



UNIVERSITIES
SOUTH AFRICA

USAf'S INAUGURAL THOUGHT LEADERSHIP EVENT, 2 OCTOBER 2025

Rethinking Post-School Pathways for Youth Employability in South Africa

**The future of work and workers in South Africa: Multiple
pathways to meaningful economic participation**

André Roux

Stellenbosch Business School

Agenda

Dimensions of the labour market

Here come the robots

Creative destruction

Alternative futures of the world of work in South Africa

To ponder over

Agenda

Dimensions of the labour market

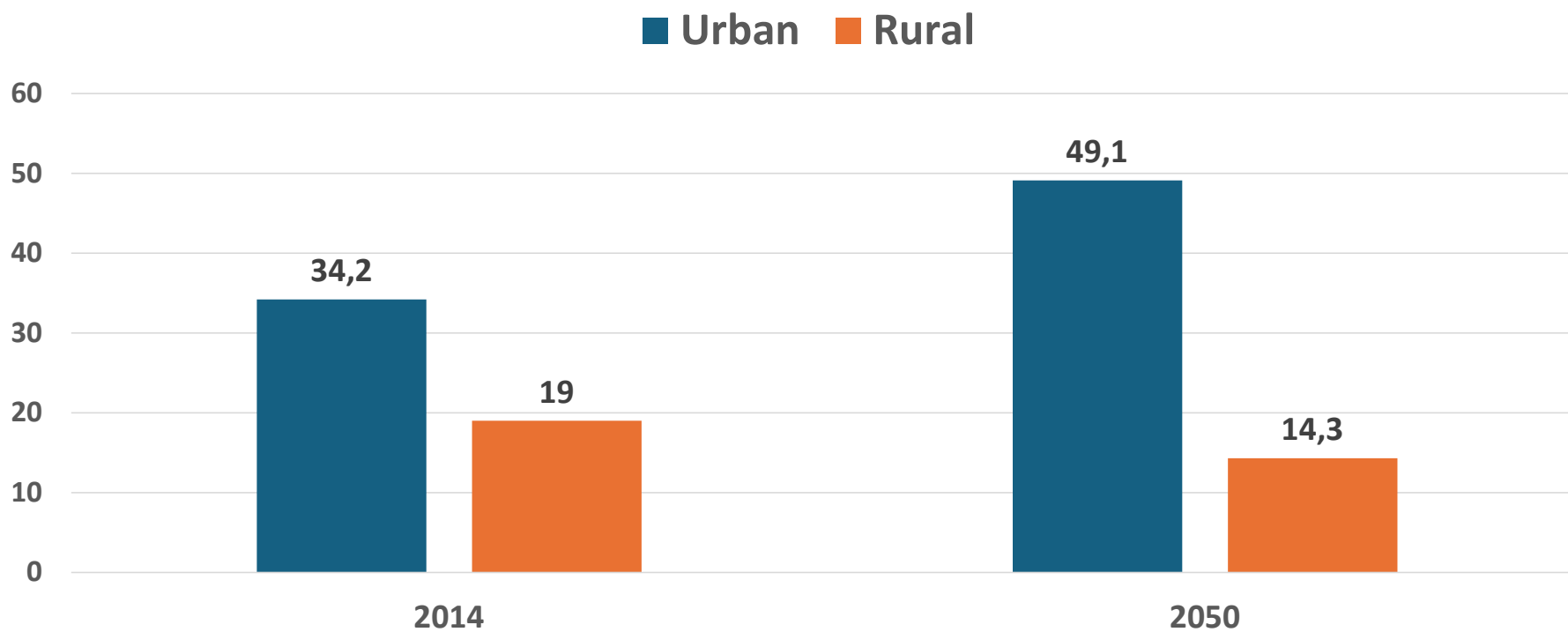
Here come the robots

Creative destruction

Alternative futures of the world of work in South Africa

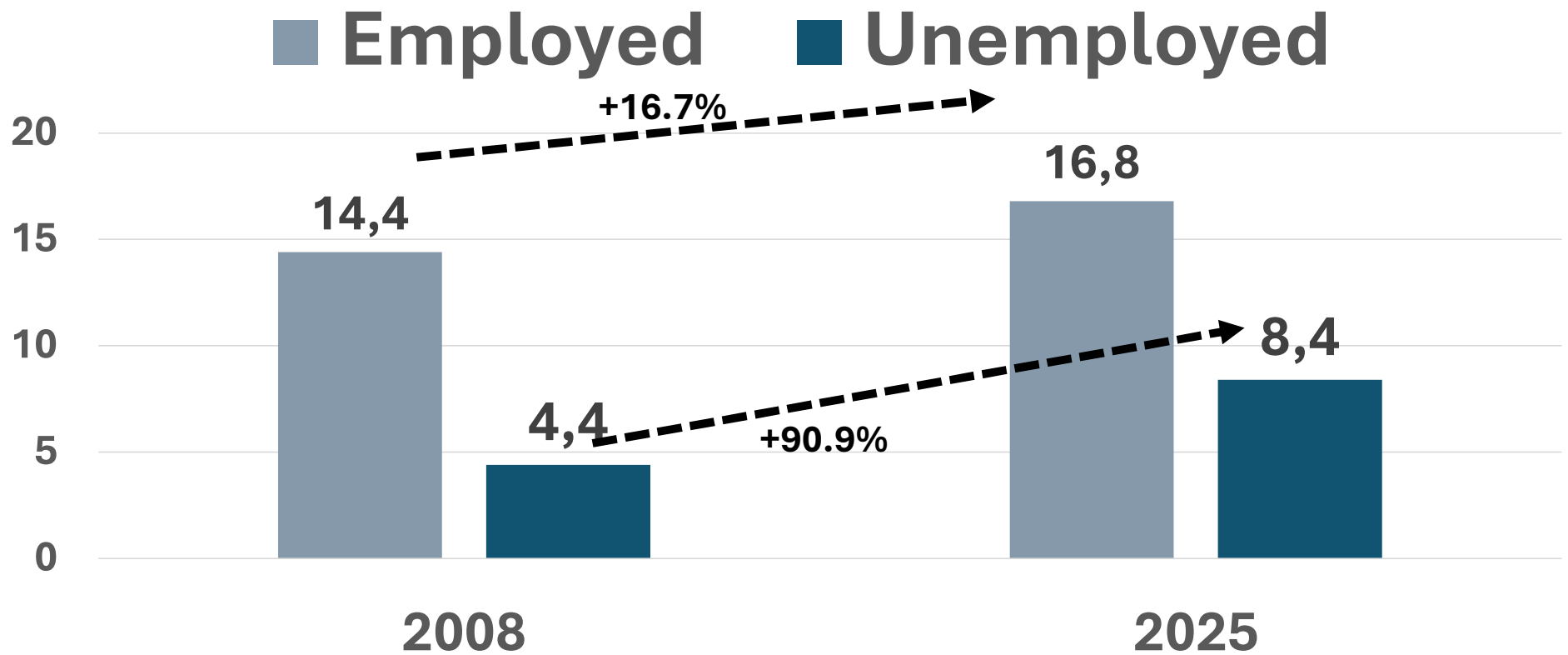
To ponder over

SA's urban and rural population (m)

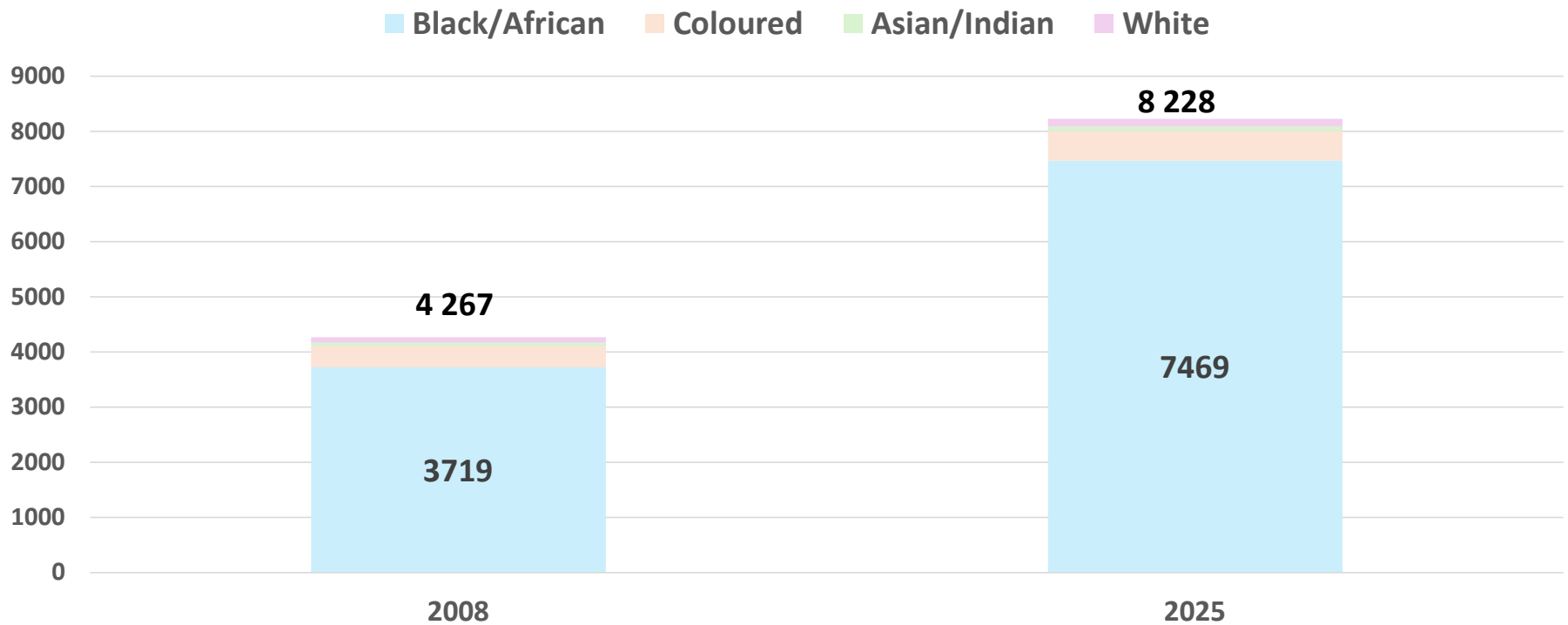


UN World Population Prospects

Employment and unemployment in South Africa (m)



Unemployment in South Africa by population group ('000)



Computed from StatsSA

Employment by occupation

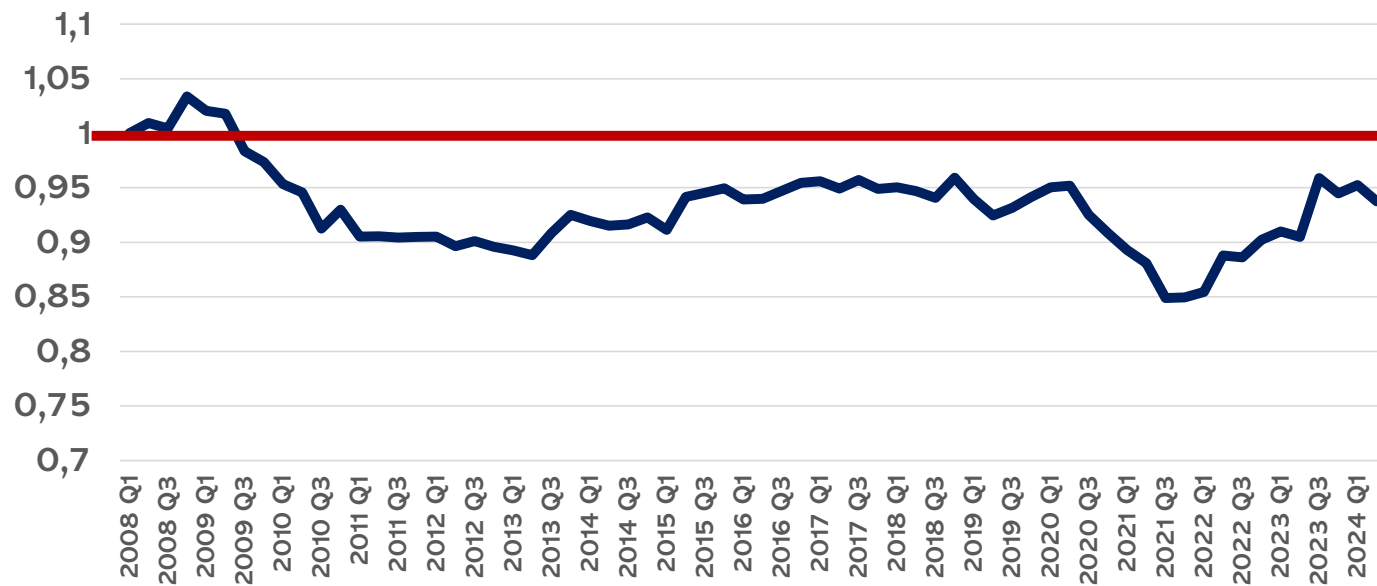
	2001	2025
More skilled	20.1	23.3
Less skilled	79.9	76.7
- Clerks	9.6	11.0
- Sales & service	14.4	17.4
- Skilled agric	1.7	0.4
- Craft & related trade	13.9	11.1
- Plant & machine operators	8.9	8.3
- Elementary	24.3	23.6
- Domestic workers	7.6	4.9
TOTAL	12 494 000	16 787 000

