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National
Digital & Future of Work Skills Strategy

Skills for agility, creativity originality and problem-solving

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Future Digital Skills Perspective

Digital transformation in economic sectors and government

Smart cities/villages
Smart industries/health clinics
Tech hubs
Cybersecurity

Digital knowledge and skills (r)evolution

Harnessing technology for growth and jobs

South Africa needs to reignite growth and job-creation

2% average GDP growth rate 2006–2018 – a 43% decline on the previous decade

29% unemployment in 2019 – highest in a decade

Digitisation could provide a major economic boost

Digitisation could result in a net gain of more than 1m jobs by 2030

Potential jobs gained and lost by 2030 as a result of digitisation, millions

New opportunities for women

Digitisation could create **1.6m** jobs for women – and boost empowerment

New demand for graduates

Tech-enabled jobs will require higher skills, resulting in demand for an additional **1.7m** graduates

To seize the opportunity, action is needed by government, business and individuals

National

- Embrace digitisation
- Invest in human capital
- Mitigate jobs impact of automation
- Foster a step-up in job creation

Business

- Rethink strategy
- Upgrade workforce planning and reskilling
- Embrace new ways of working

Individuals

- Focus on skills, not just certification
- Embrace lifelong learning
- Target high-growth sectors and roles
- Find opportunities for entrepreneurship

SECRET

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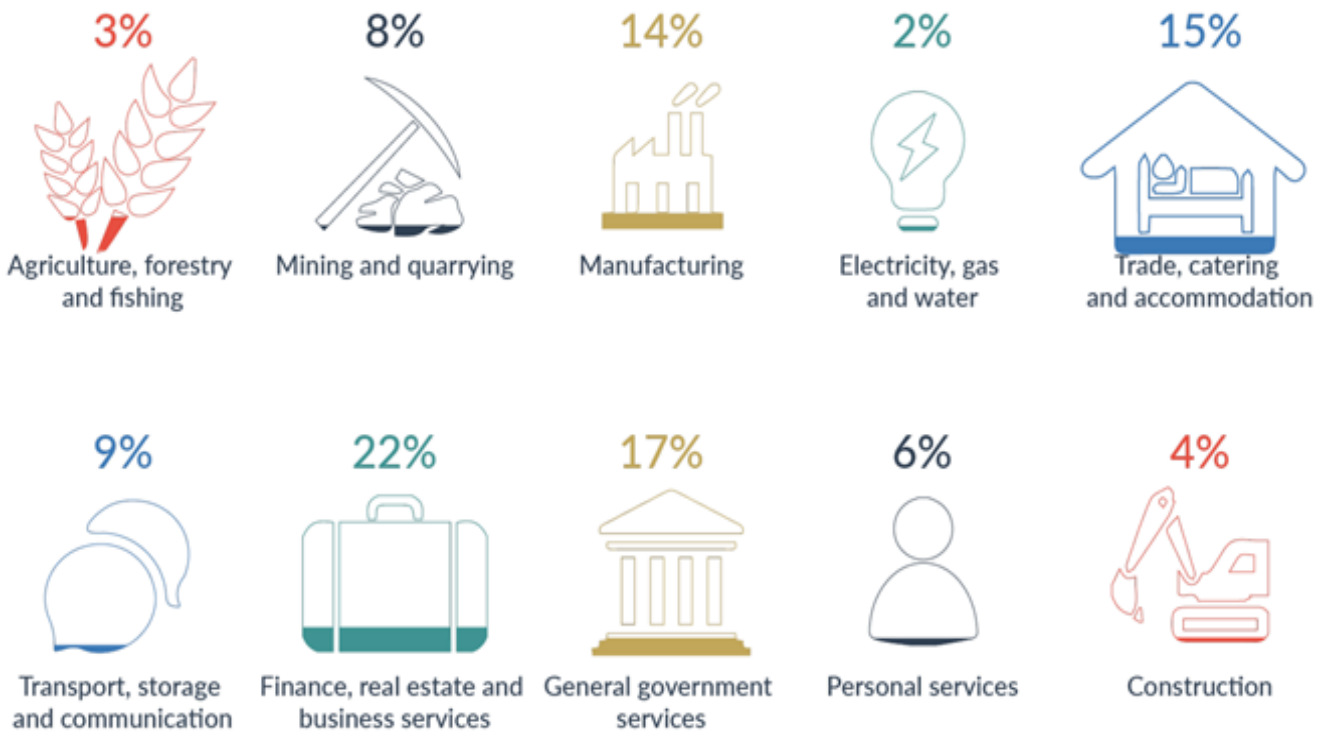
Key Sector Perspective and Impact on Skills Development

