

# **BUILDING AN ARTIFICIAL INTELLIGENCE (AI)-READY SOUTH AFRICA:** Aligning Education, Industrial Policy and Fiscal Incentives with Productivity and Employment Goals

ENTRY #559

Word count: 3,322 (excluding references)

Category: Postgraduate

## **1. Introduction**

*David Autor*, one of the foremost empirical labour economists, noted that “The unique opportunity that AI offers to the labour market is to extend the relevance, reach, and value of human expertise” (Autor: 2024). As a transformative general-purpose technology, artificial intelligence (AI) is expanding rapidly against a backdrop of entrenched structural inequalities in the global economy. Although AI has the capacity to revolutionise economic systems, its integration into South Africa is uniquely complicated by persistent socioeconomic headwinds. Consequently, policy frameworks must shift from debating the merits of adoption to formulating strategies that develop local capabilities, ultimately positioning AI as a primary driver of productivity and employment growth.

The Department of Communications and Digital Technologies (DCDT) drafted South Africa’s National Artificial Intelligence Policy Framework to guide safe, ethical and inclusive AI adoption, although it was later retracted. The formulation of a draft AI policy is a critical prerequisite for managing the socioeconomic implications of automation. Without adequate regulatory oversight and governance mechanisms, the widespread deployment of artificial intelligence risks destabilising employment across both knowledge-intensive and labour-intensive sectors, thereby undermining the potential for equitable and broadly shared economic development.

Labour-market pressure remains one of the greatest obstacles to technological advancement in South Africa. The official unemployment rate increased from 31.4% in the fourth quarter of 2025 to 32.7% in the first quarter of 2026 and 33.6% in the second quarter of 2026 (Statistics South Africa: 2026). Although this does not establish that AI caused the increase in unemployment, it highlights the importance of AI policy and the need for it to operate alongside measures addressing existing employment challenges. Rather than suppressing employment and development, AI policy must be designed to complement them.

The current labour market position in South Africa is depicted in Figure 1.