Computed from StatsSA

Employment/GDP

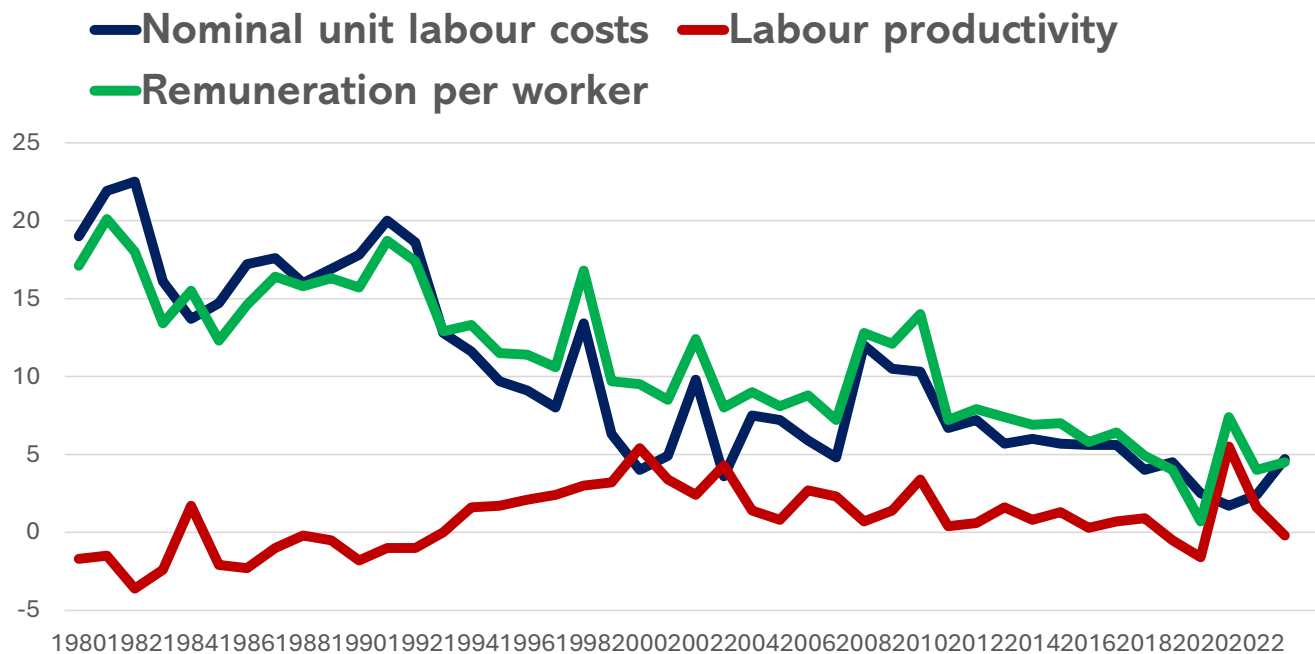


<1: The change in employment is proportionally lower than the change in the output of goods and services



Computed from SARB, historical series

Labour productivity (y-on-y % change)

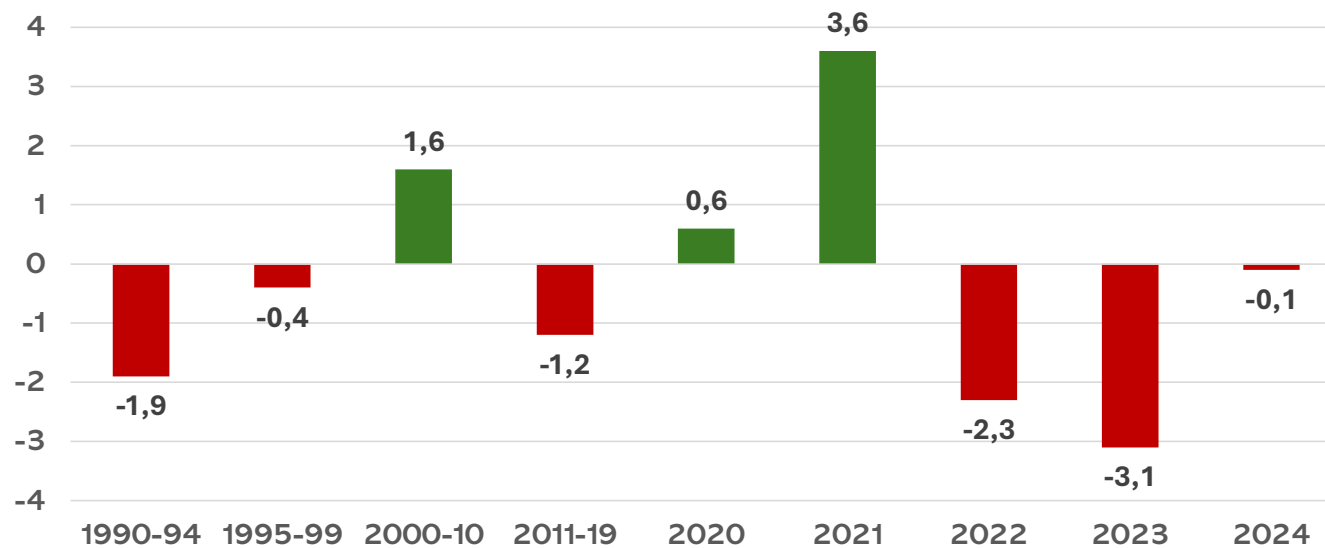


Computed from SARB, historical series

Total factor productivity growth



Measures residual growth in total output of a firm, industry or national economy that cannot be explained by the accumulation of traditional inputs such as labour and capital.

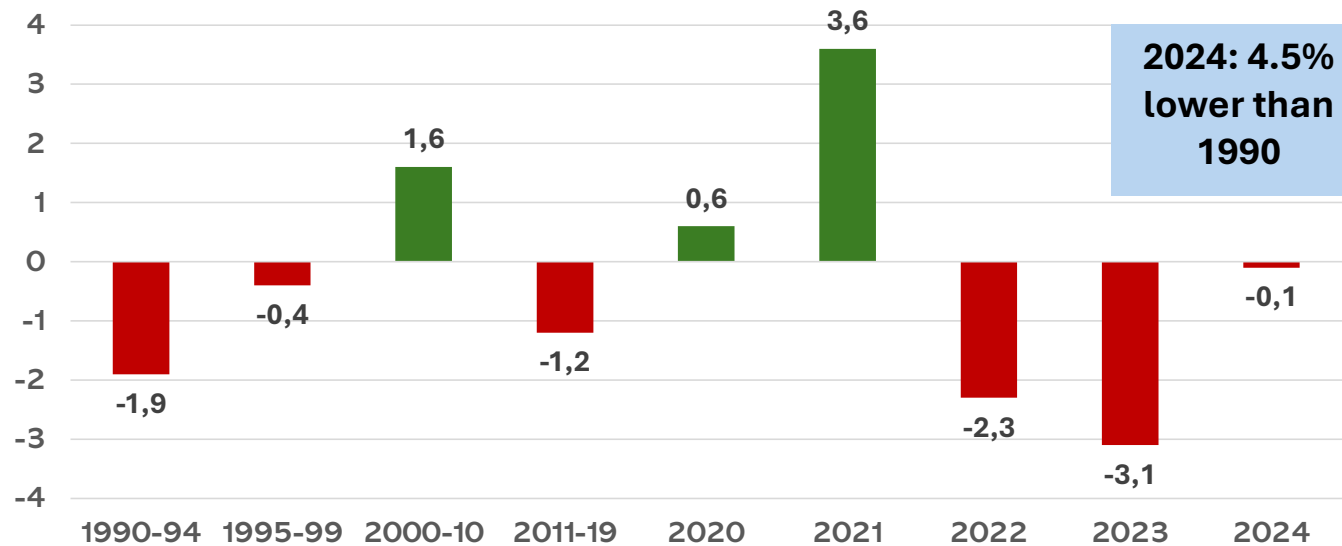


The Conference Board

Total factor productivity growth

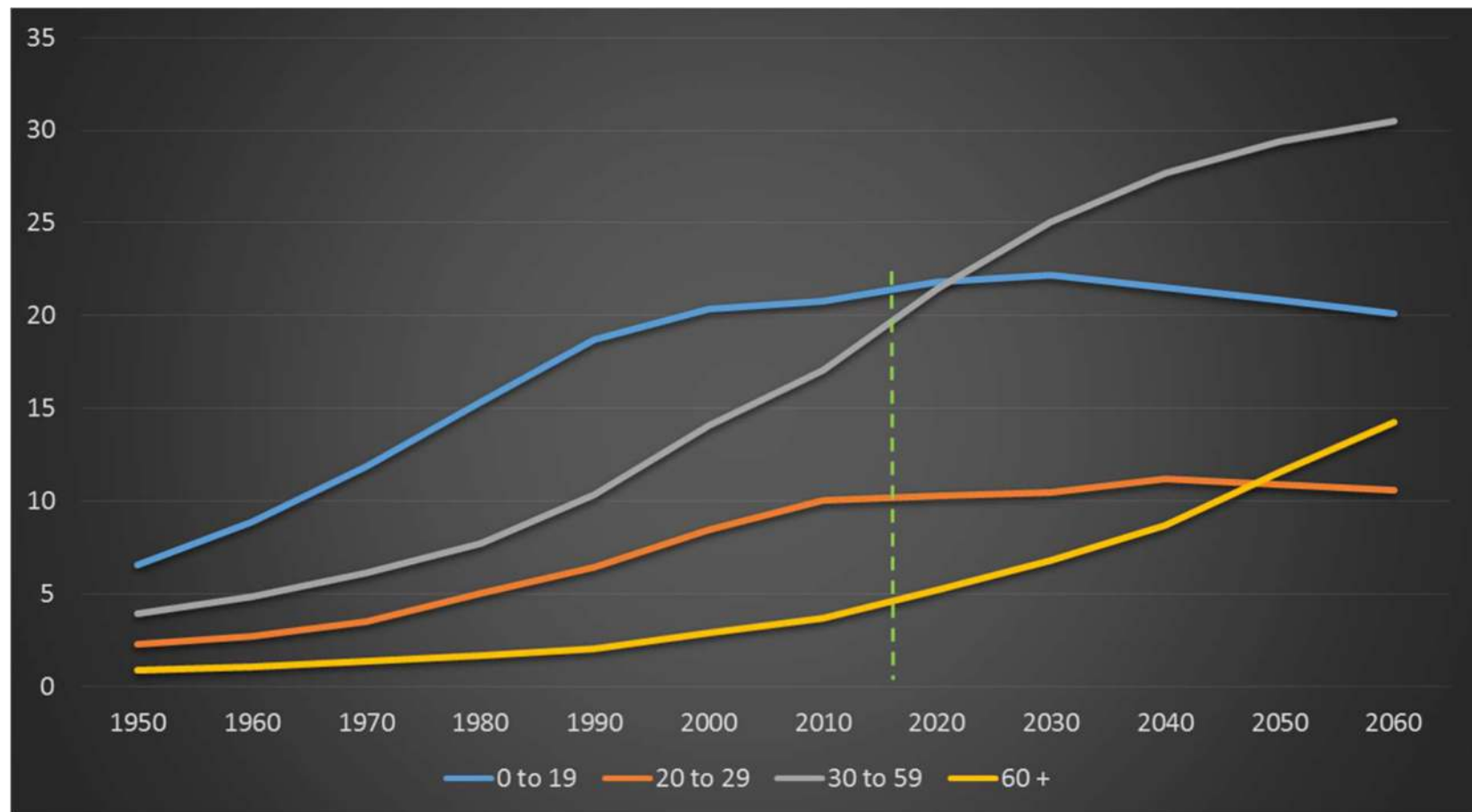


Measures residual growth in total output of a firm, industry or national economy that cannot be explained by the accumulation of traditional inputs such as labour and capital.