Key Sectors

2010-2018 GDP Contribution/ Sector



Statistics SA

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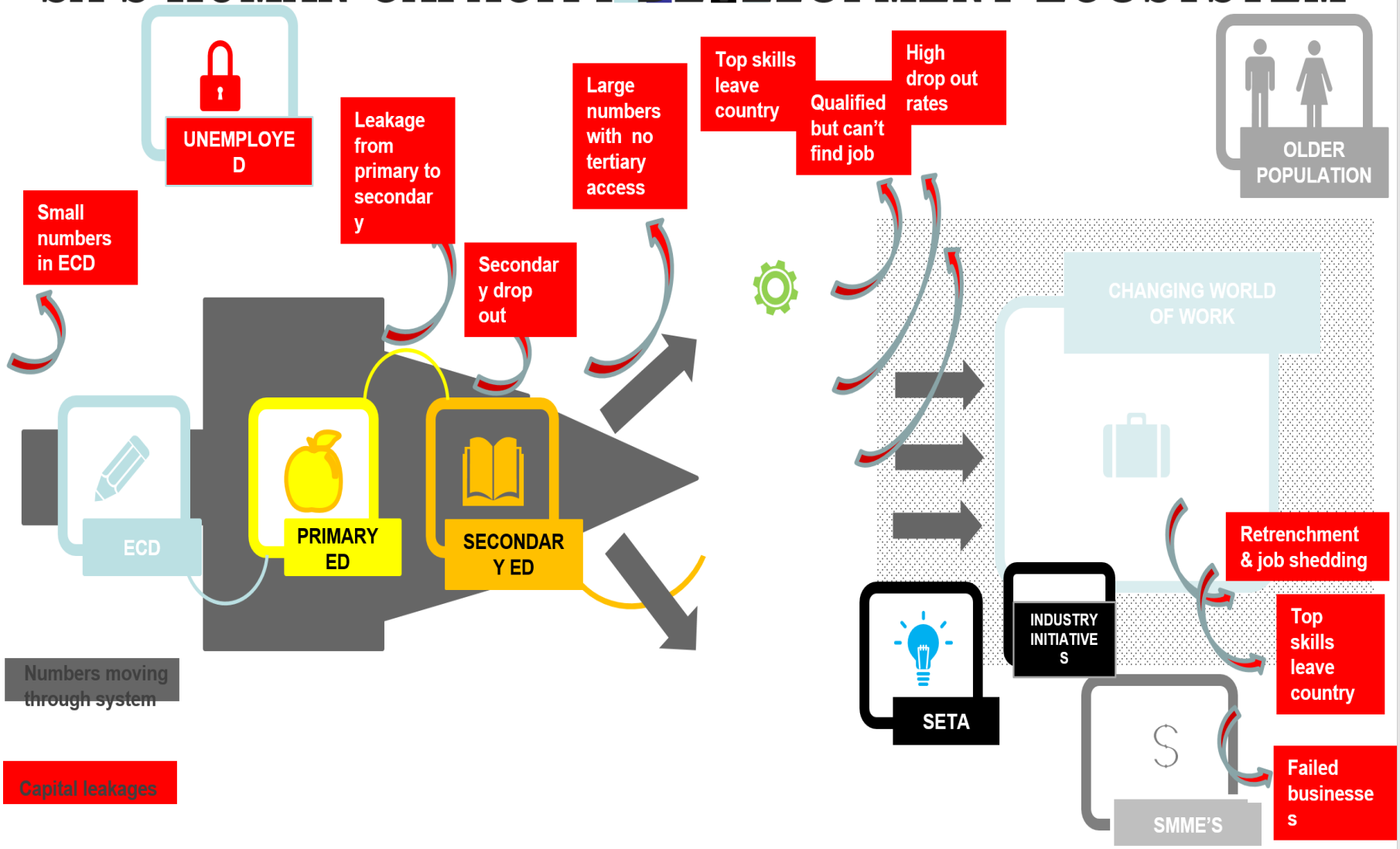
SA'S HUMAN CAPACITY DEVELOPMENT ECOSYSTEM



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Future Skills

LIFELONG LEARNING

STACKABLE SKILLS

Modular approach

Entry & exit at multiple points in system

MICRO-CREDENTIALLING

Quick accreditation – Agility

Transferable across system

INDUSTRY INFORMED

Skilled vs Employable

TECHNOLOY ENABLED SYSTEM

Nodal system, AI enabled

LIFELONG LEARNING

Digital Skills Gap Analysis Findings

MICT SETA published a Skills Sector Plan (SSP) 2018 to 2023 and the following table outlines skills in the ICT Sector

Table 6: ICT Occupations with Hard to Fill Vacancies

Occupation
2015-215201 - Electronics Engineer
2015-215303 - Telecommunications Network Engineer
2015-242101 - Business Analyst
2015-243401 - ICT Account Manager
2015-243402 - ICT Business Development Manager
2015-251101 - ICT Systems Analyst
2015-251201 - Software Developer
2015-251202 - Programmer Analyst
2015-251203 - Developer Programmer
2015-251203 - Developer Programmer
2015-252101 - Database Designer and Administrator
2015-252301 - Computer Network and Systems Engineer
2015-252901 - ICT Security Specialist
2015-311301 - Electrical Engineering Technician
2015-311401 - Electronic Engineering Technician
2015-351201 - ICT Communications Assistant
2015-352201 - Telecommunications Technical Officer or Technologist

