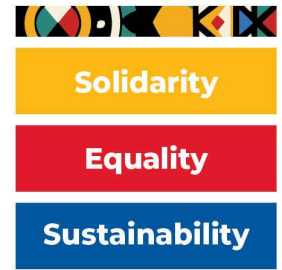




G20
SOUTH AFRICA 2025



**THE MACROECONOMIC,
PRODUCTIVITY AND GROWTH
IMPLICATIONS OF HARNESSING
TECHNOLOGY AND ARTIFICIAL
INTELLIGENCE IN THE CONTEXT OF
DEMOGRAPHIC CHANGE AND
MIGRATION: A POLICY NOTE**

South African G20 Presidency Note as Part of the
Framework Working Group outputs for 2025

Executive summary

Artificial intelligence (AI), demographic shifts, and migration are reshaping global economic prospects. AI has significant potential for productivity and welfare improvements, but its benefits remain uneven, with adoption gaps between advanced and developing economies. Meanwhile, ageing populations in advanced economies and youthful populations in many developing economies present contrasting challenges. Migration and technological diffusion can serve as balancing forces, but only with coherent, inclusive, and internationally coordinated policies.

AI adoption is progressing rapidly in advanced economies but remains limited in many developing ones due to issues with infrastructure, skills shortages, and market concentration. Women, younger workers, and those in routine roles are most vulnerable to disruption, whereas demand for AI-related and high-skilled roles continues to expand. Nearshoring and automation challenge traditional development models such as export-led industrialisation, necessitating new strategies in low-wage economies.

Although productivity growth has declined significantly since the mid-2000s, historical evidence indicates it may take decades for AI to lead to widespread productivity gains. Developing economies risk falling further behind unless they are supported in adopting and integrating AI.

Fertility rates are below replacement level in two-thirds of the world, while life expectancy continues to rise. Advanced economies face increasing old-age dependency ratios, exerting pressure on pensions, savings, and public finances. Developing economies with youthful populations risk wasting their demographic dividend if growth is not driven by productivity. Policies to extend working lives, increase female participation, and invest in skills are crucial.

Migration remains steady at around 3.7% of the world population and is primarily regional. Managed migration assists in addressing labour shortages and youth imbalances but encounters political opposition. Skilled emigration can present both risks, such as brain drain, and benefits like remittances, technology transfer, and return migration. AI might facilitate more remote, cross-border work, lessening the need for physical migration.

Insights & Policy Options: Promote inclusive productivity by investing in digital infrastructure, AI preparedness, education, and governance in developing countries. Expand access to data, cloud services, and open-source tools to diminish inequality, while reinforcing digital public infrastructure. Assist vulnerable groups with reskilling initiatives for displaced workers and address gender-based digital divides. Use AI to improve public services in health, education, and governance, thereby improving living standards. Address demographic changes by extending working lives, supporting childcare, promoting women's participation, and reforming pension schemes to ensure a more equitable distribution of resources. Promote responsible migration via skills partnerships and circular migration to ensure policies are equitable and sustainable. Strengthen global cooperation by establishing inclusive AI standards, increasing trade openness, and sharing knowledge on AI effects and best practices.

AI and demographic change pose interconnected challenges. Without purposeful, coordinated policy measures, inequality—both within and between countries—may intensify. The G20 can play a crucial role in ensuring that technology dissemination, demographic shifts, and migration patterns are utilised to increase growth, enhance productivity, and promote a more equitable global development.

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1. Introduction

This paper builds on the work of previous G20 presidencies and input from international organisations, as well as participants in the Framework Working Group. It discusses, in broad terms, the macroeconomic implications of AI, demographic shifts, and migration, as well as how these may impact economic and productivity growth, and changes in living standards.

Key trends discussed include the rapid but uneven adoption of AI and changing demographic profiles, which reflect decreasing fertility rates in most parts of the world, except in certain developing regions. The development of AI has the potential to increase productivity in advanced economies where ageing is a constraint on output, and in developing economies where productivity needs to rise to continue lifting standards of living. Sound policies need to be developed and coordinated in a timely manner at national, regional and global levels to avoid a deterioration in living standards and the increased unevenness of development.