The Conference Board

SA's population by selected age groups



Source: Compiled from UN Population Prospects, 2017 update

SA's youth by age

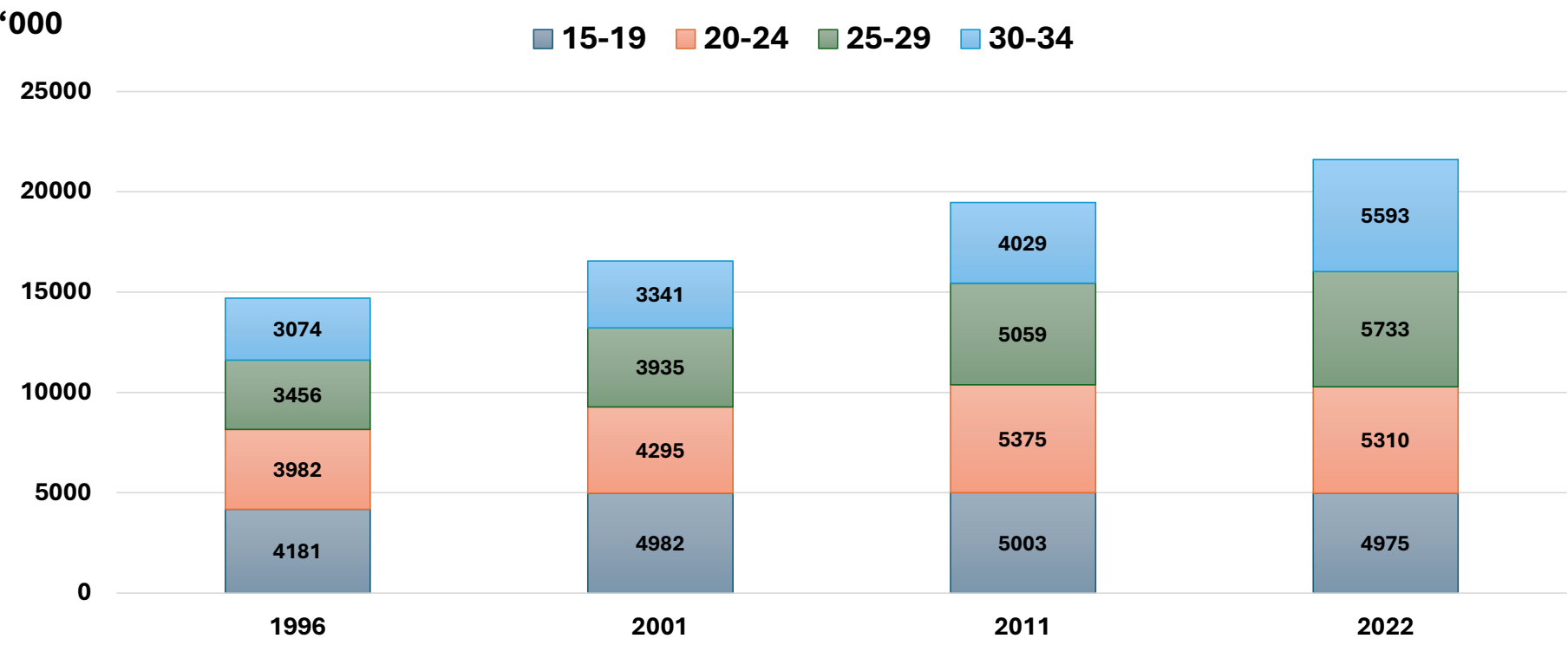


Figure 9: Labour market rates for youth males, 2004 and 2024

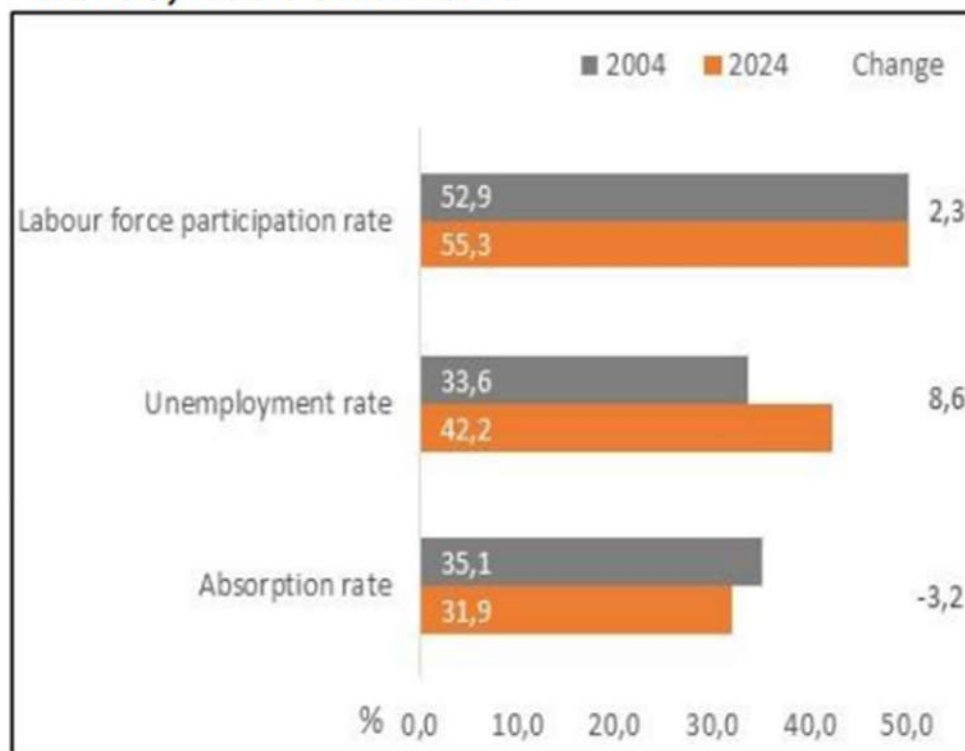
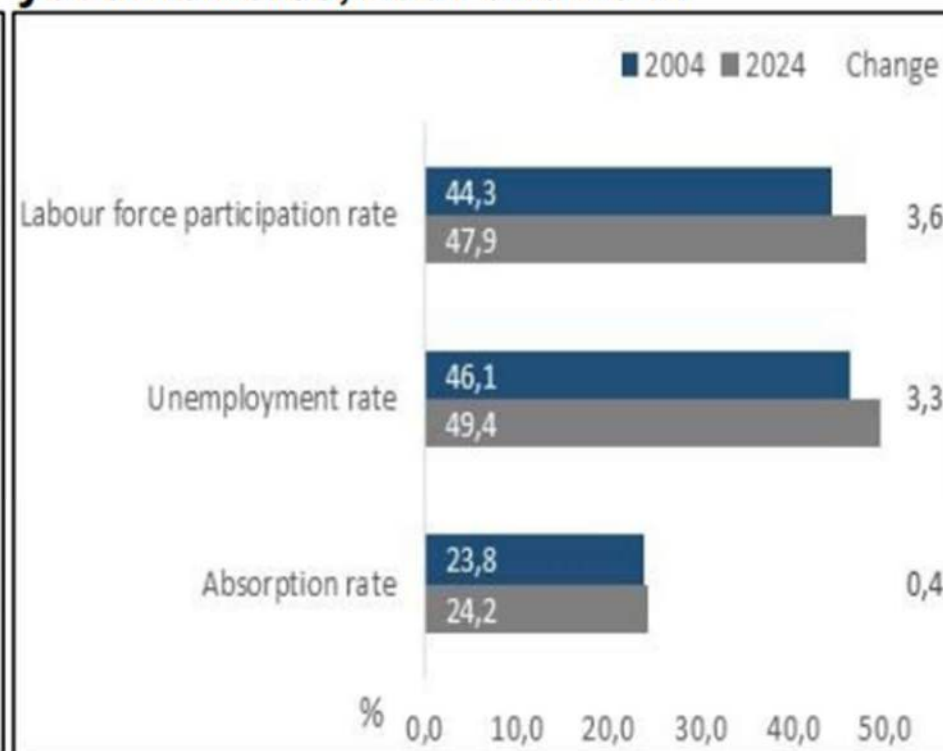


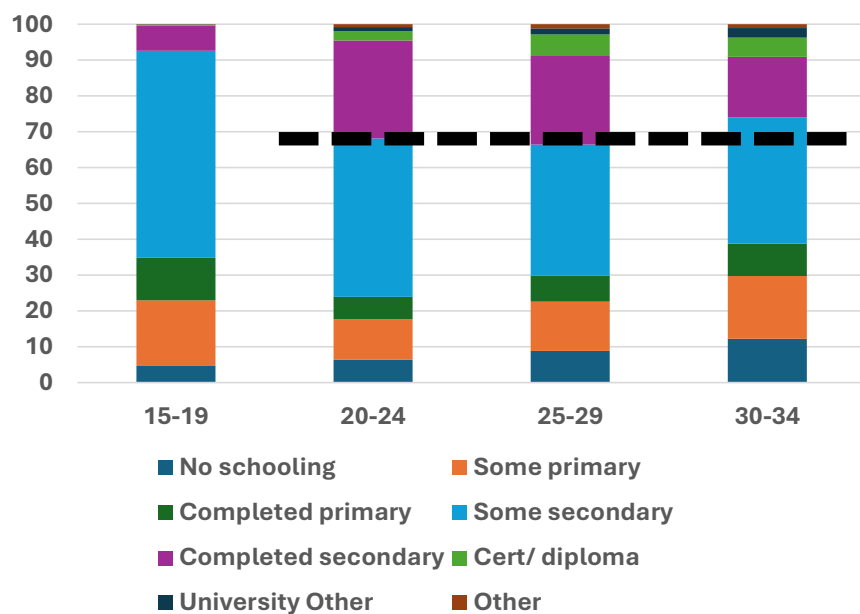
Figure 10: Labour market rates for youth females, 2004 and 2024



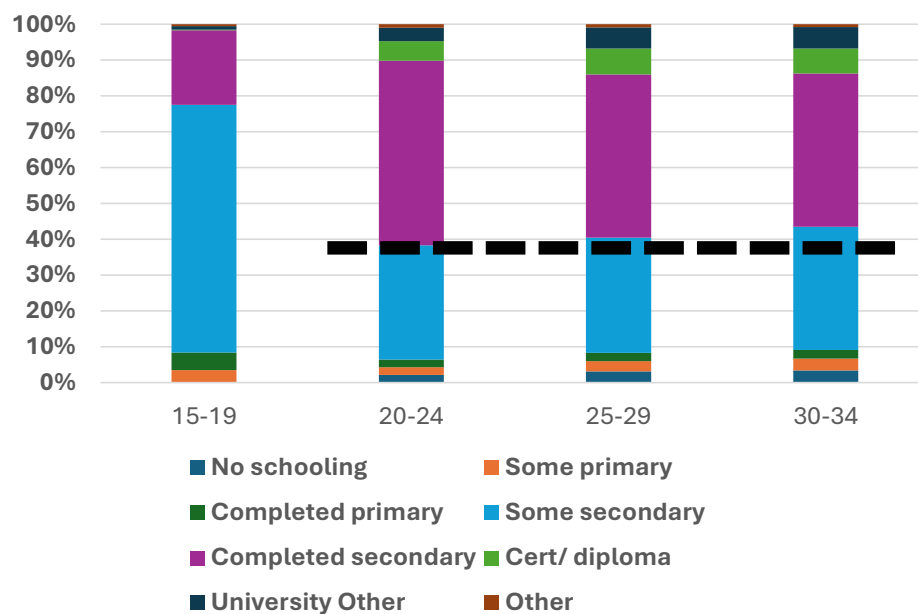
Source: LFS March 2004 and QLFS Q1:2024

Highest education level of the youth by age group

1996



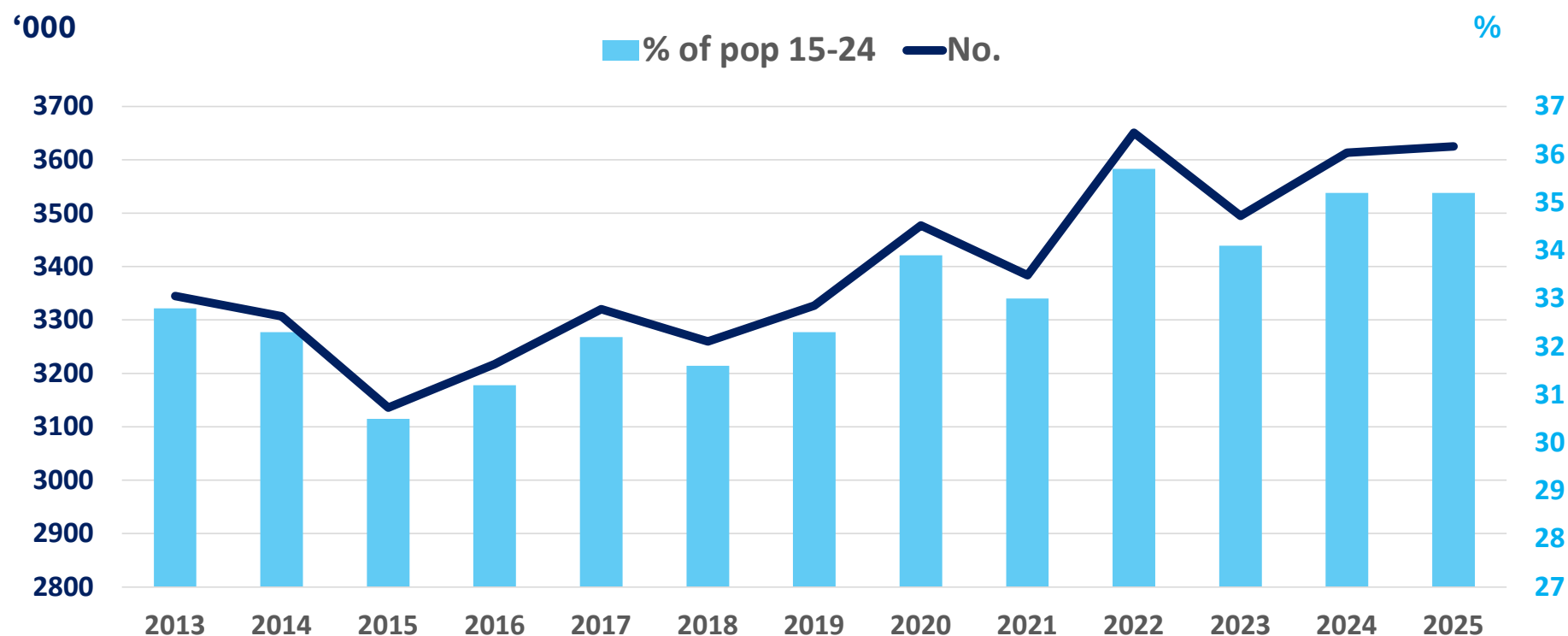
2022



Computed from StatsSA

NEETS IN South Africa (pop 15-24)

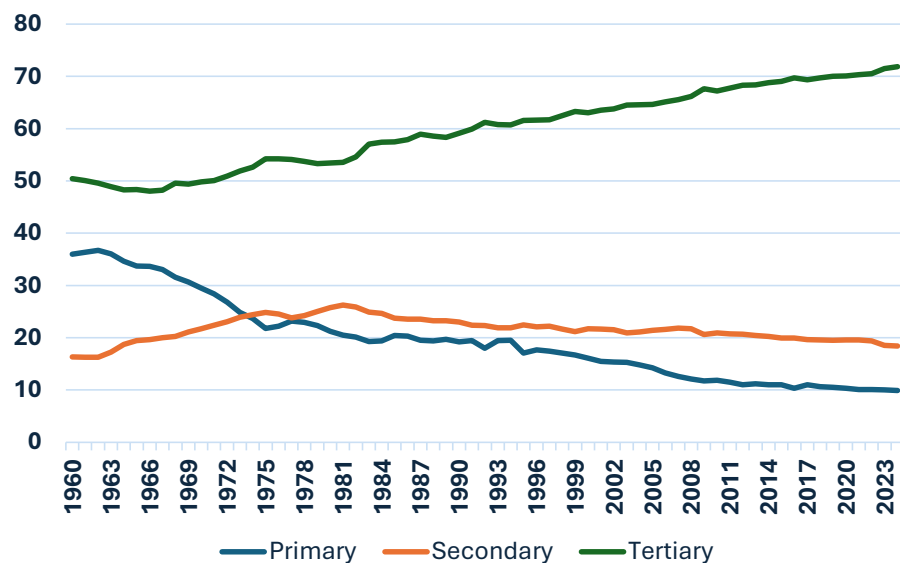
Q3 each year



Computed from StatsSA

Structural imbalance

Structure of SA economy



SARB

Highest level of education (20+ years)

Name	Frequency	%
No Schooling	2 576 011	6,9%
Some Primary	2 778 297	7,4%
Completed Primary	1 317 726	3,5%
Some Secondary	11 880 302	31,6%
Grade 12/Std10	14 122 681	37,6%
Higher Education	4 602 765	12,2%
Other	300 207	0,8%

StatsSA, 2023

SA's labour market is not even remotely efficient



When employers can fill vacancies in a timely manner, and when those who are unemployed do not remain out of work for long.



High, long-term, chronic unemployment



Uneven distribution of skills



Gaping wage divide



Wage increases not aligned with surplus of labour.



