

Harnessing AI for Productivity Growth in South Africa: Education, Industrial Policy and Fiscal Incentives

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1. Introduction: two learners and one machine

Many South African learners know the ritual of the past paper: an old exam, photocopied and worked through at the kitchen table until the questions start to look familiar. Many of us also know a classmate who struggled with those papers but could rewire a plug, fix a gate motor or find an engine fault by ear. Our school system tends to reward the first learner and overlook the second. Now artificial intelligence (AI) can answer a past paper in seconds, and it is arriving in an economy that already struggles to find work for both.

This essay asks how South Africa should redesign education, industrial policy and fiscal incentives to harness AI for productivity growth while limiting labour market disruptions. The question is urgent: the official unemployment rate rose to 33.6% in the second quarter of 2026, and youth unemployment reached 47.4% (SAnews, 2026b). In a labour market this fragile, a technology that raises output per worker while shedding jobs could widen inequality.

The central argument is that the challenge is not whether to adopt AI, but how to capture its productivity gains while managing their uneven effects on workers. Those gains become broad-based growth only if three conditions hold: workers have the capabilities to use AI, which education shapes; the economy offers opportunities to apply them, which industrial policy shapes; and firms are encouraged to share efficiency gains, which fiscal incentives and labour law shape. Section 2 sets out the economics of AI. Sections 3 to 5 test each policy lever against both goals of the question, productivity growth and limited disruption, and each ends with a specific reform. Section 6 tests the argument against its strongest objections, and Section 7 concludes with five recommendations.

2. The economics of AI: who gains when productivity rises?

2.1 Productivity is not the same as jobs

Labour productivity is output per worker or per hour worked. A firm can raise it while cutting jobs, or add jobs while it stagnates. According to Acemoglu and Restrepo (2019:3–4), automation has a displacement effect, as machines take over tasks once

done by workers, which can reduce labour demand even as productivity rises. Two forces push back: a productivity effect, as lower costs let firms expand, and a reinstatement effect, as technology creates new tasks in which people hold the advantage (Acemoglu and Restrepo, 2019:3–4). The net effect on jobs depends on the balance between them.

The gains are real. Among more than 5,000 customer support agents, a generative AI assistant raised issues resolved per hour by 14% on average and by 34% for novice and less-skilled workers, while customer sentiment and staff retention improved (Brynjolfsson, Li and Raymond, 2025). Here AI made weaker workers better rather than replacing them.

2.2 Exposure is not job loss

About one in four workers globally is in an occupation with some exposure to generative AI, but only 3.3% fall into the highest exposure category, and transforming jobs is a more likely outcome than eliminating them (Gmyrek et al., 2025). AI may free an accountant from routine reconciliations to advise clients, or it may lead the firm to employ fewer accountants. Which happens depends on how firms reorganise work and whether demand grows.

2.3 The case for protecting workers, not every job

Policy should therefore protect workers rather than freeze existing jobs. That means building skills, supporting transitions and sharing productivity gains; freezing jobs would stop firms adapting and could cost more jobs than it saves. Every proposal in this essay is held to three tests: does it raise productivity, does it strengthen capabilities, and does it spread the gains fairly?

3. Education: reading before robots

3.1 A record pass rate that hides a reading gap

The matric class of 2025 achieved an 88% pass rate, the highest on record (SAnews, 2026a). Yet the cohort that began Grade 10 in 2023 with 1,187,468 learners saw only 778,793 reach Grade 12 (IOL, 2026), and only 34% of candidates wrote pure Mathematics (Bizcommunity, 2026). These figures measure participation rather than skill, but they show that a high pass rate alone does not prove readiness for work. The deeper gap starts early: according to Spaul (2023), 81% of Grade 4 learners in PIRLS

2021 could not read for meaning in any language, and South Africa had the lowest average score of all participating countries. Reading for meaning is a prerequisite for judging whether an AI-generated answer is right.