AI has a role to play in boosting productivity, innovation, job creation and human capital, while mitigating migration induced by economic circumstances. A responsible approach to migration that respects sovereignty and national circumstances could also help to address some, but not all, demographic challenges. This paper offers policy suggestions that the G20 and the wider international community might consider.

2. Context

AI, with its applications, is broadly viewed as a general-purpose technology and is expected to boost productivity. Increasing productivity is crucial for economic growth and development. Productivity improvements from these technologies are gradually having effects across and within economies. For instance, by improving productivity, AI may boost growth, curb inflation, expand self-employment opportunities, expand the tax base and increase fiscal revenues.

In societies facing demographic ageing due to increasing life expectancy and lower fertility rates, including advanced economies and some advanced developing economies, weak productivity growth can lead to stagnating or declining living standards.

Many poorer developing countries, especially those in Africa, are experiencing modest growth, primarily driven by increases in the working-age population rather than improvements in productivity (IMF, 2024). Improved life expectancy, better health outcomes, and fertility rates above the replacement level coupled with modest growth result in continuing low per capita income levels, which lead to poor living standards. Although unemployment, underemployment, informality, and poverty are still common, the increasing youth unemployment in developing countries can be addressed by investing in AI-driven job creation in digital industries like e-commerce, fintech, and digital services. Additionally, aligning education systems with future labour market needs can help avoid missing out on demographic dividends.

To boost global productivity and growth, it is essential to diffuse, adopt, and integrate productivity-enhancing technologies, while managing the integration and deployment of older workers' labour in ageing countries and the abundance of younger labour in developing countries. In addition to productivity improvements, AI can also be used to enhance the quality and accessibility of public services.

While AI has considerable potential to boost productivity and welfare, its overall macroeconomic effects are still uncertain, partly because interactions with international trade are often overlooked. A forthcoming OECD study finds that economies with high AI exposure—especially in finance and ICT—or with favourable adoption conditions, are likely to benefit the most. However, trade significantly amplifies these advantages: AI-driven productivity in leading economies lowers prices and increases welfare in trading partners, particularly in Latin America and Eastern Europe. Even countries with low initial AI adoption can benefit through trade and knowledge spillovers, provided they can effectively learn from and collaborate with AI frontrunners. Overall, the study emphasises that while domestic adoption capacity is important, international trade is a key channel for spreading AI’s productivity and welfare gains globally.

3. Key trends and challenges

3.1 Diffusion of new technologies

The decreasing costs of AI access suggest a trend of increasing adoption, which is progressing quickly in most advanced economies and in some developing economies where infrastructure, skills and data ecosystems support integration. However, deeper integration into core business functions may still require significant additional investments.

Some developing economies have invested heavily in robotics and AI, particularly in the manufacturing sector. However, most developing economies and low-income countries remain slow adopters because of constraints such as limited digital infrastructure, skills shortages and lower investment capacity. Digital financial services are an expanding technology- and innovation-intensive sector in some developing economies. The younger average age of the workforce in low- and lower-middle-income countries may provide a comparative advantage in AI adoption. Although these differences in diffusion, adoption and integration are difficult to measure, they have diverse macroeconomic and employment effects across countries.

Structural bottlenecks also constrain adoption. Large, productive firms are best positioned to adopt and benefit from AI, while less productive firms, sectors and regions risk falling further behind (OECD, 2024). Adoption also depends significantly on sectoral AI exposure and the economic structure of countries.

When it comes to AI development, market power plays a major role. The acquisition and retention of AI talent and control over cloud infrastructure, computing power and privileged access to data are concentrated among a few global players (Adnan and Trager, 2024; UNCTAD, 2025). There is a risk that this concentration could reinforce global inequality, but some argue that the gap between cutting-edge innovation and broad adoption might open opportunities for new entrants. Developing economies, many of which are in Africa, could develop AI models and systems tailored to local data and needs if serious infrastructure and skills shortages were addressed. Access to AI tools could enable developing countries to overcome previously binding constraints (Athey, 2025).

Several strategies are emerging to address disparities in access, hardware and supporting infrastructure. Sovereign digital stacks – national or regional systems combining software, cloud services and data – are being explored to broaden access to AI capabilities. Open-source and interoperable systems could expand AI development and its application beyond the reach of dominant players. Digital public infrastructure, as pioneered in countries such as India, Brazil,

Indonesia and Saudi Arabia, demonstrates how shared, secure and standards-based platforms can scale essential services and foster inclusive growth.