Significant increase in unit labour costs (wage increases > productivity growth)



High search costs

Agenda

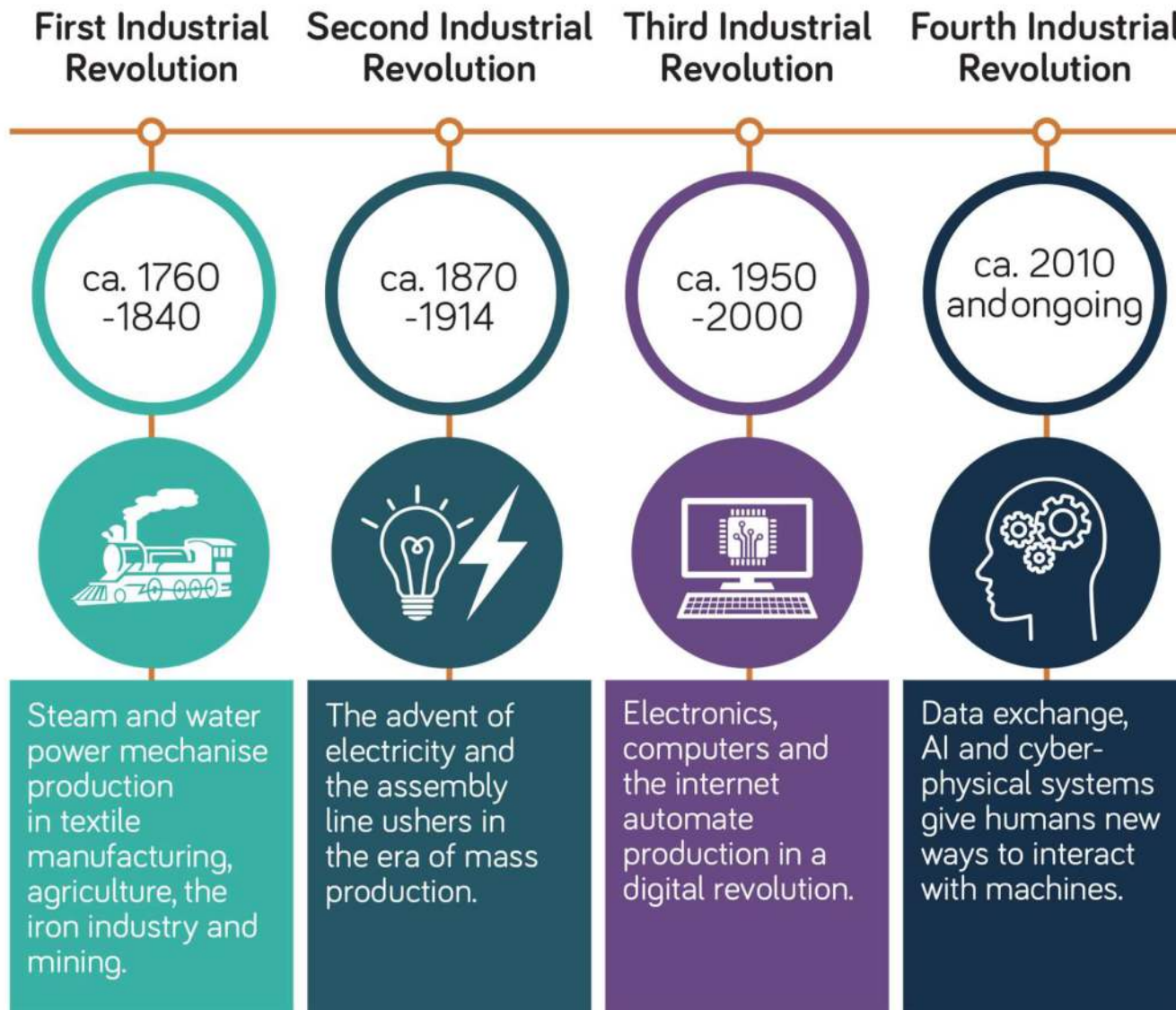
Dimensions of the labour market

Here come the robots

Creative destruction

Alternative futures of the world of work in South Africa

To ponder over



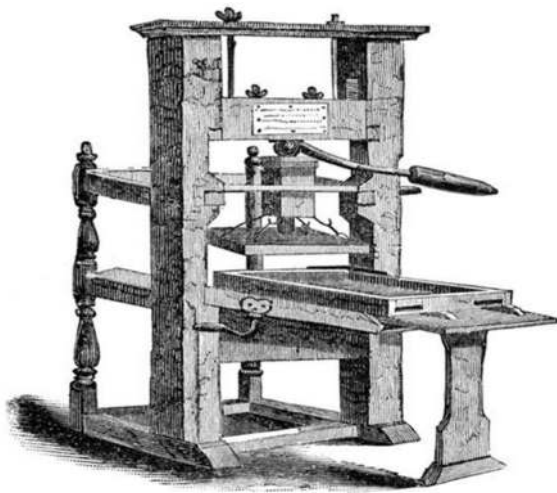
Technologies driving 4IR

1. AI and Machine Learning
2. Big Data and analytics
3. IoT
4. Cloud computing
5. Robotics and automation
7. Biotech and nanotech
6. AR and VR
8. Quantum computing
9. Blockchain
10. 3D printing

Gutenberg

vs

Zuckerberg

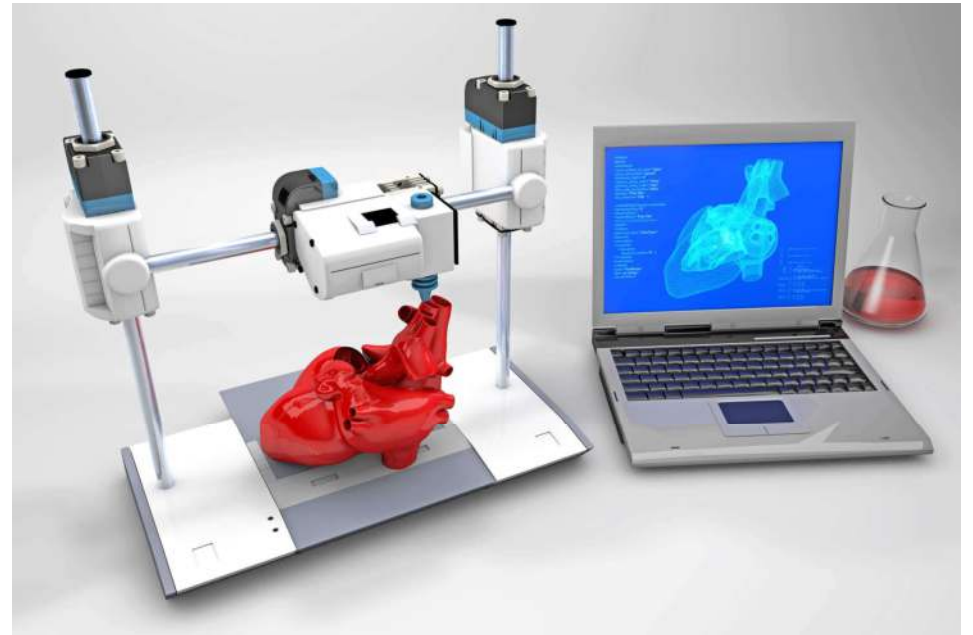


4 IR

WEF survey

By 2025 ...

- ☐ 10% of people wearing clothes connected to the Internet
- ☐ 1 trillion sensors connected to the Internet
- ☐ The first robotic pharmacist in the USA
- ☐ 10% of reading glasses connected to the Internet
- ☐ The first 3D-printed car in production
- ☐ The first implantable mobile phone available commercially
- ☐ 5% of consumer products printed in 3D
- ☐ Driverless cars equalling 10% of all cars in the USA
- ☐ The first transplant of a 3D-printed liver
- ☐ 30% of corporate audits performed by artificial intelligence (AI)
- ☐ Globally more trips/journeys via car sharing than in private cars
- ☐ The first city with more than 50 000 people and no traffic lights
- ☐ The first AI machine on a corporate board of directors





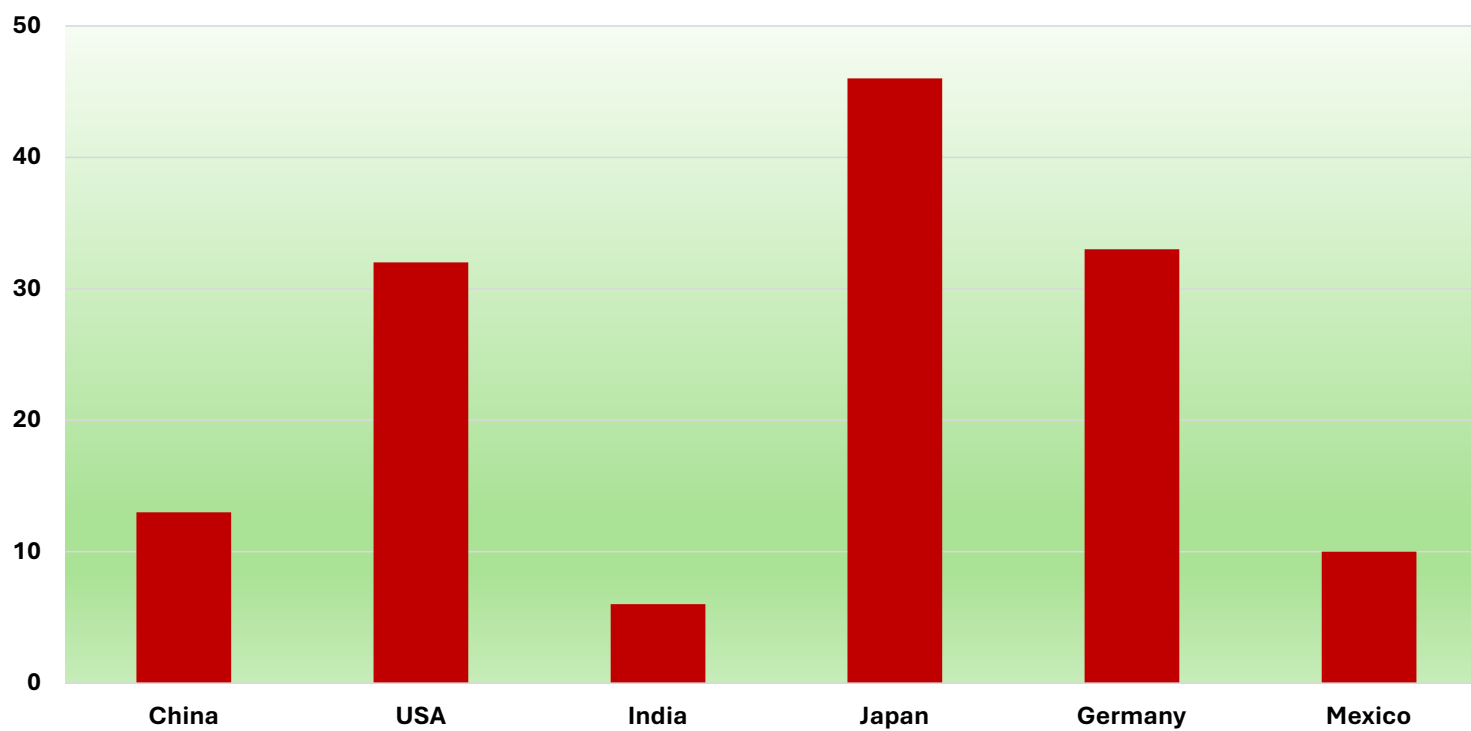
An artificial intelligence tastes 80 wines and recognizes its cellar 100% of the time

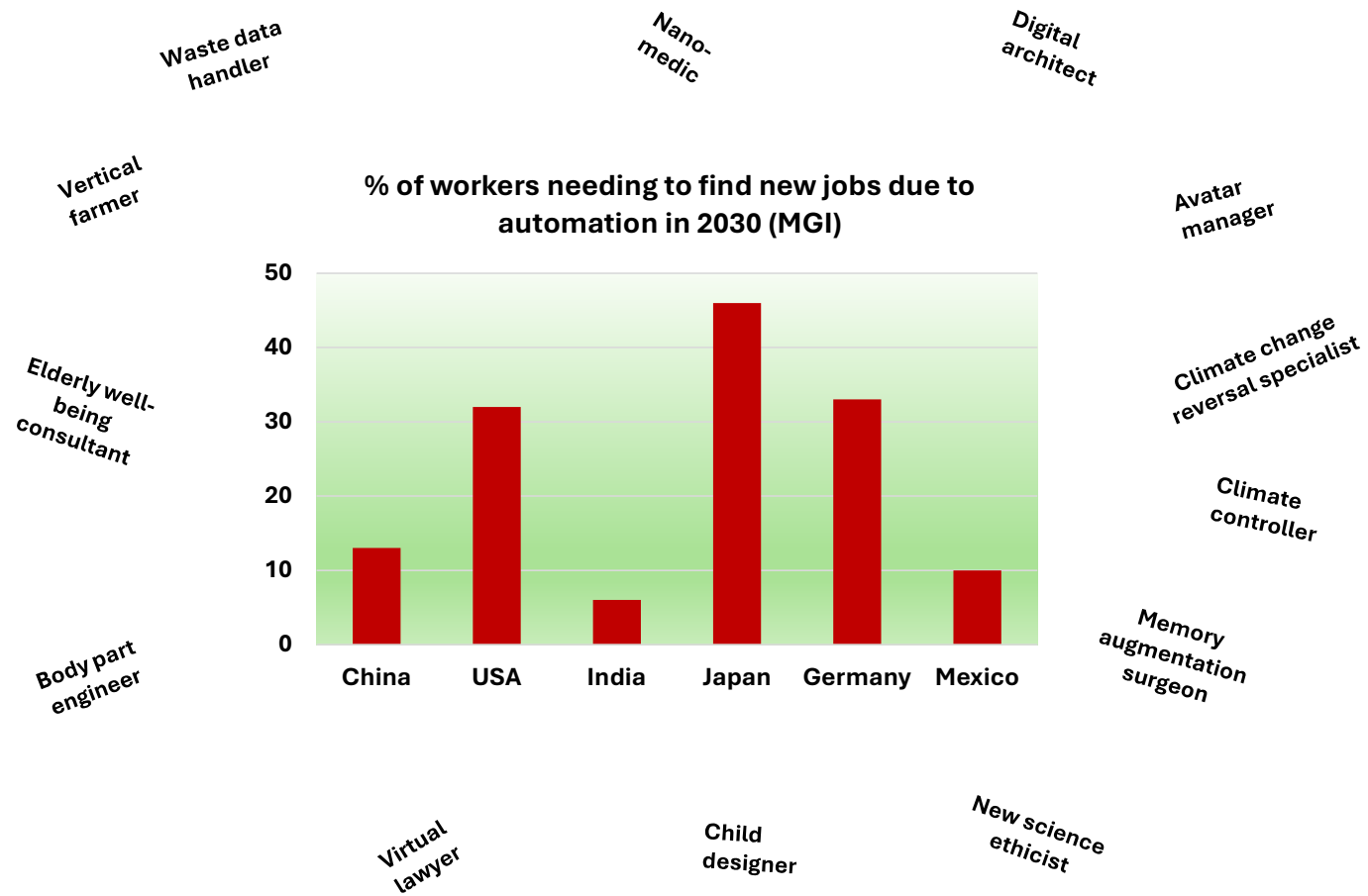
**In addition, the AI is able to identify the vintage
of the wine 50% of the time**



