
GENERAL NOTICES • ALGEMENE KENNISGEWINGS

DEPARTMENT OF COMMUNICATIONS AND DIGITAL TECHNOLOGIES**NOTICE 513 OF 2020****NATIONAL DIGITAL AND FUTURE SKILLS STRATEGY****SOUTH AFRICA**

I, Stella Ndabeni-Abrahams, Minister of Communications and Digital Technologies, in terms of Chapter 12 of the National Integrated ICT Policy White Paper of 2016, and Chapter 4 of the National e-Strategy of 2017, hereby publish the National Digital and Future Skills Strategy.



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MINISTER OF COMMUNICATIONS AND DIGITAL TECHNOLOGIES

DATE: 30 / 08 / 2020



National Digital and Future Skills Strategy

Originality, agility, critical thinking and problem-solving for digital inclusion

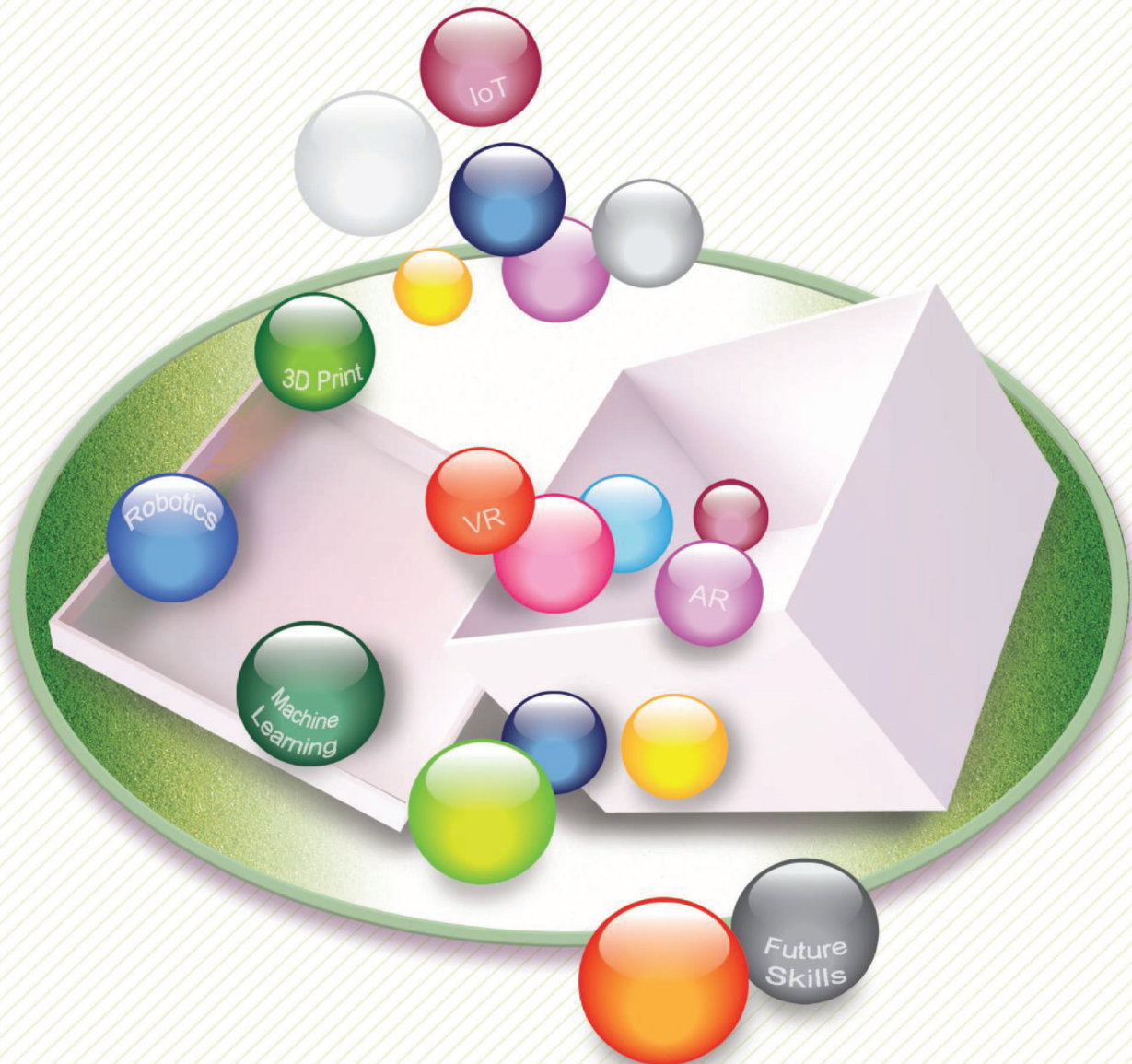


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List of Acronyms

3D	Three dimensional
4IR	Fourth Industrial Revolution
AI	Artificial intelligence
AR	Augmented reality
B-BBEE	Broad-based black economic empowerment
BLSA	Business Leadership South Africa
BRM	Benefits realisation management
BUSA	Business Unity South Africa
BYOMD	Bring your own mobile device
CAT	Computer Applications Technology
CHE	Council for Higher Education
CoLab	Collaboration Laboratory
COHORT	Committee of Heads of Organisations of Research and Development
CPD	Continuing Professional Development
CSI	Corporate social investment
CSIR	Council for Scientific and Industrial Research
DSAC	Department of Sports, Arts and Culture
DBE	Department of Basic Education
DDF	Digital Development Fund
DEDAT	Department of Economic Development
DHA	Department of Home Affairs

DoE	Department of Education
DHET	Department of Higher Education and Training
DEL	Department of Employment and Labour
DPSA	Department of Public Service and Administration
DSD	Department of Social Development
DSI	Department of Science and Innovation
DTIC	Department of Trade, Industry and Competition
DCDT	Department of Communications and Digital Technologies
GDP	Gross domestic product
GIS	Geographic information system
GITOC	Government IT Officers Council
ICTs	Information and communications technologies
IT	Information technology
IITPSA	The Institute of Information Technology Professionals South Africa
iNeSI	iKamva National eSkills Institute
IoT	Internet of Things
ISACA	Information Systems Audit and Control Association
ISSA	Institute for Satellite and Software Applications
ITU	International Telecommunication Union
JCSE	Joburg Centre for Software Engineering
MICTSETA	Media, Information and Communication Technologies Sector Education and Training Authority
MR	Mixed reality

NALEDI	National Labour and Economic Development Institute
NAPTOSA	National Professional Teachers' Organisation of South Africa
NCOP	National Council of the Provinces
NDP	National Development Plan
NEDLAC	National Economic Development and Labour Council
NEMISA	National Electronic Media Institute of SA
NeSPA	National eSkills Plan of Action
NoSQL	Not only SQL (structured query language)
NQF	National Qualification Framework
NSF	National Skills Fund
NSI	National system of innovation
OTT	Over-the-top services
PSET	Post-school education and training
QCTO	Quality Council for Trades and Occupations
SADTU	South African Democratic Teachers' Union
SAITIS	South Africa IT Industry Strategy
SAQA	South African Qualifications Authority
SETA	Sector Education and Training Authority
SIP15	Strategic Integrated Project 15
SITA	State IT Agency
SQL	Structured query language
TVET	Technical and vocational education and training

UCT	University of Cape Town
UIF	Unemployment Insurance Fund
USAASA	Universal Service and Access Agency of South Africa
USAf	Universities South Africa
USAF	Universal Service and Access Fund
UWC	University of the Western Cape
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organisation
VR	Virtual reality
WCED	Western Cape Education Department
WEF	World Economic Forum

Introduction

In the briefing and consultation sessions held across government in 2019, a few key questions were asked, such as: What actual digital skills should the strategy focus on? Is there a clearly definable set of digital skills that can or should be set down in a strategy document that should be given attention by government, or encouraged by government, through funding and other mechanisms? Setting down specific digital skills may be a narrow approach, rather than a strategic approach to digital skills development, given that digital skills apply to any and every aspect of economic endeavour and social activity. If the world is indeed experiencing a skills revolution, then it is impossible to limit the landscape of skills development to a choice or selection of particular skills over and above others, as it would be impossible to predict which skills will be most needed.