3.2 What the classroom evidence shows

Design matters. According to Bastani et al. (2025), Turkish high school students who practised with an unrestricted ChatGPT-style tool later performed 17% worse than peers without AI, while a hint-giving version largely removed that harm. In Nigeria, a six-week, teacher-led AI tutoring programme produced gains equal to 1.5 to 2 years of ordinary schooling, among the most cost-effective interventions studied (De Simone et al., 2025). Neither result transfers automatically. South African schools differ in language of instruction, electricity, connectivity, devices and teacher confidence, and a tutor that works in English may struggle in isiXhosa or Sepedi. The evidence justifies testing, not immediate scaling.

3.3 Beyond school: reskilling workers already in jobs

Education reform must also reach adults whose work AI will change. Employers with an annual payroll of R500,000 or more pay a skills levy of 1% of payroll (BANKSETA, n.d.), which funds SETA mandatory grants of 20% of the levy and discretionary grants of 49.5% (HWSETA, n.d.). The funding channel exists; the question is whether it is aimed at the skills AI makes valuable.

3.4 The case for a staged path from pen and paper to AI literacy

AI literacy cannot substitute for foundational literacy. Reading for meaning should be the central goal from Grade R to Grade 3. From Grade 4, learners should be assessed on application, solving unfamiliar problems, explaining their reasoning and practising with past papers, rather than being promoted without mastery.

The foundation phase should remain book, pen and paper. But banning AI from schools entirely would leave no-fee schools behind wealthier ones whose learners graduate fluent in it. In the intermediate and senior phases, learners should use supervised tutors that give hints, not answers, and learn to check AI output: attempt a problem alone, ask for a hint, solve it unaided, then explain it to the teacher. Township and rural schools with teacher shortages should host the first tutor rooms as evaluated pilots, measured on

reading and mathematics results, teacher workload, cost per learner and performance in African languages.

For adults, SETAs should direct part of their discretionary grants to short, accredited courses in using AI at work, starting with the most exposed workers, such as clerical and call-centre staff. This serves both goals of the question: workers become more productive, and those whose tasks change gain a route into new work rather than into unemployment.

4. Industrial policy: from raw ore to skilled hands

4.1 Minerals, artisans and their limits

The Critical Minerals and Metals Strategy of May 2025 aims to move South Africa from exporting raw materials to local beneficiation and advanced manufacturing, and lists AI-driven mining among its research priorities (IEA, 2025). Cabinet approved its implementation plan in December 2025 (Business Day, 2025). This is where AI can lift productivity in the existing economy, through predictive maintenance, process control and safer mining.

Skills are the bottleneck. The National Development Plan targets 30,000 qualified artisans a year by 2030, yet in 2024/25 the country produced more than 10,000 fewer than government targeted (EngineerIT, n.d.), and TVET leaders warn that industry must be far more involved (TimesLIVE, 2026b). Skills alone will not build plants, however. The Minerals Council's chief economist attributes declining local beneficiation largely to high electricity costs and rail and port failures, which outweigh existing incentives (Financial Mail, 2025). Nor does beneficiation guarantee many jobs: an automated, AI-monitored plant may produce far more per worker while employing fewer people. The chain from AI adoption to more productive firms, greater value added and better jobs is real but not automatic, and its final link must be tested rather than assumed.

4.2 Spreading AI beyond the largest firms

Productivity growth also depends on how widely AI spreads. The largest gains in the customer support study went to less-skilled workers (Brynjolfsson, Li and Raymond, 2025), which suggests that AI narrows skill gaps when it reaches ordinary workplaces. Yet generative AI exposure covers about 11% of employment in low-income countries

against 34% in high-income ones (Gmyrek et al., 2025). South Africa risks a split in which large firms adopt AI while small manufacturers and suppliers fall further behind.

4.3 The case for skills-intensive beneficiation, judged on results

Not every learner is academically inclined, and that should not be treated as failure. Electricians, millwrights, welders and fitters do physical work in unpredictable settings that is harder to automate fully, although AI and robotics will still change these trades and raise the value of digital skills. Artisan training is therefore necessary for industrial growth but not sufficient: it must be matched by investment, employer demand and reliable energy and logistics.