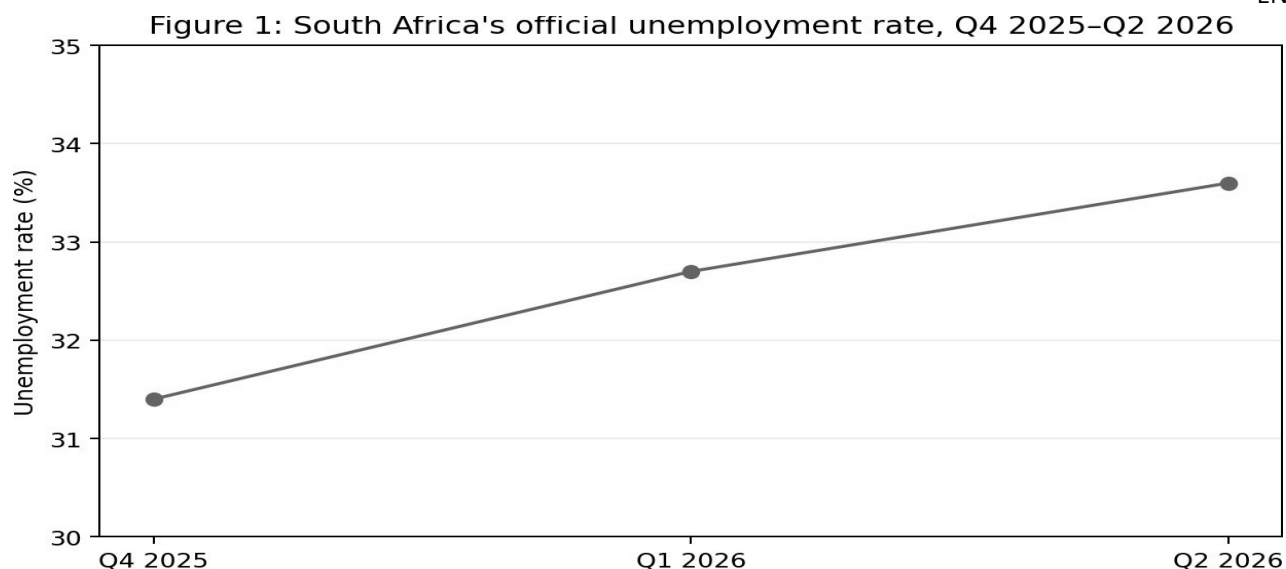


Figure 1: South Africa's official unemployment rate, Q4 2025–Q2 2026

Source: Statistics South Africa (2026), Quarterly Labour Force Survey

Figure 1 displays a rise in the unemployment rate over the three-quarter period. The purpose of this analysis is not to suggest that AI caused this increase, but rather to show that South Africa has little room for poorly managed technological advancement. Policies promoting AI adoption should be accompanied by worker mobility measures, effective institutional capacity and investment in human capital. Accordingly, this essay addresses the following research question: **How should South Africa redesign education, industrial policy and fiscal incentives to harness artificial intelligence for productivity growth while limiting labour-market disruptions?**

The paper is structured as follows: Section 2 examines the nexus of artificial intelligence with productivity growth. Section 3 evaluates Technological advancement and artificial intelligence (AI) adoption rates across the South African education ecosystem. Section 4 considers Industrial policy: Diffusing AI productivity across the Economy. Section 5 examines Fiscal Stimulus for AI-Induced Labor Productivity. Section 6 analyses labour-market disruption and worker transition. Section 7 it demonstrates A Multi-Stakeholder Framework for AI-Enabled Economic Output and Equitable Labor Absorption in South Africa. The paper concludes with policy recommendations.

## **2. The nexus of artificial intelligence with productivity growth**

### **2.1 Artificial Intelligence as a general-purpose technology**

AI could greatly increase productivity at both microeconomic and macroeconomic levels. It can improve firms' efficiency in the use of both labour and capital. In addition, firms may use AI to perform fast-paced, information-intensive tasks that support data-driven decision-making and enable new products and services.

The productivity implications of AI should, however, be analytically distinguished from those of conventional automation. Whereas AI may substitute for labour in the performance of specific tasks, it may simultaneously complement workers by augmenting their capabilities in others. The International Labour Organization estimates that one in

four workers globally are employed in an occupation characterised by some degree of exposure to generative AI. Nevertheless, the evidence suggests that most occupations are

more likely to undergo task-level transformation than wholesale displacement, since human judgement, oversight, and contextual expertise remain indispensable across a wide range of activities (ILO: 2025).

## **2.2 The issues underlying South African productivity**

Although AI may bring significant productivity gains, these cannot occur autonomously. Productivity improvements require advances in digital infrastructure, managerial capabilities, data, skills and organisational change. As South Africa is a developing economy, it is important to recognise these requirements, because purchasing AI technology alone does not ensure that productivity will increase across the entire economy.