Therefore, the strategy sets out many layers at which digital skills should be given attention, and many mechanisms for advancing digital skills. It consciously avoids setting out specific digital skills, as such an approach would risk excluding continuously emerging new areas of skills development and new areas of technology application. The strategy does refer (see Figure 5.2) to digital technology fields and new job descriptors, but this represents only a sample of the real technology fields and a very small sample of job descriptions. It can be argued that every job either is changing or will change, as digital technologies penetrate more and more economic and social activities. Therefore, the strategy has a broad focus, with a few key targeted directions. Most importantly, the strategy considers the need for (i) a diversity of digital skills, (ii) priority skills areas, and (iii) convergence of digital skills with subject matter knowledge, for example in the case of digital health professionals. While priority areas for digital skills can be supported in the short term, and revised on a regular basis as the nature of skills demand and supply changes, the real strength of any national strategy lies in the diversity of skills produced, giving the country the capacity to adjust and adapt to local and global skills demand cycles. The emphasis must be on diversity with respect to skills, with respect to the skills development programmes and associated curricula, and with respect to jobs and forms of employment.

The strategy highlights three Strategic Implications for the success of its implementation; that is (1) implication for economy, society and education which calls on the education sectors inclusive of SETAs to build a strong focus and invest in digital skills as well as invest in the development of digital innovation skills, including in agriculture, mining, manufacturing, postal services, and health services to mention a few. (2) Cybersecurity which emphasises on encouraging equal attention to cybersecurity skills as to any other digital skills. Programming for cybersecurity should be encouraged as learning programmes at various levels through the school and post-school years, and using mechanisms from self-learning to short courses and of course degree programmes. (3) Monitoring and evaluation is emphasised as a mechanism to build strong resilience for the successful implementation of the strategy.

Executive Summary

This strategy envisages a society of digitally skilled South Africans. This Digital and Future Skills Strategy, prepared by the Department of Communications and Digital Technologies (DCDT) sets out a structured series of initiatives intended to contribute to the capacities of South Africans to meet the challenges arising from the increasing deployment and adoption of digital technologies in economy and society, understanding that the digital revolution (using cloud technologies that enable big data; bringing virtual and augmented reality into a real world environment; introducing autonomous vehicles and drones; making Internet of Things, artificial intelligence, robotics and 3D printing part of everyday life) occurs within the context of the broader Fourth Industrial Revolution (working with advanced materials, biotechnology innovations, and the wider landscape of scientific innovation). The combined impact of these technology trends is having a substantial impact on the world of work, on schooling, education and research, individuals and communities.

This strategy presents a vision of a South Africa in which all its people are able to benefit from enhanced digital skills, thereby contributing to a significantly enhanced quality of life, improved education and higher economic growth. Digital skills are one of the key skills sets required for the creation of new kinds of 21st century jobs. Originality, agility, critical thinking and problem-solving are important 21st century skills that must be interwoven with digital skills.

The strategy elements needed to realise the digital skills vision will need to be undertaken by a range of stakeholders, including government, private sector, and educational institutions, who should engage in continuous, structured consultation, collaboration and co-ordination involving all stakeholders. Guidelines for such strategy elements and stakeholder collaboration are set out below. The strategy is underpinned by current research and its implementation will be assessed through ongoing monitoring and evaluation. The strategy is organised as eight interconnected strategy elements, each with a set of strategic action points, 28 action points in all. Government and other stakeholders can design their specific action plans pursuant to this broad strategy direction.

The first four strategy elements relate to the relationships across government-industry-organised labour-communities-universities-training institutions, and focus on:

Strategy element 1: Digital foundations: Basic and intermediate digital skills, which identifies three key interdependent areas of initiative to develop digital skills, namely:

- Designing, writing content for and continuously revising curricula to build a wide range of digital skills, constantly adapting to changing knowledge needs;
- Building capacity to ensure all educators are empowered with digital skills and that these skills remain current;
- Providing access to the necessary infrastructure that enables digital skills and making sure this is operational, secure and sustainable.

Strategy element 2: Digital futures and mastery: Building advanced digital skills, where strategy elements include tertiary curriculum reform; capacity-building for lecturing staff; promoting research related to the digital skills revolution; developing and promoting usage of mobile open online courses to develop digital skills on a widespread basis; and measures to strengthen the CoLabs, tech hubs and all related institutions.

Strategy element 3: Skills for Industry 4.0 and the world of work, which recognises the need for research into the impact of the digital revolution on South Africa's labour market, notes that the current skills gaps need to be addressed, and that school-leavers need to be equipped with work-ready digital skills. Programmes are required to reskill those displaced by digital technologies, as well as to provide ongoing upskilling in the workplace, including in government itself where the transition to digital government requires such upskilling.

Strategy element 4: Creating Society 4.0 and addressing the digital skills divide recognises the challenge of the digital skills divide with many disadvantaged by race, gender, geographic location, and income, highlighting the need to equip individuals and communities with digital skills, to empower them as citizens and for effective participation in the 21st century society.

The remaining four strategy elements are cross-cutting to the above four, namely:

Strategy element 5: Building digital skills awareness, where the success of any digital skills strategy depends on a high-profile campaign of engagement to ensure digital skills development is on the national agenda, through flagship events, supported by ongoing stakeholder engagement, and a variety of measures to build public awareness of the issues, options and opportunities.

Strategy element 6: Research and monitoring on digital skills, noting that a strategy for the effective development of digital skills needs to be supported by a benefits realisation approach at national and institutional levels, as well as by adequate data and practical research in order to assist in monitoring and reporting on the effectiveness of the strategy implementation, as well as the relevance and resilience of the strategy elements.

Strategy element 7: Co-ordination across government, industry, labour and other stakeholder groups, noting that effective mechanisms and structures for co-ordination are critical to the success of the Digital and Future Skills Strategy, both within government and across the country at national and provincial levels, involving all stakeholders and role players, with particular attention to the representative structures for the labour market and for skills development, including the labour unions and the SETAs.

Strategy element 8: Funding for digital skills, which stresses the importance of funding resources to underpin digital skilling initiatives and includes a number of options to secure this.

Imperatives for a Digital and Future Skills Strategy

Context for digital skills evolution

The combined impact of digital technology trends, such as the Internet of Things (IoT), big data, robotics, and artificial intelligence (AI), is changing the ways in which people, economies and societies operate. The ability of countries, organisations and individuals to participate in the growing social and economic revolution, to benefit from and to be enriched by it, increasingly depends on the acquisition and deployment of digital skills. This strategy envisages a society of digitally skilled South Africans.

Globally and locally, the mining, manufacturing and services sectors are in the process of being transformed by digital automation, artificial intelligence (AI) and a range of other digital technologies. Furthermore, government entities, private sector firms and development institutions increasingly rely on digital technologies to drive economic growth, promote social development and provide cultural enrichment. Legacy skills, and even existing ICT skills, are becoming obsolete, while new digital skills are in short supply. This means that countries seeking to advance the competitiveness of their key economic sectors and public services need to adopt a continual skills upgrade approach, where both ordinary citizens and research specialists acquire and advance their digital skills as part of a broad spectrum of 21st century skills. The whole of society must become digitally adoptive and digitally adaptive to ensure digital inclusivity for future generations.

The challenges implied by these ongoing developments, therefore, requires that South Africa adopt a clear and comprehensive Digital and Future Skills strategy in order to foster the country's ability to engage with, compete within, and benefit from the emergent digital revolution, also referred to as the fourth industrial revolution.

Legal and Policy Context

The development of the National Digital and Future Skills Strategy is informed by the analysis of the following government policies from cross-cutting sectors including education, economic development and ICT.