<https://www.vinetur.com/en/2023122677020/an-artificial-intelligence-tastes-80-wines-and-recognizes-its-cellar-100-of-the-time.html>

**% of workers needing to find new jobs due to automation in 2030
(MGI)**





Agenda

Dimensions of the labour market

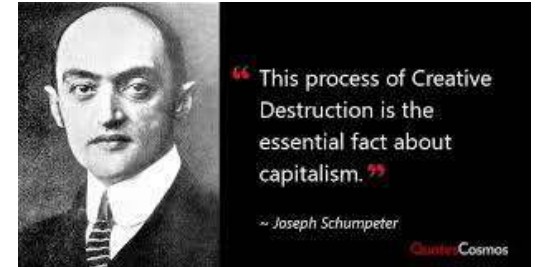
Here come the robots

Creative destruction

Alternative futures of the world of work in South Africa

To ponder over

Creative destruction



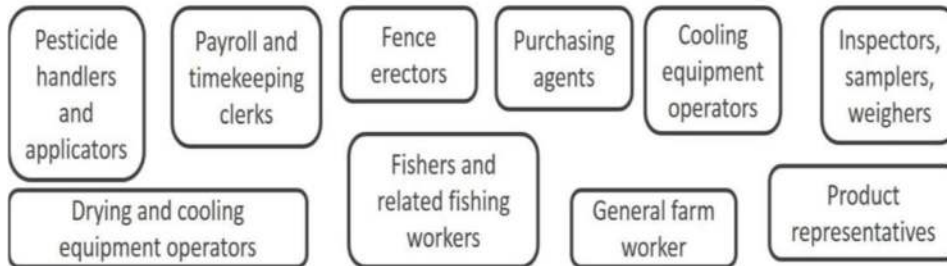
Innovation and invention creates

- New products
- New jobs
- New production processes

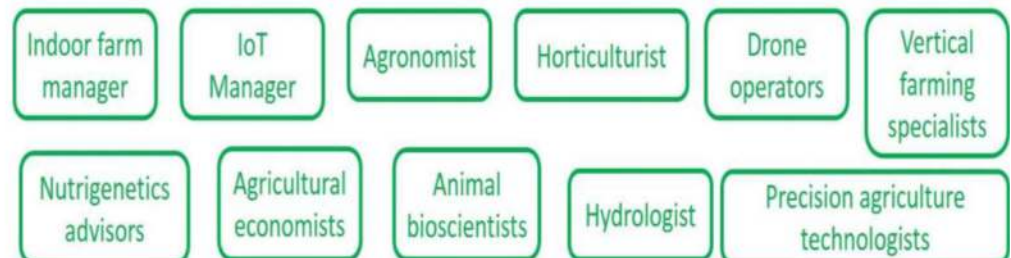
Innovation and invention destroys

- Existing markets
- Existing jobs
- Existing production processes

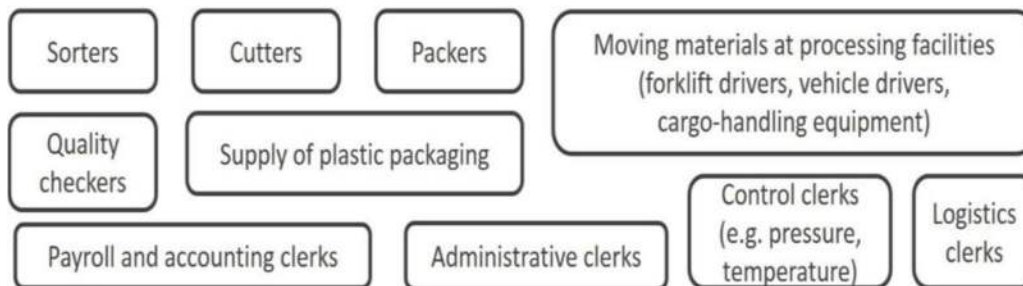
Agriculture sector: decreasing roles



Agriculture sector: increasing roles



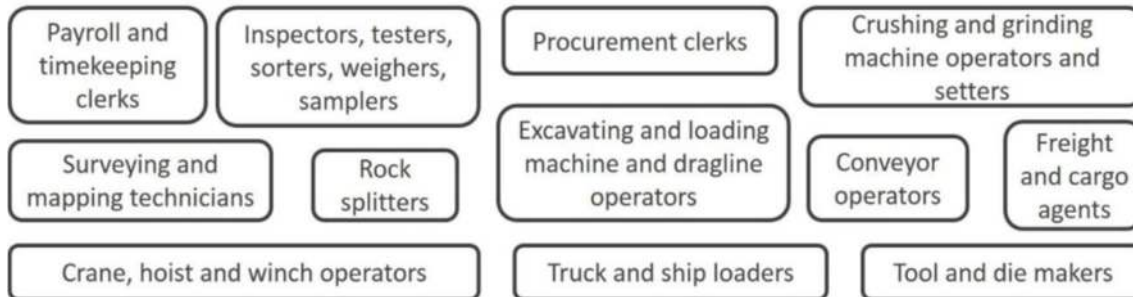
Agri processing sector: decreasing roles



Agri processing sector: increasing roles



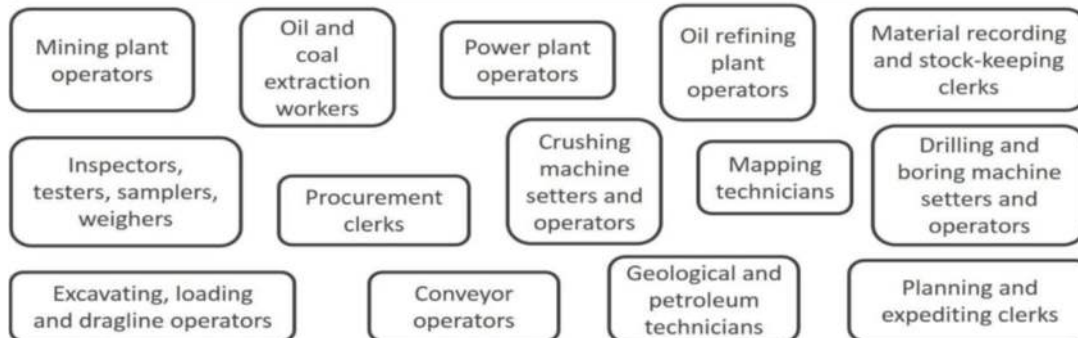
Mining industry: decreasing roles



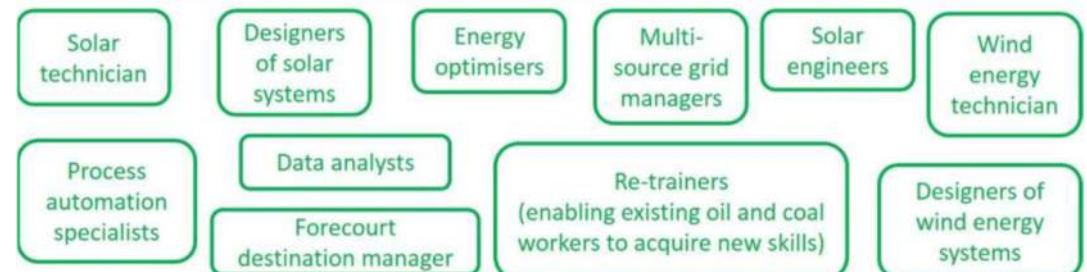
Mining industry: increasing roles



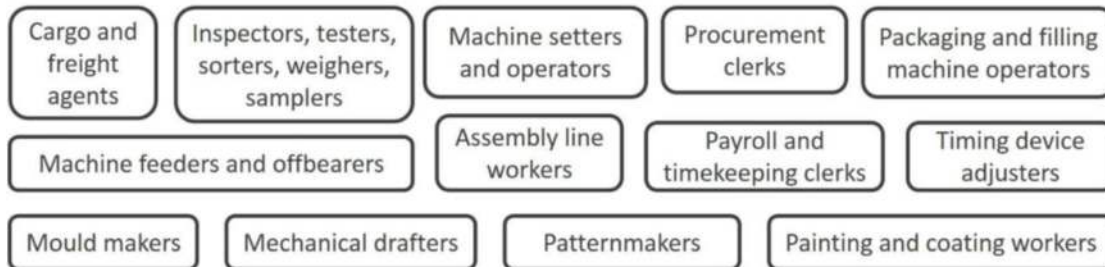
Energy (oil and coal) sector: decreasing roles



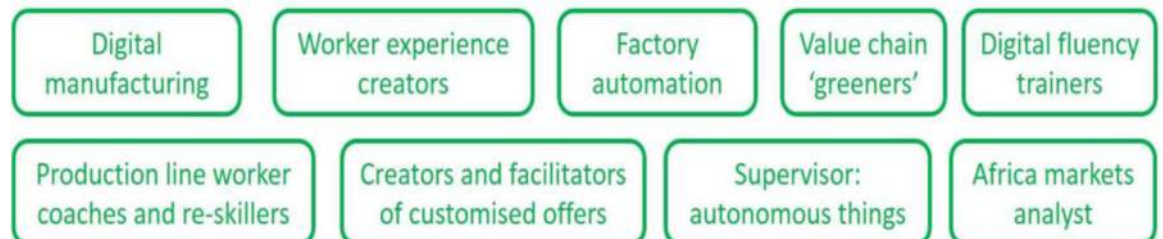
Energy (oil and coal) sector: increasing roles



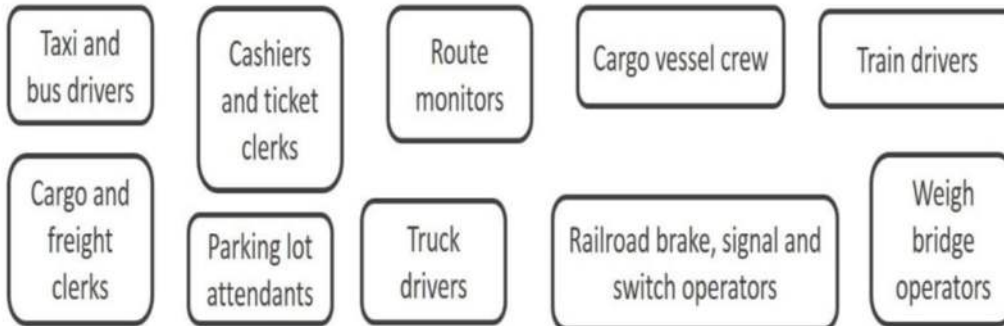
Manufacturing industry: decreasing roles



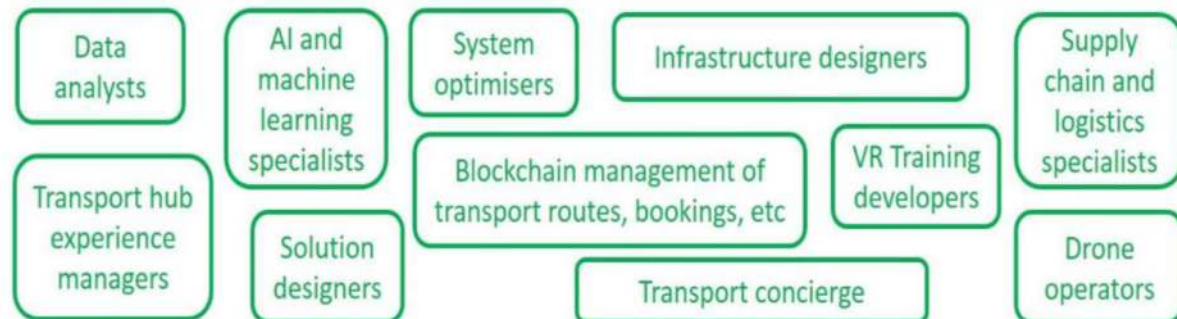
Manufacturing industry: increasing roles



Transport sector: decreasing roles



Transport sector: increasing roles



Automotive industry: decreasing roles

Assembly line workers

Welders, cutters,
solderers, brazers

Procurement clerks

Inspectors, testers,
samplers

Crane, hoist and
winch operators

Automobile
testers

Car sales
people

Mechanics
and
diagnosticians

Machine setters and
operators

Automotive industry: increasing roles

Non-fossil-fuel
energy
technologists

Cyber-security experts
(for in-vehicle systems)

Digital fluency
trainers

Production line worker
re-skillers

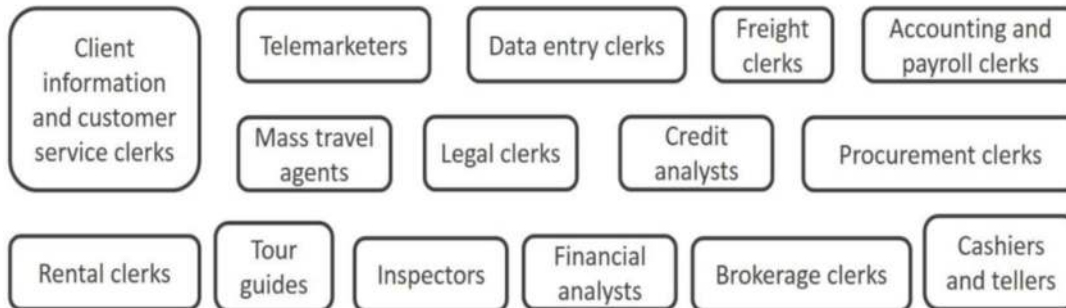
Value chain
'greeners'