The African Development Bank has suggested a continent-wide interoperable digital system to apply AI in sectors that boost productivity. Complementary regulatory measures could focus on competition policy, industrial policy and training programmes to help smaller firms and workers gain access to data, computing power and AI tools. Structural reforms could also support firms in scaling up and facilitate the efficient reallocation of resources towards more productive and AI-intensive sectors.

Ultimately, international cooperation on AI development, diffusion and adoption – building on existing initiatives such as the Global Digital Compact, the Independent International Scientific Panel on Artificial Intelligence and the Global Dialogue on Artificial Intelligence Governance – could help ensure that the benefits of these transformative technologies are widely shared.

3.2 New Technologies and employment

New technologies tend to reshape work by automating or augmenting tasks rather than replacing entire jobs. Routine manual roles – such as assembly-line work – have been most affected by robotisation, while generative AI is increasingly affecting clerical and knowledge-based tasks, including financial services, basic legal drafting, customer service, writing and software development. Although AI and AI-enhanced automation can enhance certain occupations, reduce routine tasks and enable more analytical or strategic work, they can also diminish others by stripping out skill-intensive elements, which may reduce job quality and satisfaction (Autor, 2025).

The distributional impacts of AI are uneven. Women are over-represented in some sectors most exposed to generative AI, such as services, making them more vulnerable in higher-income economies (ILO, 2025). Women may be more vulnerable to the effects of AI in developing economies (Egana et al., 2021). Younger and less experienced workers are also more likely to be adversely affected if AI performs the core tasks of entry-level jobs (ILO, 2025). However, there is also evidence of AI helping less experienced workers catch up with the performance of experienced workers more quickly (Brynjolfson et al., 2023). Certain highly supervised digital and platform-based jobs, often in developing economies – such as data labelling, micro-tasking or business process outsourcing – risk becoming precarious, with limited mobility (ILO, 2025).

Employer surveys suggest that the fastest-declining jobs in the next five years will include cashiers, administrative assistants, cleaners, stock clerks, printers, some financial sector roles, transport attendants and security guards. At the same time, demand is expected to grow for roles in AI development, data analytics, ethics and compliance, as well as senior managerial and professional positions (WEF, 2025). Many labour-intensive, non-repetitive jobs remain difficult to automate, including farm work, delivery services, construction, retail, hospitality and nursing (ILO, 2025).

Technology could help to reshape where jobs are located. The drive for the globalisation of production, which has led to dispersed manufacturing and service jobs worldwide, could weaken. Advances in technology and other factors reduce the incentives for relocating production to lower-wage economies and may encourage ‘nearshoring’ or ‘reshoring’ (Yücesan, 2025). Expectations that Africa and other low-wage regions will climb the industrialisation ladder are increasingly uncertain, as both manufacturing and service offshoring face limits set by the

advancement of automation, AI and other factors (Rodrik, 2025).

Developing countries, particularly those with large, growing populations, are likely to require new strategies to create jobs and promote growth, recognising that traditional pathways such as export-led industrialisation may no longer be effective at scale. Supporting inclusive adaptation to technological change, while addressing concentration risks and expanding access to AI capabilities, will be crucial for maintaining employment and economic development globally.

3.3 Productivity lag

Until recently, there was a clear slowdown in productivity growth in advanced economies. “Labour productivity growth rates have at least halved since the 1996-2005 period, making GDP per capita in 2017 several thousand dollars lower than it would have been based on the previous trend.” (Goldin et al., 2024) It is not yet certain when the current wave of AI-driven innovation will yield significant improvements in productivity. There are many views on the rate and timing of the impact of AI on productivity (OECD, 2025).

The history of previous industrial revolutions shows that time delays between the invention, innovation, adoption and systemic integration of new technologies can be significant. The full effect of general-purpose innovations on productivity usually takes decades because entire production systems need time to develop (Edquist & Henrekson, 2004).