Relevant Policies	
White Paper on e-Education: Transforming Learning and Teaching through Information and Communications Technologies (ICTs), 2004	South Africa's National e-Strategy, 2017
National Development Plan – Executive Summary, 2011 and full document	National e-Government Strategy and Roadmap, 2017
National Skills Accord, 2011	Integrated Justice System (IJS) Digital Transformation Strategy, 2017

Relevant Policies	
South Africa Connect: South African Broadband Policy, 2013	Professional Development Framework for Digital Learning, 2017
White Paper for Post-School Education and Training, 2013	DTPS Annual Performance Plan, 2017-2018
National Integrated ICT Policy White Paper, 2016	IJS digital transformation strategy, 2017
The Third National Skills Development Strategy, 2016	GITOC digital government strategy, 2018

Vision

A South Africa in which people, economy and society benefit from enhanced levels of digital skills as we move into a digital future, anchored in agility, creativity and problem-solving.

Mission

This Digital and Future Skills Strategy addresses the need for mechanisms to foster digital skills development across South Africa, at early childhood development, schooling and post-school education and training levels, recognising that digital skills are necessary for economic growth, social development and cultural enrichment across all sectors of our society and economy, based on strategy elements to be undertaken by government, in conjunction with a range of stakeholders.

Strategy Objectives

The objectives of the Digital and Future Skills Strategy are to provide:

- A roadmap for priority digital skills action points: Identification, categorisation and guidelines for collectively building a comprehensive range of digital skills, set out as strategy elements, driven either by DCDDT directly, or in conjunction with other stakeholders and structures;
- A roadmap for stakeholder collaboration: Identification of key action points to facilitate stakeholder collaboration across government, with state agencies and government appointed committees, with organised business and labour, with academia, scientific organisations and civil society.

Economic impacts of digital technologies

The impact of the 4IR is yet to be felt in the categorisation and descriptors of the SETAs. Descriptors for 'jobs of the future' are likely to be far more generic involving a foundational portfolio of portable skills and knowledge applicable across multiple sectors and required by many industries and government services, as can be seen in the figure below. As a result, knowledge and skills in one or a few technology fields can offer the foundation for broader job descriptions.

Figure 2.5: Digital Technologies and Job Descriptors

Associated Technology	New Job Descriptors
All technologies	Analytical engineers; digital ethics officers; futurist; digital risk managers; governance practitioners...
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...
IoT	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
SQL, NoSQL	NoSQL data architect; business intelligence specialist; data scientist; AI scientist
Robotics	Robotics engineer; applied robotics scientist; research scientist AI and machine learning; robotic process automation (RPA) developer...
Sensors and Actuators	OEM systems engineer; product and application development scientist; AI research scientist;
Simulation	Simulation environment architect; simulation scientist; simulation engineer; data scientists

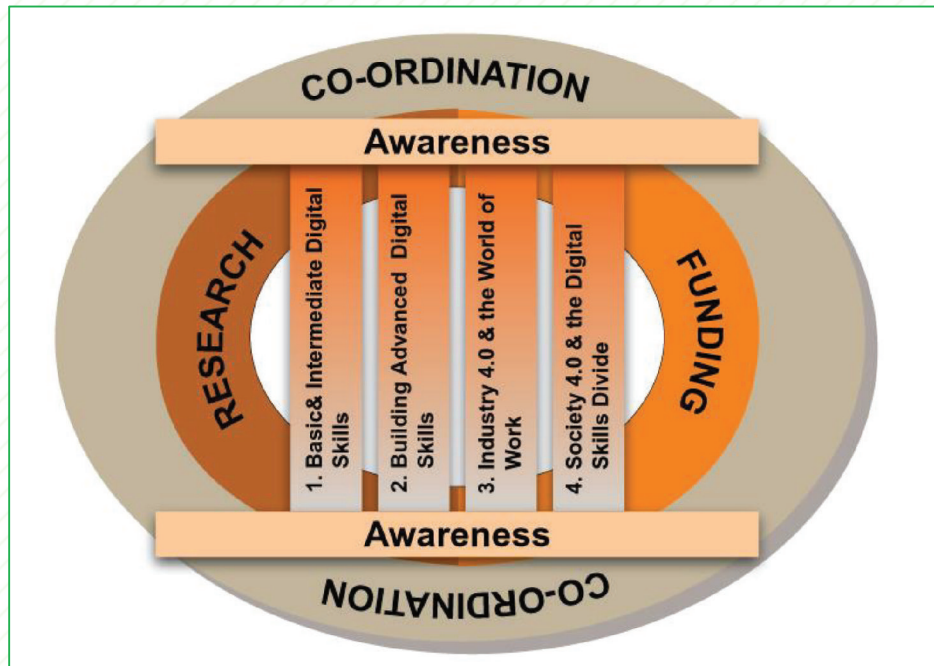
Associated Technology	New Job Descriptors
VR, AR, MR	AR/VR specialist solutions architect; AR/VR developer; digital content creator (for animation, gamification)
Wide range of technologies	3D architects and designers; crowdfunding specialist; drone pilot; gaming tutor; blockchain and cryptocurrency technologist; cryptocrimes investigator...
Technology agnostic	Management level jobs (actual jobs advertised for Johannesburg October 2018) Digital account manager/executive; digital brand marketing manager; digital media strategist; manager operations and digital enablement; manager social media and digital marketing; digital strategist; digital product manager; digital product innovations manager...
Technology agnostic	Operational level jobs (actual jobs advertised for Johannesburg October 2018) Social media content developer; coding platform integrators; digital designer; digital business analyst; digital writer; mobile digital architect; digital conceptual copywriter; digital portfolio manager; digital multimedia expert and web designer; IT audit practitioner; teachers; health professionals; digital community champions...

Eight Strategy Elements for the Evolution of Digital Skills

The Digital and Future Skills Strategy identifies and analyses the digital skills gap in South Africa, determines objectives and strategy elements for achieving digital literacy and skills development, and formulates an institutional approach to address the disconnect between supply-side skills (through schools, universities and TVET colleges) and demand-side digital skills (workplaces and communities). The strategy elements and related initiatives are in line with global trends pursued by peer countries, in order to strengthen economic growth, enhance job creation, and promote social development and cultural enrichment.

South Africa's youth will require high levels of digital skills and 21st century life skills, including scientific, digital, financial and cultural fluency; critical thinking and problem-solving skills; as well as agility and leadership. These skills will enable them to function within a twenty-first century world increasingly pervaded by and dependent upon digital technologies. The strategy therefore seeks to foster the evolution of advanced levels of digital skills necessary to strengthen the research and innovation capacities at institutions of higher learning, in digital incubators, within research entities, and across the private and governmental sectors. Digital skills are no longer just for ICT practitioners, they are for everyone. Figure 1 below illustrates the relationships between the eight strategy elements.

Figure 1: Eight Strategy Elements to Foster Digital Skills Evolution



The first four strategy elements focus on:

- 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 Training, Science and Innovation, universities and training institutions are key actors;
- Skills for Industry 4.0 and the world of work, where the Departments of Employment and Labour, and Trade, Industry and Competition, as well as industry, trade unions, NEDLAC, SETAs and other institutions are key actors;
- Creating Society 4.0 and addressing the digital skills divide, where people, social networks and institutions are active.

The other four cross-cutting strategy elements are:

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

Under each of the eight strategy elements a number of specific strategic action points are set out. Each of the strategic action points presented under these eight strategy elements has linkages to other action points, and each of the strategy elements has implications for other components of the strategy. Overlaps will need to be embraced, linkages made, and synergies explored.