Digital Skills Gap Analysis Findings

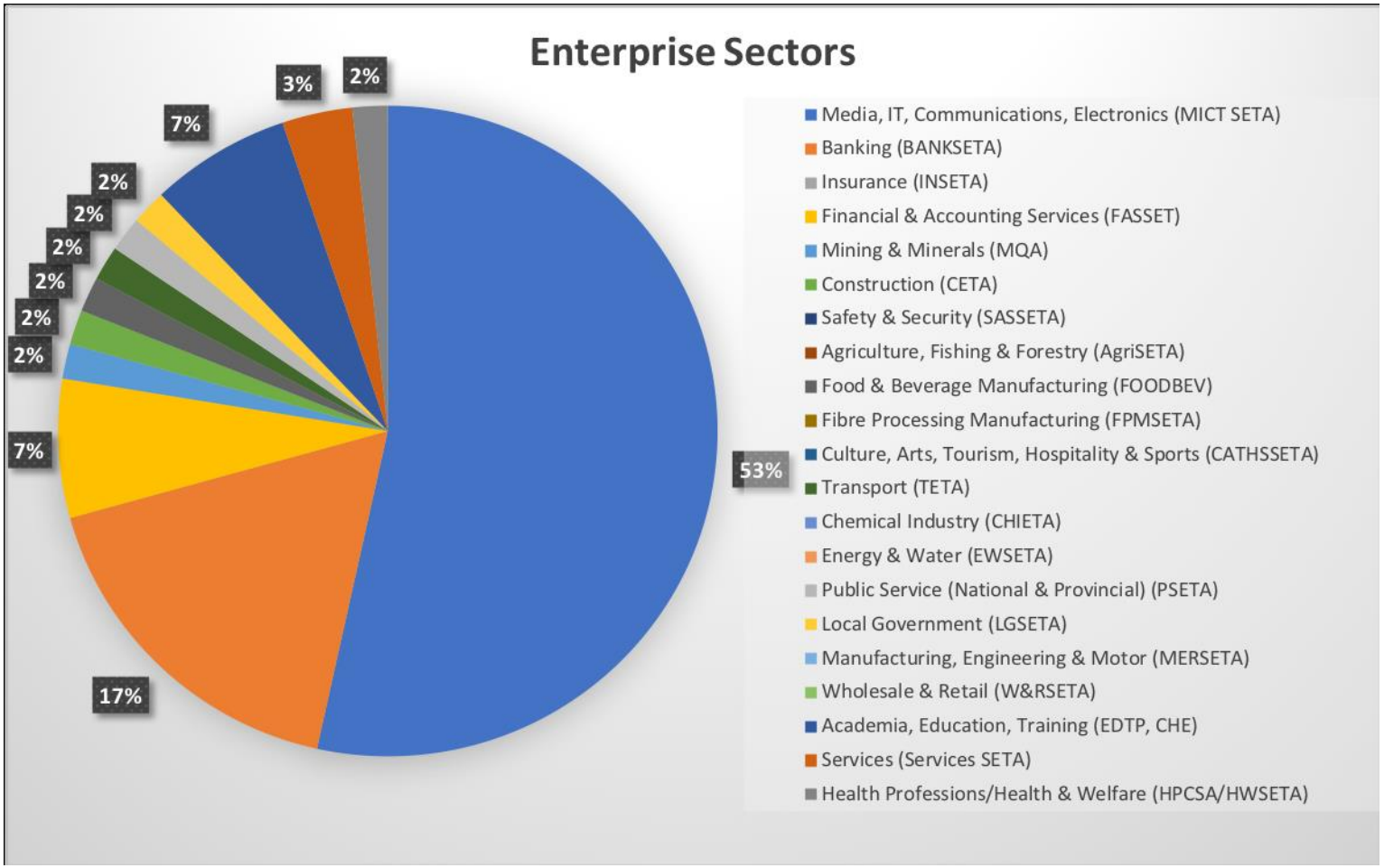
DHET published the National List of Occupations in High Demand and the table below list the occupations that are highest in demand based on the employment pressure weight (2018):

Table 11: Reweighted four-digit OFO (with employment pressure weighted at 10%)

HIGHEST	
1112. Senior Government Officials	2511. Systems Analysts
1211. Finance Managers	2512. Software Developers
1219. Business Services & Administration	2514. Applications Programmers
1311. Agricultural & Forestry Production	2519. Software & Applications Developers
1321. Manufacturing Managers	3112. Civil Engineering Technicians
1323. Construction Managers	3113. Electrical Engineering Technicians
1331. ICT Service Managers	3115. Mechanical Engineering Technicians
1349. Professional Services Managers nec	3118. Draughtspersons
2141. Industrial & Production Engineers	3123. Construction Supervisors
2142. Civil Engineers	3212. Medical & Pathology Laboratory Technicians
2144. Mechanical Engineers	3421. Athletes & Sports Players
2149. Engineering Professionals nec	3513. Computer Network & Systems Technicians
2331. Secondary or Intermediate & Senior Education Teachers	4221. Travel Consultants & Clerks
2341. Primary School or Foundational Phase Teachers	5111. Travel Attendants & Travel Stewards
2412. Financial & Investment Advisors	6711. Building & Related Electricians
2413. Financial Analysts	6712. Electrical Mechanics & Fitters