Although new technologies centred on AI may have the potential to boost productivity in advanced economies, the rate of productivity growth is likely to be relatively slow until production systems are fully adapted to incorporate the current generation of technological advances. Some experts in development economics and computer science believe full integration is decades away (e.g. Acemoglu, 2025; Narayanan & Kapoor, 2025), but careful support for the diffusion, adoption and integration of new technologies could help reduce these timelines, especially in developing economies.

AI and its applications also have the potential to significantly boost public services, including social services such as the health care sector, where they can aid in innovation, diagnosis and service provision, as well as in education and skills provision for all demographic categories.

For global development, a key issue is whether the diffusion, adoption and integration of new technologies will reduce or deepen global inequality. Without significant improvement in AI readiness in developing economies, it is likely that global inequality will be exacerbated (Cerutti et al., 2025).

3.4 Demographic transition

In more than half of the world’s countries, which are home to two-thirds of the global population, the fertility rate has fallen below the replacement level, generally estimated at 2.1 children per woman. The global fertility rate averaged 2.3 children per woman in 2023, just above the replacement level. Over the past 25 years, the fertility rate has declined in 90 per cent of the world’s countries (Madgavkar et al., 2025).

At the same time, life expectancy is increasing in nearly all countries. The combination of declining birth rates and rising life expectancy results in a fundamental shift in the dependency ratio – the proportion of those too old or too young to work compared to those of working age. This

demographic change will be slower in most of Africa, but only until the latter part of this century, when fertility rates in Africa are expected to fall below the replacement level.

The ongoing rise in dependency ratios is likely to cause a decline in per capita income as a result of a smaller working population relative to dependants, putting pressure on pension adequacy in affected countries. Older people in advanced economies consume more than they receive from government pensions. The gap is filled by in-kind payments, income from private savings and the earning power of those still working. In OECD countries, men spend an average of 18 years in retirement and women spend 23 years; in the early 1970s, men spent an average of 11 years in retirement and women spent 15 years. Older individuals also use more government services, such as health care, than they contribute to taxes, which will increasingly strain government finances (Madgavkar et al., 2025).

As the proportion of the population of retirement age increases, the demands not only on government pension systems but also on private savings steadily grow. A capital-funded private pension system pillar can help strengthen individual financial security in old age by leveraging the opportunities offered by capital markets. While the current ageing generation in advanced and some developing economies has benefited from asset growth through house prices and equity investments, there is no guarantee that these markets will remain as favourable for future generations. For example, rural housing markets could stagnate or weaken due to population decline and outbound migration to larger cities, as experienced in Japan, where increasing pressure has been placed on urban housing markets (Hashimoto et al., 2020). Moreover, in some countries, asset distribution may result in poorer elderly individuals lacking sufficient assets to bridge the gap between government support and their spending needs.

Population ageing has additional effects on generational and spatial distributive effects. Due to historical patterns of wealth accumulation and the inverted age pyramid in advanced economies, the increasingly substantial inheritances and gifts from the wealthier, elder generations are likely to benefit an even smaller proportion of the global population (Hood & Joyce, 2017).

Some developing economies already face the challenge of increasing dependency ratios as a result of declining fertility rates and longer life expectancy. In 2024, India's fertility rate was already below the replacement level at 1.98, and Türkiye's was 1.51. Even in Africa, where many countries still have fertility rates above the replacement level, by 2050, countries south of the Tropic of Capricorn and north of the Sahara are projected to have completed the demographic transition, and most of Africa is expected to follow within the next few decades.

Low productivity growth is the main obstacle to improving living standards in developing economies. The current demographic expansion in Africa has been accompanied by unemployment or, more often, underemployment, informality and persistent poverty. For developing economies, including low-income countries, low productivity presents a double jeopardy. While living standards are low for many people in developing economies, there is also an imminent threat following the demographic transition. If developing economies cannot build relatively prosperous economies during the period of demographic dividend, resources will be insufficient to support the growing elderly population later. In many countries, especially in Africa, life expectancy is increasing in parallel with GDP growth, alongside high, though declining, fertility rates. This is why relatively strong growth rates by global standards do not translate into significant per capita income growth. Africa's average growth rate from 2000 to 2020 was about 4.2 per cent, whereas the average annual per capita growth rate over the same period was only 1.1 per cent (Kuyoro et al., 2023). This is why the productivity enhancing diffusion, adoption,

integration and development of AI in Africa is urgent (African Development Bank, 2025).