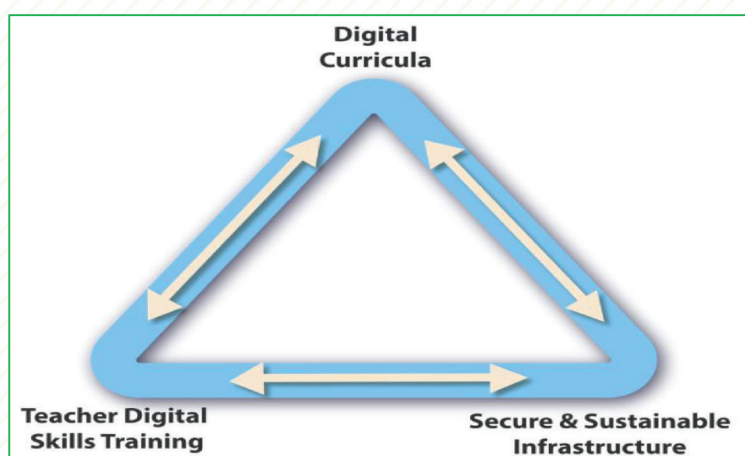
1. Strategy element 1: Digital foundations: Basic and intermediate digital skills

This first element of strategy addresses the development of basic and intermediate digital skills, from early childhood development (ECD) through primary and secondary schooling, to post-school education and training (PSET). Building basic and intermediate digital skills is a critical area for national strategy to ensure that learners, school-leavers and young adults are prepared for a society and an economy where digital technologies are increasingly pervasive. Three interdependent strategic initiatives must be:

- Designing, writing content for and continuously revising curricula to build a wide range of digital skills, constantly adapting to changing knowledge needs;
- Building capacity to ensure all educators are empowered with digital skills and that these skills remain current;
- Providing access to the necessary infrastructure that enables digital skills development and making sure this is operational, secure and sustainable.

The Department of Basic Education and the Department of Higher Education and Training are key role players for the success of this first element, with respect to schools, teacher training, TVET institutions and other private post-school institutions. Universities should “top up” basic and intermediate digital skills where required.

Figure 2: Key requirements for Basic and Intermediate Digital Skills



1.1 Fostering basic and intermediate digital skills: Digital literacy and digital fluency

Digital skills is an all-embracing concept covering a broad span of skills, both hard and soft, that empowers people to function efficiently in the 21st century. South Africa's current and future generations need to gain significant experience in 'digital learning' and 'learning to be digital' from an early age, as well as developing high-order cognitive, behavioural and leadership skills. Hence, these learning opportunities must be embedded in as many of the subject curricula as possible, including in mathematics and languages, not only in the two subjects Computer Applications Technology (CAT) and Information Technology (IT). For digitally-supported development, basic education and post-school education needs to support a range of learning content, including critical thinking and foundational digital innovation that adequately prepares learners for the future digital world of work and innovation. Digital skills are no longer only a post-school matter. The DBE Professional Development Framework for Digital Learning already provides significant guidance with respect to teacher digital skills and competencies. Now attention will need to be given to advancing and actually achieving the levels of teacher skills required for digital literacy and fluency amongst millions of learners. Many thousands of schools require contemporary computer facilities, access to devices, Internet access, and other digital infrastructure and applications, for the majority of learners to successfully embark upon a path of digital learning.

Strategic action point 1.1

Aligned with the current curriculum review processes of the Department of Basic Education, a 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. This will include but not limited to the basics required for further studies and work in the fields of 3D printing, algorithms design and use, artificial intelligence applications, big data analytics, cybersecurity, digital content design, drone applications, gamification, mechatronics and robotics, and software engineering. Curriculum review should give attention to language and mathematics curricula, since these provide foundation knowledge for digital learning. Curriculum review and design will require attention to computational thinking and problem solving; data literacy and analytical skills; mobile literacy relevant to the increasingly wider range of mobile, digital devices. Popularisation of an annual activity, the Computer Olympiad should assist in strengthening digital literacy. Curriculum review must be supported by teacher digital skills advancement and digital infrastructure investment in schools, over and above investment in tablets and broadband.

1.2 Upgrading teacher digital skills and competencies

Extended initiatives, over the next decade, will be required to advance teacher's digital skills to the point where they are major contributors to digital literacy, digital fluency and digital creativity for young people. In furtherance of the existing DBE initiatives, large numbers of teachers need to be trained to teach subjects where school goes at ECD, primary and secondary schooling levels learn to be digital citizens. This includes (i) teachers from Grade R to Grade 12 who will teach coding, CAT, IT, and the fundamentals of various branches of computer science, such as AI, as well as (ii) teachers from Grade R to Grade 12 who will teach accounting, biology, languages, mathematics and science subjects using digital tools and applications.

Strategic action point 1.2

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. Given the volume of teachers involved, this could be provided via online platforms and/or mobile platforms. Furthermore, the teacher training curricula need to be adjusted and added to, in order to cater for the new schooling curricula aimed at digital literacy and fluency.

1.3 Digital infrastructure and Internet connectivity in schools

Connectivity, security and sustainability are major issues in schools, where theft has undermined many initiatives. What is needed in the future is a combination of approaches for infrastructure funding, for long term sustainability of digital infrastructure and for community-supported security measures. Fast, reliable Internet access will enable a range of new learning modalities, updates, no real familiarity, access to new information, and no research. While tablets are useful for overcoming access to books locally, they need to have access to Internet-based resources to be truly useful. Access to the Internet outside of school hours is also important for research, communication, preparation of homework assignments, whether this is on tablets or smartphones, and whether these are provided by the state or by the learner's family.

Strategic action point 1.3

A major long-term infrastructure funding programme for schools is needed, with attention to mobile and other wireless network infrastructure, at sufficient levels of connectivity to make online access meaningful in educational terms. While government may provide tablets and other devices, learners can also use their own devices ('Bring Your Own Mobile Device' or 'BYOMD'). Well structured, well designed public private partnerships will need to be fostered by key stakeholders, and the necessary asset funding partnership regulations will need to be prepared specifically for digital infrastructure. Opportunities for infrastructure funding partnerships can be formulated through Treasury Regulations, through the proposed Digital Development Fund, and through other infrastructure funding initiatives, such as SIP15.

2. Strategy element 2: Digital futures and mastery: Building advanced digital skills

Strategy elements intended to push forward advanced digital skills include promotion of formative thinking and discussion forums for new curricula and advanced teaching approaches in the public and private post-school education and training system (PSET), including the technical and vocational, and higher education environments; promotion of research into advanced digital skills; promotion of capacity-building for PSET lecturing staff; fostering the development and roll-out of massive, open, online courses (MOOCs); and measures to strengthen CoLabs, digital tech hubs and incubators.

2.1 Advanced digital skills: Promoting digital innovation skills

The development of advanced digital skills involves a range of areas of activity, conducted through collaboration among many stakeholders. These include the Department of Higher Education and Training, with respect to TVET institutions, universities and other institutions involved in post-school education; the Department of Science and Innovation, with respect to scientific research, technology and innovation; and the Department of Communications and Digital Technologies with respect to the overarching promotion of the digital and future skills strategy. Other stakeholders and role-players include tertiary institutions, private training institutions, formal or statutory research entities, such as the Council for Scientific and Industrial Research (CSIR), and quasi-tertiary entities such as the CoLabs and the range of digital tech hubs and incubators, along with the private sector and the investment community.

It is necessary to actively promote research and innovation in digital technologies, applications and processes in universities and in science performing institutions. Innovation funding, including the South African Research Chairs (SARChi) and the many other innovation funding mechanisms, should incorporate in their funding design a range of postgraduate research programmes of relevance to skills for digital innovation, as relevant to multiple disciplines. International collaboration with other higher education institutions, research entities and the private sector is essential to keep abreast of research and development for digital innovation.

Strategic action point 2.1

Multi-disciplinary and inter-disciplinary studies are an important form of undergraduate and postgraduate degree design, as a means to incorporate digital skills and capacity building for digital innovation, so that graduates learn to adopt digitally-oriented thinking in their approaches, side by side with a socially-oriented worldview. Structured arrangements must be introduced to break down the historical walls dividing vocational training from academic education, so that these are seen as complementary and mutually reinforcing stages within the same overall digital skills continuum.

