

## Don't Train South Africans to Compete with Machines: A Human-Capital Strategy for the AI Economy

### 1. Introduction: the wrong race

South Africa should not train people to become faster versions of machines. Machines will calculate faster, search larger information sets and produce routine text more cheaply. A national skills strategy built around competing with those capabilities will lose. The more useful economic objective is to produce workers whose value rises because artificial intelligence exists: people who combine disciplinary knowledge, judgement, creativity, accountability and human relationships with the speed and scale of AI.

This matters because South Africa enters the AI transition with the problems identified in the preceding policy debate already unresolved: very high unemployment; a weak first rung into professional work; unequal digital access between rural and metropolitan communities; scarce doctors, teachers, engineers and other professionals; firms under pressure to become globally competitive; informality and unlawful labour practices; and a skills system that has often measured participation more successfully than economic outcomes. AI can intensify each weakness. It can also become part of the solution if the state stops treating AI training as a software course and starts treating it as human-capital and industrial policy.

The International Labour Organization estimates that roughly one in four workers globally is in an occupation with some exposure to generative AI, but argues that transformation of jobs is more likely than wholesale replacement because most occupations still require human input (Gmyrek et al., 2025). This creates a policy window. South Africa does not need to freeze existing jobs, nor should it subsidise automation indiscriminately. It needs to redesign the institutions through which people learn, enter work, retrain, build firms and move between occupations.

This essay proposes an implementation strategy built around “augmented human capital”: workers who can use AI, challenge it and add what it cannot reliably supply. The strategy has six pillars: a HUMAN+ capability standard; workplace-based AI residencies; AI Productivity Clinics and rural productivity centres; outcome-funded skills institutions; scarcity-weighted deployment in socially important professions; and fiscal incentives that reward augmentation before displacement. It then sets out a ten-year implementation sequence and a measurable 2036 scoreboard. The aim is not to make humans better than AI at AI's strengths. It is to make South African human resources more productive, adaptable and economically valuable because AI exists.

## 2. HUMAN+: define the worker South Africa is trying to produce

The first reform is conceptual. “AI literacy” is too weak a target. Knowing how to prompt a chatbot is not a durable skill when interfaces and models change quickly. South Africa needs a national HUMAN+ capability standard. H is human judgement: recognising when an automated answer is wrong, unsafe or inappropriate. U is understanding the domain: medicine, economics, engineering, teaching, law, agriculture or another occupation. M is machine collaboration: allocating suitable tasks to AI and integrating tools into workflows. A is analytical and critical reasoning: testing evidence, causality, assumptions and uncertainty. N is negotiation, communication and human relations. The plus sign represents continuous learning.

This standard responds directly to the inequality problem. Effective human capital is not a qualification alone. It is qualification multiplied by capability, infrastructure and opportunity. A graduate with excellent disciplinary knowledge but no access to appropriate tools, workplace experience or professional networks may remain economically underutilised. A HUMAN+ strategy must therefore build capability and the conditions through which capability becomes income.

The curriculum should follow an 80/20 rule. At most 20 per cent of publicly funded AI training should be devoted to learning interfaces and tools; at least 80 per cent should involve applying AI to authentic occupational problems. An economics student could receive municipal expenditure data and an AI-generated diagnosis, then be required to identify weak assumptions, reproduce calculations, test an alternative and defend a recommendation orally. A law student could audit an AI-generated opinion for fabricated authorities. A medical trainee could interrogate an AI-supported recommendation against clinical evidence and patient context. An engineering student could test an automated design against safety, cost and environmental constraints.

This is particularly important after South Africa’s own Draft National Artificial Intelligence Policy was withdrawn in 2026 when fictitious sources were found in its reference list (SAnews, 2026). The episode illustrates a national capability problem: institutions can acquire generative tools faster than they acquire verification disciplines. The most valuable AI skill may therefore be knowing when not to believe the machine.

## 3. Replace certificates with demonstrated capability

South Africa should also change what it rewards. A certificate stating that somebody completed an introductory AI course tells an employer little about whether that person can create value. A HUMAN+ Capability Passport should instead record demonstrated tasks: analysing a dataset with AI assistance, identifying model errors, verifying sources, producing a sector-specific recommendation and defending the reasoning before an assessor. The passport should be portable across universities, TVET colleges, employers and training providers.

Assessment must contain an unaided component. If a learner can only perform while an AI system supplies the reasoning, the programme has created dependence rather than capability. Each assessment should therefore have three stages: unaided diagnosis of the problem; AI-assisted execution; and human verification and oral defence. The difference between the first and second stages measures augmentation. The third tests whether the learner remains accountable for the result.

