



**communications &
digital technologies**

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International
Labour
Organization



African
Union



**DECENT JOBS
FOR YOUTH**



SKILLS DEMAND AND SUPPLY IN SOUTH AFRICA'S DIGITAL ECONOMY

**A focus on youth not in
employment, education or training**

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Foreword

Digitalization and technological advancements are significantly altering our work, lifestyle, business models and government policies. These changes bring benefits in terms of increased efficiency and job opportunities, but also present challenges like digital divides and uneven access to employment and learning. They are in general disrupting labour markets by altering demand for specific tasks and skills, leading to job losses, especially in routine tasks. The rapid adoption of technology and digital transformation may also exacerbate existing inequalities as new digital skills become mandatory. To fully benefit from these transformations, besides planning infrastructure and economic diversification, countries must ensure that individuals have access to knowledge and to upskilling and reskilling initiatives.

South Africa is a leader in internet usage, mobile phone penetration and broadband coverage, and has the potential to generate approximately 4.5 million new jobs through productivity improvement, strategic policy implementation and technology evolution. However, it also faces a significant challenge of youth unemployment. Out of the 20.8 million young people aged 15 to 34, 43.4% were registered as not in employment, education, or training (NEET) in Q2 2023. This issue is exacerbated by slow economic growth, a skills mismatch and persistent inequalities.

This report aims to enhance understanding of the digital skills landscape and address skills gaps in the post-Covid period. It reviews key policies and national promotion strategies to boost youth employment in the digital economy. It also examines youth perspectives on job opportunities, demand for digital skills and acquisition pathways, and identifies a mismatch between available digital skills in the labour market and the needs of employers investing in the fourth industrial revolution. Lastly, the report emphasizes the importance of education and training in equipping the current and future workforce with the optimal mix of skills, including digital skills and core skills for life and work in the 21st century.

The government of South Africa has already begun work on reducing the scale of youth unemployment, specifically under the Presidential Youth Employment Intervention (PYEI), which involves public and private stakeholders to create decent work opportunities for young people. A central component of the PYEI is the establishment of a National Pathway Management Network (NPMN) that convenes these actors working on a central site where young people seek capacity development opportunities as well as employment prospects. The National Digital and Future Skills Strategy (2021-2025), led by the Department of Communications and Digital Technologies (DCDT) includes specific initiatives aimed at youth not in education or training who are more vulnerable to joblessness or not being able to find decent work.

South Africa is also a member of a continental programme launched by the International Labour Organization (ILO) and the International Telecommunication Union (ITU), in support of the African Union (AU) and under the umbrella of the Global Initiative on Decent Jobs for Youth, called "Boosting decent jobs and enhancing skills for youth in Africa's digital economy". Work linked to the programme is carried out under the Digital Skills for Decent Jobs for Youth initiative, supported by the ILO, the ITU and the United Nations Development Programme (UNDP).

We hope that this report will contribute to a deeper understanding of YNEET (youth not in employment, education or training) as well as encourage a better matching of digital skills demand and supply in South Africa. The DCDT, ILO, ITU and UNDP remain committed to continue work initiated under the Digital Skills for Decent Jobs for Youth initiative. By sharing the results of their research, these organizations make a call to national stakeholders to join forces and support the implementation of some of the recommendations, geared towards informing the course of action and unlocking innovative skills development initiatives that can result in decent work opportunities and greater youth participation in the South Africa's digital economy.

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Juliane Hoss of TRi Facts (Pty) Ltd, subsidiary of Africa Check, is the researcher, team leader and main author of the research. Her team included Mehak Gopaldas, Vimbai Mawela, Hayley Simons and Celestine Jade Padayachee, supporting literature review, data collection and analysis, Neo Langa, for the creation of infographics and social media material, and the team of field researchers across the country who conducted the interviews.

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Executive summary



Setting the scene

The world of work has been changing drastically

The fourth industrial revolution (4IR) combined with the impact of the Covid-19 pandemic and related lockdown measures have fast-tracked digital transformation, changing the world of work.

The 4IR is expected to amount to a value of R1,4 trillion by 2026. It has been estimated that 230 million digital jobs will be created in Africa by 2030, which will result in about 650 million training opportunities. South Africa has the potential to generate 4,5 million new jobs across all industries due to productivity improvement, strategic policy implementation and the evolution of technology. Digital skills are at the centre of this new digital economy, requiring new ways of thinking about the world of work that were previously unpopular with corporate South Africa.

The potential of the digital economy is immense



What is the digital economy?

The digital economy refers to **all economic activities** that either **rely on digital input** or **use digital input** to make significant **enhancements**.

Digital input includes digital technology, digital infrastructure, digital services and digital data.



What does this mean in the South African context?

The local digital economy includes digital businesses, entrepreneurs working on digital apps or platforms and any other parts of the economy that form part of technological change:

- ▶ Traditional technology, media and telecommunication sectors
- ▶ New digital sectors and technologies, including e-commerce and digital banking
- ▶ “Traditional” sectors like agriculture, mining or manufacturing that are affected by emerging technologies

What this means in practice: Digital skills are in demand

The digital economy requires new and emerging skills to meet existing and future demand and to unlock employment opportunities for young people.

Currently, the demand for digital skills outweighs the supply. While digital skills will be required in all sectors of the South African economy, many local businesses lack the skills needed to operate, innovate and compete in the digital economy. There is an acute awareness of the importance of digital skills to secure employment but also a need for young people to learn how to use digital technologies. With employers looking for digital skills to increase growth and productivity, these skills are essential for young people to be more employable.



About the study

Objective: Assess digital skills demand and supply in South Africa

This study serves as an assessment of skills demand and supply in the digital economy in South Africa and builds on existing literature.

It focuses on young people not in employment, education or training (YNEET) and provides relevant insights about their lived realities, education and self-reported skills levels to better understand their current and potential roles in the digital economy:

1.

Review key policies and national promotion strategies to assess their potential to boost youth employment in the digital economy.

2.

Assess current and emerging skills demand and supply in South Africa's digital economy.

3.

Identify gaps, opportunities and needs related to specific skills that can generate new employment opportunities for young people.

It also aims to enhance perceptions and beliefs about the digital economy by providing a better understanding of the digital skills landscape and what it means for future skills demand.

This is achieved in the following ways



A nationwide, broad and inclusive study



Insights in the context of the global pandemic as a driver of change



Includes the perspectives of young people



A focus on skilling and upskilling pathways for YNEET



Insights on entrepreneurial opportunities

How the study was done

For **primary data collection** the researchers conducted



To categorize and understand the skills demand, the study used the digital skills framework developed by the International Telecommunication Union (ITU) in their digital skills toolkit, as well as the International Labour Organization's *Global Framework on Core Skills for Life and Work in the 21st Century*, published in 2021.

The study included a labour market policy review, which was essential in forming an understanding of the digital economy in the South African context, the skills mismatch and the country's readiness for the 4IR.

The aim of the **secondary research** was to link earlier research to the existing body of knowledge, and it focused on the following:

1.

The status quo of South Africa's digital economy and in-demand occupations

2.

Specific industries' contribution to total employment creation

3.

An understanding of local YNEET, including demographics and work experience

4.

Policies, programmes and strategies linked to unlocking employment opportunities



Findings



Status quo

The study highlights a demand in the digital economy for a new set of foundational, digital and entrepreneurial skills.

Human skills (core skills for life and work in the 21st century)



- ▶ **Critical thinking**
- ▶ **Creativity**
- ▶ **Communication**
- ▶ **Analytical skills**
- ▶ **Collaboration and relationship-building**

Demand for these skills by businesses is similar to the demand for digital skills. The biggest demand is for cognitive and metacognitive skills (especially strategic, creative and innovative skills) as well as analytical and critical thinking. In addition, there is a demand for emotional and social skills, especially in the context of programmes aimed at upskilling young people.

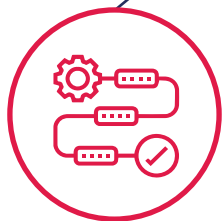
Digital building block skills



- ▶ **Analysing and managing data**
- ▶ **Software development**
- ▶ **Computer programming**
- ▶ **Digital security and privacy**

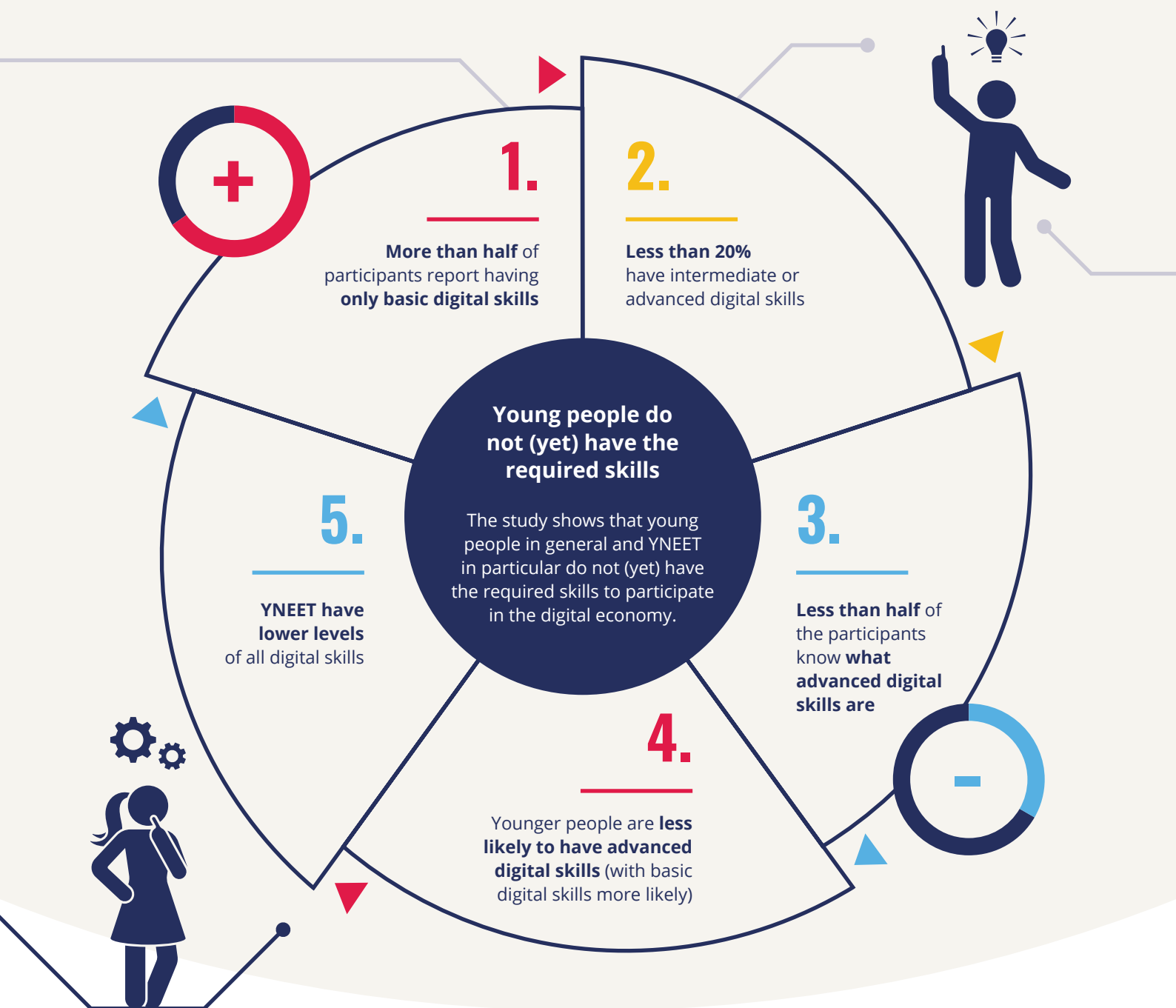
While these skills have always been important in traditionally digitally intense occupations, they are now regarded as critical in many occupations across industries. Demand does however not necessarily lead to work opportunities or full-time jobs, especially for SMEs and micro-businesses. Demand from large businesses (mainly in the space of advanced digital skills) reflects employment opportunities that these businesses are either not able to fill or that could be created if suitable talent was available.

Business enabler skills



- ▶ **Project management**
- ▶ **Business processes**
- ▶ **Communicating data**
- ▶ **Digital design**

These skills play a synthesising and integrative role in the workplace, as they enable the other two categories of skills to function practically. It reflects the fact that the digital economy now includes the increasing use of digital technologies in all industries.



In terms of demographics, there are positive trends:



Female
participants have an equal skill level compared to all participants.



Urban and rural
groups are equally likely to have used digital graphic skills, coding and app development skills or AI, VR, IoT or cybersecurity skills and less likely to have other digital skills.



Young people
trying to make an income have more digital skills compared to all participants.

Most young people surveyed have foundational literacy and human skills. YNEET are however less likely to have these skills and female participants also report lower skill levels in relation to core skills.

Defining digital skills

Digital skills are defined as a range of abilities to use digital devices, communication applications and networks to access and manage information. They enable people to create and share digital content, communicate and collaborate, and solve problems (UNESCO).

This study uses the digital skills framework in the International Telecommunication Union (ITU) [toolkit](#), which groups digital skills into three categories:



Basic digital skills

Foundational skills to **perform basic tasks** that enable people to function at a minimum level in society, including **using hardware and software** and conducting **basic online operations** such as email.



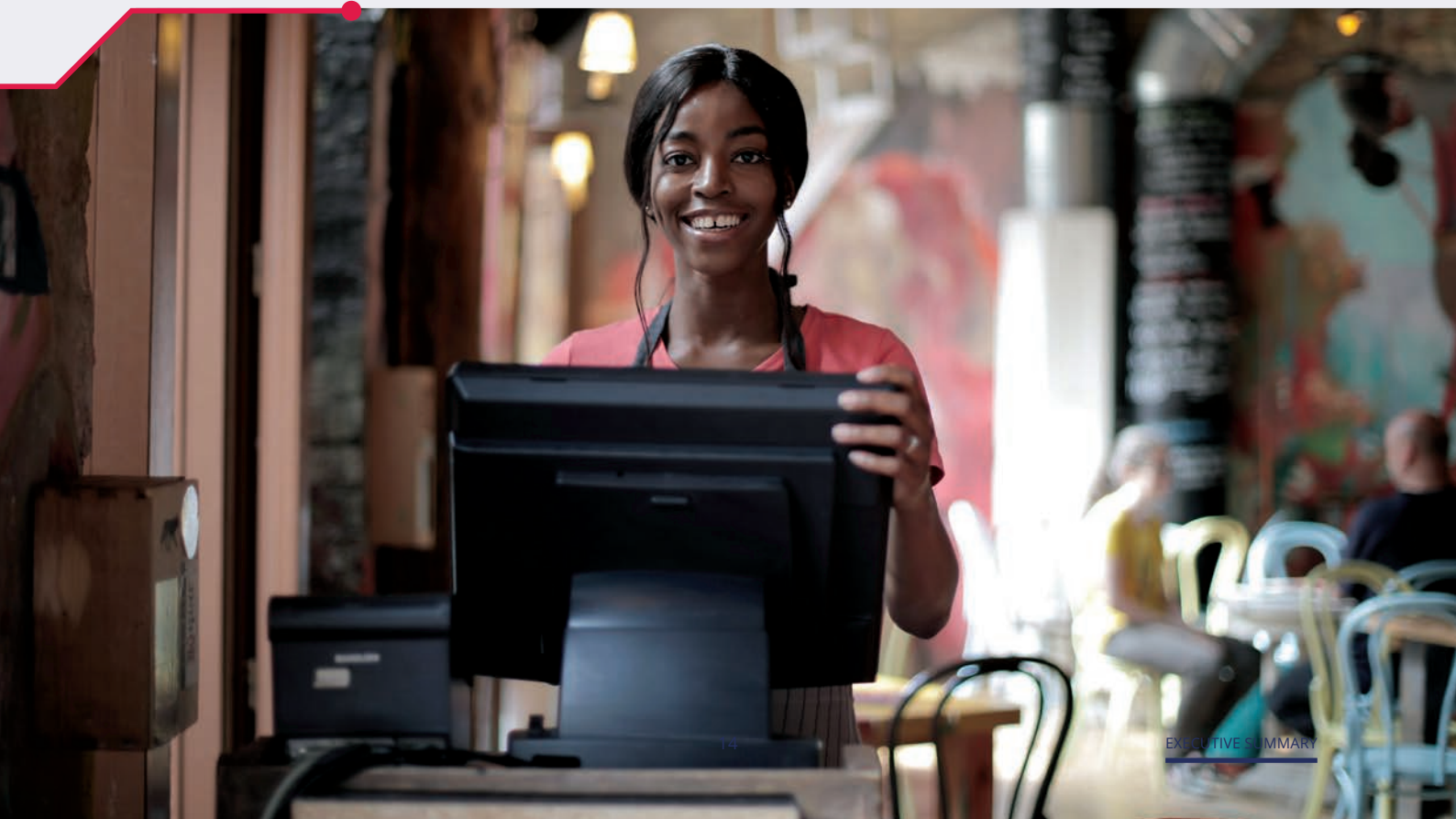
Intermediate digital skills

Skills for **using digital technologies** in more **meaningful and beneficial ways**, e.g. critically evaluate technology and create content, and that enable people to **perform work-related functions** such as desktop publishing, digital graphic design and digital marketing (i.e. job-ready skills).



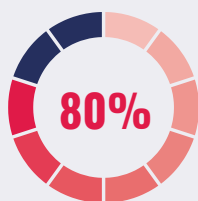
Advanced digital skills

Required by **specialists in ICT professions** such as computer programming and network management, including working with artificial intelligence (AI), virtual reality (VR), big data, the Internet of Things (IoT), cybersecurity and digital entrepreneurship.

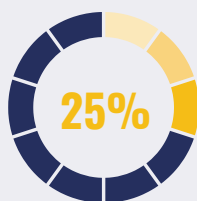


Skill requirements by businesses vary across industries and business sizes

The overview of the status quo of local businesses in this study provides a valuable understanding of the current ecosystem and how to link young people to the labour market:



Most businesses reported that the majority of their employees have **basic digital skills**.



Only one in four reported that their employees have **intermediate digital skills**.



Only one in 10 reported that they have **advanced digital skills**.

► There are some important nuances to consider:

Employee skill sets
depend on business size

SME employees are most likely to have intermediate digital skills, followed by large businesses.

More advanced tasks such as data collection, research or online meetings are common to large businesses but less frequent for SMEs and micro-businesses. Young people can add value to businesses if equipped with these skills.

Basic digital skills
are critical

Simple online operations make up the most frequent tasks performed by employees when using the internet.

Businesses of all sizes use the internet for marketing and e-commerce services, with around half reporting that their employees are completing these tasks. This highlights the importance of ensuring that all young people who want to enter the labour market have at least basic digital skills.

Employee skill sets vary
between industries

Employees working in the financial services or information and communication technology (ICT) sectors are most likely to have a range of digital skills, from basic to advanced.



Unpacking the challenge in more detail

YNEET lack extended education and formal work experience.

This study highlights the precarious living conditions of YNEET, also compared to their peers who are engaging in income-generating activities. Despite this, they are trying to improve their situation and are active in their daily lives, even if they do not have full-time work or lack formal education.



Lack of education

The findings show that most young people have some secondary education but still face huge barriers that are keeping them from furthering and completing their education. Most have not completed any additional courses or training, over and above their formal education.



Lack of experience

Young people are detached from the labour market, with the following as key trends:

1.

Just over
50% of all participants
in the survey had some
work experience.

2.

Young people
not in formal
employment, education
or training find more
opportunities in the
informal economy.

3.

Young people from
rural areas
are less likely to have
work experience
and are less likely to access
formal employment.

4.

The
youngest participants
were least likely to have
work experience and if
they did, it was mainly in
the informal economy.

Key barriers and challenges keeping young people from participating in the digital economy

1.	Availability of education and training programmes	▶ While there is a range of possible programmes, the study also highlighted a gap in terms of the number and geographic spread of YNEET who would require assistance.
2.	Limited access to information and resources	▶ Young people see a range of opportunities in the digital economy, mainly learning and entrepreneurial. However, they do not have a clear understanding of how to gain skills and access employment.
3.	Not having a clear view of options and opportunities and how to pursue these	▶ Despite being faced with information and financial constraints, young people <u>exercise significant agency</u> to try and access information about furthering their education, gaining skills and career guidance. A lack of perceived options and opportunities and how to access these can however demotivate and frustrate them. This includes confusion about which subjects and courses will get them to their chosen career, not knowing when applications are due, and hidden application fees.
4.	Being disconnected from the digital world	▶ Young people are negatively affected by the digital divide in South Africa, facing barriers in relation to access to and affordability of digital devices and connections. While most participants have access to a phone with basic features, only one in four in rural areas have a smartphone, and one in three in urban areas. About one in three participants have no internet access, with young people in rural areas most affected.
5.	Limited opportunities to further/complete their education or develop skills	▶ Most young people have some secondary education but still face huge barriers keeping them from completing their secondary education and accessing tertiary education that will help them to adhere to employment requirements.
6.	Limited ability to transform education and skills into employment/income-generating activities	▶ The main reason for this is young people's lack of social capital and lack of guidance in accessing employment opportunities. The survey indicated that young people have low self-efficacy in relation to finding work. A lack of work experience combined with a lack of technical and digital skills remain a key obstacle for young people trying to connect to the labour market.