Skill levels, infrastructure and the quality of governance hinder investment in productivity improvements in many developing economies. Limitations on the diffusion and development of technologies in these countries also restrict productivity growth. Enhancing investment conditions through investing in human capital, infrastructure and trusted institutions is a vital precondition for stronger growth in many poorer developing economies, but barriers to the dissemination of new technologies in these countries need to be addressed.

There are several ways to address the macroeconomic challenges caused by demographic trends, which could benefit both advanced and developing economies. In countries with high old-age dependency ratios and declining populations, policies that encourage female workforce participation are possible, for example, through more affordable housing and childcare (IMF, 2025).

Promoting healthy ageing and longer working lives – whether through incentivising the voluntary extension of employment or, as some countries have done, raising the statutory retirement age – can help ease fiscal sustainability pressures. These policies should be accompanied by training and retraining measures to facilitate occupational changes throughout the work life. However, such measures may encounter public resistance and could, in some sectors/jobs, also impair productivity growth, especially in physically demanding and labour-intensive roles.

The scope of remote work, including tasks that can be outsourced to workers in developing economies, is likely to keep expanding as new AI-enhanced methods for remote work continue to emerge.

There are also many activities in fields such as care, health and construction and maintenance where people cannot be replaced by AI, robots or remote work in the foreseeable future. Some advanced and developing economies have expanded the recruitment of temporary or circular migratory labour in relatively low-skill sectors, such as agriculture and construction, in recent decades to alleviate some of the challenges associated with demographic change.

Many countries employ selective systems for recruiting permanent migrants, mainly those with skills in high demand. Some of these are passive systems, such as awarding points to potential migrants to assess their eligibility for permanent residence or maintaining lists of qualifying occupations. Other countries implement more active programmes to attract sought-after migrants, occasionally referred to as skills partnerships.

While orderly migration addresses labour imbalances between ageing and youthful populations, migration issues are subject to concerns in many host and source countries, and suitable solutions are best developed considering national and regional contexts.

3.5 Migration dynamics

The migration rate indicates the proportion of people born in one country and living in another, as recorded in censuses and related statistical surveys. In 2024, global migration was roughly 3.7 per cent – somewhat higher than the global average migration rate for much of the post-1960 period, which has been about 3 per cent (IMF, 2025). Global migration patterns are typically highly regional and intraregional. Nearly half of all international migrants worldwide live in their region of origin. Migration is frequently a concern in origin and destination countries and needs to be managed responsibly.

It remains debated whether the outcome for origin countries of schemes such as skills partnerships is ultimately negative or positive, but it seems to depend, partly, on the circumstances and policies of both the origin and destination countries. There are concerns that the emigration of skilled workers leads to ‘brain drain’ and that remittances may not sufficiently contribute to the investment base of origin countries. Recent literature generally supports the positive impact of migrant labour on origin countries (Batista et al., 2025; Khanna et al., 2024), while the beneficial effects of regularised and legal labour migration for destination countries are widely recognised.

The emigration of skilled workers can positively influence development through remittances and by increasing incentives for education in origin countries. A recent review of the literature concluded that migration opportunities often enhance human capital in origin countries and generate downstream benefits through remittances, foreign direct investment, trade linkages, the transfer of knowledge, technology, norms and return migration (Batista et al., 2025). AI can facilitate cross-border virtual (i.e., remote) employment opportunities, which in turn mitigate physical migration induced by economic hardship. AI can also enhance capacity-building initiatives, promote technology transfer, and strengthen the co-creation of technologies between developed and developing countries. There is also evidence that returning emigrants can significantly improve the export performance of their home country after they return (Bahar et al., 2024).

The policy environment in the country of origin, and its ability to promote skills development, relations with the diaspora and domestic conditions for business growth, are all crucial factors shaping the long-term developmental impact of emigration. More research is needed on the policy mix necessary to achieve a positive effect from emigration and on how emigration affects smaller, more vulnerable countries, which are less studied. Similarly, the policy environment in the destination country is an essential factor affecting the success of inward labour migration.