In-vehicle info-tainment
system developers

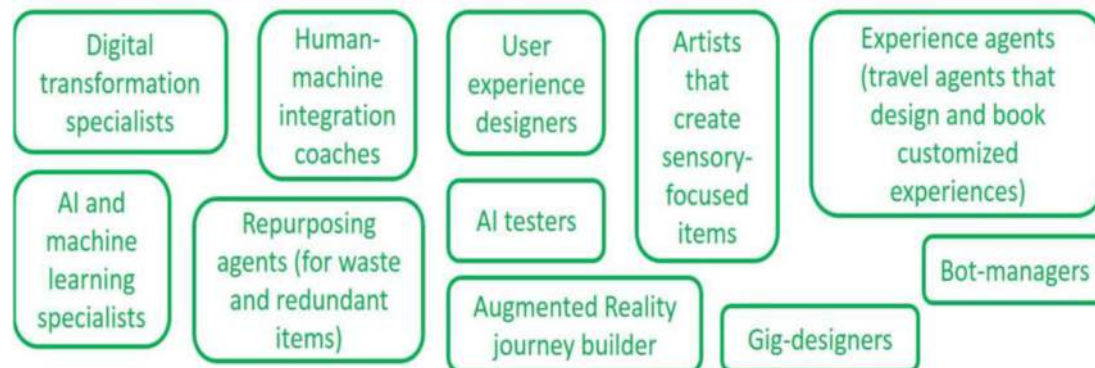
System
optimisers

Robot
engineers

Services sector: decreasing roles



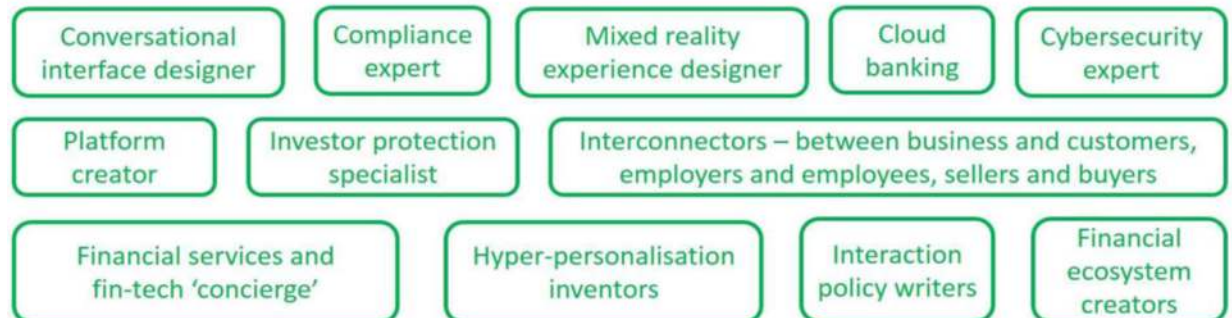
Services sector: increasing roles



Financial sector: decreasing roles



Financial sector: increasing roles



Health sector: decreasing roles

Medical and
clinical lab
technologists

Medical
transcriptionists

Medical records
and health
information clerks

Pharmacy
aides

Medical
equipment
preparers

Dental lab
technicians

Dental
hygienists

Opticians -
dispensing

Trainers
(replaced by VR
applications)

Medical insurance
claims clerks

Health sector: increasing roles

Recreational
wellness
therapists

Nurse
practitioner

VR experience
designers

Drone monitors (in
new delivery models)

Home
health aide

Online
diagnosis

Care-bots

Medical
tourism

Co-bot
surgeons

App developers
(linking medical devices)

Geriatric
carer

Geneticist

Wellness
mentor

Public sector: decreasing roles

Accounting, bookkeeping and payroll clerks

Administrative staff (capturing and sharing information)

Material recording and stock-keeping clerks

Ballot / vote counters

Roles that are duplicated across different departments

Internal auditors

Couriers and messengers

Order clerks

Roles that build unnecessary levels of hierarchy into the system; move toward flatter structures

Public sector: increasing roles

Digital transformation specialists

Digital currency people

Embassies taking a bigger role as business developers and facilitators

People facilitating optimisation across departments

Process automation specialists

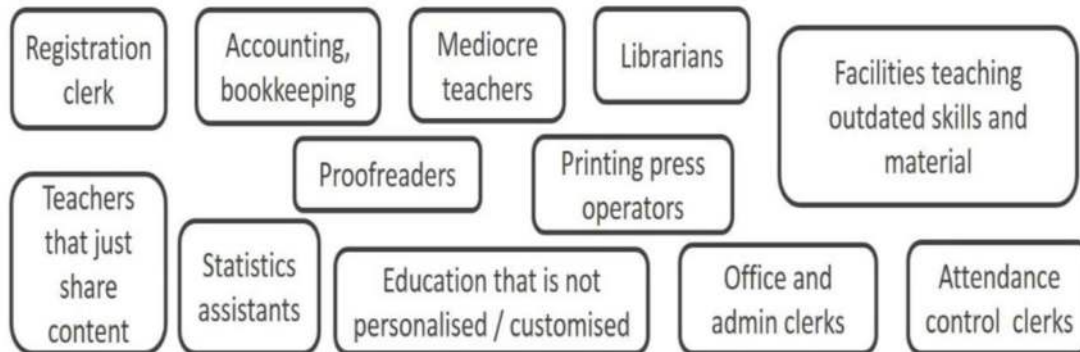
'Connectors' across departments – to identify opportunities for working together

Cybersecurity monitors and professionals

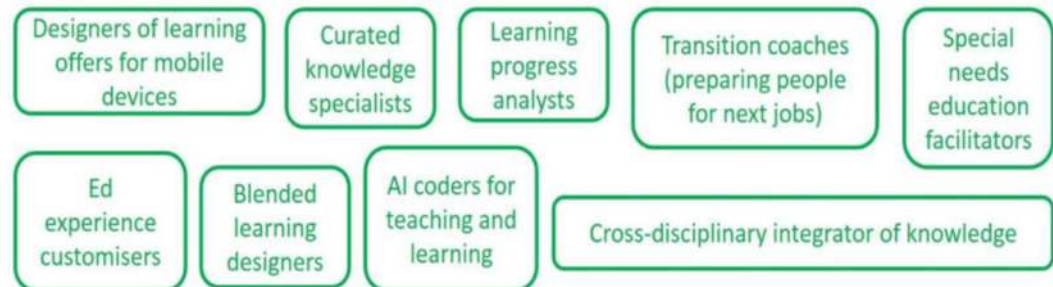
AI ethics officers and coders

Repurposers: people turning concrete jungles into greener spaces

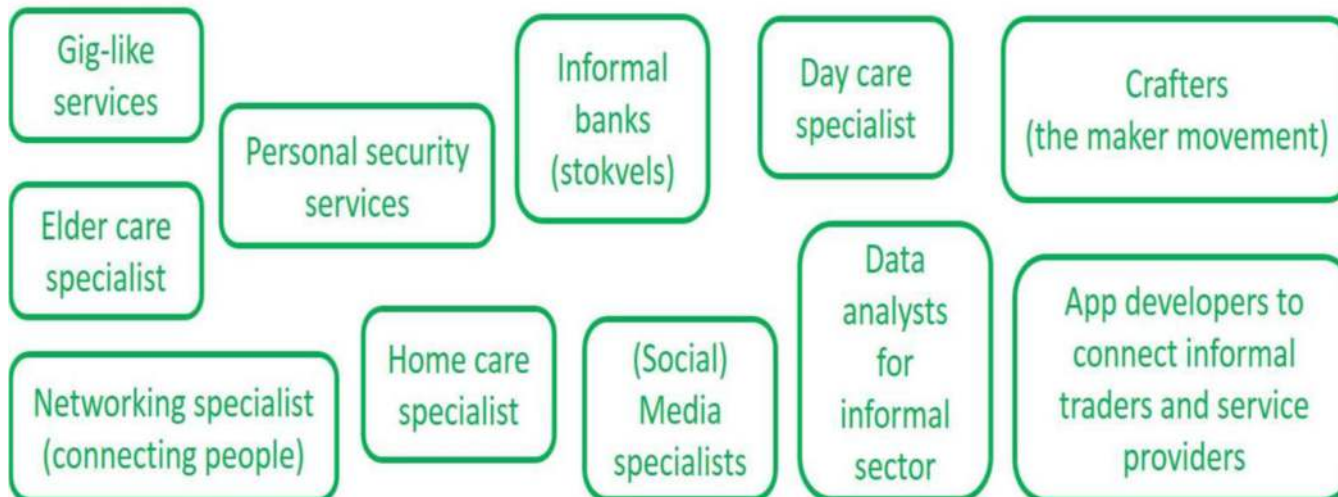
Education sector: decreasing roles



Education sector: increasing roles



Informal economy: increasing roles



Top 10 skills 2025 (WEF)

Analytical thinking and innovation

Active learning and learning strategies

Complex problem solving

Critical thinking and analysis

Creativity, originality, and initiative

Leadership and social influence

Technology use, monitoring and control

Technology design and programming

Resilience, stress tolerance, and flexibility

Reasoning, problem-solving, and ideation

Talents required

First IR	• Physical labour • Basic engineering • Learn a skill
Second IR	• Business acumen • Standardisation • Certainty
Third IR	• Deep expertise • Disciplinary • STEM
Fourth IR	• Learning agility • Adaptability • Empathy • Transdisciplinary

Integrated competencies for the 4IR (Aboderin and Havenga, 2024)

Learning competences

Set clear objectives, learner autonomy and self-directed learning, continuous and lifelong learning, intellectual curiosity, initiative for learning

Cognitive and reflective competences

Higher-order thinking, computational and innovative thinking, construction of own knowledge, entrepreneurial skills and business skills. Reflective thinking and metacognitive skills

Valued human competences

Emotional intelligence and mental flexibility, ethical behaviour, leadership, resilience, time management, cultural awareness and agility, work discipline

Cooperative competences

Group cooperation and coordination, negotiation and group dynamics, effective communication and interpersonal skills

Technological competences

Technological competences and digital literacies, integration of technologies and systems thinking. Application of competences such as AI, 3D printing and cloud computing.

Active strategies to develop essential skills

Some examples of student-centred and active learning strategies are problem-based learning, project-oriented learning, cooperative learning, experiential learning, discovery learning, play-based learning and game-based learning

Agenda

Dimensions of the labour market

Here come the robots

Creative destruction

Alternative futures of the world of work in South Africa

To ponder over

GLOBAL TRENDS

Regardless of the work-mode scenario that materialises, in order to become and remain relevant, workers will need a **higher quality education that integrates general knowledge in both the arts and sciences with emerging technologies**. Competencies in creativity, tolerance, appreciation of diversity and social skills will also form part of a high quality education system.

The **interaction between human capital and technology** is crucial as improvements in productivity are achieved by combining technology and human capital, especially skilled labour.

These thoughts are particularly relevant for most African countries where the skills sets that drive global competitiveness (viz., functional scientific and technical knowledge, and managerial skills) are often neglected in favour of nominal scientific and technical knowledge, which is “... purposeless; an end in itself; with no instrumental value beyond scientific curiosity.” (Onyeiwu, 2015).



IFR, for Nedlac (2019)

SOUTH AFRICAN TRENDS

Traditionally sought to grow the economy and create jobs through the agricultural and extractive sectors, which still account for more than half of the country's export earnings. In fact, despite the rapidly declining share of agriculture and especially mining in South Africa's total gross value added, the country's **revealed comparative advantage** (calculated by dividing the share of a particular commodity in a nation's total exports, by the share of that commodity in world exports) still lies mainly in live animals, vegetable products, wood, pulp and paper, precious stones, and base metals – little of which entails significant beneficiation

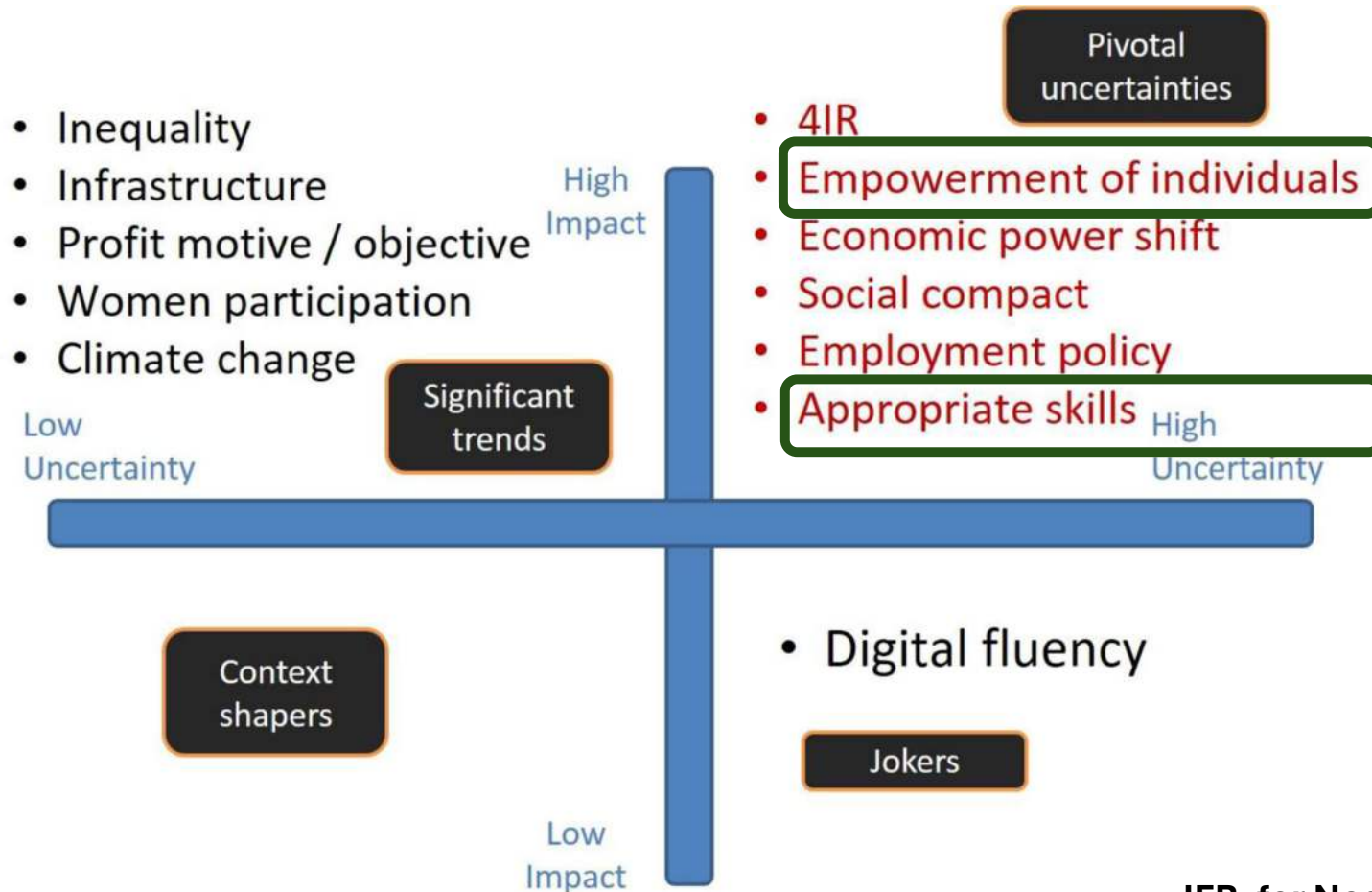
By contrast, South Africa's **revealed comparative disadvantage** lies in product lines that generally require some degree of beneficiation. These include textiles and clothing, footwear, machinery and appliances, and plastics and rubber. As an upper middle-income country, aspiring towards a higher sustained growth path that is pro-employment and pro-development, it is imperative that the country should move toward the production of high-valued goods and expand manufacturing for local, regional, and international markets.