Going forward

Key gaps to fill to include YNEET in the digital economy and meet future skills demand

To include YNEET in the digital economy, their digital skills must be strengthened across the board:

1.

Basic digital skills

Basic digital skills must be the norm, as about 50% still lack software and online operating skills and about 30% lack hardware skills. This creates the potential to offer specific short-term training programmes.

2.

Intermediate digital skills

There is a need to train and support youth to use digital skills in a working or entrepreneurial context by equipping them with an understanding of specific systems and programmes that are used widely in the industry.

3.

Advanced digital skills

There is potential to equip young people with practical experience of applying advanced digital skills in a working environment. Young people with some work experience and prior knowledge can benefit from digital leadership skills or digital skills on a managerial level.

Considering the projected demand for certain skills, the study identifies specific gaps in relation to this future demand and the potential to prepare young people for this.



Provide appropriate training

Young people must be trained to use **software, applications and systems** that are **essential in a working environment** and be taught the skills to provide technical and desktop support.



Encourage entrepreneurship

There is a need for young people with **work experience and the application of skills**. This opens an opportunity to **create entrepreneurial opportunities** and prepare young people to provide digital services to businesses.



Increase the number of students in relevant fields

There needs to be awareness that the low number of students in the science, technology, engineering and mathematics (STEM) fields can limit possible growth in the digital economy. This opens an opportunity for **courses and training programmes that are suitable for YNEET** and prepare them for **specific occupations**, such as cybersecurity officers or coding professionals.

Key success factors in helping young people access skills and employment opportunities

Based on this understanding, the study identifies key success factors for specific programmes and interventions that support young people to access skills and employment opportunities in the digital economy.



Recommendations

The objective of the study was to provide recommendations, which are outlined per strategic objective in the tables below.

Objective 1: Broaden the overall understanding of the skills mismatch

Objective 1.1: Assess the demand for and supply of skills for the digital economy

Recommendations

What this will involve in practice



Work with priority target groups

- ▶ Design an inclusive approach.
- ▶ Focus on vulnerable demographic groups: young females, people with disability or rural youth.
- ▶ Aim to reach young people across all geographic regions, irrespective of whether they have access to a simple phone or technological device.
- ▶ Identify and choose a few pilot areas, in urban and rural contexts.



Focus on priority skills in demand

- ▶ Basic digital skills: online operations (in demand by small businesses)
- ▶ Intermediate digital skills: website and graphic design, digital marketing
- ▶ Advanced digital skills: cybersecurity, mobile app testing/development, coding



Select priority sectors

- ▶ Sectors most suitable and impactful for programmes supporting YNEET:
 - Wholesale and retail trade
 - Manufacturing
 - Financial services

Objective 1.2: Identify digital skills policy and regulatory imperatives



Recommendations

Follow imperatives from the digital skills policy and regulatory environment

What this will involve in practice

- ▶ Facilitate the implementation of existing policies and programmes.
- ▶ Increase awareness among young people of existing opportunities and support programmes in the digital economy.
- ▶ Contribute to the ongoing advancement and alignment of the accreditation framework, including the development of micro-credentials.
- ▶ Ensure the alignment of all skills development programmes to the National Digital and Future Skills Strategy.
- ▶ Support the implementation of national strategies at provincial and local levels.
- ▶ Contribute to the provision of infrastructure, funding of the existing approach, as well as the engagement of stakeholders, especially from the private sector.

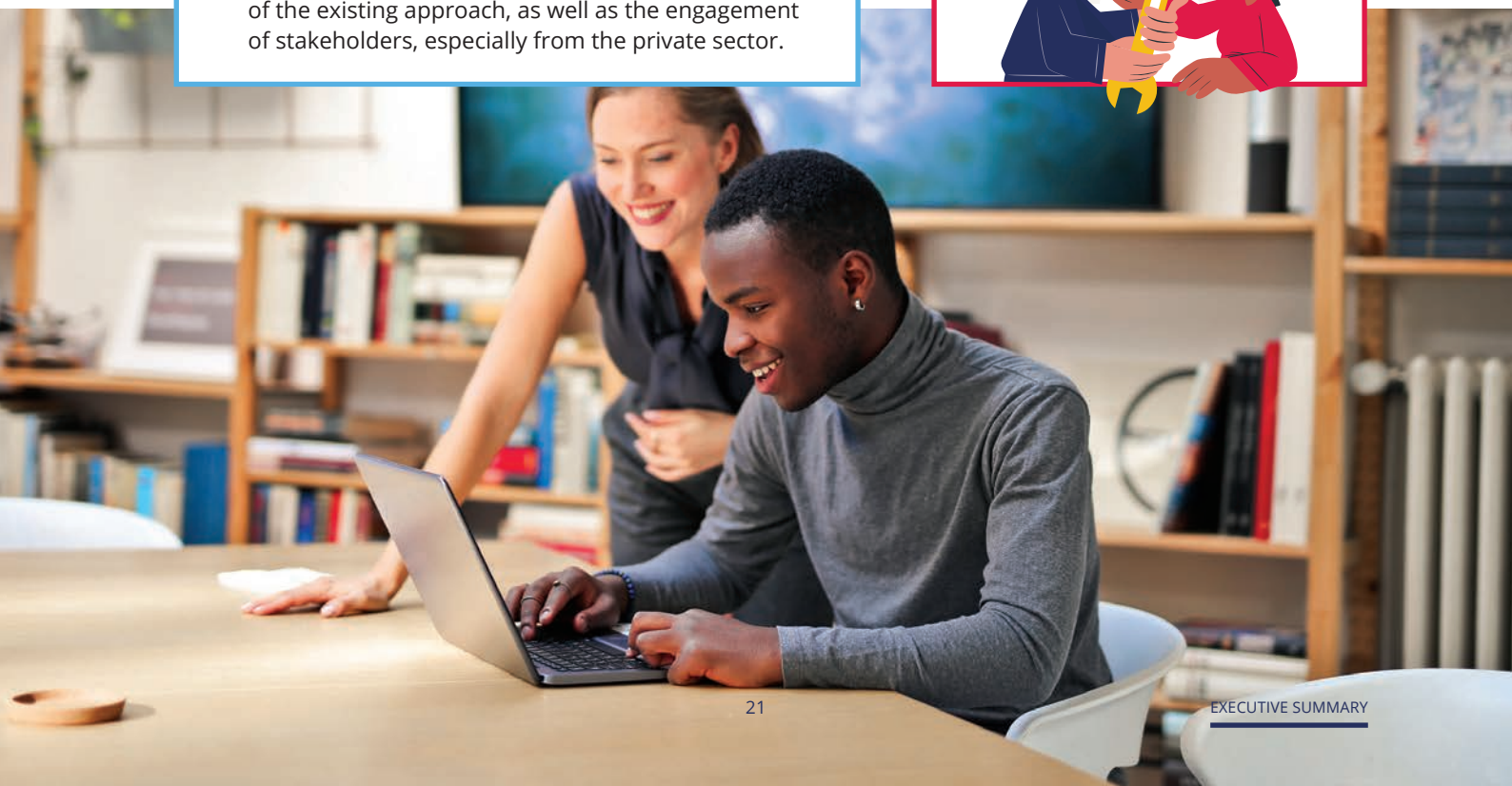


Recommendations

Create awareness among young people of the existing policy landscape and opportunities

What this will involve in practice

- ▶ Create awareness among young people of the existing policy landscape and opportunities.
- ▶ Include information on existing platforms.
- ▶ Offer short-term, in-person workshops in communities where young people live.



Objective 1.3: Understand the ecosystem for skills development in a digital economy and related enablers in the context of South Africa

Recommendations

What this will involve in practice

Incorporate the enablers that will help young people develop the relevant skills into all programmes and interventions



- ▶ Facilitate access to resources.
- ▶ Ensure connectivity, with a focus on rural and marginalized areas.
- ▶ Distribute material about opportunities and where young people can access skills.
- ▶ Adjust training formats to the specific needs of YNEET by offering long-term, in-person training.
- ▶ Include core skills to equip young people with holistic skills sets.
- ▶ Ensure accreditation with local or international institutions.
- ▶ Collaborate closely with employers to assess current vacancies, existing demand and design programmes that prepare young people for work.
- ▶ Help YNEET to gain work or practical experience through internships, apprenticeships, company placements and practical training.
- ▶ Facilitate entrepreneurial opportunities.

Objective 2: Inform the co-design of digital skills development initiatives

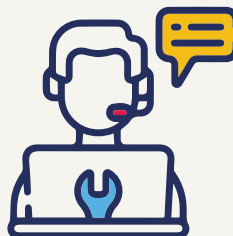
Recommendations

What this will involve in practice



Identify activities the DCDT, ILO, ITU and UNDP's constituents should prioritize

- ▶ Support key initiatives of the Presidential Employment Stimulus programme as well as the National Pathway Management Network.
- ▶ Collaborate with TVET colleges and practitioners.
- ▶ Provide capacity to scale good, demonstrated practice interventions and programmes.



Objective 3: Provide recommendations for priority activities for YNEET

Recommendations

What this will involve in practice



High-touch programmes equipping young people with skills in demand in the digital economy

- ▶ Offer longer-term training programmes (lasting six to 12 months) that will equip young people with the digital skills most in demand.
- ▶ Assess the skills level of young people and select specific courses in line with their skills level, e.g.:
 - Entry-level courses for young people with no or very limited prior exposure *focusing on basic digital skills*
 - Advanced courses for those with some experience/who have already completed a course, *focusing on cybersecurity, mobile app testing/development and coding*



Preparation programmes for young entrepreneurs to offer digital services to businesses

- ▶ Design support programmes that last six to 12 months comprising training of digital skills, practice of entrepreneurial skills and facilitation of initial work experience or contractual agreements.
- ▶ Recruit young people through colleges.
- ▶ Focus on intermediate digital skills, especially website and graphic design as well as digital marketing for SMEs.
- ▶ Place young people with SMEs that have a need for support but might not be able to pay young people and fund participants to work for businesses part-time.
- ▶ If possible, provide resources for freelance work (e.g. a laptop) and link young people to freelance opportunities.



Support for young people to access existing online content

- ▶ Run awareness campaigns about what specific digital skills young people will learn in specific courses.
- ▶ Facilitate internet access through in-person programmes at training centres or community hubs.

Objective 4: Inform a series of other system-level interventions

Objective 4.1: Strengthen and upgrade digital literacy/skills curricula and competency standards

Recommendations

What this will involve in practice



Digital Skills Accelerator that supplements the current TVET curriculum

- ▶ The Digital Skills Accelerator will be a centralized team that develops and offers hybrid, self-paced training courses on digital skills.
- ▶ The focus will be on hands-on and practical skills training.
- ▶ The team will offer support to the colleges to train their students through online content and centrally trained facilitators.

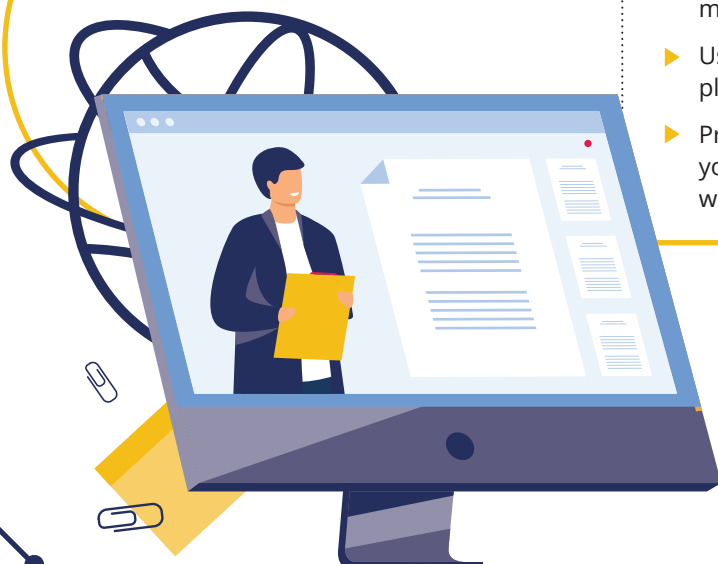
Objective 4.2: Integrate digital literacy and skills training into existing educational programmes at all levels

Recommendations

What this will involve in practice

Offer digital training as part of work-based learning (WBL), for instance through the EPWP

- ▶ Collaborate with EPWP initiatives.
- ▶ Offer in-person digital skill training that lasts a minimum of one week, prioritizing rural and marginalized areas.
- ▶ Use existing online content on free/affordable platforms under the supervision of facilitators.
- ▶ Provide advice on which additional courses young people can complete throughout their work experience.



Objective 4.3: Capacitate training institutions, trainers and teachers to deliver digital skills training

Recommendations

What this will involve in practice



Provide teaching support to TVET institutions to incorporate IT and computer science courses or increase the number of students

- ▶ Equip TVET educators with basic digital skills using existing content on online platforms.
- ▶ Offer temporary capacity support by onboarding, allocating and subcontracting educators who have the required knowledge and skills.



Provide strategic and operational support to TVET institutions

- ▶ Set up and subcontract working teams to specific TVET colleges to provide strategic and operational support to roll out the 11 4IR Future Skills Qualifications.
- ▶ Set up the courses, prepare educators and attract students to enrol.
- ▶ Connect with businesses that can offer work-based learning or practical experience.



Start a train-the-trainer initiative for educators at TVET institutions

- ▶ Identify educators who have digital skills and prior exposure and offer them in-person training to become facilitators.
- ▶ Organize sessions in which the facilitators train other educators.



Objective 4.4: Establish a platform/forum to integrate trained job seekers with relevant opportunities

Recommendations

What this will involve in practice



Use and leverage the existing SAYouth platform, Support SAYouth

- ▶ Provide relevant information about digital skills demand.
- ▶ Support the provision of training courses through the SAYouth platform.
- ▶ Develop a system to provide accreditation/credentials for the courses.
- ▶ Encourage young people using the SAYouth platform to further their education at a public TVET college, focusing on an occupational qualification.
- ▶ Support ongoing efforts to increase the visibility of the platform.
- ▶ Make the platform more accessible for young people living with disabilities.



Abbreviations, tables and graphs

Abbreviations

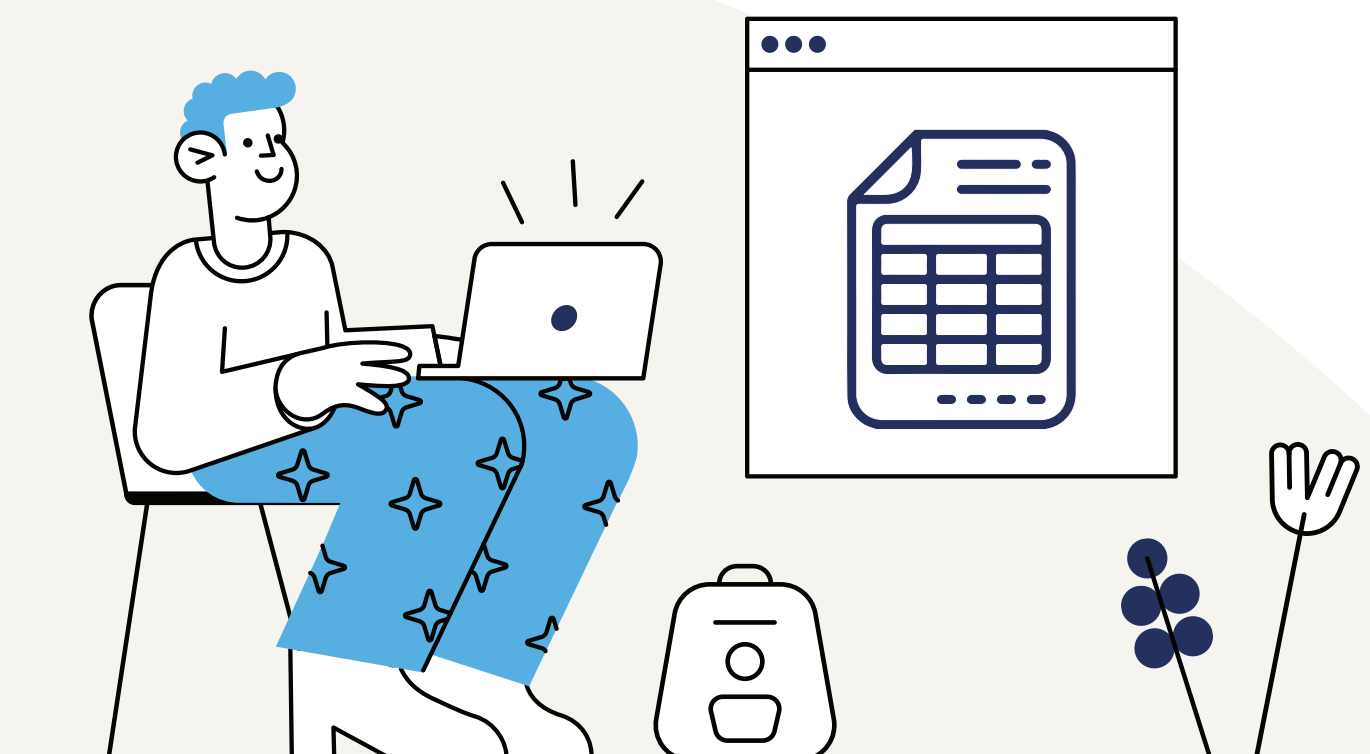
4IR	fourth industrial revolution
AI	artificial intelligence
APS	admission point score
AU	African Union
BUSA	Business Unity South Africa
CDS	Career Development Services
CEP	community of experts and practitioners
CET	community education and training
CETA	Construction, Education and Training Authority
CHET	Centre for Higher Education Transformation
DEL	Department of Employment and Labour
DHET	Department of Higher Education and Training
DPWI	Department of Public Works and Infrastructure
DQP	development quality partner
DTPS	Department of Telecommunications and Postal Services
DWYPD	Department of Women, Youth and Persons with Disabilities
ECSA	Engineering Council of South Africa
EPWP	Expanded Public Works Programme
GBS	Global Business Services
HEI	higher education institution
ICT	information and communication technology
ILO	International Labour Organization
IMD	Institute for Management Development
IoT	Internet of Things
ISCE	International Standard Classification of Education
IT	information technology
ITU	International Telecommunication Union
MERSETA	Manufacturing and Related Services SETA
MICT SETA	Media, Information and Communication Technologies SETA
NATED	National Accredited Technical Education Diploma
NCV	National Certificate Vocational

NDP	National Development Plan
Nemisa	National Electronic Media Institute of South Africa
NSC	national senior certificate
NSDS	National Skills Development Strategy
NSF	National Skills Fund
NSFAS	National Student Financial Aid Scheme
NQF	National Qualifications Framework
NYDA	National Youth Development Agency
OECD	Organisation for Economic Co-operation and Development
OFO	Organizing Framework of Occupations
OQSF	Occupational Qualifications Sub-Framework
PC4IR	Presidential Commission on the Fourth Industrial Revolution
PES	Public Employment Services
PHEI	private higher education institution
PSET	post-school education and training
PYEI	Presidential Youth Employment Intervention
QCTO	Quality Council for Trades and Occupations
SABEN	South African Broadband Education Networks
SADA	Smart Africa Digital Academy
SAMSA	South African Maritime Safety Authority
SANReN	South African National Research Network
SAQA	South African Qualifications Authority
SASCO	South Africa Standard Classification of Occupation
SDP	skills development provider
SET	science, engineering and technology
SETA	Sector Education and Training Authority
STEM	science, technology, engineering and mathematics
TENET	Tertiary Education & Research Network of South Africa
TVET	technical vocational education training
UX	user experience
VI	virtual intelligence
VR	virtual reality
VoIP	voice over internet protocol
WBL	work-based learning
WEF	World Economic Forum
WIL	work-integrated learning
YNEET	youth not in employment, education or training

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Part 1

Introduction and methodology

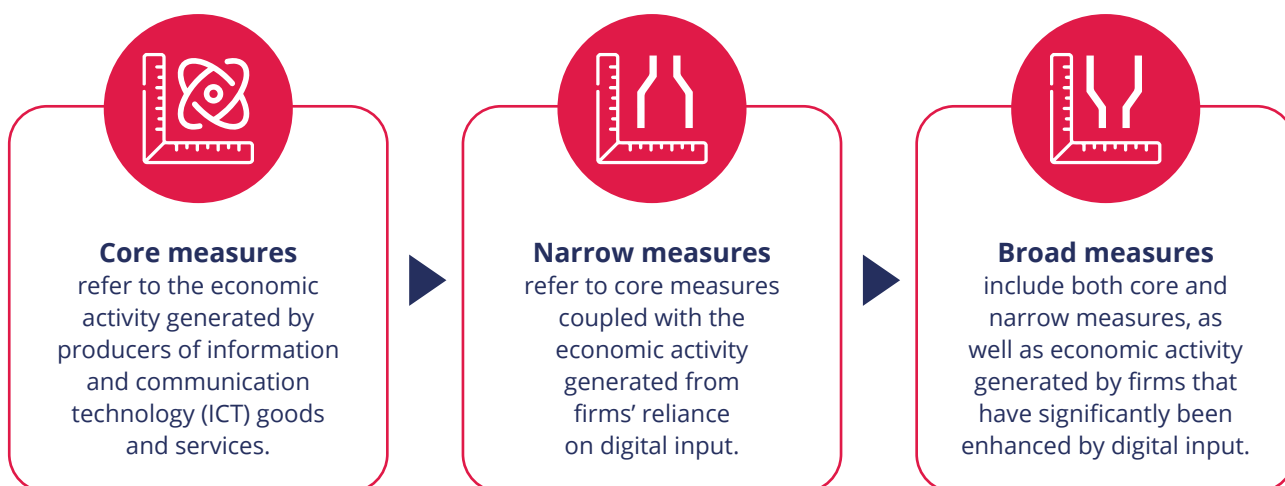


Definitions relevant to this study

For a more comprehensive glossary on skills and lifelong learning in the digital economy please refer to the ILO's report [*Changing demand for skills in digital economies and societies*](#).