Digital Skills Gap Analysis Findings

600 000 ICT Workers: Distribution according to SETAs



Source: JCSE-IIPTSA, 2018

Digital Skills Gap Analysis Findings

MICT SETA identifies the change drivers as:

- Digitisation and convergence
- Analytics and Big Data
- Information Security
- Cloud Computing
- Internet of Things

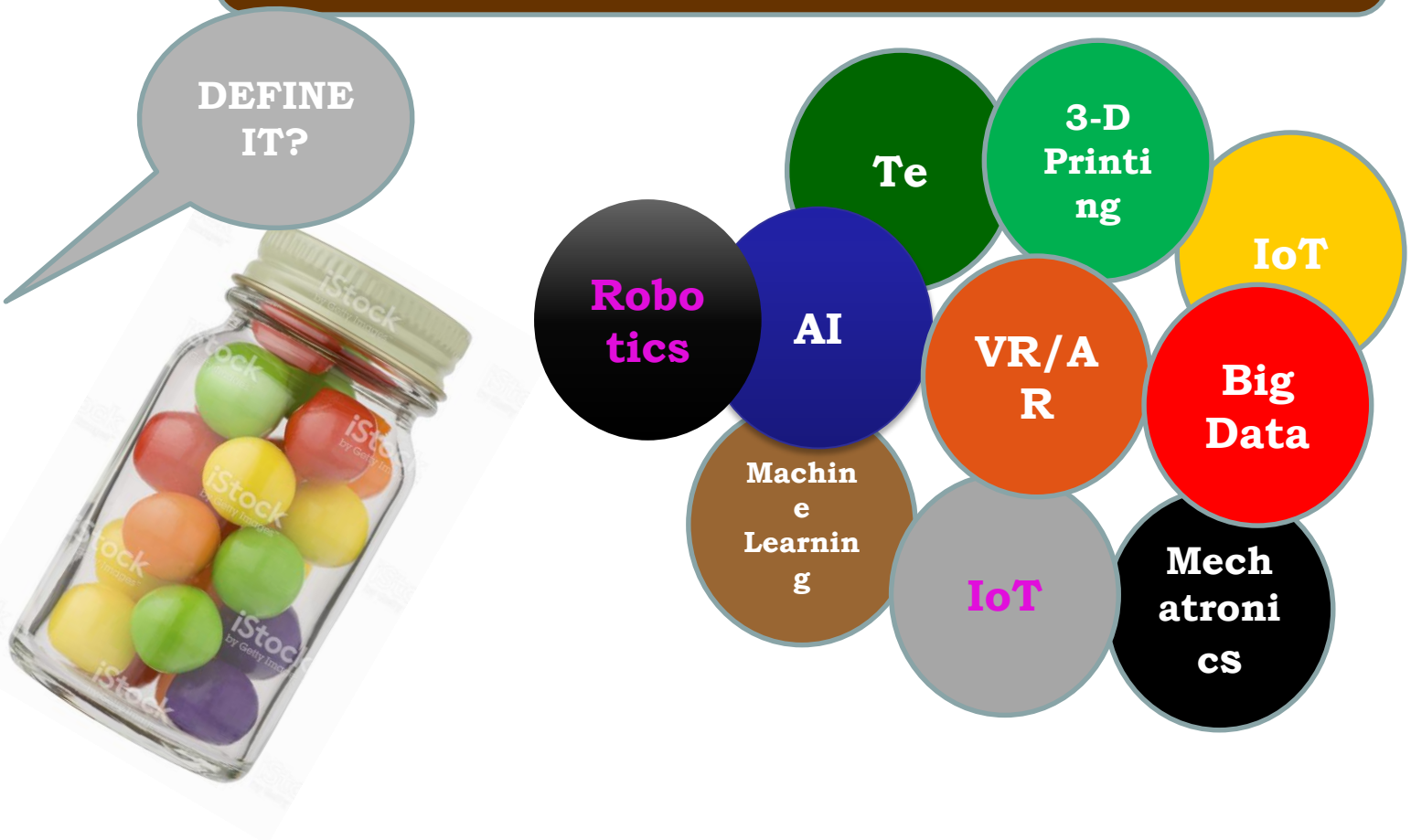
Source: JCSE-IIPTSA, 2018

MAPPING CLUES TO DIGITAL SKILLS:
GLOBAL TRENDS BASED ON SYSTEMATIC LITERATURE REVIEW

- Clarifying/explaining/defining the **meaning and scope of digital skills** .
  - digital skills (i) incorporates the arenas of telecoms, broadcasting, and other economic sectors; and (ii) includes skills for coding/programming and other digital innovation, operational IT, management, strategy and digital leadership.
- Identifying newly **emerging proto-industries, jobs spheres and skills clusters**. This includes fintech, insurtech, healthtech and other proto-industries and software applications clusters.
- Identifying **themes and clusters of digital skills requirements** in order to construct typologies of digital skills for relevant economic and societal groups in the workforce and in the general population.
- Identifying which **digital skills** are required and which are in **high demand** in a few key sectors.
  - Some of the key sectors includes (i) key production industries such as agriculture, mining and manufacturing and (ii) key service sectors such as banking and finance, health, education, environmental management and government services. It is noted that many skills will be common to all sectors, but it is also important to identify digital skills specific to particular sectors.