While the *South African economy* has benefited in the past from diversification, it has largely **failed to specialise** in production. The virtues of specialisation include allowing countries to enjoy economies of scale, thereby offsetting the costs associated with higher wages; promoting rapid innovation; and introducing new products and services based on the capabilities of firms.



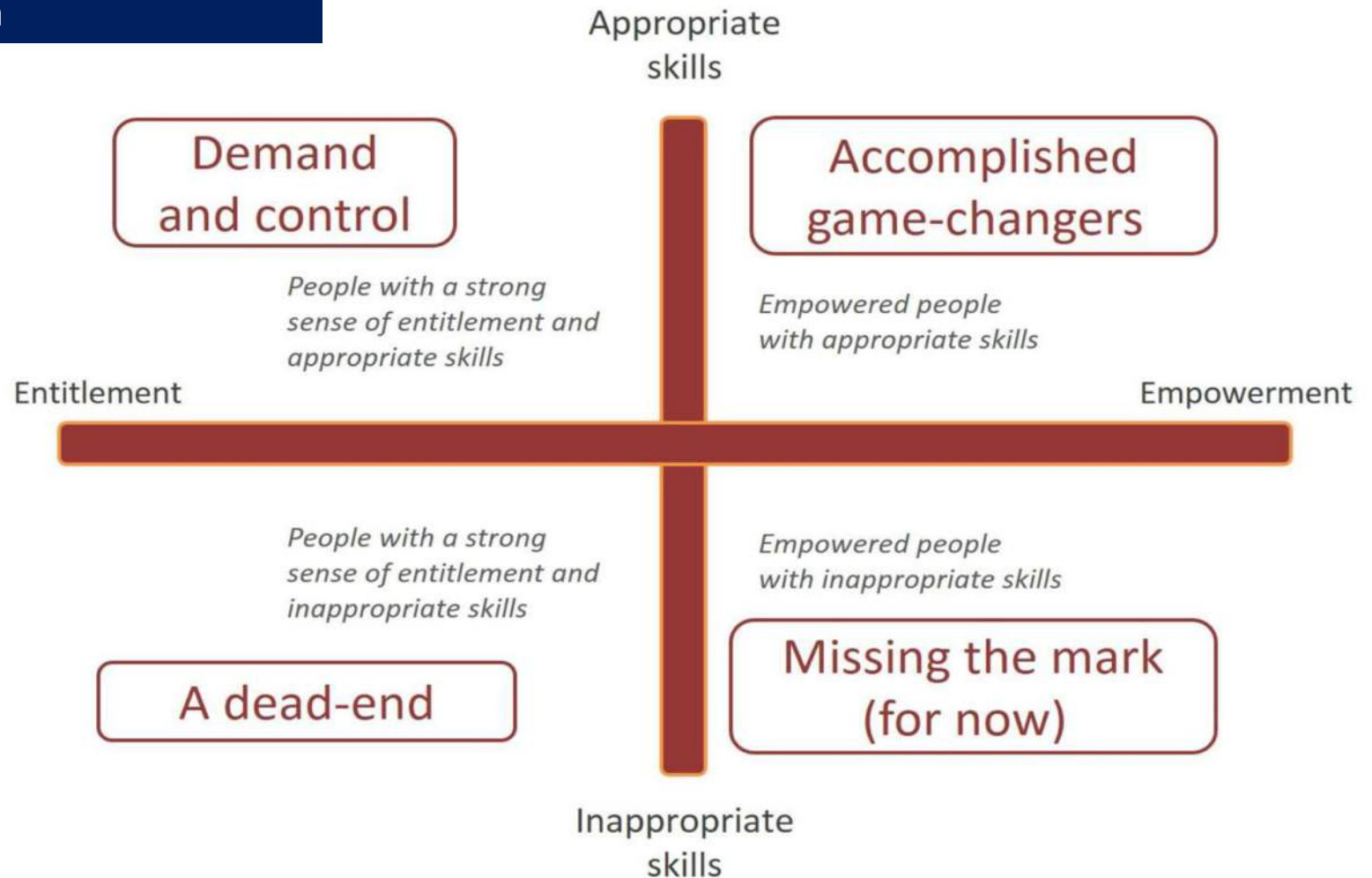
IFR, for Nedlac (2019)

Driving forces



IFR, for Nedlac (2019)

Alternative futures of the world of work in South Africa

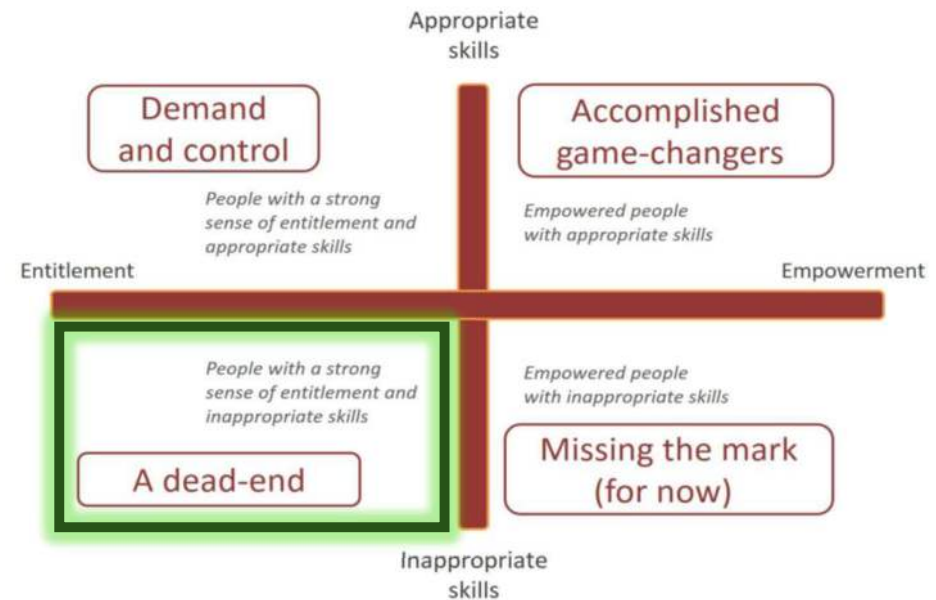


IFR, for Nedlac (2019)

In terms of skills development, business spent minimal money on developing people, labour focused on protecting existing jobs and did not collaborate with other parties about developing next skills, and government concentrated on retaining the majority vote and portrayed a very short short-term view of the kind of skills required.

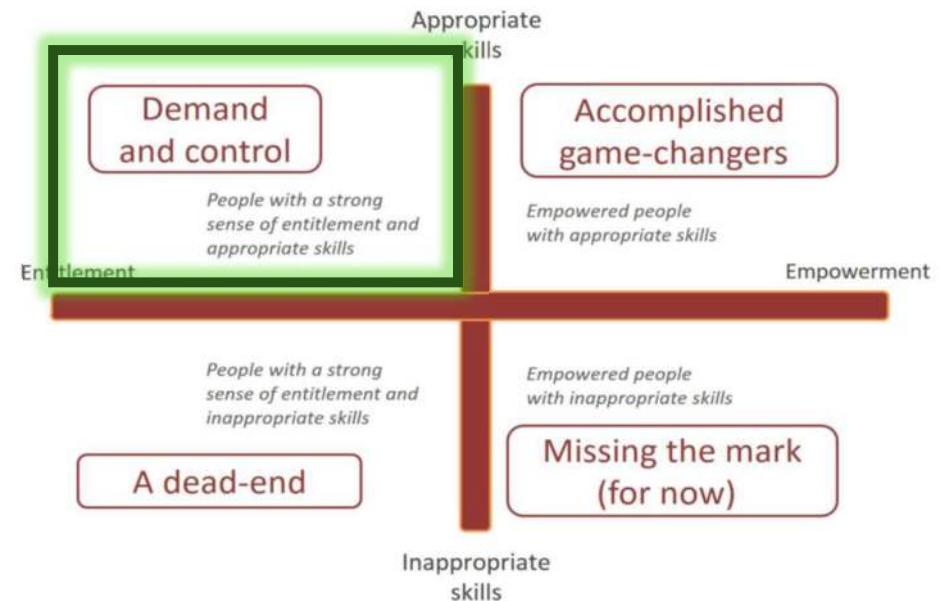
In this scenario, the social compact deteriorates because each of the social partners are focusing on their deemed immediate needs and rights and not on what is best for the country as a whole over the longer term.

Regarding the 4IR, there is continuous civil unrest – people are protesting the fact that robots are taking their jobs. Labour rejects anything that reeks of 4IR and they organise protests and strikes, creating chaos in many industries. Business adopt the new technologies to remain profitable and protect their interests. Government is getting more and more isolated, partly because they did not embrace the potential positive effects of the 4IR, or put measures in place to mitigate against the negative outcomes thereof.

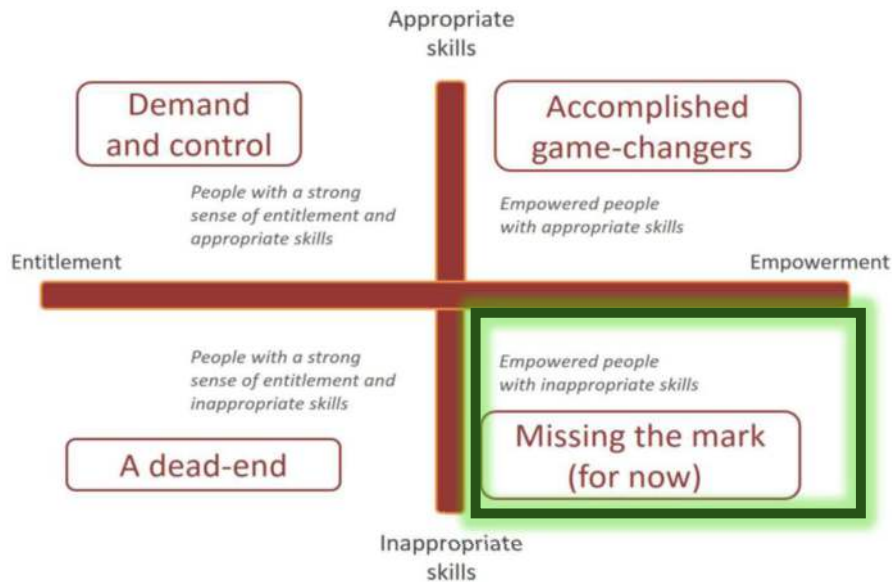


IFR, for Nedlac (2019)

There is a constant tug of war between government wanting to control (they design plans for society and individuals) and what those individuals demand based on what they deem themselves to be entitled to. But, as a nation, we are succeeding in developing the appropriate skills. Our people are able to work and earn a liveable wage, mostly in permanent jobs in the designated industries, under the guidance of a descriptive and directive government. Collective bargaining now happens between government and a newly formed coalition of business, labour and the community



IFR, for Nedlac (2019)



There is a lack of a clear country response in terms of the 4th industrial revolution.

Our people have obsolete skills, mostly as a result of their initial resistance to change – in the late-2020s there were numerous uprisings where labour resisted re-skilling and upskilling initiatives; they wanted to protect existing jobs that were rapidly becoming obsolete.

There is a general lack of communication, and very poor inter-departmental coordination on what the appropriate skills are.

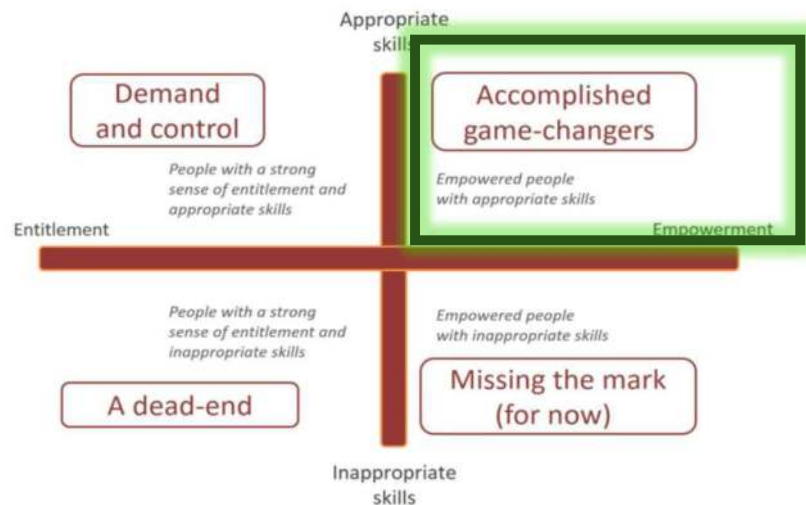
Departments of education are not coordinating with the private sector (or anyone else).

