly, 2026).

¹⁹ Income Tax Act 58 of 1962, s 12H; National Treasury, Budget Review 2024 (National Treasury, 2024) 41 (extension of the learnership incentive to 31 March 2027).

²⁰ Income Tax Act 58 of 1962, s 12V, inserted by the Taxation Laws Amendment Act 42 of 2024 (150 per cent allowance on production assets for battery-electric and hydrogen-powered vehicles, effective 1 March 2026).

²¹ Department of Communications and Digital Technologies, South Africa National Artificial Intelligence Policy Framework (Draft) (DCDT, August 2024) (risk-based approach; mandatory AI impact assessments for high-risk deployments).

billion allocated, and the Department of Social Development is developing a Basic Income Support policy.²² South Africa should pilot a "digital transition grant" for workers displaced by AI in high-automation-risk sectors, combining income support with mandatory enrolment in SETA-funded reskilling. The cost could be partially offset by a modest, progressively designed automation levy on firms whose AI deployments produce net job losses above a threshold, with SME exemptions and rebates for firms that exceed reskilling targets, so as not to discourage productivity-enhancing investment.

6. COORDINATION: FROM FRAMEWORKS TO AUTHORITY

None of these reforms will succeed without overcoming South Africa's chronic policy fragmentation. The draft National AI Policy Framework proposed an AI coordination office within the Department of Communications and Digital Technologies, supported by an interdepartmental forum including National Treasury and the Department of Science, Technology and Innovation.²³ The Draft National AI Policy gazetted in April 2026 goes further, proposing a National AI Commission, an AI Ethics Board and an AI Regulatory Authority empowered to audit AI systems and conduct human-rights impact assessments.²⁴ These structures must be given budgetary authority and statutory mandate, not merely advisory status; the framework must progress rapidly to legislation to prevent a regulatory vacuum that disadvantages responsible adopters.

Coordination must also be measured. A national AI transition dashboard, tracking AI adoption by sector, displacement and reskilling numbers, SETA expenditure on AI programmes, R&D incentive uptake by firm size, and employment outcomes by race, gender and province, would allow Parliament and the public to hold every department to account against the same evidence. What gets measured gets governed; what remains unmeasured defaults to the interests of the already powerful.

Data governance is the other coordination challenge. The Protection of Personal Information Act provides a foundation for regulating AI's data hunger, but the

²² National Treasury, Budget 2025 Overview (National Treasury, May 2025) (SRD grant extended to 31 March 2026 with R35.2 billion allocated at R370 per beneficiary per month); Parliamentary Monitoring Group, 'Basic Income Grant Policy; DSD Performance' (2025).

²³ DCDT (n 20).

²⁴ Department of Communications and Digital Technologies, Draft South Africa National Artificial Intelligence Policy (Government Gazette No 54477, GN 3880, 10 April 2026).

Information Regulator is under-resourced relative to its mandate. Treasury should fund the Regulator's technical capacity to audit AI systems, particularly in high-risk domains such as credit scoring, recruitment and criminal justice, where algorithmic bias could deepen racial and gender discrimination. Finally, the PC4IR's recommendation of a 4IR implementation coordination council in the Presidency should be revived and resourced, aligning the dtic's master plans, curriculum reforms, Treasury's incentives and AI governance into a coherent national project, with annual reporting to Parliament on adoption metrics, reskilling outcomes and employment effects.²⁵

7. CONCLUSION

South Africa's transition into the age of AI presents both significant opportunities and considerable risks. While AI has the potential to improve productivity, economic growth, and service delivery, it could also deepen existing inequalities if its adoption is not guided by inclusive and human-centred policies. The challenge is therefore not whether AI should be adopted, but how it can be implemented in a manner that promotes social and economic inclusion.

A key priority is the transformation of education and skills development. Government, educational institutions, and industry must invest in lifelong learning, digital literacy, and continuous reskilling to ensure that workers can adapt to changing labour-market demands. Without deliberate efforts to equip citizens with relevant digital skills, AI-driven economic growth is unlikely to benefit the broader population.

Industrial policy should also encourage the use of AI as a tool that complements rather than replaces human labour. In sectors such as education, agriculture, manufacturing, and public administration, AI can be used to enhance productivity while preserving meaningful employment opportunities. A balanced approach can ensure that technological advancement contributes to economic growth without increasing unemployment and social exclusion.

Equally important is the creation of regulatory and fiscal frameworks that promote responsible AI adoption. Incentives should encourage businesses to invest in workforce training and inclusive innovation, while governance mechanisms must

²⁵PC4IR (n 5) (recommending a 4IR strategy implementation coordination council located in the Presidency).

ensure transparency, accountability, and protection against algorithmic discrimination. At the same time, expanding access to affordable digital infrastructure remains essential to preventing the further marginalisation of disadvantaged communities.

South Africa's success in the AI era will depend not on the sophistication of its technologies, but on their contribution to human development. AI should be deployed as a tool for advancing dignity, equality, and opportunity. In a society still confronting the legacies of poverty and inequality, the true measure of progress will be whether AI improves the lives of all South Africans rather than benefiting only a privileged few.

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