Digital economy

The digital economy refers to all economic activities that involve a reliance on digital input or a dependency on significant enhancements using digital input. This includes digital technology, digital infrastructure, digital services and digital data. The Organisation for Economic Co-operation and Development (OECD) takes a three-tiered approach in a broad definition of the digital economy, as they consider the core measures, the narrow measures and the broad measures to holistically define the digital economy.



The definition continues by contending that the stakeholders of the digital economy produce or consume digital input, with the inclusion of government. In relation to this definition, adapted to suit the South African context, this report regards the digital economy as an economy that is based on digital computing technology, which includes digital businesses, entrepreneurs working on digital apps or platforms, and all parts of the economy that form part of technological change. It stretches from traditional technology, media and telecommunication sectors to new digital sectors and technologies, which include e-commerce, digital banking and even "traditional" sectors like agriculture, mining or manufacturing that are affected by emerging technologies.

Gig work or platform economy

A gig economy refers to a labour market that is built around independent work, characterized by its temporary nature, conducted on a project or task-to-task basis in which payment is guaranteed solely by the completion of relevant tasks. This differs from traditionally structured employment, which generally consists of an eight-hour workday and a fixed monthly salary. Gig work is flexible and gives the worker a high degree of control. Due to the short-term nature of the work (usually separate projects or tasks) gig workers' income is determined by the number of projects or tasks they complete. The independence with which gig workers can perform projects, payment per task and the limited duration of employment form the core of the gig economy. As a result of the digitalization of labour markets, gig work can be divided into offline and online categories.



Offline gig work can be separated into seasonal work – employment that is tied to a specific period of the year – and casual work, which refers to workers who receive payment at the end of the day or who are unemployed for longer than 90 days.



Considering the intersection between technology and work, **online gig work** (also known as the platform economy) can be divided into three distinct categories.

1. The first is tech-intensive work, which requires a high degree of digital skill, as the work is based on producing and using technology.
2. The second is tech-dependent work, which requires intermediate digital skills, as the work is made possible by technology and uses varying degrees of digital technologies.
3. The third category is tech-enabled work, which requires limited digital skills, as the use of technology facilitates the work, but the tasks will not be deterred if technology is not readily available.

Digital skills



Digital skills are defined as a range of abilities to use digital devices, communication applications and networks to access and manage information. They enable people to create and share digital content, communicate and collaborate, and solve problems (UNESCO). This report uses the digital skills framework in the toolkit of the International Telecommunication Union (ITU). The ITU groups the broad concept of digital skills in three categories: basic, intermediate and advanced.

Digital skills according to the ITU framework

1. **Basic digital skills** are foundational skills for performing basic tasks that enable us to function at a minimum level in society.



Hardware

Using hardware to perform basic tasks, e.g. using a keyboard and operating touch-screen technology.



Software

Using software to perform basic tasks, e.g. word processing, managing files on laptops, managing privacy settings on mobile phones.



Online operations

Conducting basic online operations, e.g. working with email, searching for information or completing an online form.

2. Intermediate digital skills enable people to use digital technologies in more meaningful and beneficial ways, including the ability to critically evaluate technology or create content. These are effectively job-ready skills, as they encompass the skills needed to perform work-related functions such as desktop publishing, digital graphic design and digital marketing.



Content creation

Creating content using software or digital tools.



Desktop publishing

Using software, e.g. page layout software, to create documents.



Graphic design

Designing graphics using software or digital tools.



Digital marketing

Marketing products or services using digital tools.



Data management

Typing, gathering, cleaning and maintaining datasets using software or digital tools.

3. Advanced digital skills are needed by specialists in ICT professions such as computer programming and network management.

1.

Artificial intelligence (AI)

The study of how to produce machines that have some of the qualities the human mind has, such as the ability to understand language, recognize pictures, solve problems and learn.

2.

Virtual reality (VR)

Perception of a fully virtual experience enabled by hard- and software.

3.

Big data

"Very large sets of data that are produced by people using the internet, and that can only be stored, understood, and used with the help of special tools and methods."

4.

Internet of Things

"A global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies."

5.

Cybersecurity

"Cybersecurity is the protection of internet-connected systems such as hardware, software and data from cyberthreats."

6.

Digital entrepreneurship

Digital entrepreneurship combines traditional entrepreneurship with new digital technologies. "Digital enterprises are characterized by a high intensity of utilization of novel digital technologies (particularly social media, big data analytics, mobile and cloud solutions) to improve business operations, invent new business models, sharpen business intelligence and engage with customers and stakeholders."

To summarize, basic skills refer to the ability to use technology, intermediate skills refer to the ability to transform content and information by using technology and advanced skills refer to the ability to create, develop and change technology.

Core skills for life and work in the 21st century in line with the ILO's framework

This report uses the ILO's *Global Framework on Core Skills for Life and Work in the 21st Century*, published in 2021. The framework's objective is to reflect the world of work that is in an ongoing state of transformation and carries copious new opportunities. It is in line with the ILO's human-centred approach to future work, being focused on individuals realizing and expanding

their potential and embracing opportunities for decent work. Core skills for life and work in the 21st century encapsulate a set of transferable skills. Core skills are important in a fast-changing world of work and contribute to an individual achieving personal goals, their personal well-being and that of their community.

The framework is based on four core skill sets – social and emotional skills, metacognitive skills, basic digital skills and basic skills for green jobs. It defines social and emotional skills as the ability to regulate your own thoughts, emotions and behaviour. Arguably, these skills are a demonstration of the dynamic interaction between an individual's character traits, beliefs, values, mindset and attitude, and the setting, environment and society in which the individual lives.

- ▶ Social and emotional skills are pivotal for effective social interaction at work and play an important role in the learning process.
- ▶ Cognitive skills refer to brain-related functions, such as the ability to process new information, to understand, remember and analyse the information and later use it. Cognitive skills form the basis of someone's ability to reason, access and understand specific knowledge domains. Metacognitive skills refer to an individual's ability to reflect on cognitive processes and be self-aware. They relate to the developing awareness of own thoughts and the ability to understand own thought processes. They also include the ability to know when and how to apply specific strategies for learning, development and problem solving. These skills are important, as they enable an individual to be self-reflective and improve the ability to adapt and learn. These abilities are needed in life as well as work.
- ▶ Basic digital skills refer to an individual performing basic tasks through using hardware, software and other basic online operations.
- ▶ Basic skills for green jobs refer to skills that are necessary to adapt working modalities to environmental regulations and requirements. Examples are awareness of environmental challenges and the need to undertake measures such as waste management and reduction, as well as energy and water efficiency.



Glossary of occupations, tasks and the digital landscape

Occupations

Data analyst

A role in the field of business change management or systems development. Tasks include “collecting/gathering data, data interpretation, database management, researching solutions to overcome data analytics challenges and making improvements in existing data models”.



Data scientist

A role in the field of data analysis. Tasks include (a) developing plans to safeguard computer files against accidental or unauthorized modification, destruction or disclosure and to meet emergency data processing needs; (b) training users and promoting security awareness to ensure system security and to improve server and network efficiency; (c) conferring with users to discuss issues such as computer data access needs, security violations, and programming changes; (d) monitoring current reports of computer viruses to determine when to update virus protection systems; (e) modifying computer security files to incorporate new software, correct errors or change individual access status; (f) monitoring use of data files and regulate access to safeguard information in computer files; (g) performing risk assessments and executing tests of data processing system to ensure functioning of data processing activities and security measures; (h) encrypting data transmissions and erecting firewalls to conceal confidential information as it is being transmitted and to keep out tainted digital transfers.

Desktop support technician

Provides technical assistance to users, either directly or by telephone, email or other electronic means, including diagnosing and resolving issues and problems with software, hardware, computer peripheral equipment, networks, databases and the internet, and providing guidance and support in the deployment, installation and maintenance of systems.

Software developer

Evaluates requirements for existing or new software applications and operating systems, and designs, develops, tests and maintains the relevant software solutions.

ICT engineer

Tasks include network management, upgrading digital servers, systems architecture and designing, testing and implementation of routine installations.

BI (business intelligence) developer

Develops and maintains dashboards, data visualizations, reports and other business interfaces.

Data scientist

Analyses and interprets digital data.

UX/UI designer/developer

Designs and/or develops user design and user experience. Tasks include user experience design, product design, user experience development, planning, system improvement, operations and administration, people management and functional and usability testing.

Cyber/IT security specialist

Tasks include performing internal and external security audits, managing firewalls, analysing security breaches to identify the root cause, verifying the security of third-party vendors, designing and implementing information security programmes, monitoring security access, and conducting security assessments.

Cloud architect specialist

Specializes in designing and implementing computing solutions for the cloud.

System administrator

Develops, controls, maintains and supports the optimal performance and security of information technology systems.

Database designer and engineer

Designs, develops, controls, maintains and supports the optimal performance and security of datasets.

Telecommunication engineer

Researches and advises on, designs and directs the construction, functioning, maintenance and repair of telecommunication systems and equipment.

Information and communication technology (ICT) installer and servicer

Installs, repairs and maintains telecommunication equipment, data transmission equipment, cables, antennae and conduits and who repairs, fits and maintains computers.

Information and communication technology (ICT) systems specialist

Has detailed knowledge and experience in relation to installing, repairing and maintaining telecommunication equipment, data transmission equipment, cables, antennae and conduits as well as in relation to repairing, fitting and maintaining computers.

Information and communication technology (ICT) analyst

Conducts analysis in relation to telecommunications equipment, data transmission equipment, cables, antennae and conduits as well as the repair and maintenance of computers.

Lead solutions architect

Tasks include development, platform building, managing users and user roles, security, providing technical expertise on data storage structures, mapping the business requirements to systems or technical requirements, commissioning and decommissioning of datasets and strategy.

Digital artist

Uses technology or digital tools to prepare creative, artistic or graphic work.



Graphic and multimedia designer

Designs visual and audiovisual content to communicate information using print, film, electronic, digital and other forms of visual and audio media. Creates graphics, special effects, animation or other visual images for use in computer games, movies, music videos, print media and advertisements.

Illustrator

Creates images, photos or visuals, mainly for advertising purposes.

Multimedia designer

Designs visual and audiovisual content to communicate information using print, film, electronic, digital and other forms of visual and audio media.

Chief information officer

Plans and coordinates the acquisition, development, maintenance and use of computer and telecommunication systems.

Information system director

Responsible for an organization's information systems or computer-related activities.



Tasks



Computer programming

Designing and building software for computer programmes.



Coding

Writing instructions for a computer programme.



Network management

Tasks network system administrators perform to provide, monitor, secure, operate and maintain an organization's data.



Cloud computing

A paradigm for enabling network access to a scalable and elastic pool of shareable physical or virtual resources with on-demand self-service provisioning and administration.



Software development

Evaluates requirements for existing or new software applications and operating systems, and designs, develops, tests and maintains the relevant software solutions.



UX design

The process and practice used to design and implement a product that will provide positive and relevant interactions with users.



Big data analytics

A set of techniques and tools used to process and interpret big data. May be used to analyse relationships, establish dependencies and perform predictions of outcomes and behaviours. Big data analytics also enable machine learning, a driver of artificial intelligence.



Mobile app development

Process of designing, developing, testing and maintaining software solutions to meet requirements.



Robotics

A branch of engineering that involves the conception, design, manufacture and operation of robots.

Landscape/context

- ▶ **Big data:** Large datasets, produced through the digitization of content, greater monitoring of human activities through digital technologies, and the spread of the Internet of Things.
- ▶ **Training and courses** refer to all opportunities outside high school, college or university (formal education).
- ▶ **Digital economy** incorporates all economic activity reliant on, or significantly enhanced by, the use of digital inputs, including digital technologies, digital infrastructure, digital services and data. It refers to all producers and consumers, including the government, that use digital inputs in their economic activities.
- ▶ **E-commerce describes** all commercial transactions or sales processed online.

Sources

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Introduction

Context of the study

The fourth industrial revolution (4IR) has been underway since 2016 and is expected to amount to a value of R1.4 trillion by the end of its first decade in 2026. It has been estimated that 230 million digital jobs will be created in Africa by 2030, which will result in about 650 million training opportunities. South Africa has the potential to generate 4.5 million new jobs across all industries, because of productivity improvement, strategic policy implementation and the evolution of technology. It is however also faced with projections of the displacement of 3.3 million existing jobs by 2030. The Covid-19 pandemic has impacted the way people work and consume. This has affected existing trends of digitalization and the digital transformation progressed faster than expected. These trends have placed skills at the centre of the digital economy. It has called for new ways of thinking about the world of work that were formerly unpopular with corporate South Africa.

The demand for digital skills outweighs the supply, as many South African businesses lack the skills needed to operate and compete in the digital economy. Digital skills will be required in all sectors in the South African economy, including agriculture, infrastructure, manufacturing and financial services. There is also a need for young people to learn how to use digital platforms so that they can be more employable, as employers are looking for digital skills to increase growth and productivity.

Purpose and value-add of this study



The aims of this study were threefold:

Conduct a review of key policies and national promotion strategies in order to assess their potential to boost youth employment in the digital economy.

Assess current and emerging skills demand and supply in South Africa's digital economy.

Identify gaps, opportunities and detect specific skills needs that, if addressed, can generate new employment opportunities for young people.

There were four broad objectives:

1. Inform the co-designing of digital skills development initiatives with DCDT, ILO, ITU and UNDP constituents.
2. Provide recommendations for priority activities for youth not in employment, education or training (YNEET).



3.**Inform a series of system-level interventions, such as:**

- ▶ strengthening and upgrading digital literacy, skills curricula and competency standards
- ▶ integrating digital literacy and skills training into existing educational programmes at national, provincial and district levels and at different levels/parts of the education system
- ▶ capacitating training institutions, trainers and teachers to deliver training programmes with digital skills components
- ▶ establishing a platform or forum to integrate trained job seekers with opportunities in the digital economy

4.**Form the basis to broaden the overall understanding of the skills mismatch by:**

- ▶ assessing the demand for skills and the supply of skills for the digital economy, within the levels and sectors prioritized
- ▶ identifying digital skills policy and regulatory imperatives, including access and connectivity
- ▶ understanding the ecosystem for skills development in a digital economy and related enablers in a South African context

The study was conceived to add value to the current understanding of the digital skills landscape and existing gaps, in line with the following five pillars:

1. Nationwide, broad and inclusive study

The study brought together all existing insights and findings and collected primary data to have a comprehensive overview and a rigorous nationwide publication. It also considered broader skills for the digital economy/society and included core skills for life and work in the 21st century beyond the required digital skills. The study aimed to provide more in-depth insights for specific sectors compared to what had been covered previously. The study was built and analysed the skills supply (such as training institutions and TVET colleges), for example understanding the current status of the digital skills training offer and identifying areas for improvement and development.

2. Timing of the study

The study was conducted nearly two years into a global pandemic, as societies and businesses as well as educational institutions and training providers became aware of the more permanent implications and impact of Covid-19 on the way people live, learn and work.

3. Perspective of young people

The study assessed the perspectives of youth in relation to job opportunities, the demand for digital skills and pathways to acquire them. The following questions provided helpful insights about how best to support young people on their journey of developing digital skills. With a high number of young people participating in the survey, this focus allowed us to look at differences based on gender and geography.

4. Focus on skilling and upskilling

The study provided insights on opportunities to train and upskill YNEET with a focus on pre-entry-level skills, for example by assessing the willingness of businesses to support young people in their upskilling journey or different stakeholders' contribution to upskilling YNEET.

5. Insights of entrepreneurial opportunities

The study summarized previous findings about entrepreneurial opportunities in the gig economy or through digital tools and platforms in general and added important insights about opportunities in the informal sector. It also looked at digital entrepreneurship and entrepreneurial opportunities in the formal sector, a topic that had not been addressed by previous studies in South Africa.

Alignment with Global Initiative on Decent Jobs for Youth

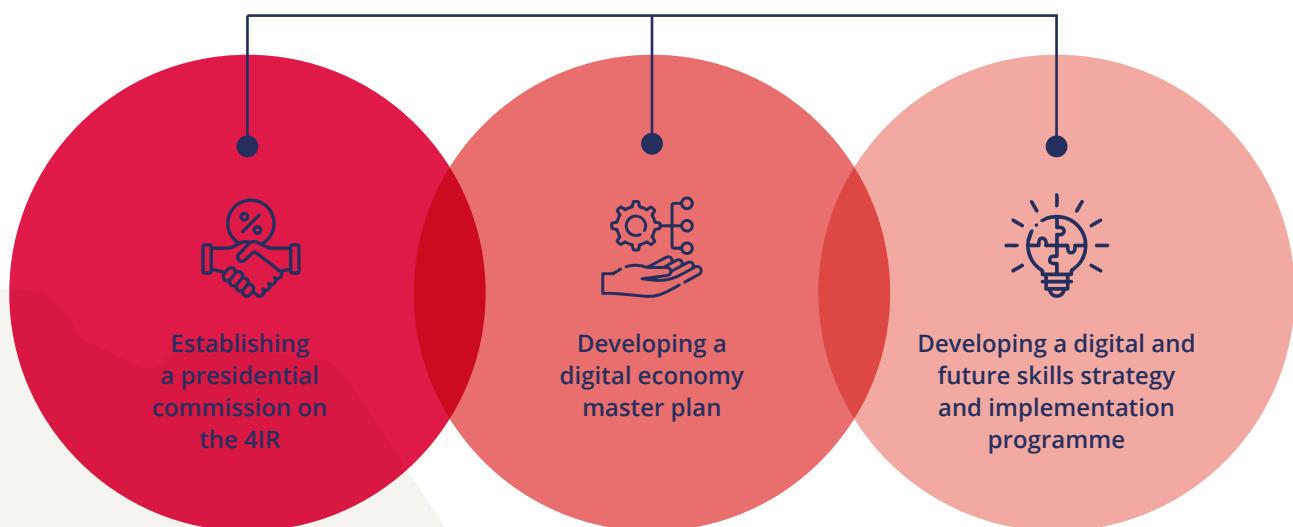
Overview of the Global Initiative on Decent Jobs for Youth

This initiative is aimed at scaling up action and impact on youth employment under the 2030 Agenda for Sustainable Development. It is a platform for promoting evidence-based strategies and interventions, a space for highlighting progress and sharing knowledge, and a hub for cooperation and collaboration.

Under the umbrella of the Global Initiative on Decent Jobs for Youth and in support of the African Union (AU), the ILO and the ITU launched a continental programme on “Boosting Decent Jobs and Enhancing Skills for Youth in Africa’s Digital Economy” to empower African youth, ensuring that they benefit from new opportunities in Africa’s growing digital economy and steer it forward with their energy and creativity.



South Africa embarked on a series of measures to prepare citizens for productive participation in the 4IR which included:



- The Department of Communications and Digital Technologies (DCDT) joined the ILO/ITU/AU continental partnership under the framework of the National Digital and Future Skills Strategy 2021-2025. The partnership, which in South Africa also counts on the participation of the UNDP, supports the country in taking advantage of opportunities in the digital economy, specifically to meet the challenges of youth participation in the economy and society. To achieve that, in 2021 the four agencies launched a national Joint Programme on Digital Skills for Decent Jobs for Youth, with a specific focus on young women and men not in employment, education or training (YNEET). Conceived as a direct contribution to the National Digital and Future Skills Strategy 2021-2025, it is meant to help strengthen the efforts of the South African government, the business community and civil society in developing digital skills for young people and link them to decent job opportunities.

Key areas have been defined in relation to the Digital Skills for Decent Jobs for Youth Programme in South Africa:

Digital infrastructure

- ▶ Support the infrastructure that the private sector, governments and customers rely on to build blocks of the digital economy.



Employment creation and access to jobs

- ▶ Respond to the needs of YNEET to enable and facilitate their access to learning and decent employment opportunities by strengthening the effectiveness of the digital skills development and labour market ecosystem.
- ▶ Improve alignment between digital skills development needs in the labour market and skills development supply, with specific reference to YNEET.