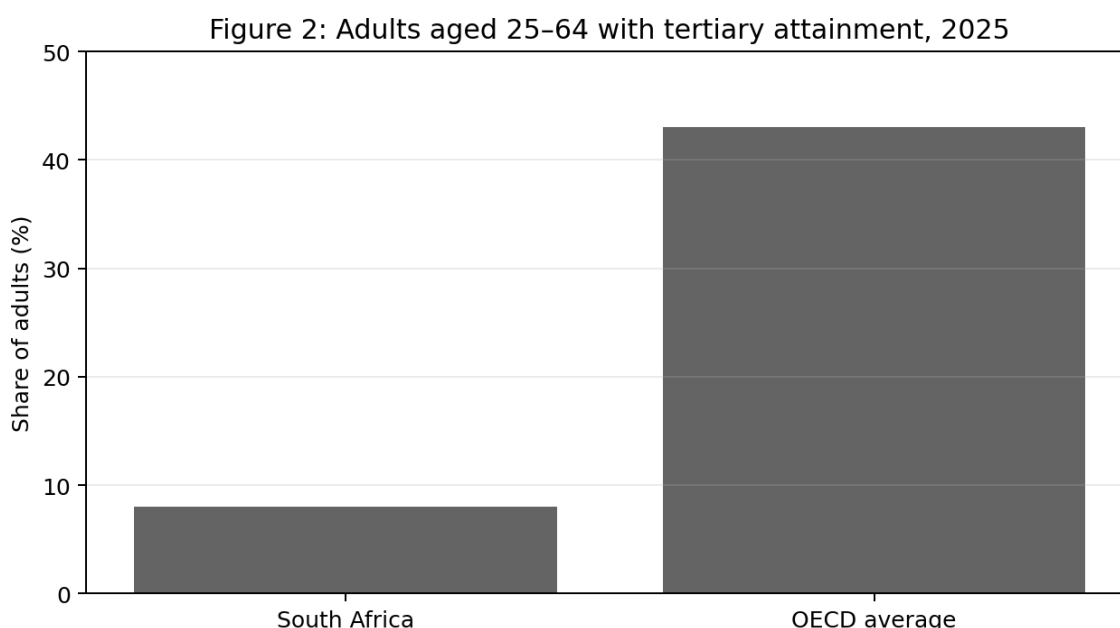
A fundamental weakness in the policy framework is that an AI-driven productivity strategy is treated as a secondary intervention rather than as a central pillar of structural transformation and long-run economic growth. Government should prioritise an enabling environment that reduces firms' technology-adoption costs, alleviates financing and capability constraints, and accelerates the diffusion of complementary technologies. Public support should also be tied to measurable socioeconomic returns, including workforce reskilling, innovation and creative capacity, productivity gains, and the mobilisation of domestic and foreign investment.

## **3. Technological advancement and artificial intelligence (AI) adoption rates across the South African education ecosystem**

### **3.1 The bottleneck in South Africa's human capital**

For a country to become fully AI-ready, it requires more than workers with traditionally acquired skills; it needs workers who can use, adapt and develop AI systems. Recent statistics indicate that the AI transition will occur within a population with a relatively small proportion of tertiary-educated adults. In late 2025, 8% of adults aged 25–64 had attained tertiary education, compared with 43% across the OECD. At the same time, 48% of South African youth aged 18–24 was not in employment, education or training, compared with 13% across the OECD (OECD: 2026).

Figure 2: Tertiary attainment among adults aged 25–64, 2025



Source: OECD (2026), Education at a Glance 2026: South Africa.

Figure 2 illustrates a major obstacle to South Africa's AI readiness: its human-capital deficit. The relatively low proportion of people who have completed tertiary education suggests that the country will have too few workers with advanced analytical and technical capabilities. AI policy must therefore be treated as a central component of education and human-capital policy.

### **3.2 From artificial intelligence literacy to artificial intelligence innovation**

Universities and research institutions, including the University of Johannesburg (UJ) and the Defence Artificial Intelligence Research Unit, can provide an institutional base for accelerating knowledge diffusion, research commercialisation and the transition towards an innovation-driven economy.