The principle should extend into schools. The rural student who first encounters serious AI tools at university is already competing against peers who may have experimented with them for years. Basic education should therefore introduce age-appropriate AI literacy alongside reading, mathematics, information literacy and source verification, but should not replace foundational learning with technology. A learner cannot critically evaluate an AI-generated answer in a subject they do not understand.

This directly addresses the access problem raised by unequal connectivity. Productive access is more than mobile internet. It requires a suitable device, reliable electricity, sufficient bandwidth, a place to work and guidance on how tools create economic value. The education system should measure these complementary inputs rather than assume that nominal connectivity has solved the digital divide.

#### 4. Create an AI Productivity Residency as the new first rung

The second structural reform is a six-month AI Productivity Residency for final-year students, recent graduates and qualifying TVET graduates. Instead of another internship in which young people observe an organisation, residents should receive a real productivity problem from a municipality, hospital, manufacturer, farm, NGO, bank, logistics company or SME. They would work in supervised multidisciplinary teams using disciplinary knowledge and AI to produce a measurable result.

A resident team might reduce patient administration time at a district hospital, analyse why a municipality's electricity losses increased, help an agricultural cooperative forecast demand, or redesign inventory management for a small manufacturer. The resident leaves with evidence of work,

a portfolio, references and a HUMAN+ Capability Passport. The host receives a solution. The training institution learns which capabilities employers actually require.

This is a direct solution to the “missing first rung” created when AI automates junior tasks. If firms need fewer entry-level workers to perform routine analysis, public policy should not preserve obsolete tasks artificially. It should create new entry tasks around verification, implementation, client interaction, data stewardship and AI supervision. The residency makes the first rung more sophisticated rather than allowing it to disappear.

South Africa already has useful building blocks. In 2026, the Department of Higher Education and Training and Google announced 5,000 career-certificate scholarships in areas including AI, cybersecurity and data analytics, with attention to rural and township institutions. An earlier DHET-Microsoft agreement included a one-year AI Engineer programme for TVET colleges (DHET, 2026a; DHET, 2025). These initiatives should be connected to real workplace problems. Training becomes economically meaningful when a certificate is converted into demonstrable productivity.

#### 5. Build AI Productivity Clinics, not computer labs

The third reform links education to entrepreneurship and regional development. Universities, TVET colleges and community education institutions should host AI Productivity Clinics modelled partly on legal clinics. Local SMEs, cooperatives, municipalities and community organisations bring real operational problems. Supervised students use data and AI tools to diagnose and solve them. The institution becomes a local productivity intermediary rather than merely a provider of qualifications.

This solves several problems at once. Students obtain experience. SMEs gain access to capabilities they may not be able to hire. Lecturers see changing industry needs. Training datasets become more locally relevant. Successful student teams may form enterprises around recurring problems. For unemployed graduates, AI can lower the fixed cost of starting knowledge businesses by reducing the cost of research, administration, bookkeeping, marketing and elementary analytics.

The model should deliberately include rural areas. A rural AI Productivity Centre should provide reliable connectivity, backup power, capable computers, approved AI and cloud tools, facilitators and access to employment and enterprise support. It should be judged by outputs: jobs applied for successfully, businesses supported, revenue generated, productivity improvements and professional services delivered. A room containing computers is not an economic intervention merely because the computers can access AI.

These centres should also host AI Enterprise Starter Accounts for qualifying unemployed graduates and TVET graduates. The account would bundle time-limited device access, connectivity, cloud credits, mentorship, business registration and access to customers or procurement opportunities. Support should taper as revenue grows. This converts the entrepreneurship proposal from a grant into a temporary reduction in the fixed costs of market entry.

#### 6. Use AI to make scarce skills less scarce

A fourth pillar should prioritise occupations where augmentation has a high social return. South Africa should not allocate public AI support solely according to which firms can produce the strongest grant application. It should use scarcity-weighted investment. Where doctors, nurses, teachers, engineers, artisans, agricultural extension officers or municipal finance professionals are scarce, the relevant question is whether AI can increase the effective supply of their expertise without compromising quality or accountability.

This leads to an AI Scarce Skills Corps. Newly qualified professionals could volunteer for 12- to 24-month placements in underserved districts with supervised access to sector-specific AI systems, professional mentorship and incentives such as bursary support, professional-development credits or tax relief. A doctor should not be replaced by a diagnostic model, but administrative automation and decision support may allow scarce clinical time to be used more effectively. An agricultural extension officer may support more farmers through multilingual digital tools. A municipal economist may analyse budgets across several small municipalities.

Human-in-the-loop responsibility is non-negotiable in high-risk decisions. AI may recommend, retrieve and detect patterns; an accountable professional must remain responsible where health, liberty, safety or major public expenditure is at stake. This protects citizens while ensuring that professional education evolves towards judgement rather than routine information processing.