Entrepreneurial activities

- ▶ Promote young people with a number of digital skills that are in demand by boosting innovation and triggering entrepreneurship opportunities for them in a growing digital economy.

Focus on youth

- ▶ Increase data sharing across entities in the digital skills and labour ecosystem to inform targeted support that links YNEET to digital skills and decent job opportunities.
- ▶ Increase the number of young people accessing digital skills development and decent job opportunities through effective digital case management.



Focus on vulnerable groups/inclusivity

- ▶ Equip young women and young people with disabilities with digital skills.

Approach to digital skills

- ▶ Promote skills development interventions and strengthen workplace experience.



Other forms of skills programmes

- ▶ Develop digital skills training programmes that take the barriers YNEET face into account.
- ▶ Design programmes at the pre-entry level as well as data analytics, network engineering and digital design for additive manufacturing skills.
- ▶ Develop three pre-entry-level digital skills programmes.
- ▶ Ensure that a number of people are trained through a train-the-trainer initiative.



Link to Research Framework and Implementation Programme for the National Digital and Future Skills Strategy of South Africa, 2021–2025

The DCDT's Research Framework for the National Digital and Future Skills Strategy of South Africa is relevant to this project and this study's approach aligned with that. The framework guided this study in its consideration of the broader digital skills ecosystem. It focused on the socio-economic context, including the labour market, by assessing the skills mismatch and current levers of economic growth that need or can be facilitated through digital skills. Ultimately, the study also tried to understand which interventions and programmes are robust in developing the digital and future skills strategy in a rapidly changing global digital skills market.

The researchers identified key elements and implementation measures of the existing framework that this project primarily contributes to:



Integrated view of intermediate and advanced digital and future skills

- ▶ Build a future-oriented TVET system.
- ▶ Strengthen higher education and digital hubs as platforms for advanced digital skills development.
- ▶ Promote a vibrant tech hub ecosystem for digital entrepreneurship.



Digital and future skills for Workplace 4.0 (digital industry and digital government)

- ▶ Establish industry-led digital skills opportunity zones and digital skills centres.
- ▶ Steer investment and opportunities towards digital skills development.
- ▶ Expand workplace-based learning opportunities in the digital economy.

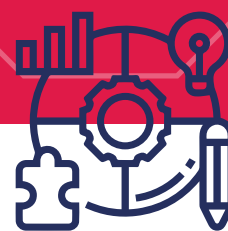


Society 4.0: Special focus on YNEET

- ▶ Unlock opportunities for learning and building digital skills.
- ▶ Build digital skills by addressing societal challenges.

Cross-cutting research framework elements that focus on YNEET

The broad research framework offers guidance on the process of specifying the target group. It highlights the need to conduct research with marginalized groups to address the multiple levels of the existing digital divide. Firstly, in resource-constrained environments research must incorporate dimensions related to rural economic and educational communities. Secondly, regarding YNEET or young people who live in low-income communities, including the ones who receive social grants, research must explore the dimensions of digital and future skills. Lastly, research should take the gender dimensions of digital skills into account, gathering relevant data for women and girls, as well as for men and boys.



Secondary research

One objective of this study was to summarize prior research relevant to this topic and link the findings to the existing body of knowledge. Consequently, the study included a range of secondary research.

1. The researchers did a background study to explain the context relevant to this study, including the status quo, trends, challenges and opportunities of the digital economy in South Africa, such as the gig and platform economy. This section also tried to assess the potential of innovation and digital technology for job creation.
2. This was followed by an overview of the contribution of specific industries for total employment creation, with a focus on the most relevant sectors for youth employment.
3. The researchers summarized the current understanding of YNEET in South Africa, including key demographic factors, such as gender, province, educational background as well as previous work experience or income-generating activities they have access to, with a focus on available information about their vulnerabilities and needs.
4. The researchers summarized existing research about in-demand occupations in the digital economy in South Africa by listing occupations most in demand in the South African economy in general. This was followed by an overview of the occupations required in a digital economy and insights about the roles that will be most needed in South Africa's digital economy. This section included a search for relevant research and literature about skills demand and supply in the digital economy in South Africa and a summary of previous studies and literature about skills demand and supply.
5. The researchers reviewed policies and programmes, which included existing policies and plans related to the digital economy and the development of digital skills, existing policies and strategies relevant to the recommendations to unlock employment opportunities, especially for youth and vulnerable groups, as well as national and local initiatives led by the public or private sector as well as civil society.



In addition, the researchers conducted secondary research to gain important insights relevant to specific support programmes or interventions.

1.

The researchers created a list of training providers and stakeholders relevant to the development of digital skills in South Africa, which is included in the appendix.

2.

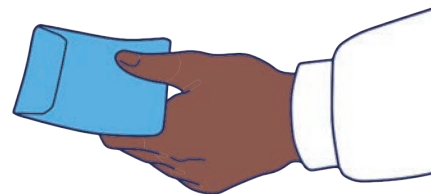
The researchers identified and reviewed good, demonstrated practice of interventions or support programmes. This included research about existing support programmes or interventions that support YNEET to grow skills to be able to fulfil roles that are most in demand and access existing opportunities, to identify key success factors.

3.

The researchers summarized existing insights in relation to the pathways young people are engaging in to gain a specific education or skills or access opportunities in the labour market. These findings were used to deduct specific recommendations and design principles to follow when designing interventions and programmes.

Primary data collection

Survey with young people, focusing on YNEET



► Interview process

Field researchers conducted the interviews between December 2021 and February 2022, with 4,397 in-person interviews included in the survey. These interviews were done to understand the background of young people by shedding light on their education, work experience, the roles they were interested in, their awareness and level of digital skills, whether they understood the digital economy and the skills required. The survey also sought to assess awareness around existing opportunities in relation to digital skills and existing training programmes, understanding how young people used digital platforms, acquired and developed digital skills, as well as to what extent young people taught themselves digital skills.

► Inclusion and exclusion criteria

Only participants who did not have paid work and did not expect to return to work within three months of the time of the interview were included. The field researchers also did not continue interviews with young people who said they had “enough money for the essentials and things they want” or “a lot of money”. The study included 2,697 young people who could be defined as YNEET, which made up 61% of all participants. The survey also included young people who engaged in income-generating activities, which made up 39% of all participants. These activities included “work or any activity to generate an income, even for a few hours, for example casual work or odd jobs”, “selling products/services through digital apps or platforms on the side”, “hustling, selling goods or offering services” and “help in a family business”. In addition, 80% of participants reported engaging in some activities without any income generation, which included “doing housework, caring for children or family”, “volunteering, unpaid community or charity work”, “looking for work in-between activities” or “attending to personal or family responsibilities”.

Category	Number of participants	Proportion of participants
All participants	 4,397	 100%
YNEET	 2,697	 61%
Youth engaging in income-generating activities	 1,700	 39%
Youth engaging in activities with no income	 3,538	 80%

Table 1: Number and proportion of participants in categories reflecting their level of detachment from the labour market

► The data was reviewed for consistency and interviews were excluded based on the following criteria:



Participants who said they did not have any experience and selected other options about the type of **work experience** they had.



Participants who said they did not have any experience and selected other options about the type of **entrepreneurial experience** they had.



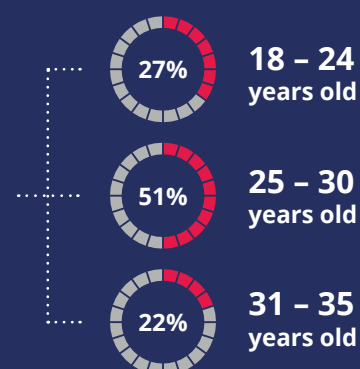
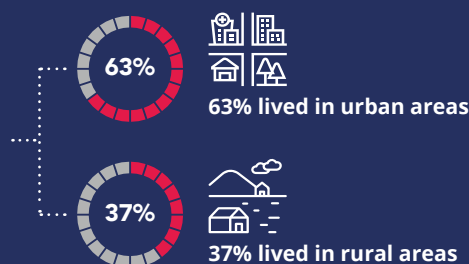
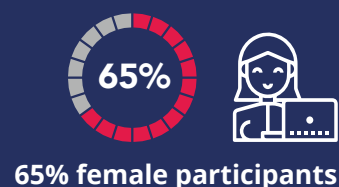
Participants whose answers in relation to their highest level of education were inconsistent, such as selecting “TVET/college/university of technology national diploma/degree: Short-cycle tertiary education (ISCED level 5)” as their highest level of education but stating that they had “heard about it but never applied/never tried it”, “have applied but was not accepted/I tried it but did not continue” or “have never heard about it” when asked about a college diploma or certificate.



Participants whose answers in relation to their level of digital skills were inconsistent, such as people who indicated that they had advanced digital skills and at the same time reported not having any basic digital skills.

► Demographic groups included in the survey

The survey included 65% female participants – 63% lived in urban areas, which included townships and informal settlements, and 37% lived in rural areas or villages; 27% were between 18 and 24 years old, 51% between 25 and 30 years and 22% between 31 and 35 years.



Category	Number of participants	Proportion of participants
All participants	 4,397	 100%
Female participants	 2,871	 65%
Participants living in urban areas (including townships and informal settlements)	 2,788	 63%
Participants living in rural areas/villages	 1,606	 37%
Youth between 31 and 35 years	 974	 22%
Youth between 25 and 30 years	 2,255	 51%
Youth between 18 and 24 years	 1,168	 27%

Table 2: Number and proportion of survey participants split by demographic group

► Survey with enterprises and organizations in the public and private sectors

The questionnaires with businesses were aimed at understanding which digital roles were most in demand, currently as well as in the future. They also focused on the digital skills most in demand, the shortage of digital and other skills in the company, opportunities that were available for YNEET, both pre-entry and entry level, and finally training and upskilling opportunities.

The survey included 834 interviews with businesses, of which 791 were conducted in person or as telephonic interviews by field researchers, while businesses completed 43 as online questionnaires. The businesses covered a range of industries, with most in trade, community, social and personal services.



Number and proportion of businesses per industry	Number of businesses	Proportion of businesses
All	 834	100%
Trade	 300	36%
Community, social and personal services	 211	25.3%
Manufacturing	 82	9.8%
Financial services	 46	5.5%
ICT (IT/digital tech)	 39	4.7%
Agriculture	 32	3.8%
Tourism	 21	2.5%
Other	 103	12.4%

Table 3: Number and proportion of businesses in the survey, split by industry group



- **The report used the industry classification as applied by Statistics South Africa (StatsSA). The categories link to the standard industrial classification (SIC) codes as follows:**



Trade refers to wholesale and retail trade, repair of motor vehicles and motorcycles.



Community, social and personal services include the SIC categories “community services, human health and social work activities”, “education” and “arts, entertainment and recreation”.



Manufacturing is consistent.



Financial services refer to financial and insurance activities.



ICT (IT/digital tech) refers to information and communication.



Agriculture refers to agriculture, forestry and fishing.



Tourism is closest related to accommodation and food service activities.

The study had a specific focus on small and medium-sized enterprises (SMEs) and micro-businesses but also included large businesses in each industry. Businesses were categorized based on the number of employees, with micro-businesses having fewer than 10 employees, SMEs having between 11 and 249 employees and large businesses having more than 250 employees. Retail stores or other franchise businesses that were part of a large business or chain were categorized based on their number of employees at a specific branch or location. Duplications, for example interviews with franchises belonging to the same company in different municipalities, were excluded from the dataset.

Number and proportion of businesses per industry	Micro-businesses	SMEs	Large businesses
All	473 (57%)	322 (39%)	37 (4%)
Trade	150 (50%)	144 (48%)	6 (2%)
Community, social and personal services	149 (71%)	57 (27%)	4 (2%)
Manufacturing	49 (60%)	30 (37%)	3 (4%)
Financial services	22 (48%)	14 (30%)	9 (20%)
ICT (IT/digital tech)	28 (72%)	9 (23%)	2 (5%)
Agriculture	14 (44%)	16 (50%)	2 (6%)
Tourism	19 (90%)	1 (5%)	1 (5%)
Other	42 (41%)	51 (50%)	10 (10%)

Table 4: Number and proportion of businesses in the survey, split by size of business and industry

The study included businesses working across all provinces and in urban, semi-urban as well as rural areas. The survey with employers had a specific focus on businesses in proximity to the young people who were surveyed as part of this study. It therefore included businesses that were not only working in the large metropolitan areas but also in small cities or towns, townships and informal settlements, as well as villages, where many young people, especially YNEET, live.

Number and proportion of businesses per industry	In a large city	In a small city or town	In a township or informal settlement	In a rural area or village
All	286 (34%)	291 (35%)	225 (27%)	31 (4%)
Trade	83 (28%)	126 (42%)	83 (28%)	8 (3%)
Community, social and personal services	48 (23%)	59 (28%)	100 (47%)	4 (2%)
Manufacturing	38 (46%)	29 (35%)	14 (17%)	1 (1%)
Financial services	29 (63%)	11 (24%)	6 (13%)	0 (0%)
ICT (IT/digital tech)	21 (54%)	11 (28%)	6 (15%)	1 (3%)
Agriculture	9 (28%)	9 (28%)	1 (3%)	13 (41%)
Tourism	18 (86%)	1 (5%)	2 (10%)	0 (0%)
Other	40 (39%)	45 (44%)	13 (13%)	4 (4%)

Table 5: Number and proportion of businesses in the survey, split by location (urban/rural) and industry

The data from the survey with businesses is presented as an average as well as split by industry group and business size. The appendix includes weighted averages, firstly weighted by the proportion of employment creation per industry based on proportion each, as part of total employment in the [Quarterly Labour Force Survey](#) (ICT and tourism from Q1 2021 and other categories from Q3 2021) and secondly by the proportion of employment creation in large businesses compared to SMEs and micro-businesses (based on the assumption that 64% of [economy-wide employment](#) is provided by SMEs and micro-businesses).



► Focus groups or in-depth interviews with YNEET

Two focus groups or individual interviews were held with YNEET to review and complement results. This was done to gather examples of how YNEET have access to pre-entry or entry-level roles through digital skills and understand young people's upskilling journeys.



► Key information sources or expert interviews

A total of 24 semi-structured interviews were held with key sources. Representatives of seven TVET colleges, three experts who work in the field of recruitment, HR or employer engagement at a university, four key sources who lead organizations that offer digital skills training for YNEET, one professor who developed a digital skills framework for the South African context, two independent consultants in this field, three industry associations, one expert from the Presidency, as well as representatives of Nemisa (National Electronic Media Institute of South Africa), the Department of Public Works and Infrastructure (DPWI) and the Department of Higher Education and Training (DHET).

Sampling strategy

Survey with young people, focusing on YNEET



The survey with young people was conducted across the country by a team of field researchers who were onboarded, trained and supervised by a field research coordinator. Field researchers went to places that were frequented by YNEET, such as malls, shopping centres, “busy corners” including public spaces, parks or wifi hotspots in communities, taxi ranks and community centres. They approached young people and asked them to participate in the interviews. They received a target for a proportion of women and youth with disabilities to be included and received payment for each interview that was conducted and was in line with the internal quality and consistency checks.

Prior to the interviews, the field researchers informed the participants that they would not be paid for taking part in the survey. They were also assured that their participation was voluntary, that they were not obliged to participate, that all their information was confidential, that they could stop and withdraw their participation at any point. In addition, field researchers shared information about the organizations that commissioned and implemented the survey, including the contact details they could use to share any concerns, complaints or withdraw their participation. All participants were given a chance to ask questions before giving their informed consent.

The questionnaires were translated into several languages, namely Afrikaans, Sepedi, Seswati and isiZulu. Field researchers were instructed to approach young people in English and ask about their preferred language to conduct the interview. At the beginning of the interview, field

researchers asked multiple screening questions that aimed to verify that all participants belonged to the target group. The responses were also used to categorize young people based on their participation in economic or other activities, as well as any form of education and training.

During the interviews, the field researchers read the questions out loud to the participants and documented the answers through an online form on their phone while conducting the interview. In cases where field researchers were unable to use a phone, mainly due to safety reasons, they recorded the answers on paper and submitted them later. Most questions were open-ended and not probed. However, to document and structure the answers, field researchers selected the answer options that were most aligned to the participants' responses. The field researchers had a guideline document with the definitions of the terms being used in the survey to clarify these with the participants.

The following key considerations were made when selecting municipalities:

1. representation of all provinces
2. balance between urban and rural areas
3. key priority areas for government (district development model pilot areas)

The number of interviews per province were in line with the proportion of YNEET who live there, based on secondary research (included as targets in the table below).

	Number of participants	Proportion of participants	Target (%)
Gauteng	 1,104	25%	23%
KwaZulu-Natal	 943	21%	22%
Eastern Cape	 499	11%	13%
Limpopo	 535	12%	11%
Western Cape	 441	10%	9%
Mpumalanga	 330	8%	8%
North West	 263	6%	7%
Free State	 164	4%	5%
Northern Cape	 118	3%	2%

Table 6: Provinces covered in the survey, with number and proportion of participants in comparison to targets

The following key considerations were made when selecting industries to include in the study:

1. most important sectors for employment creation
2. growth potential (with a perspective beyond the Covid-19 pandemic)
3. in line with priority sectors for government as part of South Africa's National Digital and Future Skills Strategy

As such, the focus industries for this study were agriculture (agro-processing; horticulture; commercial agriculture); manufacturing; ICT (IT/digital tech); financial services; government services; trade; community, social, personal services and tourism. The survey followed a specific process to identify and approach businesses. For medium-sized businesses and larger corporates, the researchers established contact through BUSA (Business Unity South Africa), industry associations and representative organizations. The researchers shared the online questionnaire and followed up with telephonic conversations. For SMEs and micro-businesses, the focus was on the same municipalities as the ones in the survey with YNEET. The researchers then developed a business registrar based on existing online registers for SMEs and micro-businesses and online searches. In-person or telephonic interviews were done.

Part 2

Demand and supply assessment



Context: South Africa's fourth industrial revolution – status quo, challenges and opportunities

The digital economy in South Africa

► Trends in relation to the digital economy in South Africa

The fourth industrial revolution has been underway since 2016, and estimations expect it to amount to a value of R1.4 trillion by the end of its first decade in 2026. It has been estimated that 230 million digital jobs will be created in Africa by 2030 which will result in about 650 million training opportunities.

The management consultancy firm McKinsey & Company estimates that digitization and machine learning, coupled with automation, can potentially create 1.8 million new jobs, purely as the result of improved productivity. They estimate an additional 1.2 million jobs from occupations that are still unknown and, consequently, South Africa has the potential to generate 4.5 million new jobs across all industries because of improved productivity, strategic policy implementation and the evolution of technology. The firm however also estimates that this plethora of new jobs could lead to the displacement of 3.3 million existing jobs by 2030.

On the one hand, these changes will compromise job opportunities, with estimates that 41% of all work activities might be automated. On the other hand, it presents an opportunity, as technology and digital skills open avenues to scale business models that may help South Africa compete on a global scale.

THE IMPACT OF THE COVID-19 PANDEMIC

Covid-19 has profoundly impacted economies around the globe, including South Africa's. On the one hand, the unemployment rate surged from 30% in the first quarter of 2020 to 34.4% in the second quarter of 2021, which equates to 7.8 million unemployed South Africans. On the other hand, the pandemic and related lockdowns required people to change the way they work and consume. This affected existing trends of digitalization and digital transformation progressed faster than expected. These trends placed digital skills at the centre of the digital economy. It called for the adoption of new ways of thinking about the world of work that used to be unpopular with corporate South Africa.

In addition, the pandemic made it even more difficult for unemployed young people to find decent work or secure a job, as the unemployment rate among youth further rose by 4.6 percentage points from the third to the fourth quarter in 2020. Women and people living with disabilities were particularly affected.



Digital, gig or platform economy in South Africa



Opportunities for young people in the digital and gig economy

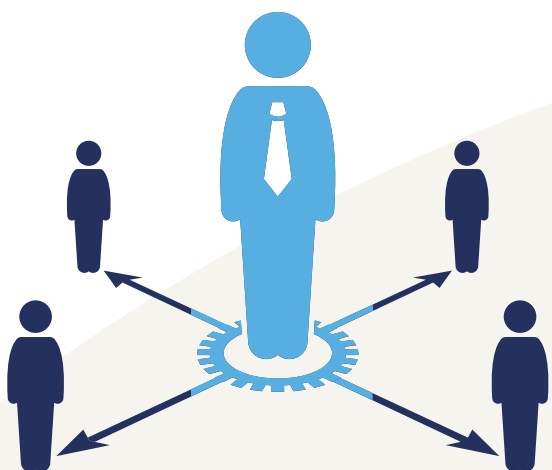
Digital platforms are restructuring the economy, as they remove information asymmetries through aggregating both skills supply and demand. It is reported that these platforms will become the common way of consuming and providing a broad range of services. Considering South Africa's high levels of unemployment, coupled with extreme inequalities, and an economy characterized by highly developed internet infrastructure and regulatory conditions for innovation, the imminent emergence of a gig economy is inevitable.