State support for beneficiation should require a credible workforce plan, and each project should be judged against a baseline on domestic value added, jobs, apprenticeships completed, productivity and wages. Rather than rebuilding stand-alone trade schools everywhere, ordinary high schools near industrial areas should offer technical subjects, TVET colleges should be better equipped, and employers should offer paid apprenticeships. Finally, the Department of Trade, Industry and Competition, working with industry bodies and SETAs, should help small suppliers in mining and manufacturing adopt practical AI tools such as predictive maintenance and quality control, so that productivity gains spread beyond a handful of large firms.

5. Fiscal incentives and labour law: rewarding firms that share the gains

5.1 What existing incentives teach

The Employment Tax Incentive (ETI) lowers the cost of hiring young workers (Cliffe Dekker Hofmeyr, 2024), and the section 12H allowance gives employers an extra deduction for registered learnerships, extended to 31 March 2027 (SARS, 2025; Wylie, 2024). The ETI evidence is a warning. According to Ranchhod and Finn (2016), it had no statistically significant effect on youth employment in its first period, so much of the forgone revenue went to firms that would have hired anyway, a deadweight cost. A later study found positive effects mainly in firms with fewer than 200 employees, though its authors were cautious about attributing all of the increase to the policy (Ebrahim, Leibbrandt and Ranchhod, 2017).

5.2 The risk of automating for cost alone

Klarna claimed in 2024 that its AI assistant was doing the work of 700 customer service agents; by 2025 its chief executive admitted that cost had dominated and quality had fallen, and the company began rehiring human agents (McKay, 2025). The case does not prove that AI destroys jobs, but it shows the risk of judging AI by short-term labour savings rather than by productivity and quality together. South Africa's own draft National AI Policy was withdrawn in April 2026 after it was found to contain fictitious, likely AI-generated references (TimesLIVE, 2026a). Labour law already offers some protection: section 189 of the Labour Relations Act requires consultation on avoiding or minimising retrenchments, including those driven by technology (Labour Guide, n.d.), and section 189A adds minimum consultation periods and facilitation for large-scale retrenchments (Van Deventers, n.d.).

5.3 The case for a responsible-adoption incentive, not a headcount rule

AI should take over repetitive, menial tasks while people keep the judgement, care and accountability, because job losses impose costs beyond the firm through lower household income, weaker spending and pressure on public support systems.

A broad AI tax allowance tied to keeping headcount for three years would be flawed. Large firms would invest in profitable AI anyway, repeating the ETI's deadweight problem, and a headcount rule could punish a firm hit by a recession while rewarding one that keeps its numbers but cuts hours or uses contractors.

A narrower responsible-adoption incentive would work better. Because the ETI evidence suggests that firm size may affect how well incentives work, it should be tested among small and medium firms. To qualify, a firm would submit a worker transition plan before deployment, fund accredited training, report employment, hours, wages and redeployment, and show a measurable gain in output, cost or quality without a fall in service quality, so that no firm qualifies simply by cutting staff. Clawbacks should be proportionate, with exemptions for shocks unrelated to AI, and reporting should be scaled to firm size. The governing fiscal principle is value for money: a pilot should compare participants with similar non-participating firms, and the incentive should

continue only if its additional productivity and worker-transition gains justify the cost to the fiscus, measured per unit of productivity gained or per worker redeployed.

The alternatives fall short on their own: training subsidies do not shape how firms adopt AI, and stricter retrenchment rules may simply deter investment. The incentive should therefore be paired with one light rule, applying only to large-scale, automation-driven retrenchments already covered by section 189A: an AI impact statement and a retraining or redeployment offer. Smaller firms would face no extra paperwork.

6. Testing the argument: the strongest objections

6.1 Will conditions on AI cost South Africa investment?

Investors choose between countries, and extra reporting could tip a marginal investment elsewhere. This is a fair concern, although labour protections also bring a more stable, better-trained workforce. The objection has shaped the proposals: the incentive is voluntary, the procedural rule covers only large-scale retrenchments already under section 189A, and smaller firms face no new obligations.