Formal measures are necessary to provide for mutual recognition of qualifications across all tertiary institutions, and for incremental articulation pathways in the context of education appropriate to a digital economy and society. Measures for recognition of prior learning (RPL) can be factored into the positioning of CoLabs, tech hubs and incubators, where practical design and developer skills are learned. Government will foster these strategic action points, through institutional arrangements with sector education and training authorities (SETAs), and where possible, contribute to funding. Government innovation funding programmes should incorporate digital innovation skills and capacity building in their frame of reference, noting that digital innovation skills are relevant across a range of innovation verticals, from agriculture and aeronautical engineering to transport systems.

2.2 CoLabs, digital tech hubs and incubators

The tertiary digital skills building environment extends beyond universities, TVET institutions and accredited private training institutions to learning in collaborative learning environments. These include the provincial Collaboration Laboratories or CoLabs established by government at historically-disadvantaged universities, which focus on digital inclusion and social innovation, effective service delivery, rural development, creative new media industries, connected health, knowledge-based economy, digital literacy and digitally enabled agro-tourism. The CoLabs play an important role in the transition from basic digital skills to the acquisition of advanced digital skills. Therefore, government seeks to create a statutory environment for the establishment, functioning and operation of the CoLabs under the Ikamva Digital Skills Institute.

Knowledge and skills building in tertiary education and research institutions, and in technology hubs, maker spaces and digital incubators, plays a key role in the development of advanced digital skills. Tech hubs function as spaces for innovation learning, entrepreneurship development and digital upskilling. The tech hub community of researchers, software developers and incipient entrepreneurs, supported by universities, corporate clients and investors in research, innovation and development, create the necessary conditions for innovation success. Tech hubs, maker spaces and digital incubators are part of a virtuous research triangle, which draws together government bodies (such as the DCDT, DHET and the DSI), academic and research institutions (universities, TVETs, the CSIR), and the private sector into multiple partnerships for growing local digital innovation. Technology hubs and incubators stimulate demand for advanced digital skills, and act as a developmental space to nurture and hone such skills.

Strategic action point 2.2

In order to encourage multiple forms of collaborative learning, government will work with academic and research institutions, and with industry partners to introduce funding and other support measures for CoLabs, digital tech hubs and incubators, with the aim of fostering digital entrepreneurship in cities and in rural areas. Consideration will be given to matching industry and government funding for digital innovation skills advancement.

2.3 Open online courses

Massive open online courses (MOOCs) are increasingly a feature of the university learning environment in the 21st century. Ideally such courses are free of charge, with unlimited enrolment and delivery over the Internet, using a range of innovative content delivery approaches.

Strategic action point 2.3

A viable model for the development and rollout of open online courses covering digital skills is essential to ensure scalability and sustainability. Such a model should include financial delivery incentives covering open online course development and learner throughput; competence certification by either the relevant tertiary institution or SETA; blockchain-based 'digital badging' to ensure portability and mutual recognition of certification; the provision of financial or other incentives for learners to secure sufficient throughput; and measures to avoid duplication of materials and to promote sharing of courses across TVET institutions and universities.

2.4 Academic capacity-building in TVETs and universities

The TVET, university and broader post-school teaching and learning environment needs future cohorts of lecturing and research staff who have high levels of knowledge and capacity with respect to shaping the digital university, where digital applications contribute to an enhanced learning experience. Academics and researchers in all disciplines must become innovators and advocates for digital skills in their disciplines. The Department of Higher Education and Training, the Council on Higher Education (CHE), Universities South Africa (USAf) and the representative organisation for the TVET sector each need to invest in strategies for improving the digital fluency and digital mastery of academic staff.

Strategic action point 2.4

The DCDT will propose a joint working group with the DHET and major higher education actors, to formulate a programme to advance academic staff digital literacy, digital fluency and digital mastery.

3. Strategy element 3: Skills for Industry 4.0 and the world of work

Strategy to promote effective digital use in the world of work needs to recognise at least four dimensions, including (i) effective utilisation of digital technology where tasks are high risk, (ii) effective utilisation of digital technology for process and service automation where major efficiencies gained will benefit consumers and citizens, (iii) collaborative computing, and (iv) engaging the workforce in the design of innovative digital solutions. In South Africa, those forms of collaborative computing that minimise unemployment at a range of income levels, and foster an actively evolving labour market, require greater attention by business and government. These include approaches such as blending humans and technology in the workplace, collaborative robotics, techno-human interaction or machine-human interaction, and human-computer collective intelligence.

With respect to all four dimensions set out above, South African business and government needs to address the existing skills gap, to actively build adaptive digital skills for workers in the future workplace. A few of the key areas for digital skills development in business and government are additive manufacturing (incorporating 3D printing, laser cutting, virtual and augmented reality, other), apps development, biotechnology, cloud computing, data analytics, robotics and basic computer user skills. Particular attention must be given to new skills for those parts of the workforce where significant jobs losses will occur over a lengthy period through the introduction of disruptive technologies.

3.1 Digital skills for Economy 4.0

The transformative role of digital technologies in the economy is only possible where many levels and layers of digital skills are available in the labour market. The absence of digital skills excludes economic participation, while the presence of digital skills encourages economic participation. Digital technologies may have a low, high, or transformational impact on business and government. The disruptive effects of digital technologies may lead to short-term and long-term job destruction. New and better jobs, or employment opportunities, or entrepreneurial and self-employment opportunities, are only possible where major investments in digital skills are made over an extended period of time. To become a medium to high growth economy, South Africa needs to advance digital skills for the workforce at an unprecedented level, particularly for low-skilled workers who will otherwise bear the brunt of job vulnerability.

Strategic action point 3.1

All 21 sector education and training authorities (SETAs) must incorporate digital skills planning in their sector skills plans, taking note of the specific applications of digital technologies and digital process innovation in their respective sectors, from agriculture and banking to transport, wholesale and retail. MICT SETA must develop digital skills planning informed by the plans from other SETAs. This work must include attention to skills development for low-skilled workers. This will greatly advance the capacity of the labour market for effective economic participation, growth and development.

3.2 Digital skills for Government 4.0

The success of the National e-Government Strategy and Roadmap, namely e-government services transformation, enhanced e-governance, and digitally-enabled society is dependent on the level of digital skills within government departments and entities, and amongst citizens. Digital skills development is required for around 2,1 million civil servants, indicating a requirement for incorporating digital competencies in job descriptions and suggesting the need for continuous online learning. The demand for new skills for digital government, including digital government strategy design and digital leadership, will continue to grow over the next decades.

Strategic action point 3.2

As part of building an ongoing digital government skills programme, a digital skills audit will be performed every three years, covering foundational digital skills (such as computer user skills) and advanced skills (such as data analytics skills), guiding the provision of digital skills training and online learning. Government will take the necessary actions required to progressively include digital skills and competencies within pay progression policies. The DCDT, DPISA, GITOC and SITA are partners in this major initiative.

3.3 Research on digital skills, digital disruption and the labour market

The digital labour market requires analysis, in order to identify the particular digital skills gaps that are relevant in the South African context and to propose ways to address those skills gaps. This applies to those professions where advanced digital skills are in high demand, such as IT/digital service managers and digital applications developers, as well as to professions where advanced user skills are required, such as in banking, mining, agriculture, tourism and other sectors.

Furthermore, major digital disruption is being experienced in the banking and finance sector, while future digital disruption will be experienced in other commercial sectors, in tourism, in agriculture and in mining. Conversely, most jobs will require digital skills. Limited research has been done into the likely effects of digital disruption on the South Africa labour market. The positive and negative effects of digital evolution on labour, including the significant future challenges with respect to labour and AI, require extensive research in order to take account of and respond effectively to the concerns of representative labour organisations, the SETAs and South African workers, noting the potential for collaborative human and artificial intelligence as being relevant to the South African socio-economic reality. Speculation about positive and negative effects can create an environment in which employers and organised labour are in major disagreement, unable to effectively negotiate a way forward. 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, as the basis for future policy and well-informed strategic action.