The South African working population consists of 40 million people, of whom at least 1% engage in gig work. Unlike some global counterparts, who engage in gig work for its high degree of flexibility, to supplement an income or to generate faster income, in the South African context engaging in gig work is a necessity. Gig economy platforms in South Africa benefit from a legal loophole, as gig workers can be classified as "independent contractors" instead of employees, which means that the cost and duties that arise from employee rights can be avoided. Due to this non-standard form of employment, gig workers felt the impact of the Covid-19 pandemic quite harshly. However, ironically due to the pandemic, South Africa's gig workers, especially people in delivery services, were recognized as essential for society's functioning during lockdown.



Entrepreneurial or income-generating opportunities in South Africa

The digital economy opens opportunities for digital entrepreneurship, which contribute to continued economic growth by digitally connecting people to opportunities and through ventures in the digital sector. Digital businesses do not only offer new products and services; they also leverage new technology and business models, which in turn open new markets. Income-generating opportunities in the digital economy can be categorized into multiple forms — firstly, online gig workers who use task-matching platforms for freelance opportunities and/or casual employment and secondly, entrepreneurs who start or operate digital businesses. Entrepreneurs also use digital technologies to conduct research, promote their products and engage with customers.





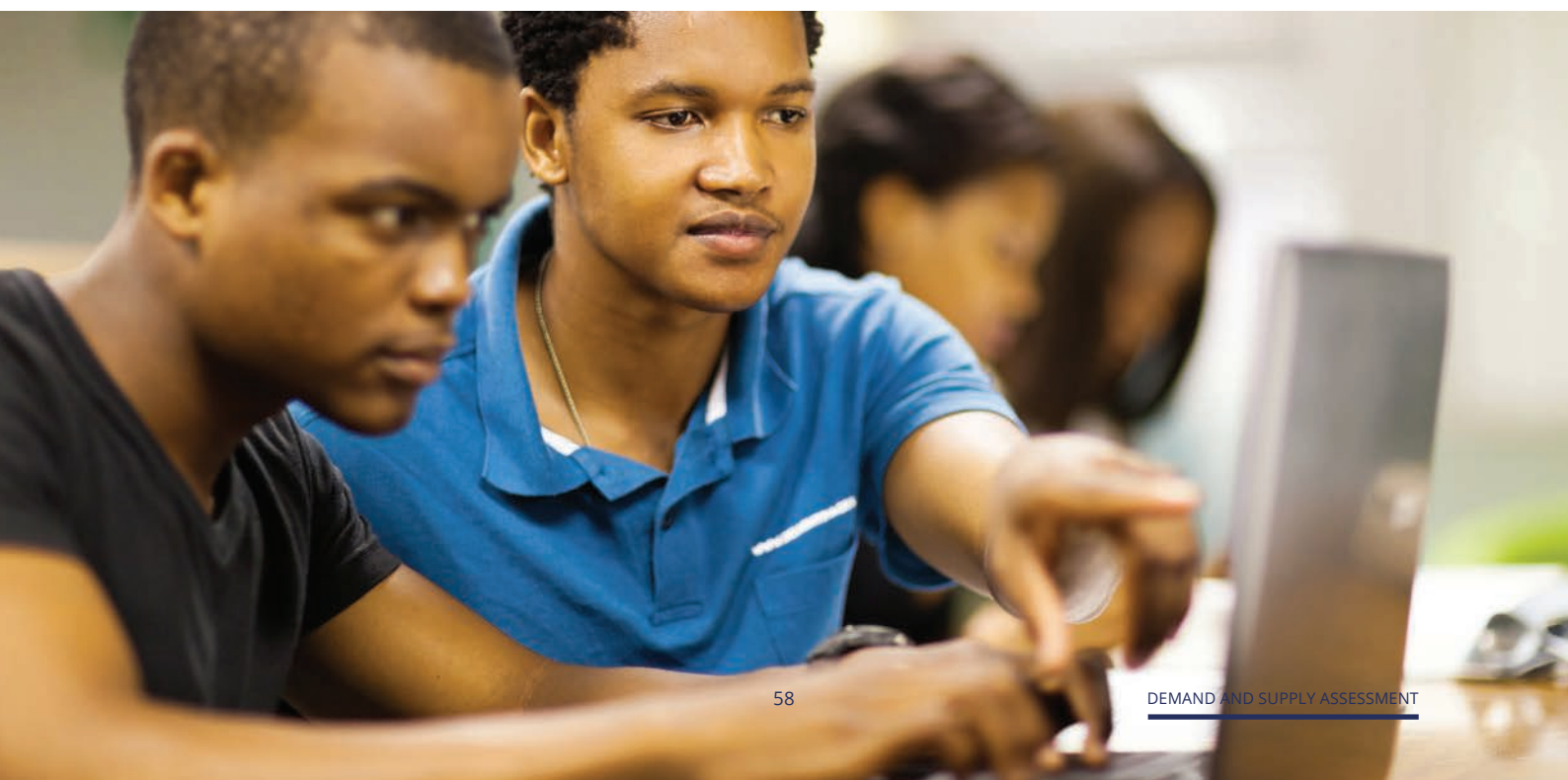
Online gig workers in South Africa

Online gig workers can be categorized as freelance entrepreneurs who use task-matching platforms for offline work and services, and those who provide professional digital services or products. There are several prominent examples of digital platforms that facilitate offline services:

- ▶ ride-hailing task-matching platforms, such as Bolt, Uber, Didi, LoadIt and Droppa
- ▶ artisan task-matching platforms, which in South Africa include GetTod, BuddyAssist, Kuanda and PrimU Hair
- ▶ trade work task-matching platforms like SnupIt and BuddyAssist
- ▶ domestic service task-matching platforms like Domestly and SweepSouth
- ▶ tourism and hospitality task-matching platforms like GetYourGuide, Homestay.com, AfriStay, Airbnb and SafariNow
- ▶ tutoring task-matching platforms, such as BrightSparkz

These platforms require proficiency in or specialized artisan knowledge of the related offline work. They also require basic entry-level digital skills, namely end-user skills so that the freelancer entrepreneurs can operate the platform. Tutoring platforms might require more intermediate digital skills, depending on the tutoring services that are offered.

All the above mentioned platforms require the basic core skills for life and work in the 21st century. In relation to social and emotional skills, communication is essential and cognitive and metacognitive skills are, for example, required for problem solving. Freelance workers who provide professional digital services, such as digital marketing or software development, require intermediate and/or advanced digital skills.



Digital businesses in South Africa

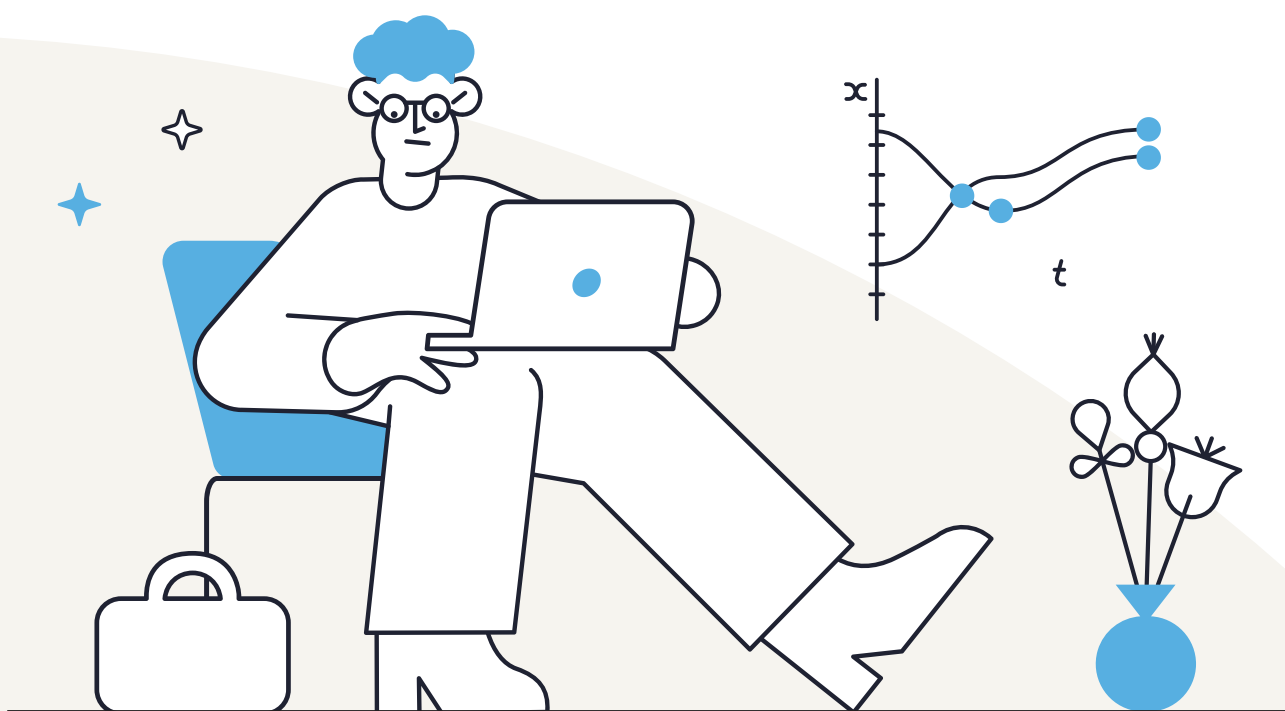
Digital businesses play an important role and transform various industries, including e-commerce, finance and investment, as well as advertising, research, travel and tourism. Individuals who start or operate digital businesses require advanced digital and entrepreneurial skills. These digital skills include knowledge about cloud computing, cybersecurity, data management, digital marketing and user experience (UX) design.

Examples of South African digital businesses in e-commerce are Topwatch, Superbalist, Zando, Takealot and Yuppiefchef. The finance industry includes businesses such as SA Shares, Stock Market College and Quicktrade, as these businesses provide platforms for individuals to learn about stock markets and foreign exchange trading. Zinia, Payday Payroll Software and FMJ Tax Practitioners provide software development and analysis services. These businesses are often supported by business incubators that offer sustainable and fundamental entrepreneurial support in the form of mentorships, support and advice. Digital businesses supported by incubators reap the benefits of low-cost office spaces, networking opportunities, mentoring and professional counselling. Examples of business incubators focused on digital innovation and development include Injini, Sw7, Maximum Business Incubators and Tshimologong Precinct.

Potential of innovation and digital technology for job creation in global business services

South African businesses outsource jobs relating to application development, big data, software development, cloud computing and data science internationally to countries and regions such as India, the United States of America, the United Kingdom, China, as well as Eastern Europe. This could be due to the size of the IT market abroad. However, it calls for the development of stronger in-demand skills and pipelines to return these jobs to South African shores. This would also result in local businesses and entrepreneurs having the opportunity to develop core competencies in technologies such as artificial intelligence (AI), the Internet of Things (IoT) and blockchain.

The development of these core technological competencies could in turn lead to the invention of products and services that can address and solve local problems and could also be exported globally. Expanding on the idea of global exportation, the Smart Africa Digital Academy (SADA) contends that South Africa possesses a well-developed domestic ICT sector, as indicated by Microsoft, Oracle, Google and IBM setting up subsidiaries in the country. Arguably, this sector can be developed as a niche service area that can be exported globally to compete with outsourcing locations such as India and Egypt.

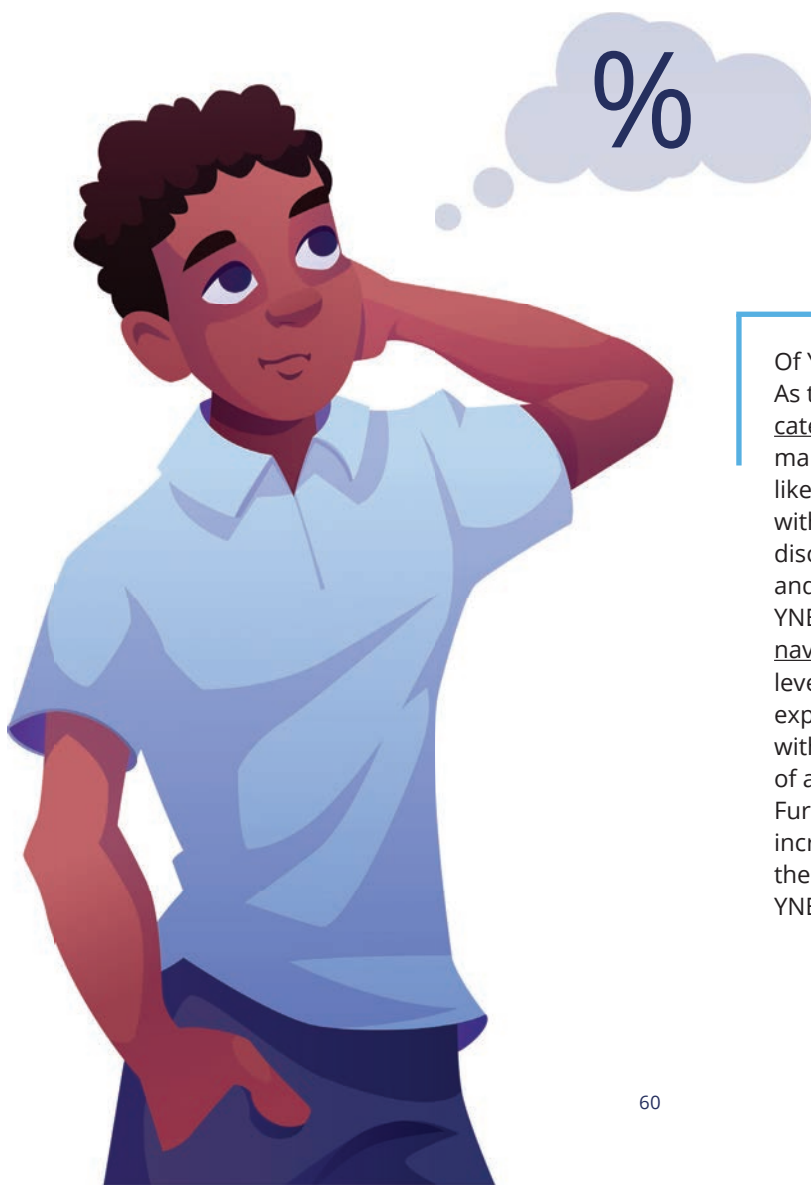


Context: YNEET in South Africa

Number of YNEET in South Africa

NEET are defined as people who are currently not in employment, education or training. YNEET refers to young people in that category. Internationally, a fifth of young people between the ages of 15 and 24 years are not employed. In South Africa, the official definition of youth refers to people aged 15 to 34 years and includes people who remain in education and enter the labour market in their late 20s. In the third quarter of 2021 (when this research started), the total youth population (15-34) in South Africa was 20,513,000, which was 34% of the total population of 59.6 million. In 2020, it was found that over 8 million (N= 8,811,000) people between the ages of 15 and 34 were classified as NEET, with the YNEET rate being 42.95%. Comparatively, the NEET rate for people aged 15 to 24 years was more than three times as high as the NEET rate in the UK (10.5%) or Germany (5.9%) in 2018. South Africa's NEET proportion was also higher compared to countries with a comparable GDP, such as Brazil with 24.2% and India with 30.4% in 2018. South Africa has been described as the country with the highest YNEET rate among the BRICS countries.

There are two subsets in this group: unemployed and inactive NEET. Unemployed NEET are not in employment, education or training but are actively seeking employment, and are available to start working. Inactive NEET are people not in employment, education or training who are also not looking for work. There are various reasons for people being inactive NEET, according to Statistics South Africa, including being a homemaker, struggling with health, being too young, too old, retired or discouraged, as well as other unmentioned reasons.



Of YNEET, 43% are considered unemployed. As this is a broad category, it is often categorized by connection to the labour market. For example, graduates are less likely to feel disconnected, whereas those without matric are more likely to feel disconnected (Centre for Development and Enterprise, 2021). Unemployed YNEET may also experience difficulties navigating the labour market due to low levels of education and skills, lack of work experience, poor networks and connections with people in the market, as well as lack of access to resources such as transport. Furthermore, Covid-19 has caused an increase in the unemployment rate and therefore contributed to higher levels of YNEET in South Africa as well as globally.

Key demographic factors

► Categories of YNEET in SA (percentage of all YNEET)

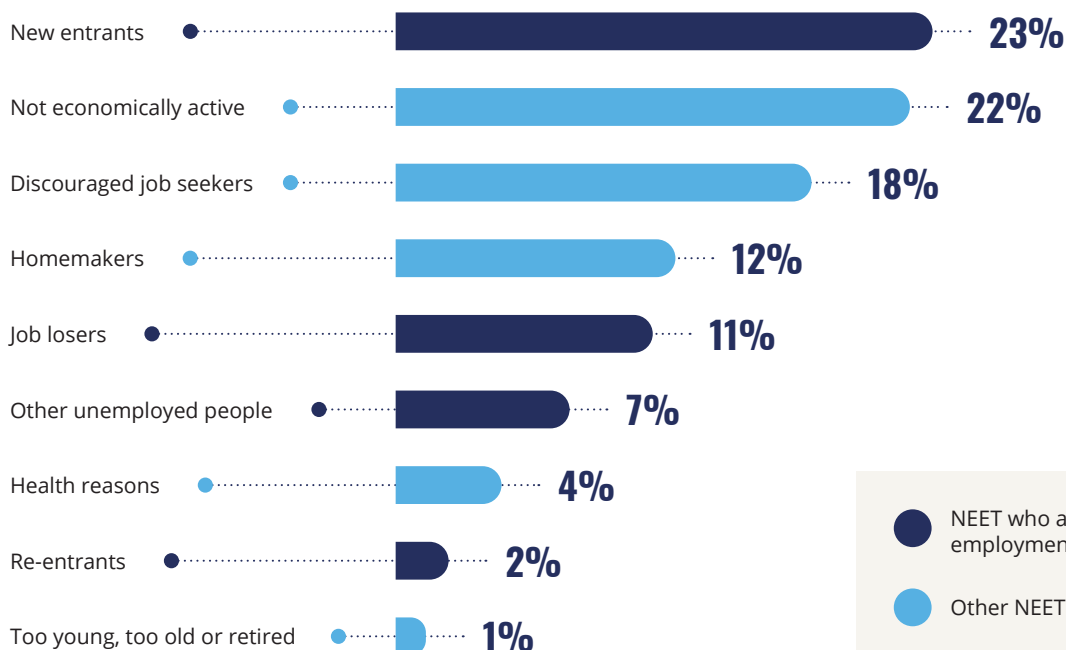
The largest proportion of YNEET (23%) are new entrants to the job market. South Africa has a low labour absorption rate and a huge lack of employment opportunities in the labour market. Young people experience a number of barriers when navigating the labour market, including the cost of job seeking (such as printing documents and transport expenses) and job scams. The category “job loser”, which makes up 11% of YNEET, are people who had been employed but lost their job. There is little known about their previous work experience, but evidence indicates that they may have done seasonal work.



The data indicates that 57% of YNEET are classified as inactive. The category “discouraged job seekers” makes up the highest proportion of inactive YNEET. Youth are in this category either out of necessity, such as caregiving purposes or following pregnancy, or by choice, such as having a spouse who provides an income to the family. It is essential to consider the context in South Africa where it would largely be driven by necessity. The data does not indicate the proportion of people with disability, which can prevent them from entering the labour market.