We made very slow progress towards an uptake of green jobs (it is getting better, but we started too late).

IFR, for Nedlac (2019)

People are continuously attaining appropriate skills, because all parties are working together in an efficient manner.

- Government ensures policies that enable skills development and lifelong learning, with curriculum development and content that is up-to-date, practical and inter-disciplinary.
- Business encourages and supports lifelong learning by their employees, they collaborate with labour and skills development organisations to ensure that appropriate skills are developed and with government to provide adequate infrastructure and an enabling environment.
- Labour works with business, government and skills development organisations to ensure a fair and just environment, where people constantly have re-skilling opportunities that is relevant for them.
- Communities are benefitting from people's empowerment and skills
- Individuals are active agents of change, ploughing back into their communities, not hindered by traditional gender and other social norms.



In this scenario, South Africans have access to and are in command of technological equipment and robots, where AI supports humans and thereby increases productivity and reduces human working hours. People have improved job quality and quality of life, with a better balance between work and family, and they contribute to reducing inequality in SA. People are healthy and have reduced working hours, good job quality and decent, livable remuneration. A mental shift happened – we are not working against the 4IR, we are working alongside robots/AI

Agenda

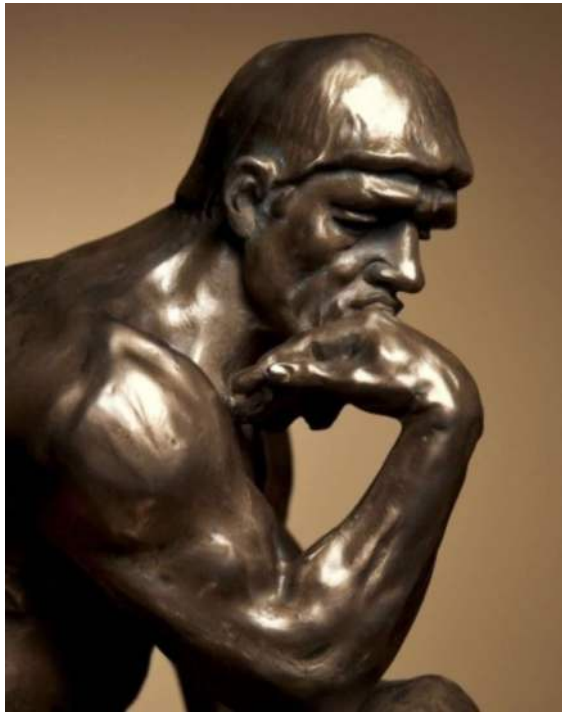
Dimensions of the labour market

Here come the robots

Creative destruction

Alternative futures of the world of work in South Africa

To ponder over



- Economic growth is not the panacea to job creation
- Production could happen without people. This implies the potential substitutability of smart robots and artificial intelligence for human beings in the labour force in all sectors of the economy.
- We are competing against international providers that have access to low-cost, productive labour and locally, our people will increasingly ‘compete against’ robots, automated systems, and machines that learn and are able to perform the same activities with higher efficiency and at lower cost.
- We should not steer ourselves toward a situation that pegs people *against* robots, automated systems, and machines that learn, but rather one that works toward people working *with* new technologies.
- We are in a position to gain from a demographic dividend, but only if our working age population have the appropriate skills.
- The growing democratisation of the workplace presents the firm possibility that full-time employment contracts might, in some instances, give way to less formal, gig-economy workplace agreements.
- Education needs a total ‘face-lift’; the entire education environment, from pre-school to post-graduate education, needs to be re-imagined and aligned with emerging skills requirements. Life-long learning must become an imperative; not simply a ‘nice-to-have’.
- Leaders on all levels of society should engage with their people, to facilitate understanding and share knowledge and insights about emerging opportunities and potential threats.

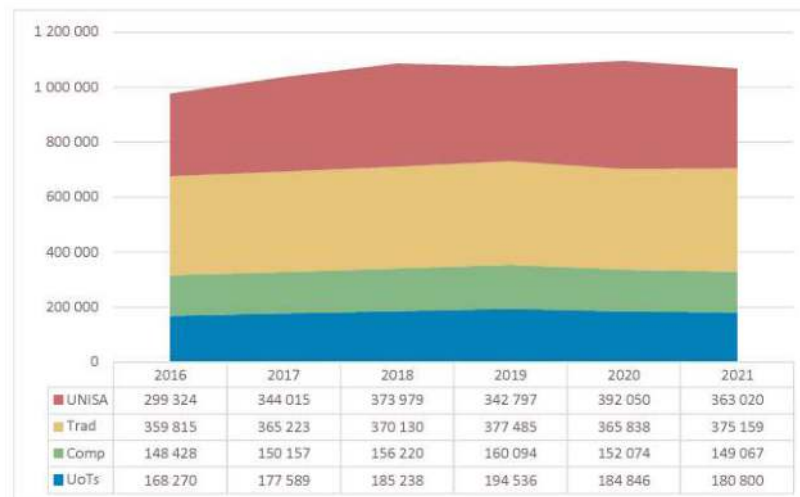
Pressure to increase the capacity of universities

NDP: Aim for a combined total (private and public) of 425 000 graduates by 2030, and more than 5 000 doctoral graduates per year.

NP-PSET: Goal to increase enrolment

Despite the clear growth of the HE system, the participation rate in higher education is currently about 20%, well below what the country needs as a developing economy.

Figure 79: Public universities enrolments by institutional type



CHE VitalStats 2021, published 2023

Focus on undergraduate studies

White paper for post-school education and training, 2013:

All three policy drivers – planning, funding and quality assurance – must continue to be directed at the improvement of the quality of teaching at undergraduate level

The share of the White and Indian population with post-school qualifications has increased by 15%, whereas the share within the African and Coloured population has only increased by 7% highlighting the need to address persistent structural challenges.

The growth has been enabled through significant investment by the state in the block and earmarked grants allocated to universities, and in funding increasing numbers of students from poor family backgrounds to access higher education.

Educational attainment

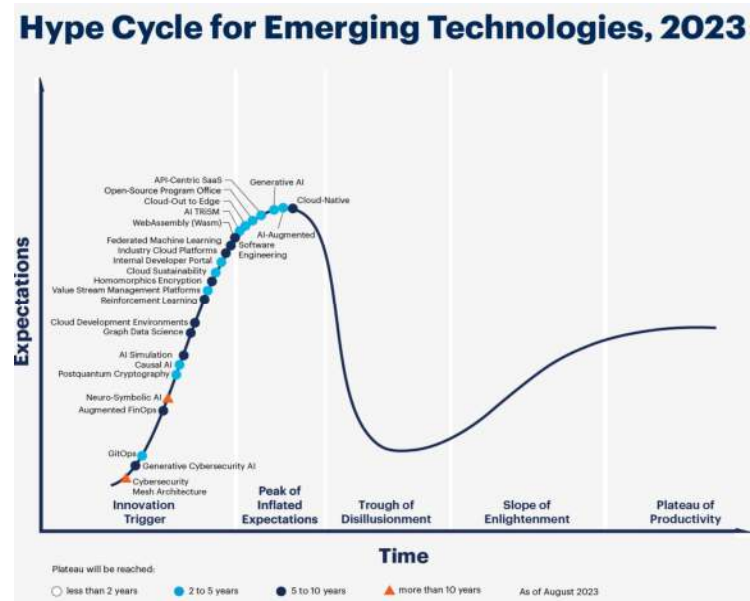


Primary or less:	17.8%
Some secondary:	31.6%
Grade 12:	37.6%
Any post-school:	13%

Source: Census 2022

Pace of technological innovation

- Rapid developments in Information and Communication Technologies (ICTs) opening new opportunities in higher education but also presenting more challenges of resourcing, capacity and infrastructure;
- The pace of change has increased exponentially due to the speed of technological innovation which creates an environment in which 'speed to market' is highly prized - thus contributing to a societal logic that places crucial emphasis on rapid and continuous responsiveness, adaptability, flexibility and agility.
- Advanced technologies will support innovative approaches to learning and teaching, and modes of educational delivery. They also have the potential to exacerbate inequalities between institutions nationally and globally.
- The rapid evolution in the labour market and knowledge economy necessitates adaptations in education and skills development. Higher education institutions (HEIs) globally are integrating technology into teaching and learning, offering flexible learning pathways, and promoting interdisciplinary education to prepare students for contemporary workplace challenges.



<https://www.gartner.com/en/articles/what-s-new-in-the-2023-gartner-hype-cycle-for-emerging-technologies>

Integration of generative AI into L&T activities

Generative AI could be used to co-produce:

- **Assessment instruments**
- **Texts and content for L&T activities**

HEIs should assist in developing enhanced prompting skills through their L&T activities

[AI Prompting: The Universal Skill for the Next-Gen Workforce](#)

Masterful prompt crafting guides AI to produce responses that are not just accurate and data-driven but also contextually relevant and ...

ChatGPT



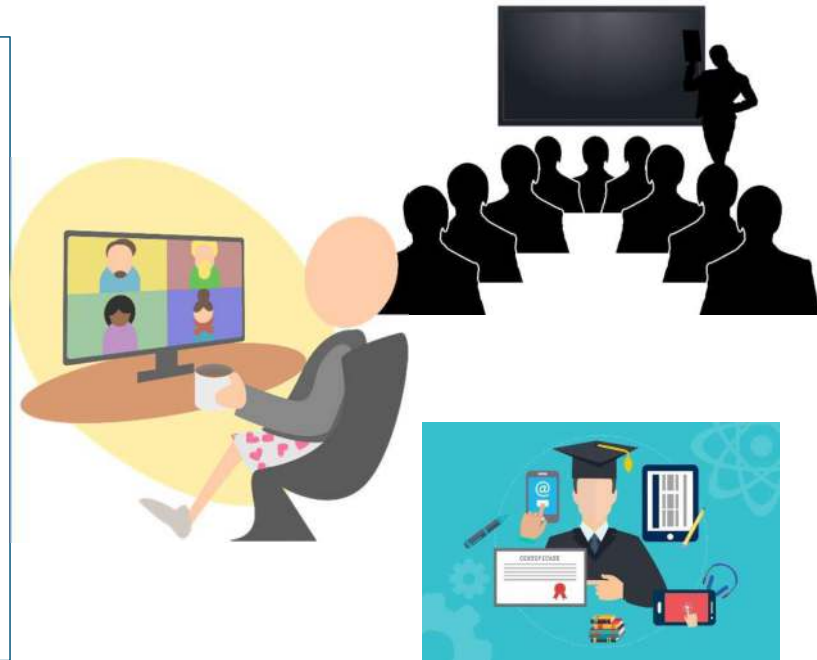
How can I help you today?

Introducing
Meta Llama 3

Attitudes toward differing models for learning and teaching

Tensions can develop between views about different modes and models for learning and teaching.

Students' needs in terms of learning are shifting. They increasingly expect a more personalised, student-centric campus and learning experience (Kim 2018), so that the student journey from enrolment to graduation encourage access, personalisation, and engagement at each touchpoint.



Prevalence and popularity of non-credit bearing L&T

MOOCs

LinkedIn Learning

YouTube

**In-house organisational
skills development**

Industry bodies



COURSE
Ethics in the Age of Generative AI
By: Vilas Dhar
284,922 viewers · Released May 25, 2023



COURSE
Project Management Foundations
By: Bonnie Biafore
649,422 viewers · Released Oct 13, 2022



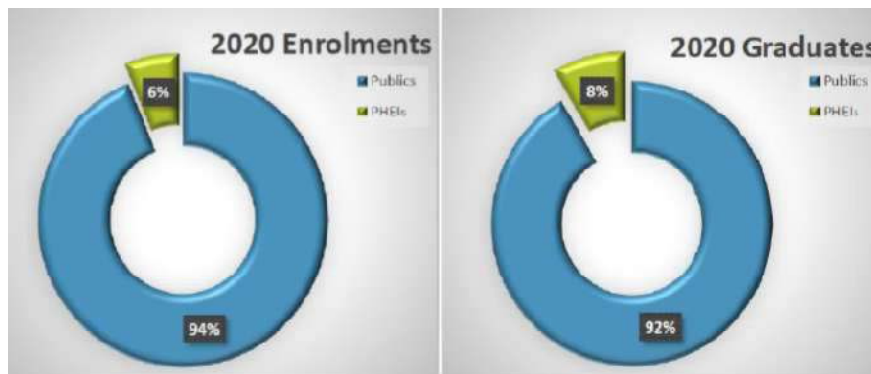
1. Strategic Thinking

This course teaches managers and leaders how to use strategic thinking to guide the direction of their teams and come up with solutions to key business problems.

<https://linkedin.com/learning/strategic-thinking-22616141>

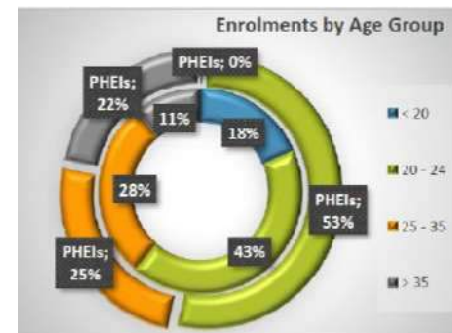
Role of private providers

Competition / collaboration between private and public HE institutions



CHE VitalStats 2021, published 2023

NDP: *private providers should be important partners; quality of private provision should be improved through enabling regulation, quality assurance, and monitoring and evaluation of programmes.*



Appropriate levels of responsiveness, agility, and flexibility

Responses to change have to be fast, coordinated, comprehensive, and happen on multiple levels.

Various factors could converge into a set of inter-related challenges with profound implications for the design of the curriculum, research ethics, research and innovation portfolios, knowledge production, knowledge and information management (including the role of libraries) and the capability to support big data and data analytics.

Responsiveness entails both a critical engagement with technological advances and appropriately using technology to advance learning and teaching in ways that align with institutional contexts, and their missions and goals, which includes their student profile.

Flexible, transparent, and robust mechanisms to assess and monitor the quality of new offerings are required.