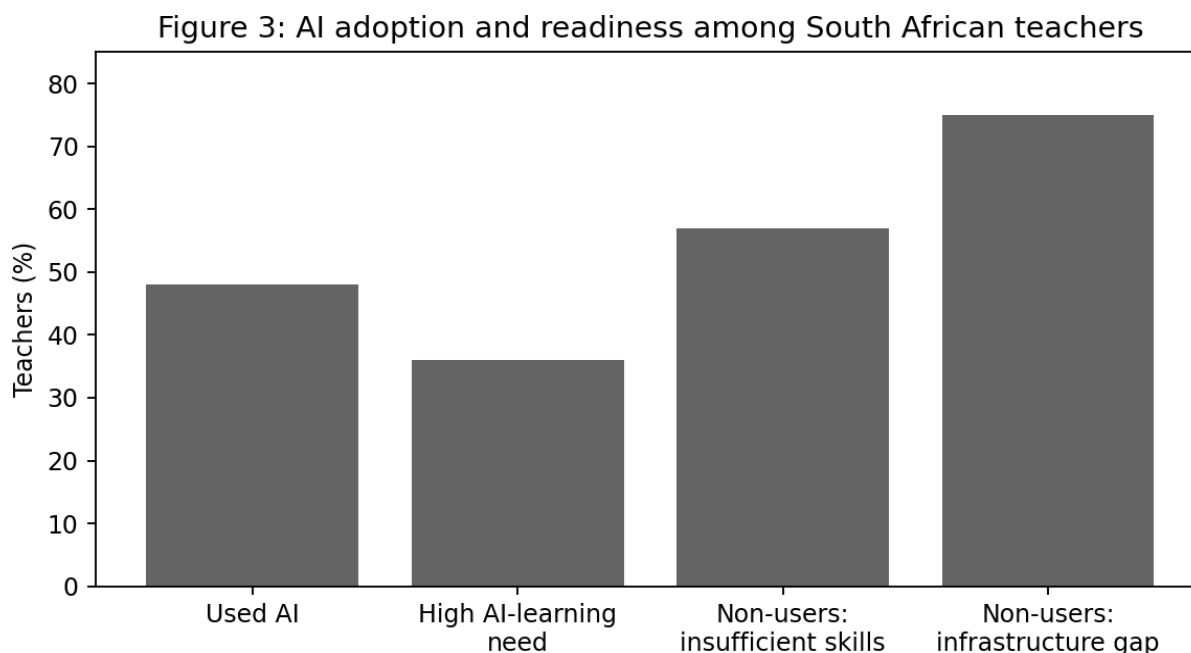
Curriculum reform should be differentiated across the education and training system. Early-childhood, school and adult-learning programmes should emphasise AI literacy, critical thinking, data literacy and the responsible use of technology. Technical and Vocational Education and Training institutions should prioritise applied AI competencies, workplace automation and industry-responsive skills, thereby reducing skills mismatches in the labour market. Universities should integrate AI and data-science capabilities across disciplines, while postgraduate programmes should expand advanced research, innovation and the supply of highly skilled labour.

The objective is not to convert every learner into a computer scientist or AI developer, but to raise the population's technological absorptive capacity and enable individuals to use AI productively, critically and responsibly. Broad-based access to these capabilities would reduce the risk of a digital divide in which the productivity gains and income benefits associated with AI accrue mainly to middle- and high-income groups. An inclusive education strategy can therefore improve labour-market adaptability, promote social mobility and support a more equitable distribution of the economic returns generated by technological change.

### **3.3 AI transition and readiness among teachers**

The effective diffusion of AI throughout the education system depends fundamentally on teacher readiness, because teachers are the principal agents responsible for translating technological innovation into classroom practice. OECD TALIS 2024 data indicate that 48% of South African lower-secondary teachers reported using AI in their work, compared with an OECD average of 36%. This relatively high adoption rate suggests emerging demand for AI-enabled teaching; however, significant supply-side constraints continue to impede broader and more productive uptake. Among teachers who had not used AI, 57% cited insufficient knowledge and skills, while 75% identified inadequate school infrastructure as a binding constraint. Furthermore, 36% regarded the use of AI in teaching and learning as a high-priority professional-development need (OECD: 2025).

Figure 3: AI adoption and readiness among South African lower-secondary teachers



Source: OECD (2025), Results from TALIS 2024: South Africa.