Strategic action point 3.3

Annual SETA surveys should include a focus on current digital skills, future digital skills needs emerging in South African industries, and should explicitly report on the skills gap. This will require the active involvement of organised business and labour, and should be a major agenda item at the National Economic Development and Labour Council (NEDLAC), working with the SETAs, with the labour research bodies such as the National Labour and Economic Development Institute (NALEDI), with industry-based research entities, and with university-based research entities. Attention should be paid to strengthening the quadruple helix of industry, labour, government and academia collaboration in relation to relevant research and the utilisation of research outputs to create benefits for economy and society.

3.4 Digital learning for youth and unemployed persons

The digital skills gap underlines the need for structured initiatives aimed at young people and unemployed people. Newly-qualified young people emerging from universities and TVETs must be ready to enter the job market, including in respect of the necessary digital skills. This implies the need for an interface between employers and tertiary institutions to ensure that youth graduates with digital skills appropriate to a range of sector requirements. It is also clear that many segments of the workforce lack a sufficient digital skills foundation to enable easy reskilling and access to new job opportunities. This implies the need for an interface between employers and SETAs to promote reskilling.

Digital learning platforms include open online courses, game-based and virtual reality-based learning, cybersecurity awareness and other online learning modalities. While there are powerful MOOCs available in the market, industry and the SETAs need to collaborate to advance locally developed digital learning programmes relevant to the digital revolution and pertinent to priority digital skills for South Africa. Digital wellness programmes with respect to cybersecurity awareness and netiquette are equally important and should be fostered and promoted, in the online environment by, amongst others, the DCDT, government and industry in general, National Skills Authority and SETAs.

Strategic action point 3.4

Government, through its relevant agencies, mechanisms and partnerships, will promote the funding, development and popularisation of online platforms and open online courses for industry-oriented learning and continuing profession development (CPD). This needs to take place in consultation with industry and organised labour, with SETA recognition and SETA funding.

In particular, the DCDT will support a South African programme of the 'Digital Skills for Decent Jobs for Youth', global campaign by the International Telecommunication Union (ITU), International Labour Organisation (ILO) and United Nations Development Program (UNDP), guided by specific and achievable sub-targets. The Labour Activation Programme of the Unemployment Insurance Fund (UIF), which is intended to reskill beneficiaries who have lost jobs, must incorporate a digital skills component. Currently in operation in KwaZulu-Natal Province, this initiative must be extended nationwide, in consultation with business and organised labour.

4. Strategy element 4: Creating Society 4.0 and addressing the digital skills divide

The digital revolution offers a wide range of benefits to individuals and communities. It can promote social development by increasing access to a range of tools that improves lives and livelihoods. It can empower communities to have political, social and economic agency and open the doors to the world of information, knowledge and continuing education. However, this is not the case where there is a digital skills divide, disempowering those who lack awareness of digital technologies and their potential, and who lack the ability and skills to exploit such potential.

4.1 Digital skills for Society 4.0

Individuals, citizens and communities require the necessary digital skills to access, evaluate, organise, interpret, utilise and act upon information increasingly available in digital format via digital channels. The move to greater online interactivity and the rise of user-generated content over social media platforms, demands greater levels of digital skills. As envisaged in the National e-Government Strategy and Roadmap, actions are needed to foster a digitally-enabled society. The development of appropriate local content to advance the digital skills of the public should be made available in all 11 official languages. Cybersecurity awareness and skills are a priority in the context of public awareness. Cybersecurity skills are also a priority agenda item for national skills development, to enable South Africa to protect, detect and respond to cyber threats.

Strategic action point 4.1

Government encourages corporate and academic social investment in digital skills learning material for communities across the country. This learning material can include informal learning not accredited by any agency, as well as interactive, open, online courseware designed to provide accredited digital skills training on demand to South Africans. The DCDT Cybersecurity Hub, will make available a Cybersecurity Awareness Portal. This needs to be supplemented by industry initiatives to improve cybersecurity awareness across all sectors of the economy and society.

4.2 Dealing with the digital skills divide

The digital revolution is likely to have a negative race and gender based impact. South Africa's society and economy is characterised by a sharp digital divide and a digital skills divide, which has a strong bias with respect to race, gender, disability, education, income and geographic location. Black, female, low educational level, low income and rural communities all experience the whip end of the digital divide. Access to online courses and tech hubs may be negatively affected by these biases. Differences in access to digital technologies and to digital skills have been a key concern of policymakers, with universal access and service being a key focus of policy, law and regulation since 1996 and this requires renewed attention. Continued focus on equity issues, in accordance with the ICT Sector Code, under the auspices of the B-BBEE ICT Sector Council and the Department of Trade and Industry, is both socially desirable and economically beneficial.

Strategic action point 4.2

Broadening the meaning of and mechanisms for universal access in the policy, legislation and regulation for the telecoms, broadcast and Internet sectors is an important next step, including expanded use of the Thusong Service Centres and successful use of the Public Access Facilities in Under-served Areas to promote digital skills training programmes, with particular attention to race, gender, disability, geographic, and other equity factors.

Strengthening the skills development components of the ICT Sector Code, with particular reference to digital skills, is therefore an important component within the Digital and Future Skills Strategy. For persons with disabilities, it is necessary to identify accessible ICT solutions and provide commensurate training on how to use these solutions. Equally the B-BBEE codes in each specific sector need to provide for the level, nature and extent of digital skilling appropriate to their respective sectors. In revising relevant legislation, regulation and industry codes, funding models such as the still existing Universal Access and Service Fund (USAF) and the proposed Digital Development Fund (DDF) must include appropriate funding for digital skills development.

5. Strategy element 5: Building digital skills awareness

A high-profile campaign of engagement is needed to ensure country-wide prominence for digital skills development. This includes engagement with the public at large, with organised labour and the private sector, with civil society, with state-owned entities, and with government structures.

5.1 Public campaigns for digital skills

Campaigns and similar multi-stakeholder initiatives provide an important means to building awareness, creating interest, drawing national attention, launching major initiatives, forging partnerships and otherwise motivating people to acquire digital skills. Such campaigns are best focused on young people, on key sections of the workforce who require upskilling, and on unemployed people, noting the need for continuous public information required to popularise online learning resources, digital wellness, cybersecurity and the economic and social changes that come with the digital age.

To address limited public awareness of the range of digital upskilling initiatives, programmes and opportunities available in South Africa, it would be useful to create an information clearing house, connector and facilitator to make sense of the many existing initiatives and new skills initiatives. A clearing house acts as a repository of information relevant to digital skills futures, available skills training programmes and other stakeholder relevant information.

Strategic action point 5.1

An ongoing country-wide digital skills and digital wellness campaigns will be organised, under an attractive branding, spearheaded at Ministerial level, widely publicised, and including flagship events and stakeholder engagement at national, provincial and levels. As part of this public campaign and information sharing initiative, a clearing house function will be established. The iKamva Digital Skills Institute will provide an online portal to showcase the available information. The role of such a portal could cover issues such as cybersecurity, privacy awareness and netiquette. Awareness of the portal could be generated via public service announcements on the broadcast media, and by bulk public service SMS messages.

5.2 Digital skills flagship events

A diverse range of flagship events, offering a variety of digital skills for life, livelihoods and citizenship, can foster public awareness. Embracing a variety of topics and technologies, these flagship events and competitions can stimulate greater public interest in the acquisition of digital skills, from agricultural fairs with a digital component to the annual computer olympiad.

Strategic action point 5.2

Public engagement and awareness initiatives organised by government and industry or academic partners will include once-off, or annual, high-profile public events, such as competitions, learnerthons and hackathons, code weeks for digital literacy and coding skills, digital expos, and other events, with attention to digital inclusion with respect to race, gender, educational status, income status, employment status and geographic location.

5.3 Stakeholder engagement in advancing digital skills

Lack of awareness of the multiple dimensions of the digital revolution amongst many of the stakeholders, means that organised business and labour are frequently in disagreement with respect to the introduction of new technologies in the workplace environment, some seeing digitisation as a threat to profits, others as a threat to jobs. Few, if any, unions in South Africa have been able to develop proactive responses that allow their members to benefit from the digital upskilling and job enrichment that can be associated with the introduction of digital technologies. Government notes the guidance of the Trade Union Advisory Committee (TUAC) to the OECD, to foster policies that encourage positive technology impacts on job quality and employment creation, including “quality jobs in digitalised economies”.