4. Insights and policy options

Rising old-age dependency ratios, caused by lower fertility rates and higher life expectancies, threaten to exacerbate slow growth and falling living standards in many parts of the world. There are several strategies to address these challenges, such as increasing the participation of women in the labour market (by improving access to childcare, for instance), encouraging healthy ageing and extending working life. The official retirement age has been rising in many countries, from below 60 in some to up to 70 in others.

Countries with ageing demographics may need to prepare for increasing fiscal challenges that threaten the quality and availability of government services. Collaboration and sharing information on macroeconomic reforms, alongside foresight and risk management tools, can help to address these growing challenges.

AI can be used to boost productivity and invest in human capital – such as education, skills and health – across all demographic groups. Reforms would benefit from being part of a comprehensive structural agenda focused on enhancing growth prospects, infrastructure, institutions and governance quality. Targeted investment in digital infrastructure, education and institutional capacity is crucial for developing economies to adopt and develop AI, strengthen innovation ecosystems and engage in global value chains, thereby reducing rather than increasing inequalities. To maximise the benefits of AI in trade, policy priorities could include

strengthening digital infrastructure, facilitating open access to AI models, maintaining trade openness and improving data collection on the use of AI to inform policy decisions.

Although innovation and new technologies can boost productivity and help offset the pressures of ageing and declining populations, as well as improve productivity in countries experiencing demographic booms, their uneven diffusion risks widening inequalities within and between nations. Access to digital infrastructure, skills and data remains concentrated in a few countries. Efforts to expand digital infrastructure, develop digital-ready skills, enhance access to data and increase investment in developing economies could be intensified to address the aforementioned risks. G20 member countries should stay committed, as agreed under the Indian and Brazilian presidencies, to reducing digital divides – including halving the gender digital divide by 2030 – and ensuring that technological transitions are inclusive and fair. Reducing digital divides may include supporting labour market participation for vulnerable groups most affected by AI access and adoption, while upholding standards related to intellectual property, data protection, privacy and security. It may also involve supporting structural reforms necessary to make countries more attractive for AI investments.

The value of safe, secure, trusted and inclusive digital public infrastructure as a foundation for resilient economies and innovation was recognised, as reflected in the India 2023 and the Brazil 2024 Leaders' Statements. Investing in systems that respect human rights, privacy and intellectual property rights will ensure that the digital economy remains open, fair, safe and secure, enabling all countries to benefit from technological progress while reducing the risks of fragmentation and inequality.

As with most new technologies, there are risks of unintended negative impacts on affected employees. Reskilling and other adaptation strategies can be considered for older workers and those at risk of being fully or partially displaced by AI-related changes. As recommended by the International Labour Organisation (G20, 2025), G20 members could consider developing comprehensive policies and regulations with active input and consultation from social partners. Workers, including “data labourers” and other outsourced or offshored employees, should be involved in discussions with employers and governments.

G20 countries, alongside existing organisations and institutions, can consider facilitating the sharing of knowledge on AI policies and practices. This would support governments by offering information on the most effective ways to implement new technologies, and how policies and practices can be adapted to maximise the opportunities these technologies present. Sharing insights gained from measuring, monitoring and evaluating the impact of AI, as well as assessing AI readiness, can benefit all countries. It can also provide guidance on how governments can mitigate new risks linked with the deployment of these technologies and ensure their ethical use.

Simultaneously, global AI frameworks should include perspectives from all economies. Ensuring that developing countries have a voice in shaping standards and principles will enhance legitimacy, foster trust, and promote more balanced and sustainable outcomes.

The International Monetary Fund has noted that sound migration policies can help to address long-term demographic challenges. Further, these policies can be supported by integration efforts, infrastructure development, and active labour market policies to address short-term congestion costs and maximise benefits for immigrant workers and both the destination and sending economies. Building public support and social acceptance for such policies is also crucial (IMF, 2025). Alongside productivity-enhancing innovations, responsible skills

partnerships and circular migration can help alleviate labour shortages caused by demographic trends; however, their effectiveness depends on securing public backing in both source and destination countries. The connections formed between these countries, as well as between employers and workers within such arrangements, can be crafted in a way that is fair and beneficial for all, taking into consideration country-specific context and policy priorities.

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