Figure 3 illustrates an important policy contradiction. AI is already being used by some teachers, but infrastructure and skills remain prominent constraints. An AI strategy that focuses only on distributing software or devices would therefore be incomplete. Educator training, departmental support, connectivity and responsible-use guidelines must also accompany automation and AI adoption.

These findings point to persistent human-capital and digital-infrastructure deficits that may limit the productivity gains associated with educational technology. Policy intervention should therefore prioritise investment in teacher training, digital infrastructure and institutional support to strengthen absorptive capacity and ensure that AI adoption generates inclusive improvements in educational outcomes.

### **3.4 Education as labour-market policy**

Education reform should be treated as an integral component of labour-market policy, because workers' employability will increasingly depend on their ability to move between occupations as technological change reshapes the demand for skills. Evidence from the ILO indicates that exposure to generative AI is already expanding; however, its principal effect is more likely to be the transformation of existing tasks and occupations than the wholesale displacement of employment (ILO: 2025). Continuous education, reskilling and lifelong learning are therefore essential for strengthening occupational mobility, reducing structural unemployment and enabling workers to adapt to changing production processes.

The Department of Higher Education and Training (DHET) should promote stronger collaboration among universities, TVET colleges, employers and technology providers to ensure that curricula remain responsive to evolving occupational and industry requirements. Such partnerships can improve the alignment between skills supply and labour-market

demand, accelerate knowledge transfer and shorten the adjustment lag between technological innovation and workforce development.

#### **4. Industrial policy: Diffusing AI productivity across the Economy**

##### **4.1 from technology adoption to productive capability**

South Africa should prioritise sectors in which AI adoption can complement existing human labour and improve production technologies while addressing structural constraints. These sectors include manufacturing, agriculture, mining, logistics, financial services, healthcare and public administration.

The objective of industrial policy should not be to insulate firms from technological disruption, but to strengthen their productive adaptability and capacity to absorb innovation. Achieving this requires a coordinated ecosystem of complementary capabilities, including robust data systems, research collaboration, technology-extension services, reliable digital infrastructure and access to appropriate financing.

##### **4.2 SMEs and diffusion**

While market forces enable larger enterprises to seamlessly integrate and fund AI workflows independently, smaller firms are constrained by prohibitive capital requirements, data scarcity, and high investment risks. Consequently, a targeted technology diffusion policy is necessary to democratize access to computational infrastructure, high-fidelity data, expert consultations, and digital hubs.

To ensure fiscal accountability and widespread economic spillovers, state support must feature strict eligibility requirements. Subsidized firms should provide periodic progress reports highlighting advancements in labour upskilling, localized supply chain participation, or academic collaborations, ensuring public funds drive systemic economic growth rather than passive software procurement.

#### **5. Fiscal Stimulus for AI-Induced Labor Productivity**

##### **5.1 Strategic pillars of fiscal intervention**

As artificial intelligence lowers the marginal cost of cognitive tasks, firms face a profit-maximising incentive to substitute capital in the form of AI tools for labour, disproportionately displacing entry-level human capital. While policymakers may consider fiscal intervention to steer this transition, using tax policy to subsidise AI adoption is generally economically redundant and risks generating deadweight loss unless it is targeted strictly at verified market failures. Where fiscal incentives are deployed, they must be time-bound, conditional and narrowly focused. Conversely, public intervention is analytically justified to subsidise private-sector training and knowledge spillovers—positive externalities that the market will otherwise undersupply.

##### **5.2 Selective corporate tax incentives for digital transformation**

The South African government could implement AI legislation and productivity incentives that offer firms tax relief during the AI-adoption process, but only when participating firms meet performance targets or protect their employees. Government could use targeted tax incentives to support firms investing in future-ready technologies, specifically AI, employee

upskilling, digital infrastructure and data development. Compared with companies that merely import ready-made software, firms that develop technology locally should receive stronger support, such as tax relief, grants or subsidies.