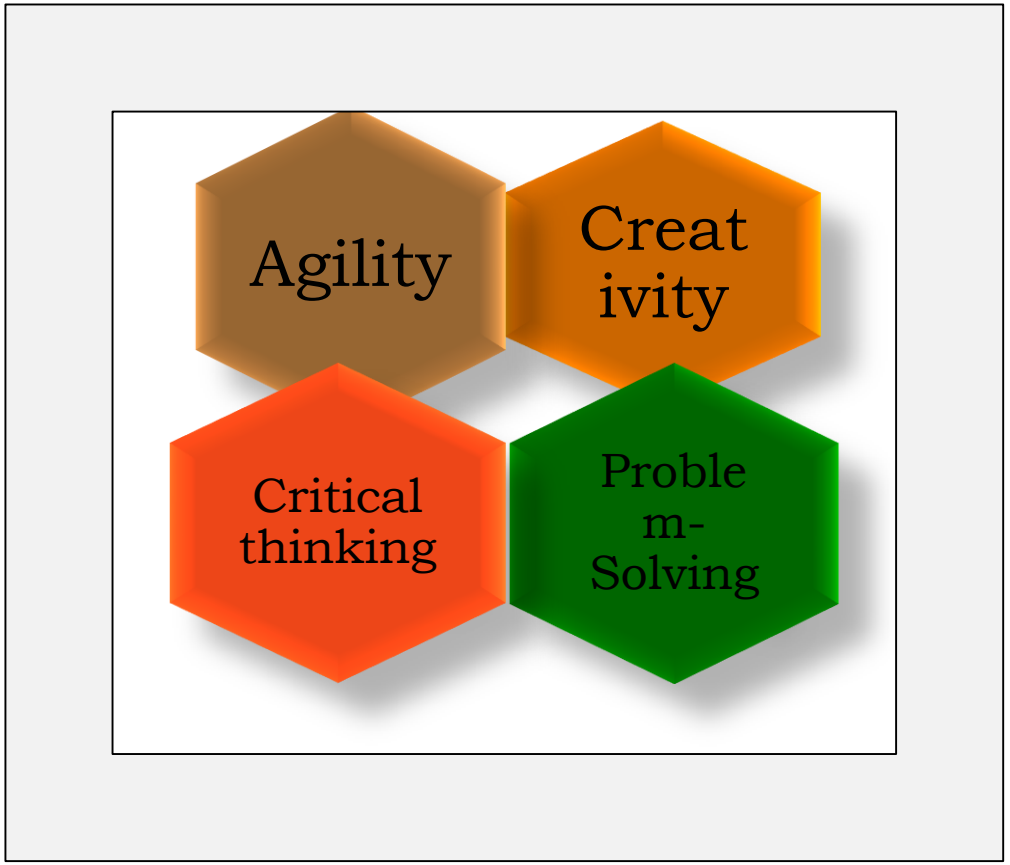
Context

The Digital Skills Strategy sets a broad framework within the context of the complex nature of the 4IR