Strategic action point 5.3

Government encourages organised business and labour to engage in proactive rather than defensive responses to the digital revolution, noting the need to preserve labour market stability and a strong skills profile for South Africa. The DCDT will organise structured stakeholder engagement regarding the development of digital skills, reaching out to a wide range of economic and social development entities, including those in the private sector, civil society bodies, state-owned entities, and other government structures. Such engagement will include low-profile face-to-face meetings at sectoral or individual level in order to brief key role-players on the importance of digital skilling; as well as high-profile public occasions to showcase digital skills development initiatives and programmes at sectoral or local level. It will include provincial outreach, addressing provincial governments, local chambers of commerce, and other stakeholders at provincial level.

6. Strategy element 6: Research and monitoring on digital skills

This Digital and Future Skills Strategy must be supported by adequate data and practical research in order to effectively assess the benefits derived. The digital skills gap analysis is one of the research initiatives undertaken by DCDT. Ongoing research is needed.

6.1 Research to inform continuous strategy evolution

As valuable as international best practice may be, it is not always appropriate to the national context and does not adequately inform national strategy. In-depth research into the state of digital skills in South Africa, along with detailed case study analysis is needed. Government, the private sector, social partners, non-profit organisations and education providers can work together to provide the data and conduct the data analysis required to foster greater accuracy in initiatives to advance digital skills in South Africa. Such research can include a structured data repository on digital skills needs, digital skills evolution, with capacity to generate strategic intelligence from the data. This research can be translated into publicly available reports, news and events; and can inform funding initiatives.

Strategic action point 6.1

The DCDT, 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. This will include an open data information and knowledge management system in respect of labour market and digital skills data; and in respect of youth, unemployment and digital skills data. The DCDT will establish its digital skills research unit, to create the research partnerships necessary to address the specific digital skills problematic of South Africa. The ensuing collaborative research will be made publicly available, and will be used to inform further iterations of the Digital and Future Skills Strategy, and to encourage the formulation of industry-wide and government-wide digital skills action plans.

6.2 Monitoring and evaluation of digital skills building

In every strategy implementation process, monitoring and evaluation is required to track the realisation of the objectives and benefits arising from that strategy. This strategy encourages adoption of a formal benefits realisation management (BRM) approach at national and institutional levels, so that benefits, success and failure levels are effectively monitored and understood and remedial action can be taken. There are many BRM strategy methodologies to choose from. Monitoring and evaluation enables government to present regular reports to key stakeholders and to the public which, if benefits realisation is demonstrated, can unlock greater interest and additional funding for digital skills training and related initiatives.

Strategic action point 6.2

The successful implementation of this strategy requires that the eight strategy elements be translated into action plans, or benefits realisation plans, incorporating each of the eight elements. These benefits realisation plans need to be as specific as possible, to have measurable benefits (including targets and milestones), to be realistically achievable, and tied to explicit timeframes, setting the benefits and outcomes against which the strategy can then be measured. Ongoing monitoring and evaluation can be conducted using the benefits realisation plans as a basis, allowing assessment of implementation progress against the pre-defined targets, enabling timely initiatives to address areas of weakness, and allowing for modifications to the strategy in accordance with changing conditions.

6.3 Building capacity for digital skills research, monitoring and evaluation

Relevant research linkages with tertiary institutions and other research entities will be necessary to build research capacity. Such linkages can include local and international universities and research institutes; the CoLabs, tech hubs and digital incubators; and international bodies such as the ITU and the ILO. These activities can take place in discussion with the 4th Industrial Revolution Commission and the Broadband Commission.

Strategic action point 6.3

The iKamva Digital Skills Institute will promote local and international research networks for the advancement of research on digital skills, working with universities and other research institutions. DCDDT will work with iKamva Digital Skills Institute and other research partners to establish a South African digital skills observatory capacity, responsible for aggregating comprehensive data sets that derive from the South African context, assembling and making publicly available statistics and data on digital skills, labour market trends, training opportunities, as well as tracking specific lines of enquiry related to building digital skills, and publishing annual studies for advancing stakeholder knowledge of the digital skills requirements of the country. Research output will be made widely and publicly available, with open access to data.

7. Strategy element 7: Co-ordination across government, industry, labour and other stakeholder groups

A wide range of stakeholders are involved in various aspects of digital skills development, occasionally with divergent views on the issues and with contending interests in the outcomes. Effective mechanisms and structures are required for co-ordination of these fragmented efforts. Accordingly, extensive cross-governmental and multi-stakeholder co-operation is needed to advance the digital skilling agenda, while limiting interference in and independence of initiatives.

7.1 Cross-governmental co-ordination

Large-scale initiatives require a high level of political and organisational leadership, supported by financial commitment. However, large-scale initiatives do not have a strong record of success in South Africa. This is because they require collaborative action across many organisations, which requires effective project management. Co-ordination is required with respect to integration of Digital and Future Skills Strategy (which sits with DCDT) with broader skills development initiatives (which sit with other government departments). These broad initiatives are set out in, amongst others, the National Skills Development Strategy, the Skills Accord and the Green Paper for Post School Education and Training. Alignment between various government skills plans and strategies is essential, not only to minimise overlaps and duplication, but to unify and strengthen key initiatives. Digital and Future Skills Strategy implementation will require setting action plans with clear goals for the realisation of benefits, as well as effective data management, strategy intelligence, and regular reporting.

The DCDT is mandated, under the 2017 National e-Strategy, to prepare a National e-Skills Plan, which includes this Digital and Future Skills Strategy. The Department of Basic Education (DBE) is a critical role player in the development of digital skills in schools and in adult basic education. The Department of Higher Education and Training (DHET) holds responsibility for encouraging digital skills advancement in universities. The Department of Science and Innovation (DSI) is the originator of policies and strategies for the digital skills required for research and innovation in the broader science and technology institutional landscape. The Department of Employment and Labour (DoEL) must address digital skills matters related to employment/unemployment, including industrial relations. The Department of Trade, Industry and Competition (DTIC) must encourage digital skills for Economy 4.0, while the Department of Public Service and Administration (DPSA) and the Government Information Technology Officers Council (GITOC) must ensure that skills building for digital government are prominent in their activities. Other government departments have a direct interest in digital skills for citizen services, notably the Departments of Home Affairs, Social Development, and the South African Police Service (SAPS).

Strategic action point 7.1

Effective co-ordination across the complex ecosystem of government departments, with engagement across national, provincial and local government, will be facilitated for the successful achievement of basic, intermediate and advanced digital skills. All these governmental players will operate in collaborative networks and partnerships with respect to the eight strategy elements. Inter-ministerial and inter-departmental clusters must support the digital skills initiatives relevant to their mandates. The Government IT Officers Council (GITOC) must play a leading role in this cross-governmental collaboration with respect to encouraging departments to invest in skills development relevant to digital government. The South African Local Government Association (SALGA) must play a leading role in this cross-governmental collaboration with respect to skills for local level digital government.

7.2 Co-ordination with state agencies and government appointed committees

Two state agencies are important contributing entities to Digital and Future Skills Strategy implementation. These are the National School of Government and the Ikamva Digital Skills Institute. Other key players are the 21 Sector Education and Training Authorities (SETAs), in particular the Banking SETA (BANKSETA), the Financial and Accounting Services SETA (FASSET SETA), and the Media, Information and Communication Technologies SETA (MICTSETA); the National Skills Authority which advises the Minister of Labour, manages the National Skills Fund and liaises with the SETAs; the South African Qualifications Authority (SAQA) which manages the National Qualifications Framework, in terms of which qualifications and skills programmes are graded and registered; the Quality Council for Trades and Occupations (QCTO), which oversees the design, implementation, assessment and certification of occupational qualifications; and the Council on Higher Education (CHE), which oversees quality assurance for higher education. In addition, the Fourth Industrial Revolution Commission and the Broadband Commission are envisaged to provide input on matters relating to digital skills.