Tax incentives could encourage firms to upskill workers instead of replacing them with AI systems that perform the same responsibilities. Rather than substituting for human labour, this approach would use AI to augment human capabilities, ensuring that people and machines complement each other productively.

### **5.3 Fiscal discipline**

Policymakers must consider what else could be achieved with the same public resources if the proposed incentives were not adopted. South Africa faces substantial demands on public resources. Although AI adoption should be treated as an important socioeconomic priority, its budget must be weighed against other priorities, including basic education, electricity, transport, healthcare and infrastructure. Funding programmes, subsidies and enhanced allowances designed to encourage AI development and adoption must not remain unchecked or unregulated; they should be evaluated regularly.

## **6. LABOUR-MARKET DISRUPTION AND WORKER TRANSITION**

### **6.1 Augmentation, automation and task transformation**

Debate about AI's labour-market effects should extend beyond whether it creates or eliminates jobs. By automating routine tasks and reducing the time required to complete them, AI can complement human labour, create opportunities for workers with relevant technical skills, and encourage the upskilling of existing employees. Its primary value lies in accelerating work while enhancing, rather than simply replacing, human capabilities.

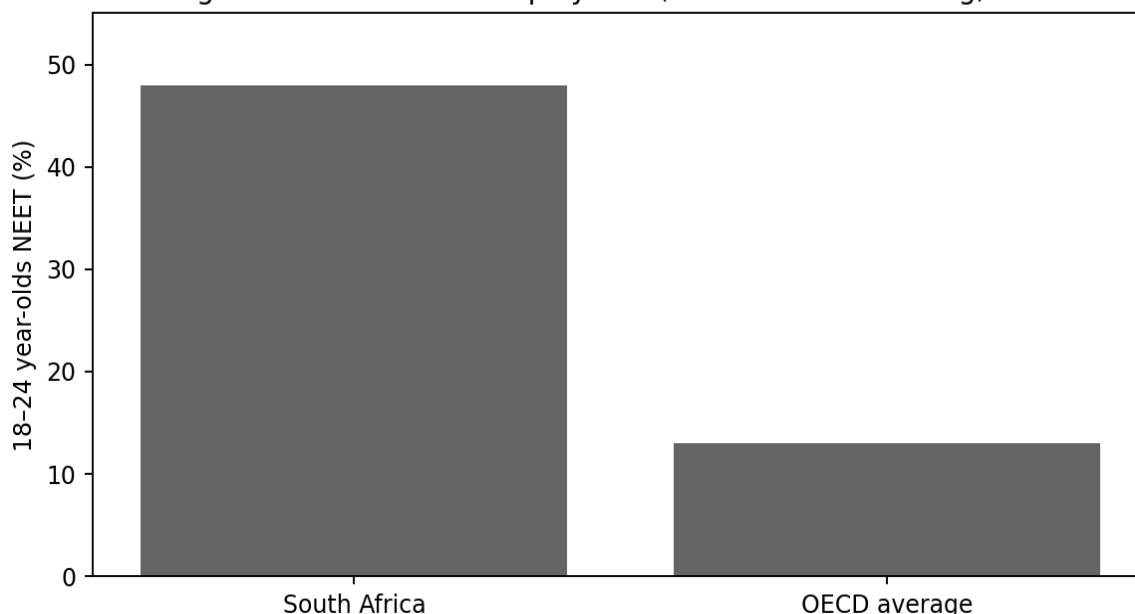
The ILO estimates that one in four workers worldwide is employed in an occupation with some degree of exposure to generative AI, while also indicating that most jobs are more likely to be transformed than replaced or eliminated (ILO: 2025). This aligns with the draft AI policy framework, which seeks to address retraining, occupational transformation and social dialogue rather than prevent AI adoption.

### **6.2 Employment obstacles in South Africa**

South Africa's high unemployment rate makes it essential for the country's AI strategy to address employment creation and worker transition. However, halting AI adoption could discourage foreign direct investment and weaken national competitiveness. Policy should therefore promote productive complementarity between technological advancement and workers, ensuring that AI supports employment and economic growth rather than displacing labour unnecessarily.