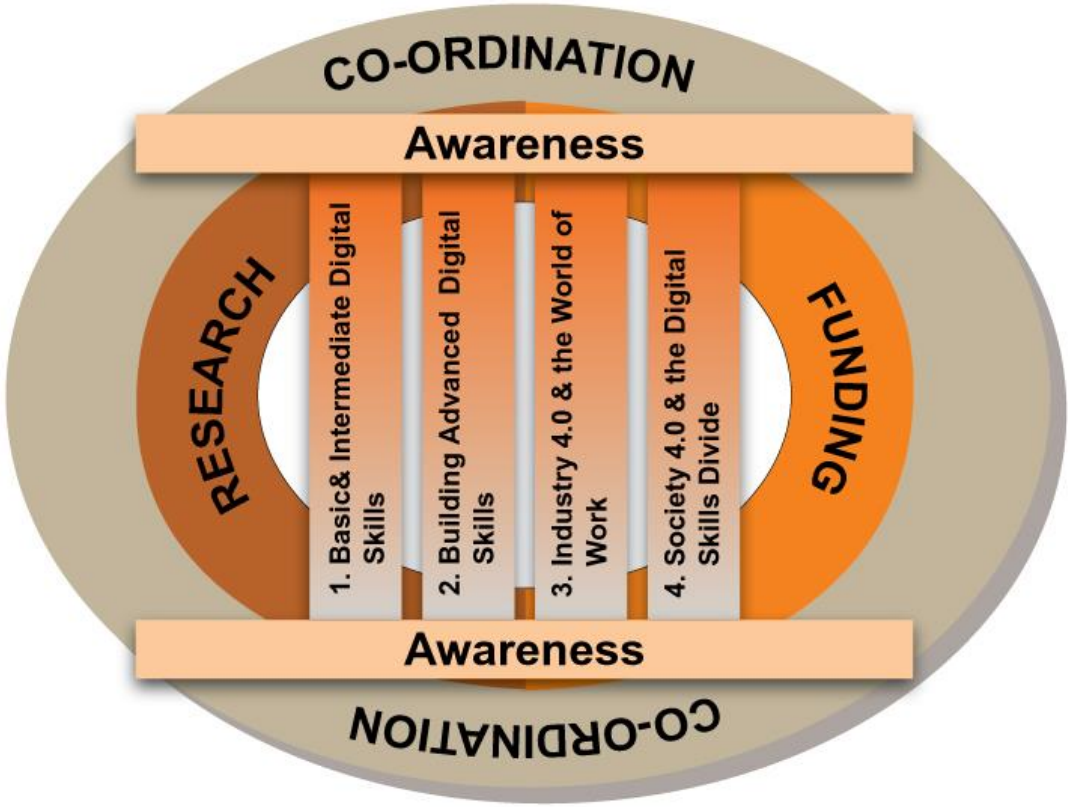


Vision of the Digital Skills Strategy

The whole of society must become digitally adoptive and digitally adaptive to ensure digital inclusivity for future generations.



Strategy Elements of the Digital Skills Strategy



Focus of the Strategy Elements

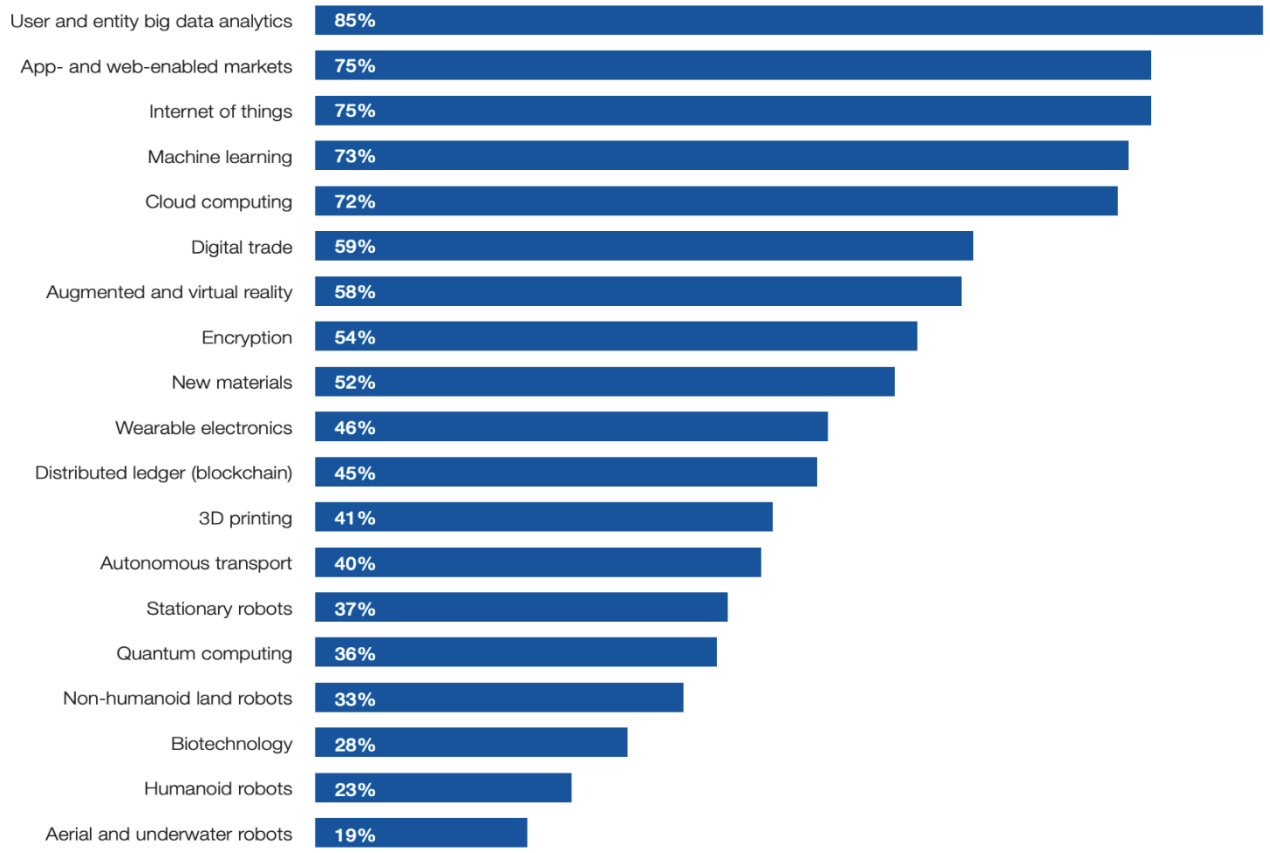
- **Digital foundations: Basic and intermediate digital skills**, where the Department of Basic Education, training institutions, TVET institutions and technology hubs are key actors;
- **Digital futures and masters: Building advanced digital skills**, where the Departments of Higher Education and Science and Technology, universities and training institutions are key actors
- **Skills for Industry 4.0 and the world of work**, where the Departments of Labour and Trade and Industry, as well as industry and other government institutions are key actors;
- **Creating Society 4.0 and addressing the digital skills divide**, where people, social networks and institutions are active.