Scarcity-weighting also makes fiscal sense. The social return from saving an hour of a scarce specialist's time may exceed the return from automating an already efficient administrative process. Public investment should therefore compare social marginal productivity, not only private cost savings.

#### 7. Reform the skills levy: pay for economic outcomes

The fifth reform concerns incentives inside the training system itself. The 2026 Budget Speech explicitly proposed exploring a dual-training skills acquisition system that combines theoretical

learning with practical training, while the Estimates of National Expenditure show that SETAs plan substantial spending on workplace learning, artisan development and related programmes over the medium term (National Treasury, 2026a; National Treasury, 2026b). AI provides an opportunity to make this shift measurable.

Public training providers should not receive full payment simply because a learner attended. A pilot outcome contract could release 30 per cent when training begins, 20 per cent when capability is independently demonstrated, 25 per cent when the learner enters employment or a viable enterprise pathway, and 25 per cent after 12 months of retention or enterprise survival. The exact weights should be tested rather than legislated permanently, but the principle is important: the state should purchase economic capability, not certificates.

The Skills Development Levy should finance sector-specific HUMAN+ programmes through existing SETAs rather than creating a new national bureaucracy. Sector bodies already possess employer relationships and occupational knowledge. Their AI programmes should publish completion, placement, retention, wage and productivity outcomes. Programmes that repeatedly fail should lose funding.

The same outcome discipline should apply to corporate training incentives. Firms should receive greater support when AI training results in wage progression, redeployment, higher output, export growth or new entry-level roles. Training expenditure with no demonstrated change in capability should not automatically qualify as a public benefit.

#### 8. Train before you automate

The sixth pillar addresses firms that adopt labour-saving technology. South Africa should neither prohibit automation nor write a blank cheque for it. For firms receiving significant public AI incentives, the rule should be “train before you automate”. Before technology-related retrenchments, the firm should demonstrate that it assessed feasible retraining, redeployment, job redesign and transition options for affected workers. Where displacement remains economically necessary, the firm should contribute to a Worker Transition Account that finances accredited retraining, job search and temporary adjustment support.

This approach fits the evidence better than assuming an imminent job apocalypse. The ILO finds that most exposed occupations are more likely to be transformed than eliminated because human input remains necessary (Gmyrek et al., 2025). Policy should therefore influence the direction of transformation. A customer-service worker might move from scripted responses to complex case

resolution; a bookkeeper from data capture to exception analysis; a production worker from repetitive inspection to technology-assisted quality control.

Fiscal incentives should reinforce this choice. An AI Augmentation Tax Credit should be available where a firm can demonstrate additional output, worker training and retention or new employment. A company that purchases an AI system and simply reduces payroll should receive no special AI reward. A company that uses the same technology to increase exports, retrain workers and create higher-value positions may generate productivity spillovers worth supporting.

Where a subsidised firm receives a substantial AI grant and then undertakes avoidable technology-related retrenchments, clawback provisions should recover part of the subsidy. This is not a robot tax. It is a fiscal additionality test: taxpayers should finance social returns, not merely private substitution of capital for labour.

#### 9. Fix labour-market enforcement at the employer

The strategy must also address the labour-market tensions surrounding unemployment, migration and informality. Enforcement should focus on the employer incentive. Before a firm receives an AI tax incentive, industrial grant, government tender or training subsidy, a single digital compliance gateway should verify PAYE, UIF, minimum-wage compliance and lawful work authorisation. This prevents public money from supporting firms whose competitive advantage depends on unlawful labour-cost avoidance.

This is a more durable response to the political tensions visible in movements such as March and March than treating migration as the cause of structural unemployment. Lawful scarce-skill migration can complement South African workers, while unlawful employment and underpayment require enforcement. The same principle applies to automation: firms should not be able to arbitrage between unlawfully cheap labour and publicly subsidised labour replacement.

The compliance gateway could also reduce administrative burdens for compliant SMEs. Instead of submitting the same documents to multiple agencies, a consent-based verification system could confirm status across SARS, UIF, labour and immigration systems. Better state capacity can therefore improve both enforcement and the ease of doing legitimate business.

#### 10. Make the public sector an AI productivity laboratory

Government itself should become a disciplined user of AI. Municipal officials, teachers, nurses, procurement specialists, SARS investigators and other public servants should receive occupation-

specific HUMAN+ training. AI could help identify procurement anomalies, forecast infrastructure maintenance, analyse revenue leakage, translate public information and reduce repetitive administration. The objective should be to return scarce human time to judgement and service delivery.

However, the withdrawal of the 2026 draft AI policy demonstrates why public-sector deployment needs stranger verification and governance (SAnews, 2026). High-impact systems should have named human accountability, audit trails, data-protection controls, error-reporting mechanisms and independent evaluation. Procurement should disclose the problem being solved, expected productivity gain, vendor cost, performance metrics and renewal decision.