**Figure 4: Young people not in employment, education or training, 2025**

Figure 4: Youth not in employment, education or training, 2025



Source: OECD (2026), Education at a Glance 2026: South Africa.

Figure 4 illustrates the relevance of an inclusive transition. The significant proportion of young people who are not in employment, education or training presents both challenges and opportunities. If education, vocational training and entry-level employment pathways incorporate AI skills, AI adoption may increase workers' productive capacity.

### **6.3 A worker-transition framework**

Organisations such as COSATU and other trade unions should work closely with a national worker-transition programme to identify occupations with high exposure to task changes, provide training linked to potential vacancies and facilitate relevant retraining opportunities. These programmes should prioritise workers whose tasks are changing rather than attempting to preserve existing tasks indefinitely.

## **7. A Multi-Stakeholder Framework for AI-Enabled Economic Output and Equitable Labor Absorption in South Africa.**

Industrial policy, fiscal policy, education and labour-market policy cannot function independently without an integrated framework. For the AI ecosystem to function effectively, each of these four pillars must have a clearly defined and coordinated AI strategy in addition to its stand-alone policies. Funding university programmes or reskilling workers in isolation will not sustain productivity growth.

### **7.1 Redesigning education for AI readiness**

The Department of Basic Education (DBE) and the Department of Higher Education and Training (DHET) must work progressively to integrate AI into the public education system, and the AI skills pipeline must extend from the foundational phase to postgraduate study. Through pedagogical-development programmes, government should prioritise and support teacher reskilling alongside curriculum reform and infrastructure investment.

## **7.2 Progressive productivity through AI adoption**

SMEs must not be excluded or left behind in the AI-adoption process. Industrial policy must support AI diffusion among SMEs in sectors with substantial productivity potential. Public support should be offered based on potential innovation, measurable productivity gains and worker-upskilling outcomes.

## **7.3 Conditional fiscal incentives**

Digital infrastructure, research, labour upskilling and the development of domestic capabilities must be the primary targets of fiscal incentives. All incentives must be thoroughly scrutinised and assessed against measurable results.

## **7.4 Worker transition**

The Department of Employment and Labour, trade unions, employers and educational institutions should share responsibility for training and occupational-transition programmes. Worker training must focus on skills that are in high demand in the labour market rather than training without a clear employment pathway.

## **7.5 AI labour-market observatory**

South Africa, through SITA, the DCDT and AI-hub institutions, should establish an AI labour-market observatory to monitor occupational exposure, emerging skills requirements, employment opportunities, wage trends, training outcomes and regional disparities. The observatory should provide regular reports on government's progress with curriculum and labour-market interventions.

## **7.6 Inclusive infrastructure**

AI adoption must be accompanied by investment in secure data infrastructure, reliable electricity, broadband connectivity and adequate computing capacity. Policy should ensure that participation in the AI-driven economy is not restricted by geography, income or institutional affiliation.

## **8. Conclusion**

Artificial intelligence presents South Africa with both an opportunity to raise productivity and a challenge to manage labour-market disruption. The central issue is therefore not whether the

country should adopt AI, but whether it can build the skills, firm-level capabilities and institutions required to translate adoption into broadly shared productivity gains.

The analysis shows that education must be at the centre of this strategy. Low tertiary attainment, the large share of young people who are not in employment, education or training, and uneven teacher preparedness expose serious human-capital constraints. At the same time, evidence that 48% of lower-secondary teachers have already used AI indicates that the transition is already under way.

Industrial policy should focus on diffusing productive technologies throughout the economy rather than merely supporting their acquisition. Fiscal incentives should be selective, time-bound and conditional on worker training, innovation and measurable economic outcomes.