Cross-cutting elements

- Building digital skills awareness;
- Research and monitoring on digital skills;
- Co-ordination across government and stakeholder groups;
- Funding for digital skills

Future of Jobs

Figure 2: Technologies by proportion of companies likely to adopt them by 2022 (projected)



Source: Future of Jobs Survey 2018, World Economic Forum.

A comparative analysis of the Future of Work by NEDLAC

Trends set to positively influence business growth towards 2022	Trends set to negatively influence business growth towards 2022
Increasing adoption of new technology	Increasing protectionism
Increasing availability of big data	Increase in cyber threats
Advances in mobile internet	Shifts in government policy
Advances in artificial intelligence	Effects of climate change
Advances in cloud technology	Increasingly older societies
Shifts in national economic growth	Shifts in legislation on talent migration
Expansion of affluence in developing economies	Shifts in national economic growth
Expansion of education	Shifts in the mindset of the new generation
Advances in new energy supplies and technologies	Shifts in global macroeconomic growth
Expansion of the middle classes	Advances in artificial intelligence

Source: NEDLAC. Future of Work in South Africa, 2019

SOFT SKILLS

Impactful Technologies

List of some technology fields which provide a foundation for broader job descriptions.

Associated Technology	New Job Descriptors
Algorithms	Business intelligence engineer; database architect; data automation programmer; data scientist; machine learning scientist; research scientists in multiple fields including quantum computing, neuromorphic computing and other applications fields; relevant digital executive positions…
Artificial intelligence (AI)	Applications developer; AI developer; intelligence analyst; user interface/user experience (UI/UX) designer; robotic process automation and AI transformation specialist; AI and game theory research scientist; machine learning engineer…
Big Data	Big data specialist/developer/engineer; data scientist; big data team manager…
Cybersecurity	Security tool specialist; security analyst; project manager; incident response specialist; data scientist; scripting specialist (Python, Perl, etc.); soft skills; digital forensics expert; cybersecurity regulatory specialist…
Digital Communications	Digital content manager; digital graphic designer; digital arts professional; digital archivist; digital marketing specialist; digital media designer; digital media editor…
Digital Modelling	Digital process automation architect; enterprise security engineer; data scientist; digital banking professionals; digital manufacturing engineers…

Impactful Technologies

List of some technology fields which provide a foundation for broader job descriptions.

Associated Technology	New Job Descriptors
Internet of Things	Data scientist; IP network engineer; digital systems developer (specializing in hardware interfacing); mobile application developer; UI/UX designer; information security specialist; cybersecurity specialist…
Machine Learning	Machine learning engineer; computer vision and machine learning scientist; medical image analyst; manufacturing engineer/ programmer…
Mechatronics	Mechatronics engineer/architect; innovation and design engineer (robotics and mechatronics); research scientist automated driving; manufacturing engineer…
Networks and cloud computing	Cloud computing solutions engineer; solutions architect healthcare and life sciences; cloud AI research specialist; high performance computing cloud specialist; network engineer; consulting engineer…
Robotics	Robotics engineer; applied robotics scientist; research scientist AI and machine learning; robotic process automation (RPA) developer…

Broad Strategic Action Points

- SETAs to incorporate digital skills building in their sector skills plans to advance the capacity of the labour market for effective economic participation, growth and development
- Research on the effects of digital disruption on the labour market is needed to provide descriptive detail, track historical and ongoing effects, and offer forecasting models and predictive analytics
- structured initiatives aimed at young people and unemployed people; namely interface between employers and tertiary institutions to ensure that youth graduates with digital skills appropriate to a range of sector requirements
- An ongoing country-wide digital skills and digital wellness campaigns on cybersecurity, privacy awareness and netiquette
- DTPS, working with government and industry partners, will establish a digital skills research programme, including but not limited to monitoring and evaluation of digital skills development initiatives.