6.2 Are fears of job loss overstated?

If AI mostly transforms jobs rather than eliminating them (Gmyrek et al., 2025), why worry? Because averages hide uneven effects: some workers will earn more, while others lose hours or find their skills devalued without the means to retrain. Policy should therefore target the most exposed workers rather than treat all AI as a threat.

6.3 Could AI create more jobs than it destroys?

AI may help firms expand and create new tasks, the reinstatement effect described in Section 2.1 (Acemoglu and Restrepo, 2019:3–4). Protecting every existing job could block these gains, which is why this essay protects workers rather than jobs and ties incentives to productivity rather than headcount.

6.4 Does limiting AI in classrooms widen the digital divide?

If wealthy schools teach AI and poor schools ban it, inequality grows. This is why the essay rejects a blanket ban in favour of the staged approach in Section 3.4, starting with no-fee schools.

6.5 Why the argument survives

Each objection has sharpened a proposal: the incentive is narrower, the procedural rule proportionate and the education plan staged. None removes the central point that AI's gains will not spread on their own. All of the proposals also depend on state capacity, from TVET quality to SARS enforcement, which must be strengthened alongside them.

7. Conclusion: making productivity work for people

7.1 What the research shows

Technology alone does not decide whether productivity growth becomes inclusive growth. AI can raise output per worker, with the largest gains for less experienced workers, but those gains reach South Africans only if workers can read, reason and check what AI tells them; if the economy offers productive work in which to use those skills; and if firms are encouraged to share efficiency gains. The evidence points to constraints in all three: weak foundational literacy, a persistent artisan gap, and the risk that incentives subsidise hiring that would have happened anyway.

In direct answer to the question: education should be rebuilt around reading for meaning, application and a staged introduction of supervised AI, with skills funding helping working adults use AI. Industrial policy should link skills-intensive beneficiation to the spread of AI among smaller firms. Fiscal incentives should reward firms that adopt AI in ways that raise productivity while retraining and redeploying workers. Together, these measures raise what workers can do with AI rather than leaving them to compete against it.

7.2 Recommendations

Each recommendation should begin as a pilot with a clear measure of success.

7.2.1 A comprehension-first foundation phase

The Department of Basic Education should make reading for meaning the central goal from Grade R to Grade 3, with a national check at the end of Grade 3 and application-based assessment from Grade 4, measured by results in the next PIRLS cycle.

7.2.2 Staged, supervised AI tutoring

Basic education departments should pilot hint-only AI tutor rooms, working in African languages, in no-fee schools facing teacher shortages, measured on learning gains, cost per learner and teacher workload against comparison schools.

7.2.3 Skills-intensive beneficiation

The Department of Trade, Industry and Competition and the Department of Higher Education and Training should tie support for beneficiation projects to workforce plans with TVET partners and paid apprenticeships, measured on apprenticeships completed, value added and wages, alongside action on energy and logistics.

7.2.4 A responsible-adoption incentive for smaller firms

National Treasury and SARS should pilot the incentive set out in Section 5.3 and extend section 12H to AI-related upskilling, continuing funding only if productivity, wage and redeployment gains justify the fiscal cost.

7.2.5 AI impact statements in large-scale retrenchments

The Department of Employment and Labour, through NEDLAC, should require an AI impact statement and a retraining or redeployment offer in automation-driven retrenchments under section 189A, with the rule reviewed if it measurably deters investment.

7.3 Concluding remarks

The evidence reviewed in this essay supports a clear conclusion: AI will raise productivity in South Africa only to the extent that the country builds the capabilities and institutions needed to absorb it. Left to market forces alone, adoption risks concentrating in large firms, while its costs fall on the most exposed workers. The reforms proposed here are deliberately incremental and testable. Each begins as a pilot, each is tied to measurable outcomes, and each can be scaled or withdrawn on the evidence, because fiscal resources are scarce and public money should follow results. On that basis, South Africa can treat AI neither as a threat to be resisted nor as a solution to be adopted uncritically, but as a productivity opportunity whose gains are deliberately shared.

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