Ultimately, AI policy should form part of a broader programme of economic transformation. By investing simultaneously in human capital, infrastructure, innovation and institutional capacity, South Africa can use AI to strengthen productivity, competitiveness and access to better employment opportunities. Without these complementary measures, however, the benefits of adoption may remain concentrated among a small group and deepen existing inequalities.

## 9. RECOMMENDATIONS

The discussion above suggests that South Africa's AI policy should focus not only on adopting new technology, but also on helping people and firms use it productively. The following steps would connect the education, industrial and labour-market measures discussed in this essay.

First, schools, TVET colleges and universities should give learners practical opportunities to build digital and data skills. Teacher training and reliable internet access need to be part of this effort. Without these basics, AI-related learning is likely to remain easier to access in better-resourced institutions, widening existing gaps rather than reducing them.

Second, smaller businesses should be able to get practical help when they consider adopting AI. Shared digital facilities, technical advice and links with universities or research hubs could lower the cost of trying new tools. Any public support should be reviewed against evidence of improved productivity, worker training or stronger local partnerships, rather than simply the purchase of software.

Third, tax relief and grants should be used carefully because public money is also needed for education, electricity, transport and healthcare. Support for AI investment should therefore have clear conditions and an end date. Firms receiving assistance should show what they are contributing through employee training, local research or digital infrastructure, and government should assess whether the results justify the cost.

Fourth, employers, government, colleges, universities and trade unions should work together when job tasks change. Training is more likely to help workers if it is linked to skills that employers need and to real employment opportunities. This approach would not prevent all disruption, but it could give affected workers a more realistic route into changing roles.

Finally, government should publish regular information about how AI is affecting occupations, wages, skills demand and training outcomes. This evidence would help policymakers identify where support is needed and adjust programmes when they are not working. These measures should be introduced in stages, with responsibilities made clear and spending reviewed openly.

## 10. LIST OF REFERENCES

Acemoglu, D. and Restrepo, P. (2018). The race between man and machine: Implications of technology for growth, factor shares, and employment. *American Economic Review*, 108(6), pp. 1488–1542.

Autor, D. (2024). Applying AI to Rebuild Middle Class Jobs. NBER Working Paper No. 32140. Cambridge, MA: National Bureau of Economic Research.

Brynjolfsson, E. and McAfee, A. (2014). *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. New York: W. W. Norton & Company.

Department of Communications and Digital Technologies (DCDT) (2020). Report of the Presidential Commission on the Fourth Industrial Revolution (PC4IR). Pretoria: Government Printer.

Department of Trade, Industry and Competition (DTIC) (2021). *South African Steel and Metal Fabrication Master Plan 1.0*. Pretoria: Government Printer.

International Labour Organization (ILO) (2025). *Generative AI and Jobs: A 2025 Update*. Geneva: ILO.

National Planning Commission (NPC) (2012). *National Development Plan 2030: Our Future – Make It Work*. Pretoria: Government Printer.

OECD (2023). *Tax Challenges Arising from the Digitalisation of the Economy: Pillar Two Model Rules*. Paris: OECD Publishing.

OECD (2025). *Results from TALIS 2024: South Africa*. Paris: OECD Publishing.

OECD (2026). *Education at a Glance 2026: South Africa*. Paris: OECD Publishing.

Rodrik, D. (2018). New technologies, global value chains, and developing economies. NBER Working Paper No. 25164. Cambridge, MA: National Bureau of Economic Research.

Schwab, K. (2017). *The Fourth Industrial Revolution*. New York: Currency.

Statistics South Africa (2026). *Quarterly Labour Force Survey: Quarter 2, 2026*. Statistical Release P0211. Pretoria: Statistics South Africa.

UNESCO (2024). *AI Competency Framework for Students*. Paris: UNESCO.

World Bank (2024). *South Africa Economic Update: Turning the Tide on Unemployment and Inequality*. Washington, DC: World Bank Group.