A small AI Productivity Observatory located across National Treasury and relevant economic departments should evaluate publicly supported projects using administrative data. It should publish both successes and failures. South Africa needs to know whether an AI intervention raised productivity, reduced waiting time, improved tax collection, expanded employment or simply produced another pilot. The country has too little fiscal space for AI theatre.

#### 11. A ten-year implementation pathway

Implementation should be sequenced. In 2027-2028, the BUILD phase should establish the HUMAN+ standard, pilot Capability Passports in selected universities and TVET colleges, launch AI Productivity Clinics, place the first cohort of Productivity Residents, and create rural productivity centres in districts with weak productive digital access. Treasury should establish baseline measures of AI exposure, graduate transitions and productivity before incentives are scaled. Selected SETAs should test outcome-based funding contracts.

In 2029-2031, the SCALE phase should expand the HUMAN+ curriculum across occupational qualifications, introduce the AI Augmentation Tax Credit, integrate AI residencies into workplace-learning funding, deploy the Scarce Skills Corps and connect the digital labour-compliance gateway. Successful rural productivity centres should be expanded using evidence on utilisation, employment and enterprise outcomes rather than political allocation.

In 2032-2036, the TRANSFORM phase should make demonstrated human-AI capability normal across the post-school system. TVET colleges should function as regional productivity institutions linked to local industries. Public-sector AI should be routine but auditable. Industrial incentives should depend increasingly on demonstrated productivity, exports, local capability and worker transition

outcomes. South Africa's competitive proposition should be augmented skilled labour rather than cheap labour.

The sequence matters. Large fiscal incentives should not precede measurement capacity. National scaling should not precede credible pilots. And advanced AI curricula should not displace foundational literacy, numeracy and disciplinary knowledge. The strategy must learn as the technology changes.

## 12. The 2036 scoreboard: results, not rhetoric

A strategy without measurable outcomes will become another policy document. By 2036, government should report a public AI Productivity Scoreboard. Productivity indicators should include labour productivity and, where measurable, total factor productivity in supported sectors. Employment indicators should track graduate employment within 12 months, entry-level hiring in AI-exposed occupations, worker redeployment after AI adoption and wage progression after training.

Spatial indicators should measure the gap in productive AI capability between rural and metropolitan districts. Enterprise indicators should measure survival, revenue and employment among firms supported through Productivity Clinics and Starter Accounts. Scarce-skills indicators should measure patients, learners, farms or municipalities served per professional while monitoring quality. Industrial indicators should track AI-enabled exports and local supplier capability. Fiscal indicators should compare additional PAYE, corporate income tax and economic activity with the cost of incentives.

The scoreboard should also reveal distribution. Outcomes should be disaggregated by geography, gender, disability and other relevant dimensions so that apparent aggregate productivity does not conceal exclusion. If national productivity rises while the rural capability gap widens and entry-level employment collapses, the strategy is failing one of its central objectives.

Every major programme should have a sunset or redesign point. Interventions that do not produce measurable additionality should end. Those that work should scale. This creates a policy culture appropriate to AI itself: iterative, evidence-based and willing to learn.

## 13. Conclusion: make people more valuable because AI exists

South Africa cannot solve unemployment, inequality, rural exclusion, scarce skills and weak productivity with a technology policy alone. Nor can it protect workers by pretending technological change can be stopped. The strategic task is to change the relationship between technology and human

capital so that AI raises the value of South African capability rather than simply reducing the cost of existing tasks.

The solutions proposed here deliberately answer the problems raised across the wider AI debate. Unequal access is addressed through rural productivity centres and capability-based support. The missing first rung is rebuilt through Productivity Residencies and AI apprenticeships. Graduate unemployment is connected to enterprise formation and real work. Scarce professional capacity is expanded through augmentation. Firms receive incentives for additional productivity and worker development, not software purchases. Labour-market compliance is enforced at the employer. Public institutions learn to verify before they automate. And the skills system is paid increasingly for outcomes rather than attendance.

By 2036, success should not mean that every South African can prompt an AI system. It should mean that a nurse can care for more patients without compromising care; an artisan diagnoses a machine faster; a rural graduate can compete for the same work as a metropolitan graduate; an economist produces better analysis rather than merely faster prose; an entrepreneur can build a viable firm with less starting capital; and a worker whose old task disappeared acquired a more productive one rather than joining the unemployment queue.

Artificial intelligence is making the production of answers cheaper. South Africa's response should be to increase the economic value of judgement, expertise, creativity, trust and responsibility. The country should not train people to be better than AI at being AI. It should build people who know what to ask of machines, what not to trust, what consequences an algorithm has ignored and how to convert machine capability into human and economic value. That is how South Africa can turn disruption into productivity without accepting exclusion as its price.

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