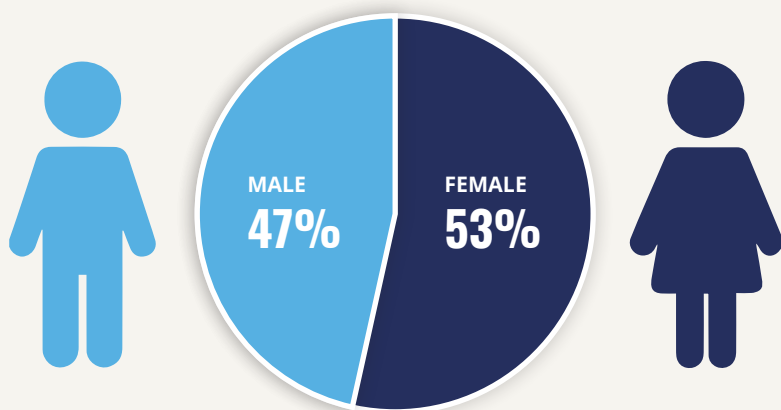
Graph 1: Categories of YNEET in South Africa

► Reasons for YNEET (percentage for all YNEET in SA)



● NEET who are seeking employment opportunities
● Other NEET

Graph 2: Reasons why people are classified as YNEET in South Africa



Graph 3: Gender of YNEET in South Africa

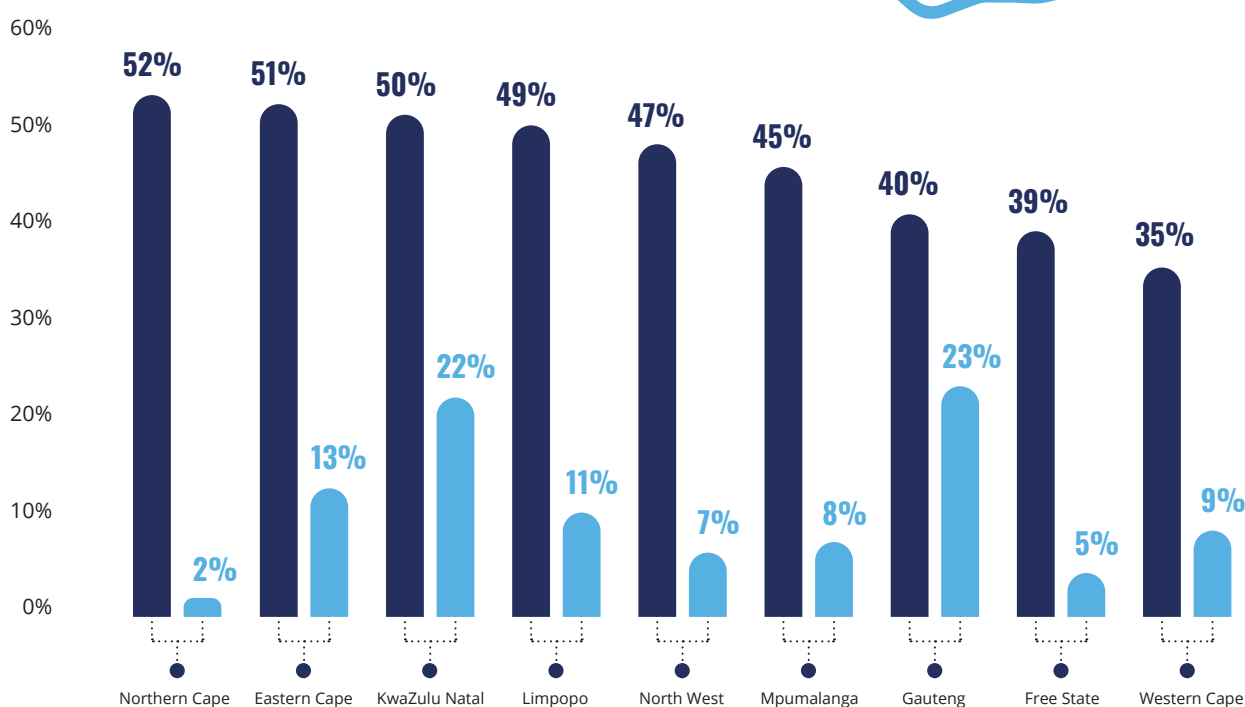
In terms of gender, 53% of YNEET are women and 47% are men. The gender disparity is often attributed to gender discrimination and the labour market favouring men. Caregiving may also be a contributing factor, as young women are more likely to take care of children and people in need. However, the gender gap appears to be closing, which could be the result of the increasing job losses of young men during the Covid-19 pandemic.

Geographic distribution

Geographically, the majority of YNEET are in Gauteng and KwaZulu-Natal. The graph below reflects the proportion of YNEET in each province.



▶ YNEET (percentage per province)



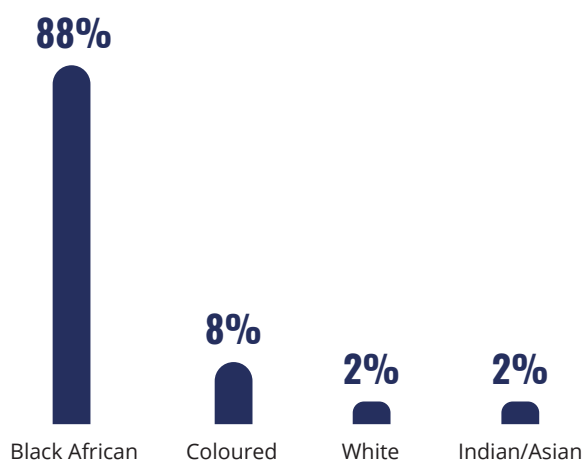
Graph 4: Geographic location of YNEET in South Africa

● YNEET rate ● Percentage of total NEET

Interprovincial migration in search of opportunities is also a relevant factor, as YNEET move to more urban provinces, such as Gauteng.

Vulnerabilities and needs

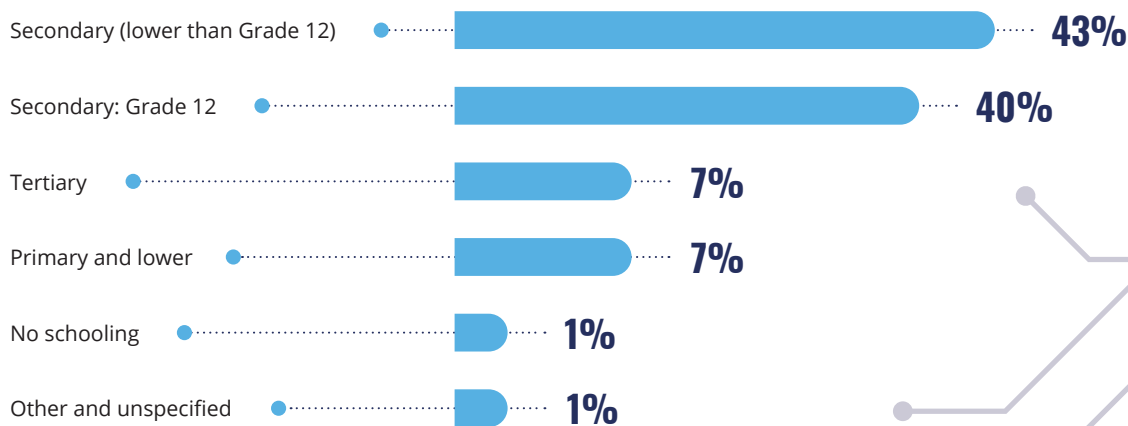
► YNEET demographics (percentage of YNEET)



Graph 5: Proportion of YNEET per race group in South Africa

The data shows that 88% (7,771,000) of YNEET in South Africa are black. This is higher than the proportion of black people in the total population, which stands at 80%. This highlights that black youth are more likely to be out of employment, education and training than other race groups. Several factors contribute to this. In 2019, the total population of black South Africans was 47,454,000. In 2014, the total number of black youth was estimated to be 16,313,000. If this estimate is used, 48% of black youth would be YNEET. This group is often described as largely homogenized and De Lannoy and Mudiriza (2019) unpacked several factors that make this group vulnerable to high NEET levels in their study. This includes poor health, lower education levels and household-related factors (including size, income, number of children below the age of seven and household employment).

► Highest level of education obtained (percentage for all YNEET in SA)



Graph 6: Highest level of education obtained by YNEET in South Africa

The bar graph above indicates the highest level of education obtained by YNEET in South Africa – 45% had obtained secondary education lower than Grade 12 (matric) and 40% had achieved Grade 12 (matriculated), which means that the majority (85%) of YNEET have had some form of secondary education.

Around 7% of all YNEET have tertiary education. However, the number of young people trying to further their studies is likely higher, as prior research has indicated a high dropout rate due to financial constraints and lack of resources, such as computers. There is not much empirical data on the kind of courses young people started studying or which skills they obtained in the process.

***Note:**

This figure was calculated using data that indicates the total YNEET population as 20.5 million. StatsSA used an estimate of 20.4 million in quarter 1 of 2021, which results in a YNEET rate of 43.6%, as mentioned in their report.

Literature review: Skills demand in the digital economy in South Africa

The growth of the digital economy in South Africa impacts the demand for specific skills. Globally, 85% of employers are set to rapidly digitalize their work processes. This development can also be observed in South Africa, as 37% of South African companies reported that they were prepared for the digitalization of work processes in the Worldwide Worx report in 2020. These developments affect employment projections and skills that will be required.

Globally, portable and transferable skills such as critical thinking and analysis, problem solving and self-management – including active learning, resilience, stress tolerance and flexibility – are among the top skills employers required based on a World Economic Forum (WEF) survey that focuses on recent trends, including digitalization. Citizens as well as specialists across all sectors will benefit from skill sets that combine digital and cognitive skills, as part of the broad spectrum of 21st century skills to participate in the digital economy.

More specifically, the digital economy requires a new set of foundational skills that can be categorized into three groups.

1

The first category is human skills, which is the application of an individual's social, creative and critical intelligence. This category includes critical thinking, creativity, communication, analytical skills, collaboration and relationship building. These human skills are important to employers and will continue to be in high demand across the digitally intensive economy.



2

The second category is digital building block skills, which have been important in traditionally digitally intense occupation and are now regarded as critical in many occupations across most industries. These skills include analysing and managing data, software development, computer programming, and digital security and privacy.



3

The third category is business enabler skills, which play a synthesizing and integrative role in the workplace. These skills enable the other two categories to function practically, as they include project management, business processes, communicating data and digital design.



In relation to developing these skills, it is important to take an inclusive approach to bridging the digital divide which negatively affects individuals who are not able to swiftly adjust to the digital economy and consequently are at risk of falling behind.



Jobs and occupations most in demand in the digital economy (focus on pre-entry and entry level)

Occupations in high demand in the digital economy globally

The list of general occupations in demand shows that South Africa already has a clear need for ICT occupations as well as the digital economy more broadly. This demand is expected to increase with the growth of the digital economy as highlighted by the WEF's Future of Jobs Survey. The occupations in high demand in the digital economy are the following:



Roles in the ICT and digital economy

► Advanced level

- Data analysts and scientists
- Artificial intelligence and machine learning scientists
- Big data specialists
- Digital marketing and strategy specialists
- Digital transformation specialists
- Information security analysts
- Software and application developers
- IoT specialist



Managers/managerial roles

► Business management (strategy)

- Project managers
- Organizational and development specialists
- Risk management specialists
- Operational managers
- Business service and administration specialists



Experts with specialized knowledge

► Professionals and technicians

- Business development specialists
- Database and networking specialists
- Management and organization analysts
- Mechanics and machine repair operators

► STEM

- Robotic engineers
- Financial technology engineers

Occupations in high demand in South Africa's digital economy

Occupations in high demand in South Africa in general, combined with insights about the demand for specific occupations in the global digital economy and South African publications, provide insights into the specific occupations in high demand in the country's digital economy. These can be split according to the level and proficiency of skills required – South Africa has a demand for specific occupations on entry and intermediate level, while globally there is a need for occupations that require an advanced skill set.

1.

Pre-entry/entry level

- ▶ Desktop support technicians
- ▶ Junior software developers
- ▶ Data analysts
- ▶ Information and communication professionals and technicians

2.

Intermediate level

- ▶ Mid-level software developers
- ▶ IT/Cybersecurity specialists
- ▶ Mid-level development and operations (DevOps) engineers

3.

Advanced level

- ▶ ICT engineers
- ▶ Lead solutions architects
- ▶ Senior UX/UI designers
- ▶ Digital artists
- ▶ Illustrators
- ▶ Multimedia designers
- ▶ Web designers
- ▶ Chief information officers
- ▶ Information system directors

4.

Managerial level

- ▶ Managers in the roles of application development, data management, ICT projects and information technology
- ▶ Legislators, senior officials and managers in ICT



The digital economy extends beyond traditional technology, media and telecommunication sectors and includes the increased use of digital technologies in all industries. Consequently, there will be a need for individuals with digital skills in a range of occupations and a demand for specific occupations that will be required to use digital technologies or that will change fundamentally through their introduction. Examples of such occupations are business and operational managers who must lead the digital transformation.

Managers and experts with specialized knowledge with occupations in the financial or architectural sectors must change their ways of working and incorporate digital technologies. Engineers, engineering technologist occupations and occupations in STEM fields will increasingly use digital technologies. This will also have an impact on artisans and blue-collar workers. Staff in the medical field, such as general practitioners, registered nurses, nursing educators and pharmacists, are further examples of occupations that will change significantly through digital technologies.

Occupations in high demand in South Africa

Occupations in high demand refer to employment opportunities that are currently in high demand or will be in the future and that are difficult to fill due to a shortage of suitable candidates in the labour market. These occupations are also among the opportunities with the strongest employment growth.

To identify which occupations are in demand in the digital economy, this report includes occupations that are most in demand, using the [critical skills list](#) of the Department of Home Affairs, the Department of Higher Education and Training's [skills demand and supply report](#) and the Africa Growth Initiative at the [Brookings Institute](#). The report then summarizes the occupations and skills in demand in the digital economy, globally based on the WEF's Future Jobs Survey. Based on these insights and existing South African publications, primarily the Mappings of The Digital and ICT Roles and Demand in South Africa by Harambee Youth Acceleration, the researchers analysed the occupations in high demand in the digital economy in South Africa.



Critical skills report

The Department of Home Affairs critical skills report outlines the skills that are in short supply in South Africa. Businesses that seek to employ skilled workers from other countries use this list. Section 19(4) of the Immigration Act permits the issuing of critical skills visas to people who have the skills deemed critical for South Africa. The list is compiled by an advisory committee based on extensive research and a collaborative process with employer associations and public feedback.

Occupations in ICT and the digital economy most in demand according to the critical skills report include:

Advanced level

- ▶ Digital artists
- ▶ Illustrators
- ▶ Multimedia designers
- ▶ Web designers
- ▶ Chief information officers
- ▶ Information system directors



Managerial roles

- ▶ Managers in the roles of application development, data management, ICT projects and information technology
- ▶ FET college principals



Managers

Business management (strategy)

- ▶ Projects
- ▶ Policy and planning
- ▶ Research and development
- ▶ Sales and marketing



○ **Operational managers**

- ▶ Construction projects
- ▶ Agricultural farming
- ▶ Engineering
- ▶ Contact centres
- ▶ Caravan parks and camping
- ▶ Travel agencies



○ **Engineers/engineering technologists**

- ▶ Industrial engineers
- ▶ Civil engineers
- ▶ Mechanical engineers
- ▶ Aeronautic engineers
- ▶ Agricultural engineers

○ **Experts with specialized knowledge**

○ **Financial sector**

- ▶ Tax professionals
- ▶ Practising accountants
- ▶ Financial accountants



○ **Architectural sector**

- ▶ Architects
- ▶ Naval architects

○ **STEM**

- ▶ Experts in the fields of geology, geophysics, mineralogy, hydrology, oceanography, actuarial science, quantity surveying

○ **Staff in the medical field**

○ **General practitioners**

○ **Registered nurses, nursing educators, pharmacists**



Skills demand and supply report

The DHET's skills demand and supply report outlines the current supply and demand for skills in South Africa. The report's analytical approach attempts to provide an in-depth understanding of the interaction between skills demand and supply, and the corresponding implications for the labour market.

The report interprets signals for current and future demand for skilled, semi-skilled and low-skilled occupations and compares these with the skills supply from school and post-school institutions to identify the signal skills shortages and mismatches.

- 1. Occupations in ICT and the digital economy**
- 2. Entry level**
 - ▶ Information and communication professionals and technicians
- 3. Managers/managerial roles**
- 4. Business management (strategy)**
 - ▶ Chief executives
 - ▶ Legislators
- 5. Operational managers**
 - ▶ Senior officials
 - ▶ Administrative and commercial
 - ▶ Production and specialized services
 - ▶ Hospitality
 - ▶ Retail
- 6. Engineers/engineering technologists**
 - ▶ Engineering professionals and technicians
- 7. Experts with specialized knowledge**
- 8. Financial sector**
 - ▶ Business administration
- 9. STEM**
 - ▶ Experts in the fields of physical science, mathematics, health science
 - ▶ Science professionals/technicians
- 10. Other**
 - ▶ Legal professionals/technicians
 - ▶ Social professionals/technicians
 - ▶ Cultural professionals



11.	Office support workers	
12.	Clerks ▶ General and keyboard ▶ Customer service ▶ Numerical	
13.	Artisans and blue-collar workers	
14.	Workers in agriculture, forestry, fishery, craft, food processing	
15.	Electricians	

Brookings report

The South African case study of employment creation potential published by the Africa Growth Initiative at the Brookings Institute forms part of a larger working paper series. It uses interviews with employers to identify labour skills requirements and skill gaps for young people.



Roles in the ICT and digital economy

- ▶ **Advanced level**
 - Legislators, senior officials and managers in ICT



Managers/managerial roles

- ▶ **Business management (strategy)**
 - Managers in finance, trade and agriculture
 - Legislators
- ▶ **Operational managers**
 - Senior officials



Experts with specialized knowledge

- ▶ **Financial sector**
 - Technical and associated professionals



Office support workers

- Clerks



Artisans and blue-collar workers

- Workers in agriculture, fishery and craft
- Plant and machine operators and assemblers

Literature review: Skill supply for the digital economy in South Africa

Education and skills development

In South Africa, the education system is divided into three phases: primary, secondary and tertiary post-school education and training (PSET). The PSET sector comprises all education and training provision for people who have completed school, people who did not complete their schooling and people who never attended school ([White Paper for Post-School Education and Training, 2013](#)). Students have the option to **further their studies** through higher education institutions (HEIs) and technical vocational education training (TVET) colleges. The differences between HEIs and TVET colleges are that HEIs follow a more academic or theoretical approach to learning whereas the TVET approach is more practical and technical.

The PSET landscape comprises various institutions and organizations that can be broadly divided into education and training provision, regulation, advisory, and planning and facilitating. The planning and facilitation role in the PSET system lies with the National Skills Fund (NSF) and Sector Education and Training Authorities (SETAs), where the former is mandated to fund various solicited and unsolicited projects identified as national priorities or which contribute to the achievement of skills development objectives set by government. Brief NSF objectives include funding for projects aimed at creating a skilled workforce. The NSF funds projects from private companies and training providers, non-profit organizations, public entities and universities. It aims to improve training programmes, increase market penetration and increase access for YNEET.



Qualifications framework



The **National Qualifications Framework (NQF)** refers to the comprehensive system for categorizing, enrolling, publishing and dispensing quality assured national qualifications. It outlines the requirements for part-time and full qualifications. The **ILO** indicates that an **NQF was adopted** by several Global South nations, including South Africa, to improve the quality and creditability of existing qualifications and training. The table below outlines each NQF **level**.

Level	Qualification types			
	Professional	Vocational	National diploma	National certificate vocational (NCV)
1.	Grade 9	Occupational certificate 1	-	-
2.	Grade 10	Occupational certificate 2	N1-NATED certificate	National certificate vocational, first year
3.	Grade 11	Occupational certificate 3	N2-NATED certificate	National certificate vocational, second year
4.	Grade 12	Occupational certificate 4	N3-NATED certificate	National certificate vocational, third year
5.	Higher certificate	Occupational certificate 5	N4, N5 and N6-NATED certificate	-
6.	National diploma and advanced certificate	Occupational certificate 6	N6-NATED diploma (after 18 months of work experience)	-
7.	Bachelor's degree and advanced diploma	Occupational certificate 7	-	-
8.	Honours degree and postgraduate diploma	Occupational certificate 8	-	-
9.	Master's degree	-	-	-
10.	Doctorate	-	-	-

Table 7: NQF levels for different qualifications

National certificate vocational (NCV) refers to programmes that build on foundational education and introduce the experience of the workplace environment. National accredited technical education diploma (NATED) programmes offer students theoretical as well as practical understanding of various occupations. The NATED course is offered on levels N1 to N6. Each level is covered in a single trimester (10 weeks), after which a national examination is written. By contrast, the NCV qualification is a full year study programme at NQF levels 2, 3 and 4 and a certificate is issued on completion of each level. For NCV, there are seven subjects that comprise four vocational subjects and three fundamental subjects (language, mathematics and life orientation). These types of programmes are offered at all TVET colleges, but the fields of expertise may differ. The DHET (2012) stipulates that the ratio of apprenticeship (or practical work experience) to theory should be 60 to 40. These apprenticeships offer a simulated workplace environment so that students may experience work situations while studying. Both are offered at TVET and private colleges. Occupational programmes provide theoretical, vocational and practical work experience. There are also short courses and other skill qualifications available to young people. **TVET institutions** offer courses in various industry fields including agriculture, arts and culture, business, hospitality, commerce and management, education, training and development, engineering, manufacturing and technology, services, building construction and security.

Secondary: Assessment of graduates in relation to acceptance at HEIs

Several factors are considered for acceptance at HEIs. These include a national senior certificate (NSC) and meeting the required admission point score (APS) for the desired course. A key determinate to achieve the APS requirements is a mathematics mark. Standard mathematics allows one to study at HEIs. In 2020, 41% of matric students were enrolled in standard maths. Mathematical literacy allows one to study at university but with exclusions from technical courses such as accounting, engineering, information technology (IT) and chemistry. Around 59% of matric students were enrolled in mathematical literacy in 2020. This limits students in relation to the courses and skills necessary for the digital economy, which include ICT-related studies and courses in the fields of science, technology, engineering and mathematics (STEM).



In addition, secondary education can equip students with relevant core skills for life and work in the 21st century. Some that are particularly needed for the 4IR include critical thinking and complex problem solving. There appears to be a gap in learning these in essential skills, as it has been found that public schools often promote “rote learning” or memorizing the syllabus rather than creating environments for critical and creative engagement.

Social aspects affect access to education. The legacy of apartheid led to disparities in access to education across different race groups. This can especially be seen in the black population, as despite the reforms brought through democracy, historical disadvantages still impact access. In addition, many South Africans are deprived economically or live in poverty and this lack of resources may hamper their educational pursuits. The curriculum has been criticized for not taking this history and context into account but instead adopting reforms from other countries which lack similar context and background. This may lead to further exclusions from accessing the skills needed to enter the digital economy, for example with high data costs. In terms of gender, the gap is small, with 50.9% of women and 49.1% of men having secondary education.