Strategic action point 7.2

The HRDC is a strategic body assigned to coordinate Human Resource Development initiatives and to provide advice on policies, strategies and services that if implemented would achieve sector-growth and skills development in South Africa. A Digital Skills Forum will be established, aimed at drawing on the knowledge and expertise of key stakeholders, structures and interests around digital skills priorities. It will provide technical digital skills support to the broader work of the HRDC and ensure coordinated implementation of the digital skills programme with secretarial support from the Department of Communications and Digital Technologies.

7.3 Co-ordination with organised business and labour

The National Economic Development and Labour Council (NEDLAC), which brings together government, labour, business and civil society in a forum aimed at ensuring effective public participation in the labour market and socio-economic policy, must add the digital skills dimension to its agenda and deliberations. Entities representing organised business include Business Unity South Africa (BUSA), Business Leadership South Africa (BLSA) and a number of Chambers of Commerce. The voice of organised labour is heard through individual unions and through trade union federations.

Strategic action point 7.3

NEDLAC, organised business and organised labour are important actors in the arena of digital skills development. Government will seek clarity from these parties with respect to their particular interests and concerns, including ways in which these concerns may best be addressed through the range of existing fora, and funding mechanisms.

7.4 Co-ordination with academia, science institutions, professional bodies and civil society organisations

In higher education, Universities South Africa, represents the interests of the 23 public universities. COHORT, the Committee of Heads of Organisations of Research and Technology, can formulate views on behalf of the many science performing councils such as the Agricultural Research Council (ARC), the Council for Scientific and Industrial Research (CSIR), and the Human Sciences Research Council (HSRC). Industry professional bodies representing professionals active in the digital sphere include the Engineering Council of South Africa (ECSA), the Institute of Information Technology Professionals South Africa (IITPSA), and ISACA South Africa Chapter (Information Systems Audit and Control Association), the body representing the information systems audit profession. The Health Professions Council of South Africa (HPCSA) is the relevant professional body with respect to education and training for advancing e-health. Each of these representative bodies can participate in the process of Digital and Future Skills Strategy implementation. At present, there is no representative body for the CoLabs, tech hubs and digital incubators, noting that these institutions should be engaged in the digital skills evolution process. South Africa has important, large civil society organisations, which must be engaged in the programmes for digital skills building. It is not obvious what types of engagements will be required in promoting digital skills in every profession, nor is it obvious what changes need to be made to advance digital skills in the professions and across society broadly. While some initial strategic action points are offered here, an ongoing conversation is required.

Strategic action point 7.4

For ease of communication, the DCDT will liaise with Universities South Africa, with COHORT, with ECSA, with the IITPSA, with ISACA, HPCSA and other relevant industry professional bodies, in its efforts to understand what needs to be co-ordinated, why and how. DCDT will make special efforts to work with key civil society organisations, particularly those who have a major interest in skills building, and in race, gender and disability equity.

8. Strategy element 8: Funding for digital skills

Funding is needed for a wide range of digital skills initiatives, including materials development (inclusive of open online courses), training delivery, scholarships and bursaries, support for learnerships, support for digital tech start-ups, public awareness building and flagship events. Co-ordination and collaboration is required with respect to the sourcing of funds and the management of funding for Digital and Future Skills Strategy implementation, best addressed in the form of a collaborative multi-stakeholder funding vehicle. Existing entities through which funds are available for the digital skills training programmes include the National Skills Fund and the SETAs in the main. The national Jobs Fund co-finances programmes that offer support for work seekers where these programmes have a significant impact on job creation. The Universal Service and Access Fund (USAF) is currently funded via a levy on turnover imposed on electronic communications licensees, with the funds collected by ICASA, passed over to

Treasury, which then allocates funds to the USAF, which is administered by the Universal Service and Access Agency of South Africa (USAASA). In recent years the Fund has received substantial allocations towards digital terrestrial television set-top boxes, some of which should be available to fund digital skills development. The DCDT is preparing draft legislation to dissolve the Universal Access and Service Fund and replace this with a Digital Development Fund (DDF), with broader scope and access to a greater pool of funding.

8.1 Funding for digital skills: SETAs

The 21 SETAs channel funds from employers, via a payroll skills levy, towards vocational skills training through learnerships, internships, unit-based skills programmes, and apprenticeships within their jurisdiction. They already provide substantial funding support to employers for skills development, although this is not specifically geared towards the digital skills identified in this strategy, except in the case of the MICT SETA.

Strategic action point 8.1

Government encourages the SETAs, in particular the AGRISETA (agriculture), BANKSETA, the ETDPSETA (education training and development process), the FASSET SETA, the HWSETA (health and welfare), the LGSETA (local government), the MICTSETA, the PSETA (public service), and the SERVICES SETA to include sectorally-appropriate digital skills development within training programmes and internships. The SETAs should consider funding for basic digital skills sets that will assist job seekers and form the basis for later upskilling.

8.2 Funding for digital skills: National Skills Fund and UIF Labour Activation Programme

The National Skills Fund (NSF) operates under the Department of Higher Education and Training and provides funding for skills development, a capable workforce and inclusive growth. Its principal focus lies in supporting the education and training of learners. The NSF receives 20% of the amount collected via the skills levy, and spends upwards of R5 million per annum. A portion of these funds could be made available for digital skills development programmes.

The Labour Activation Programme under the Unemployment Insurance Fund (UIF) is a potential source of funding for the digital reskilling of appropriate beneficiaries who have lost jobs as a result of disruptive digital technologies.

Strategic action point 8.2

The National Skills Fund can incorporate digital skills as an explicit component of its funding orientation, and budget for the provision of bursaries and scholarships, occupational programmes, skills programmes, workplace-based learning and worker education. The UIF Labour Activation Fund can similarly include digital reskilling within its frame of reference.

8.3 Funding for digital skills: USAF/DDF

In terms of the 2005 Electronic Communications Act, disbursements from the Universal Service and Access Fund (USAF) are exclusively for the payment of subsidies towards ensuring universal access and service to electronic communications services, and are primarily focused on supply-side infrastructure initiatives. The Digital Development Fund (DDF) will be created for the purpose of funding digital development in broad terms, including but not limited to priority digital skills development projects. Enabling legislation to establish the DDF will be drafted and tabled in Parliament. Digital literacy and digital skills development is to be an explicit focus of the DDF.

Strategic action point 8.3

Subject to Ministerial regulation, monies from the USAF could be used for digital skills development projects under the overall universal access and service ambit, until such time as the DDF has been established and is operational.

8.4 Funding for digital skills: Funding for tech start-ups

A gap exists in respect of bridging finance for tech start-ups to support the transition from early stage innovation to commercialisation to scaling up. Funding support of this nature, however, lies outside the scope of the funds examined in this section. It is, therefore, important to partner with the private sector to encourage funding arrangements that will support and encourage the transition of tech hub innovations into commercial production where they will attract independent investment. Tech start-ups located at tech hubs and digital incubators have a marginally greater chance of success because they operate within a semi-formal innovation institutional environment.

Strategic action point 8.4

A public-private partnership, to establish seed funding for digital tech start-ups located at tech hubs and digital incubators, will be investigated and created, within the broader national system of innovation.

8.5 Funding for digital skills: CSI funding

Corporate social investment (CSI) funding is an important potential source of digital skills development funding, although there is no specific requirement or incentive to direct CSI funds to digital skills within the legislation applying to CSI projects. Nevertheless, interactions with organised business may persuade CSI programmes to adopt a greater emphasis on digital skills.

Strategic action point 8.5

The DCDT will review the relevant CSI legislation and advise the relevant government parties on recommendations related to funding digital skills building. This matter can be an important part of the conversation at the Digital Skills Forum and at NEDLAC.

Conclusion

The DCDT hereby gazettes the National Digital and Future Skills Strategy. The DCDT will develop a five-year comprehensive Digital and Future Skills Implementation programme and will revise and update the Strategy through a formal public consultation process every five years.