Broad Strategic Action Points

- A major curriculum development initiative needs to be undertaken for computing, coding and a wide range of digital skills relevant to the continuously evolving digital skills requirements.
- All in-service and pre-service teachers at tertiary institutions need to receive training in a wide range of subjects related to digital learning, including coding
- A major long-term infrastructure funding programme for schools is needed, with attention to mobile and other wireless network infrastructure
- Structured arrangements must be introduced to break down the historical walls dividing vocational training from academic education to promote complementary digital skills continuum
- A viable model for the development and rollout of open online courses covering digital skills is essential to ensure scalability and sustainability- *blockchain-based 'digital badging' to ensure portability and mutual recognition of certification*

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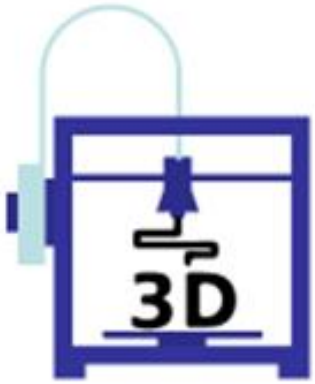
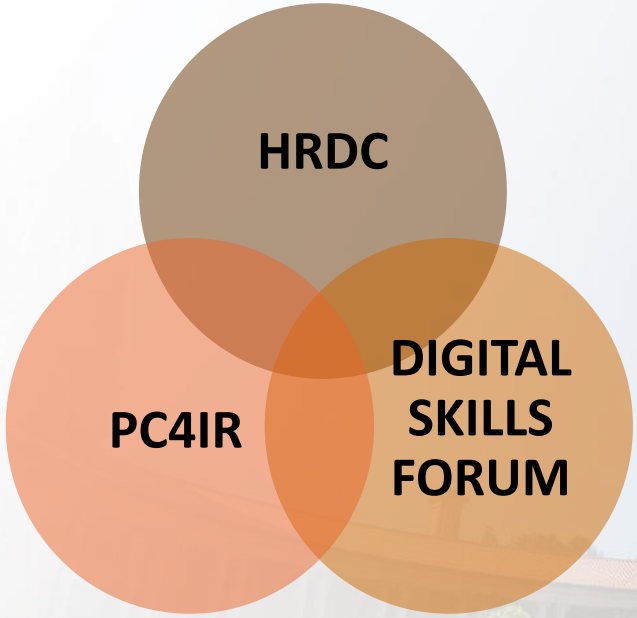
System Issues



1. Coordination
2. Mandates – need something from outside system
3. BBBEE Codes
4. Key challenge – Re-shaping SA's skills development focus according to jobs landscape of the future.
5. Disconnect between different system components
6. Accreditation processes
7. Seta's need a vertical and horizontal approach. Not geared for this
8. Multi-stakeholder cooperation (Govt, labour, business, Smme's)

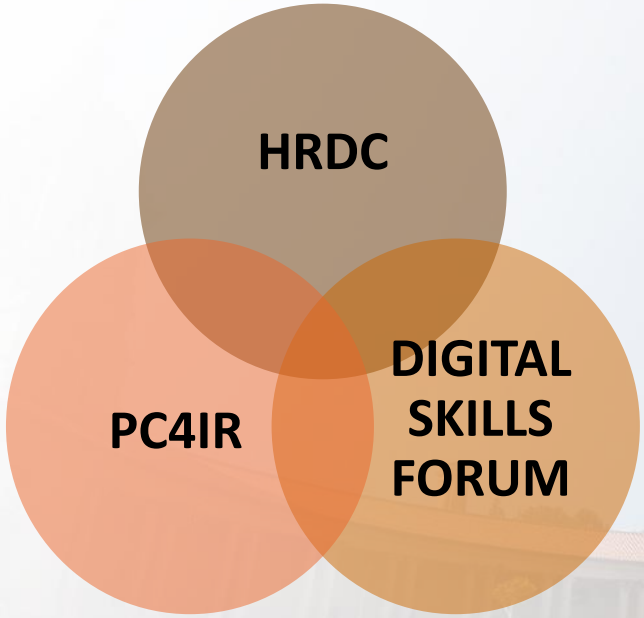
Recommendations



- Develop Digital and Future Skills programme encompassing full spectrum of appropriate skills for future of work i.e. digital skills, competency skills. Links with the mandate of the Dept to drive the implementation of 4IR readiness in the country.
- Make this the overarching strategy for coordination of Digital and Future skills nationally, let this fall under one entity – the Digital and Future Skills Forum (attached to Commission).
- Put other structures (research entity, monitoring and evaluation of action plan, SA Digital & Future Skills Observatory) as sub functions of the Digital skills forum.
- Mainstream this body via Commission/President at HRDC, the key body to give guidance in terms of streamlining the skills ecosystem (political buy in)

DBE | DHET | USAF Universities | TVET | SETA'S | BBBEE COUNCILS

Recommendations



- Place it outside of Government department for agility and speed of implementation and capacitiate it with strategic capacity.
- Bring the BBBEE ICT Sector Council into the HRDC for purposes of streamlining the skills, funding and incentivising take place.
- Use the nodal system developed by NTIP as a base to streamline and coordinate these processes and automate some of the coordination, eliminate some of the inefficiencies in the system. Nodal system at back end is AI driven - coordination of the skills ecosystem components.