The education system has seen rapid change since the country became a functioning democracy in 1994, characterized by the directive to create an inclusive, diverse system with access to basic education for all. The government's transformation goals are also reflected in the implementation of several development programmes. The National Skills Development Strategy III (NSDS III) has been extended beyond its initial mandate in 2016 to develop skills needed for social development and sustainable growth. The New Growth Plan that was implemented in 2010 aims to promote job creation and improve labour absorption through enhancing skills in each job. The National Development Plan (NDP) was implemented in 2012 as a long-term plan to improve employment by aligning skills development according to the needs of the economy.

The government also developed strategies that can be linked to developing skills for the digital economy. The National Skills Development Plan (NSDP) aims “to ensure that South Africa has adequate, appropriate and high-quality skills that contribute towards economic growth, employment creation and social development”. The plan's objective is to improve the quality of education and skills development. This includes emphasizing mathematics and physics competencies to better prepare scholars for the labour market and increasing the number of matrics who will be eligible for bachelor's degrees at HEIs. This has been done to ensure an increase in enrolment in science, engineering and technology (SET) courses at HEIs. Overall, there has been an improvement in mathematics and science performance at Grade 9 (22.7% in 2019, which was double that of 2011) and matric levels, with increases in pass rates. However, the pass rate for these subjects is 30%, which does not guarantee university acceptance despite the objective to improve university acceptance which was outlined in the development strategies. Furthermore, initiatives such as the White Paper on Post-School Education and Training sought to increase learners' digital skills as well as students' knowledge of technology to adequately prepare them to fully participate in the 4IR.



Tertiary: Assessment of student enrolment and completion, focusing on STEM

Enrolment



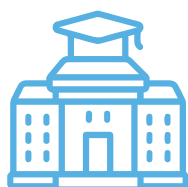
According to a 2017 report by the UNESCO Institute for Statistics, tertiary enrolment levels in South Africa are low compared to international levels. By international standards, the South African PSET system has a particularly large ratio of university to TVET enrolments. Policy appears to recognize this imbalance and the White Paper on Post-School Education and Training stated “highest priority” is to both strengthen and expand the TVET sector. It is clear that the greatest source of expansion in the PSET sector will be in vocational education (broadly defined) through increased TVET enrolment and introducing community education and training (CET) colleges.

Challenges



South African tertiary institutions still experience difficulties, including limited financial resources and access challenges, despite having the fourth highest per capita income levels and education expenditure in Africa. In 2019/2020, around R107 billion of the government’s national budget was allocated to PSET – 63.7% of spending was on universities, while 16.5% was spent on TVET colleges, 17.1% on SETAs, the NSF and the Quality Council for Trade Organisations (QCTO), 1.9% on CET colleges and 0.8% on other expenses. The budget is spent on resources as well as funding agencies such as the National Student Financial Aid Scheme (NSFAS). PricewaterhouseCoopers’s list of top universities in the world featured 13 South African universities, but none of them ranked in the top 150.

Universities



South Africa has 26 public higher education institutions (HEIs) and 131 private higher education institutions (PHEIs). In 2019, the data indicates that 1,074,912 students were enrolled in public universities, of which 77.3% were black, 11.8% were white, 5.8% were coloured and 4% were Indian/Asian. The number of graduates recorded in 2019 was 221,942, which was 2.3% (5,246) lower than in 2018. Low completion rates are often attributed to the gap between secondary and tertiary education, in that secondary education often does not prepare students for the expectations of tertiary institutions.

STEM courses are important to prepare students for the digital economy. STEM refers to science, technology, engineering and mathematics, and includes astronomy, biochemistry, biology, chemical engineering, chemistry, civil engineering, computer science, electrical engineering, mechanical engineering, physics and statistics. University graduates in STEM fields accounted for only 29% of all graduates. In terms of STEM courses, only 21% of life and physical sciences students and 32% of engineering students completed their courses in the prescribed time. In 2016, of all graduates from public universities and universities of technology, 0.9% had mathematics and statistics degrees, while 6.4% were life and physical sciences students and 7.1% were engineering students. These figures indicate that most graduates are unprepared for careers in STEM fields, as these were the subjects with the lowest percentage of graduates in 2016.



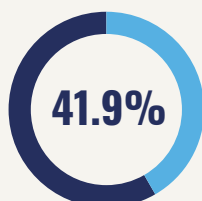
There are 50 public TVET institutions and 253 registered institutions and other sites that provide qualifications, national diplomas (NATED courses) rated 2-6 on the NQF levels, as well as vocational modules. The entry qualification to the two programmes currently offered at TVET colleges, namely the National Certificate Vocational and the national accredited technical education diploma (NATED), is a minimum of Grade 9. A higher qualification is an advantage, as NCVs give students the option to become self-employed after completion and NATED courses provide practical experience that can improve employment prospects.

As indicated in South Africa's NDP, it is a key mission of the government to strengthen the role of TVET colleges in better preparing young people for the labour market. The White Paper for Post-School Education and Training refers to the important role of TVET colleges in the PSET sector, which is to bridge the gap between education and work.

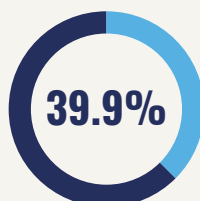
In line with the policy objectives outlined above, enrolment in public TVET colleges has increased in recent years (from 358,393 in 2010 to about 673,490 in 2019, shortly before the Covid-19 pandemic started). "This increase in TVET enrolment, supported by financial support from NSFAS, is therefore a tangible sign that the balance of the PSET sector is shifting slowly towards vocational education and training (although the university sector is still the single largest component of the PSET system)." The number of enrolments remains below the policy objective of one million TVET enrollees by 2030.

TVET institutions offer courses for diplomas and NATED certificates in several fields, including art and design, business management, human resource management, legal and medical secretary qualifications. The national diplomas closely related to the digital economy and 4IR include engineering studies, computer sciences and civil engineering.

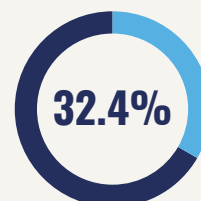
The breakdown of NCV level 4 students at TVET colleges in STEM courses in 2019 is as follows: for civil engineering and building construction, 1,409 registered, 1,131 wrote the examination and 474 completed the course. The completion rate is 41.9% for the civil engineering and building construction course, and 4% compared to all completers. For the engineering and related design course, 2,581 registered, 2,070 wrote the exam and 826 completed the course. The engineering and related design course completion rate is 39.9%, and 8% compared to all completers. Information technology and computer science had 1,074 registered students, 930 who wrote the exam and 301 students who completed the course. The completion rate for the IT course was 32.4%, and 3% overall of the 2019 completers. Overall, the completion rate of STEM courses across HEIs as well as TVET colleges is low.



Civil engineering and building construction



Engineering and related design course



Information technology and computer science

Status quo and impact of TVET colleges in South Africa – tracer study

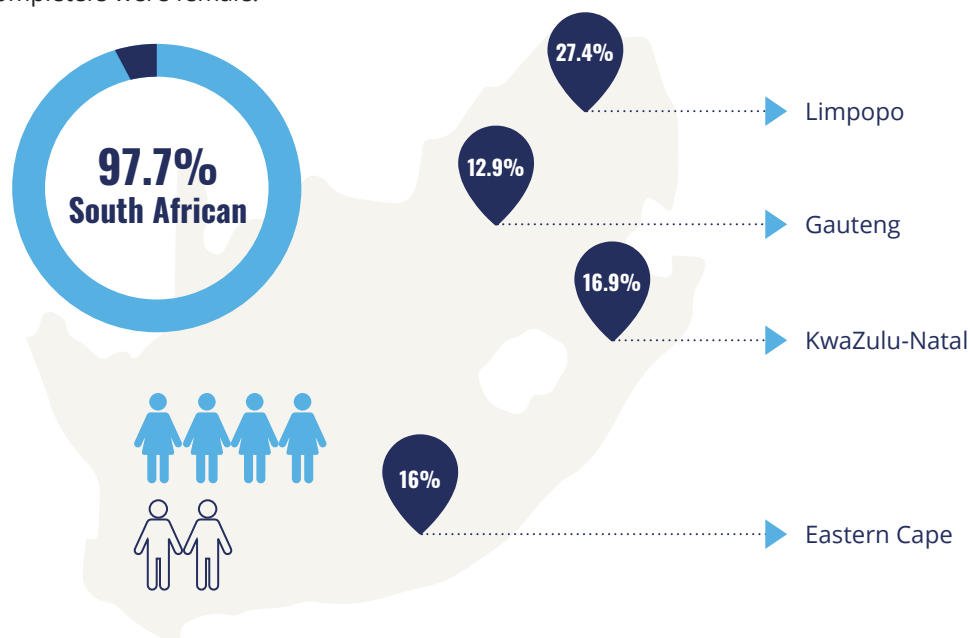
Introduction

In line with the NDP, the government planned to improve TVET colleges to have better labour market absorption among the graduates. The White Paper for Post-School Education and Training was an initiative in line with the national development goals to improve youth employability. Tracer studies are used to understand the extent to which TVET colleges are creating these bridges. The DHET does not currently conduct surveys to trace all graduates, but in 2017 one tracer study covered all public TVET colleges across the country, including 4,000 completers. This section summarizes the findings of this study. The respondents had completed their various courses within 18 to 30 months prior to the interviews. The sample included students who completed NCV level 4, N3, N6 Engineering and NCV level 4 and N6 Business. As this study focuses on NCV programmes and qualifications, it is important to note that there is limited information and knowledge about NATED graduates and their transition into employment.

Demographics

The respondents' average age was 24 years, and 60% were female. The sample consisted of 97.7% South African completers, with the remainder from other African countries, such as Mozambique and Swaziland. Of the SA respondents, 27.4% were from Limpopo, 16.9% from KwaZulu-Natal, 16% from the Eastern Cape and 12.9% from Gauteng. The study found that TVET completers who migrate are most likely to move to Gauteng and the Western Cape from some more rural provinces. Only about 15% of the sample were employed before completing their TVET qualification. The study does not mention how many completers gained work experience while attending a TVET institution. From the sample, 66.6% were unemployed.

Additional studies reveal that in terms of socio-economic background, TVET enrollees share similar baseline characteristics as people who did not attend PSET within two years of completing school. There are also significant differences: TVET enrollees tend to live in households with slightly higher household incomes, and on average their mothers have higher qualifications. In terms of their field of study and qualifications, women and men were equally represented in the N6 Engineering qualification. Women were slightly underrepresented in the N3 Engineering qualification and overrepresented in the NCV Engineering group. In terms of the business qualifications, most completers were female.



Labour market outcomes

In terms of labour market outcomes, based on the 2017 tracer study, only 16.6% were employed, 21.9% were a part of a workplace learnership, 2.0% were self-employed, 14.2% were studying and 45.3% were not working, revealing a poor labour absorption rate. The tracer study differentiates between employment and workplace-based learnerships (WBL). In terms of the “employed” category, the study does not specify if this is full-time employment.

%

The overall unemployment rate among TVET completers was 52.2%, and at the time of the study, the overall youth unemployment rate was 67.4%. The unemployment rate was calculated for TVET completers by excluding people who furthered their studies to reach 85.8 % of students that should be working. The lowest unemployment rates among TVET completers were in Gauteng, the Northern Cape and the Western Cape. The highest unemployment rates were among respondents in Limpopo, North West and Mpumalanga.

Across the various qualifications, respondents were more likely to be part of workplace-based learning (apprenticeship, internship or learnership) than to be self-employed. Workplace-based learnerships are intended to accommodate all vocational and occupational qualifications across NQF levels. The number of people being enrolled in workplace-based learning has steadily increased over the five years from 2009/10 to 2014/15, for internships by 278%, for apprenticeships by 148% and for learnerships by 111%. The completion rate has also been growing. Learnerships made up the biggest proportion in 2014/15 with 117,586 registrations compared to 31,702 in the apprenticeship system and 14,515 in the internship system.

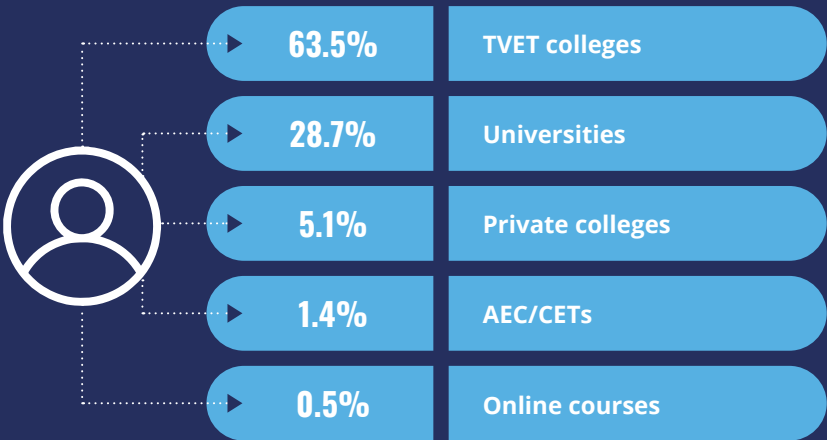
Of the respondents in the tracer study in workplace-based learnerships, 57.2% were in internship positions, 19.6% in apprenticeships, 15.7% in learnerships, 7.3% were trainees and 0.2% were cadets. The cadets were being trained on shipping vessels, overseen by the South African Maritime Safety Authority (SAMSA) as part of its government mandate to develop a maritime strategy to grow the country's maritime economy.



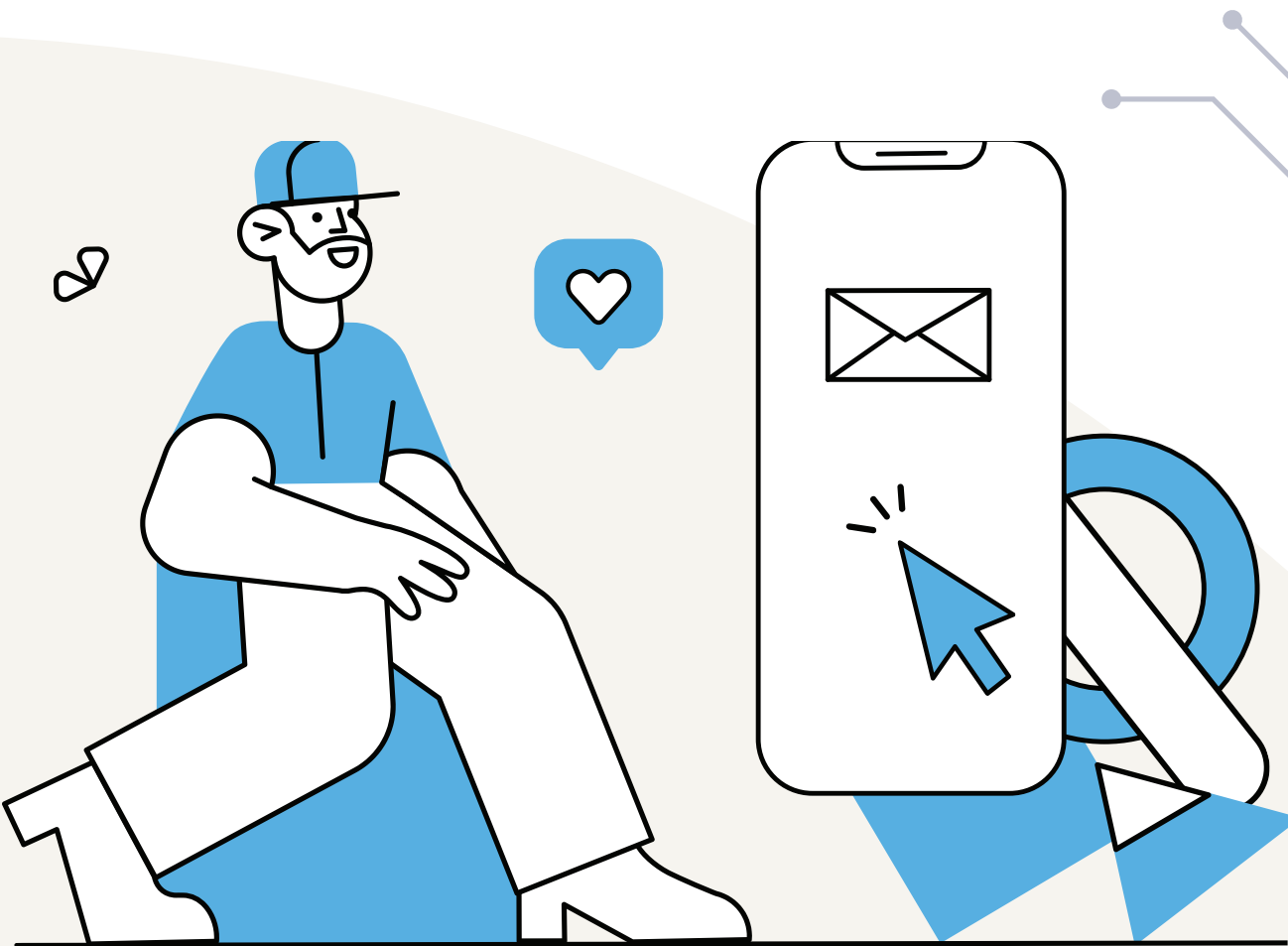
On average, employed respondents earned roughly R3,000 per month (the tracer study does not specify if “employed” includes WBL). At about R20,000 a month, respondents with N6 engineering qualifications were the highest earners. In 2021, the average income of all people working in the formal economy was R12,129 after taxes.

The majority of the self-employed respondents reported that the skills obtained from their qualifications were relevant to their enterprises. The tracer study found that the self-employed people were likely to be in the informal sector, with 58% reporting that their skills were applicable, 46.9% saying that their qualification was related to their business and 14.8% reporting that their qualification was somewhat related.

Just over 14% of respondents reported that they were studying. In this group, 63.5% were enrolled at TVET colleges, 28.7% at universities, 5.1% at private colleges, 1.4% at AEC/CETs and 0.5% were doing online courses. The reasons they provided for studying further included obtaining a higher qualification, increasing knowledge and improving the likelihood of finding a job.



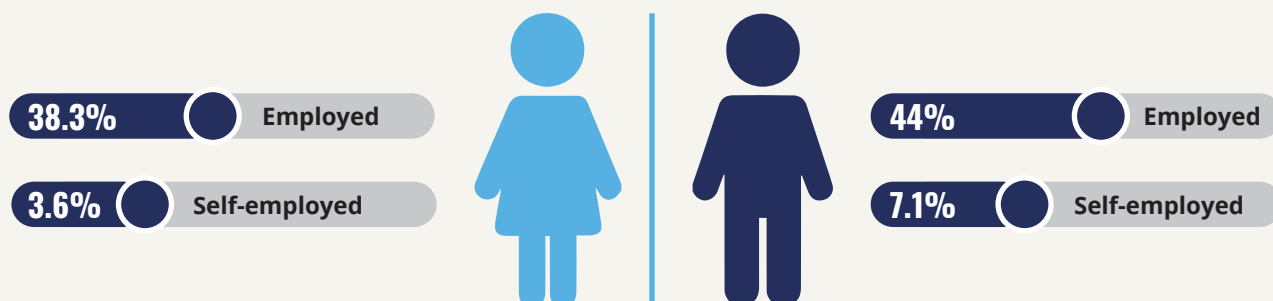
The tracer study further analysed the 45.3% of respondents who were not working after completing their qualification. It found that 90% of completers across the different qualifications were not employed but were searching for work, 0.23% were discouraged job seekers, 0.06% reported that they did not need work, 0.35% said that they did not want to work, 0.35% mentioned that they could not work and 1.10% reported that they were not actively searching for a job but would work if they came across a suitable opportunity. On average, 31.9% of the respondents had been unemployed for six to 12 months. Most of the unemployed completers sent out their CVs and were using online searches to find jobs.



Key predictors of labour market outcomes

Regarding employability based on qualification, N6 engineering and business qualifications had the highest employment rates. This was to be expected, as these qualifications have higher admission standards and NQF levels. The unemployment rate by type of TVET qualification is 54.9% for NCV level 4 engineering, 60.3% for NCV level 4 business, 63.5% for N3 engineering, 46.8% for N6 business and 47.7% for N6 engineering. These figures indicate low unemployment rates among NCV level 4 engineering completers. Due to the small sample size (4,000), it can however not be assumed that this is the norm. Furthermore, 42.1% N3 engineering, 35.6% N6 business and 29.2% N6 engineering students found employment within six months of completing their qualification. In South Africa the prospects of finding a job within six months of completing a qualification are slim, for example, 0.2% of the 8,000 jobs advertised on Gumtree (a platform which allows employment postings) are looking for graduates.

Taking a closer look at the women included, the study found that 38.3% were employed, 58.1% were part of workplace-based learnerships (WBL) and 3.6% were self-employed. These figures indicate that fewer women were employed or self-employed than male completers, of which 44.5% were employed and 7.1% were self-employed. However, more women were in work-based learnerships than men 48.5%).



Respondents (excluding WBL participants) used several methods to find employment. Some of the more frequently used methods were friends and family contacts, cold calling and online job searches. Most of the respondents across the various qualifications reported working for private companies, primarily businesses with more than 50 employees. Furthermore, 48.86% of the respondents who were employees, not self-employed or part of WBL from the various qualifications, reported having permanent contracts.

This study provided critical insights into TVET qualifications and labour market outcomes. It led to several insights regarding gender and qualification type, and the impact on labour absorption and unemployment. Studies of this nature are important, as despite large numbers of cohorts completing TVET, this does not necessarily lead to employment opportunities. Innovative interventions are needed to assist completers with their transition into the workplace to avoid what is termed the “revolving door syndrome” or returning students.

The study also revealed that TVET does not ensure preparedness. Two in three (67.5%) reported that the skills they obtained during their training prepared them for their current work tasks. There are interesting differences between the qualification groups. Lower percentages of the two engineering groups reported that their TVET qualifications had prepared them for the tasks they were currently undertaking in their jobs – 51.7% for N3 engineering and 57.1% for N6 engineering. These results suggest that completers experienced deficiencies in their preparation for the world of work and/or the skills they obtained are not well-matched with their work tasks. The tracer study showed that the policies are falling short when it comes to their goals of improving employability. An intervention offered by Stumpf, Papier, McBride and Needham (2012) has been to adopt a number of Australian initiatives that are focused on supporting learners in making decisions about further training and study.

Skills mismatch and work experience

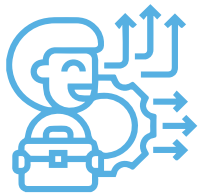
Skills are defined as “all types and facets of competencies required by workers to perform their jobs”. This includes competencies, educational attainments, qualifications and practical experience. Employers report a lack of skills in South Africa, with 34% of employers reporting in 2019 that they found it difficult to fill vacancies. They attributed this to a lack of experience as the main driver, followed by a lack of required hard skills. Several occupations requiring STEM skills were in high demand, including chemical, electrical, civil and mechanical engineers, as well as IT roles (cybersecurity experts, network administrators, technical support).

This did not guarantee that graduates easily found work, even though the unemployment among graduates was 23% lower than the national unemployment rate in the first quarter of 2021. South Africa's graduate unemployment rate still stands at 33.5% for people between 15 and 24 years, and at 10.2% among people between 25 and 34 years. South Africa is experiencing a skills mismatch which also affects individuals who completed a post-secondary qualification. The skills mismatch occurs when workers find themselves lacking the skills that employers require. This could be that workers lack the skills that are required of the occupation or that they possess skills that exceed the requirements for that occupation. Previous research estimated that more than 50% of SA's labour force were affected by a mismatch between their skill set and the skills required for their work. Around 27% of all employed graduates worked in occupations that were not directly related to their studies and around half of them reported being overqualified.



At the same time, employers often criticize TVET curricula as outdated, inflexible and unrelated to the industry, and this causes a skills mismatch and students who are unprepared for the workplace. Employer studies have also found that the solutions they provide are for TVET curricula to introduce soft skills and provide more work exposure and up-to-date industry knowledge. A lack of work experience is often a barrier to employment for young people. If they can obtain field experience, they are allowed to learn while doing, which gives them practical skills and direction. Black students experience this barrier the most, due to poor access to networks as well as little previous work experience.

Career guidance



Context and relevance of career guidance

Career guidance is defined as “services intended to assist individuals of any age and at any point throughout their lives, to make education, training and occupational choices and to manage their careers (career management skills)”. With the rampant unemployment, poverty, inequality and their accompanying challenges in mind, strengthening South Africa’s education, training and skills development system is regarded as a key component to address these social ills. Through the National Policy for an Integrated Career Development System for South Africa, the government is committed to the promotion, enhancement, strengthening and development of people-centred career development services. The policy aims to ensure that citizens of all ages gain access to quality information relating to various careers and career development services, as this will enable them to make more informed career decisions. This might positively impact the economy, resulting in high levels of employment and increased sustainable economic growth.



Funding for career guidance

The NSF offers financial support to a variety of career development support interventions geared at schools, TVET and CET colleges, as well as universities, and especially focuses on addressing the need for opportunities for YNEET. In March 2021, the NSF budget of R30.7 billion funded learnerships, internships, artisan development, bursaries, skills programmes, work-integrated learning for universities and TVET colleges, cooperative community-based organizations, and adult education and training.



Brief overview of career guidance programmes

One of the initiatives the NSF funded is the Career Development Services (CDS), a national initiative that offers career information, advice and counselling to both students and employed people. The CDS started out as a ministerial flagship project that later became a DHET function. The Presidential Youth Employment Intervention (PYEI), also funded by the NSF, seeks to facilitate YNEET with entry into the labour market. The SAYouth Platform, which is part of the PYEI, aims to connect South African youth to work through providing a range of services and work readiness training opportunities. Several universities also provide career advice and guidance to prospective and current students, as well as alumni.



Limitations due to a lack of career guidance

The importance of career guidance become clear on two levels. On an individual level, poor career decisions can negatively affect a student's mental health. In an investigation on depressive symptoms in students, about a quarter felt overwhelmed by their studies and 7% had experienced suicidal thoughts. On a national level, poor career decisions that result from a lack of career guidance could have an impact on the economy, as it can result in a lack of or mismatch of skills.

It is reported that a lack of career advice in South Africa is limiting young people – especially those in less-resourced communities – as they are not adequately provided with trained guidance counsellors and cannot afford such counselling. This results in low aspiration levels for specific careers, as lots of young people are unaware of their strengths and the career path they might excel in. In the digital economy – with its constant evolution and creation of new careers – career guidance is especially important, as students are presented with new opportunities. However, students often do not have access to timely and credible information about these new careers and opportunities. Students who drop out of their studies, which might be because the course was the wrong choice for them, can also be seen as an incurred expense, as funding could have been used elsewhere.

Digitalizing career guidance services is one option to make career guidance more accessible to young people, especially those in rural and remote areas. To achieve this, any service has to be zero-rated and the technology has to user-friendly for young people with minimal digital experience.



Overview of existing courses and training

Identification of training and courses relevant for digital skills and the digital economy

The fourth industrial revolution (4IR) represents a new era of innovation in technology – one that enhances human-machine relationships, unlocks new market opportunities and fuels growth across the global economy. In South Africa, various groups are promoting 4IR and are taking steps to leverage it. But there's a long way to go before South Africans can enjoy the fruits of innovation-led prosperity.

This section provides an overview of the PSET landscape, systems and processes as well as relevant stakeholders. It assesses capacity in relation to the development and supply of skills required in the labour market and evaluates South Africa's readiness to face this era.



Government and HEIs responsible for PSET in South Africa

The PSET landscape comprises various institutions and organizations that can be broadly divided into education and training provision, regulation, advisory, as well as planning and facilitating. The DHET provides national strategic leadership in support of PSET. South Africa has 26 public and 131 private HEIs, 50 public TVET colleges and 253 privately registered institutions. The DHET funds NSFAS, that provides financial aid to undergraduate students at tertiary institutions.

In the PSET system, the planning and facilitation role lies with the NSF and SETAs, where the former is mandated to fund various solicited and unsolicited projects identified as national priorities or that contribute to the achievement of skills development objectives set by government.



The responsibility of the South African Qualifications Authority (SAQA) is to “oversee the further development and implementation of the National Qualifications Framework (NQF) and advance its objectives, which contribute to the full development of the lifelong learner and to the social and economic development of the nation at large”.

The NQF includes three sub-frameworks, each of which is developed and managed by a specific Quality Council (QC) in the PSET field: the General and Further Education and Training Qualifications Sub-framework (GFETQSF), by Umalusi (the Council for Quality Assurance in General and Further Education and Training); the Higher Education Qualifications Sub-framework, by the Council on Higher Education (CHE); and the Occupational Qualifications Sub-framework (OQSF), by the Quality Council for Trades and Occupations (QCTO).



The quality council for South African higher education is responsible for leading and managing quality assurance, research and monitor trends and development. It promotes “a system of quality assurance for all higher education institutions, including private providers of higher education, which focuses on programme accreditation, institutional audits, national reviews, standards development, quality promotion and capacity development” and provides advice to the DHET.

The QCTO is responsible for setting standards national occupational qualifications for everyone who wants a trade or occupation. Where appropriate, it's also done for professions. The council also develops the qualifications and does the quality assurance. In addition, it accredits skills development providers (SDPs) who are interested in offering qualifications that are registered on the OQSF.



Umalusi, as well as covering qualifications and quality assurance for the GFETQSF, is responsible for the schools certification programme (National Senior Certificate, Senior Certificate Amended), TVET colleges (National Technical Certificate, National Certificate Vocational) and Adult Learning Centres (General Education and Training Certificate for Adults).

Occupational classification system

“An occupational classification system, in its simplest form, attempts to classify occupations according to specific principles and can be used for different purposes. On a broad level, occupational classification systems are designed to map the world of work, more specifically, the use of data on occupations collected depends on how the occupation is defined within the system. Occupations can be defined through tasks, duties, skills, earnings, job environment, cognitive abilities, educational requirements, etc.”

There are two classification systems in South Africa: South Africa Standard Classification of Occupation (SASCO) and the Organising Framework of Occupations (OFO).

1

SASCO is used by Statistics South Africa to provide a national framework to identify occupations and as a basis for international comparability. SASCO is the systematic basis for the classification of occupations obtained through the population census, marriages, divorces, causes of death and the Quarterly Labour Force Survey.

2

OFO is a coded hierarchical occupational classification system based on the ILO's International Standard of Occupations. Because SASCO was drawing on older occupational definitions, OFO intended to standardize occupational definitions and their up-to-date associated practice requirements, which educational institutions would then use to develop their training programmes, to avoid or minimize the skills mismatch between curricula and employer requirements.

The OFO uses a bottom-up approach, which means:

- ▶ analysing jobs and identifying similarities in terms of tasks and skills
- ▶ categorizing similar jobs into occupations
- ▶ classifying these occupations into occupational groups at increasing levels of generality

Occupational qualification development in South Africa

The process of developing an occupational qualification begins with an educational institution or employer putting forward a proposal to create a qualification. The QCTO staff evaluate this proposal and find the occupational definition of the OFO, or develop a new OFO code. The development quality partner (DQP) then appoints a panel of community of experts and practitioners (CEPs), consisting of employers, educators and assessors in the field related to the qualification. The CEPs participate in a series of workshops to develop the required qualification documents, including an occupational profile, curriculum framework and assessment specifications.



Types of courses offered by HEIs

Universities offer an academic and mostly theoretical approach to learning through professional courses, with qualifications ranging from NQF level 5 to 10, or higher certificates to doctorate degrees. TVET colleges offer a more practical technical approach by offering NATED and NCV courses.

The National Curriculum Vocational programme is aimed at equipping learners with vocational as well as academic skills, and function as a bridge for learners who want to attend universities. The programme was introduced in 2007 to replace the National Accredited Technical Education Diploma programmes, but caused a decline in enrolments. This resulted in the NATED programmes being reintroduced in 2010.

NCV courses are designed for students who are willing to master a skill away from the traditional school environment and they fit on qualifications levels 2 to 4.

NATED programmes are post-school courses that help further education in a specific learning area and use practical as well as theoretical teaching. These courses provide qualifications up to NQF level 6, but according to Rogan (2019) they currently “lack a significant work preparation programme and a consistent practical component, both of which are important for the workplace”.

Accessibility and costs of higher education

Public higher education institutions charge tuition fees for their courses, but NSFAS provides funding for students who attend universities and public TVET colleges, including tuition fees and a monthly stipend. Consequently, courses at these institutions are accessible for young South Africans with limited financial resources.

Private TVET colleges are not part of the NSFAS funding, therefore only students that have the financial means can apply, making them unaffordable to most young students or forcing them to choose shorter courses. The fees vary between colleges and course types. One-year courses at places like Pretoria Technical College, Rand Training College and Taal-Net cost between R12,000 and R25,000, and higher education courses up to a bachelor's degree cost between R70,000 and R94,000 (Varsity College).

Points of improvements of relevant frameworks and responsible stakeholders

Regardless of the many changes and developments in recent years, South Africa is far from equipping young people to fully participate in the 4IR. Points of improvement among relevant stakeholders are summarized below.

► NQF

As the NQF has been initiated by higher learning institutions, it is not necessarily fit for employers' needs and the logic of occupational/workplace-focused qualifications often does not fit comfortably in the NQF. The need to develop skills programmes creates a category of training that does not align to current NQF policy.

► PSET

Several challenges persist, including the institutional and spatial discrimination due to underfunding, imbalance in the PSET system due to sector-based allocation of resources, weak linkages between employers and the education system, and the unsatisfactory quality of education offered at PSET institutions.

► SETAs

"Many SETAs dominate the occupational development process, which may result in qualifications that are focused on the needs of a single industry rather than the industries that require the qualification." "The QCTO was established to address this shortcoming and the intention was for this organization to take on the quality assurance work carried out by the SETAs before. However, due to funding constraints and other challenges, this is still delegated to the SETAs." In addition, the SETAs have been criticized as being inefficient and bureaucratic.

► OFO

"The local government SETA acknowledges in its guide to OFO coding for workplaces that there is not necessarily a direct link between occupation and qualification and that the final qualification does not always directly correspond to the original occupation specified by the OFO code. It highlights that the OFO is defined by what employees do in various sectors or industries rather than their qualification." This could be because OFO occupational definitions by employers represent jobs in the workplace rather than occupations. Another shortcoming is that in the conceptualization of the OFO was the idea that employers would update occupations on the OFO through employer skills plans, which would lead to occupational definitions being a more accurate reflection of the labour market. In retrospect, it has been acknowledged that employers rarely make significant updates to the OFO definitions or work within the structure.



Evaluation of the supply of courses equipping young people with digital skills

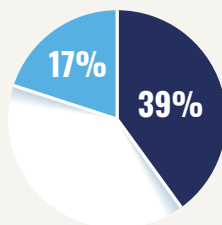
The section below draws on insights from existing literature, our secondary research at 27 universities, as well as 52 public and 77 private TVET colleges and interviews with representatives of the DHET, as well as other key experts.



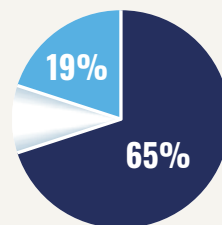
In 2020, South Africa ranked 59th out of 63 economies in the Institute for Management Development's *World Competitiveness Yearbook* – its lowest ranking since the inception of the yearbook. Its top weaknesses were listed as digital and technological skills, as well as higher education achievement.

Our analysis revealed that 17% of the public TVET colleges and 39% of the private ones do not offer any digital courses and training, while 19% of the public TVET colleges and 65% of the private ones do not offer NQF-level digital courses and programmes.

No digital courses or training



No NQF-level digital courses or programmes



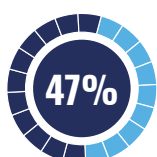
● Public
● Private



The number of students enrolled for the three-year national certificate vocational: information technology and computer science at public TVET colleges was 7,745 in 2019 and 8,256 in 2020. In 2019, only 1,074 registered for the examination (42% of the average proportion of students per year, as based on the 2019 figures). Of them, only 301 completed the degree, a completion rate of 32%, compared to all students that wrote the exam. In 2019, graduates in ICT courses accounted for only 3% of all graduates at public TVET colleges. This indicates a very low number of graduates in relation to occupations that are in high demand in South Africa.



The gender split was equal among the students enrolled as well as the graduates for national certificate vocational: information technology and computer science at public TVET colleges. However, at 28% the completion rate was lower for women, compared to 39% for men. In addition, men only made up 35% of all students at public TVET colleges in South Africa, which means they were overrepresented in the ICT course.



Around half (47%) of students enrolled for the national certificate vocational: information technology and computer science in 2020 were concentrated at ten TVET colleges, namely Ekurhuleni East, Ekurhuleni West, Elangeni, King Sabata Dalindyebo, Maluti, Mopani South East, South West Gauteng, Tshwane South and Vhembe. All other TVET colleges contribute less than 3% of the total number of enrolled students.

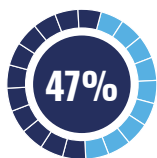


Universities offer digital programmes, sometimes up to doctorate level.

TVET colleges mostly offer only one dedicated programme in the digital field, namely information technology and computer science, where all basics are covered in one course on NQF levels 2 to 4. There are rarely digital courses for NQF levels 5 and up.



In recent years, some colleges have dropped digital courses (specifically IT and computer science). Colleges report difficulties with attracting and retaining lecturers who are knowledgeable and equipped to teach these subjects. In addition, the fact that students struggle academically and have above average failure rates in these courses resulted in some colleges cancelling the programme (key expert, DHET).



As research revealed that only 42% of the public TVET colleges and 45% of the private ones offer digital skills programmes and short courses, increasing short courses or skills programmes with a focus on basic but also advanced digital skills might increase the chances for employment (independent key expert). There is potential for online courses or self-taught digital skills, as certificates are considered less important compared to other industries because employers can test and assess digital skills during the recruitment or selection process (key experts from a recruiter and software company).

Some experts believe that if work-based learning is provided, high-level certificates are not required and even NQF level 4 will be better accepted and qualifying than an academic degree (independent key expert). Secondary research did not reveal any such programmes specific to digital skills, even though some universities and colleges offer work-integrated learning and work-based experience programmes. Experts have confirmed that 26 public TVET colleges currently offer the theoretical component of a dual-system apprenticeship scheme in collaboration with employers who recruit, select and appoint the students as part of the programme. These apprenticeships are however only for artisan work, and none exist for digital occupations. The goal is to expand the centre of specialization to include more occupations, including ones that require digital skills (independent key expert).

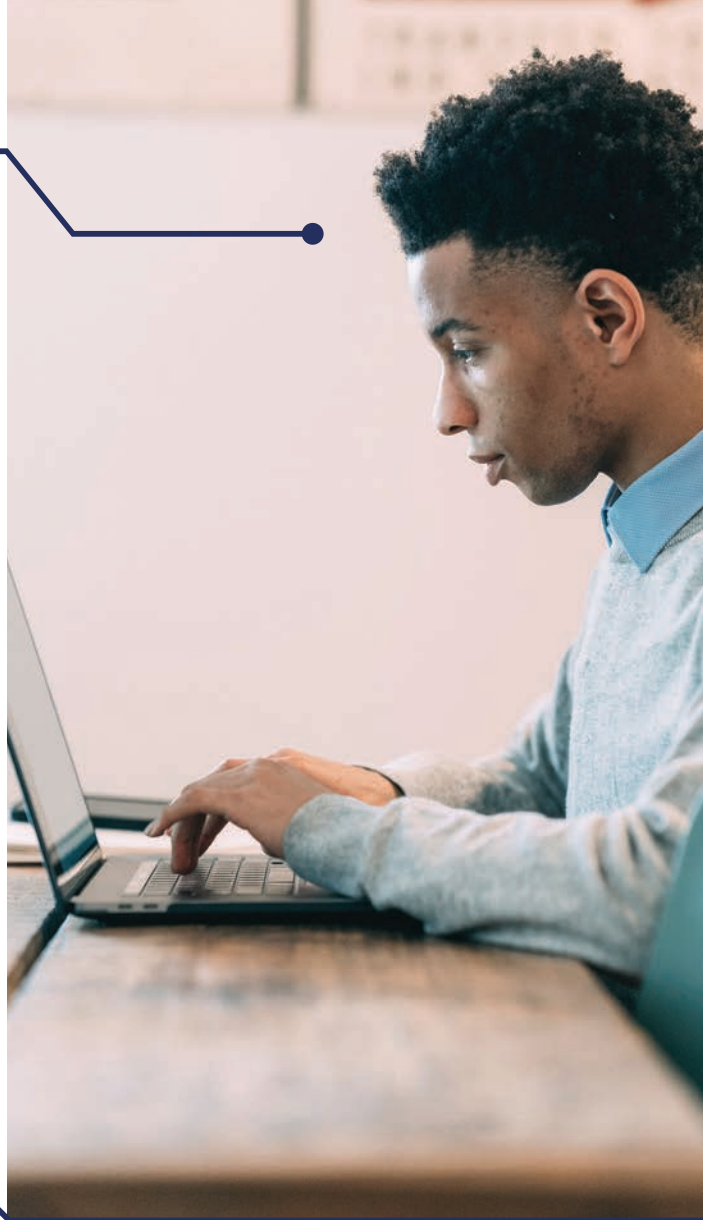


Besides the challenges with the availability of digital courses, pandemic-related lockdowns exposed a lack of readiness for providers and learners to move to online learning.

During the Covid-19 lockdowns, when HEIs had to start providing online teaching and learning, only 29% of African HEIs could transition quickly, compared to 85% of HEIs in Europe, 72% in the Americas and 60% in Asia and the Pacific regions. In South Africa, only 20% of TVET colleges could afford to provide online education. A survey conducted on more than 800 education providers in South Africa in March/April 2020 showed that only 9% of them were prepared for online or blended learning, while more than 54% had never conducted such training before and 80% had limited or no relevant experience. This was while many TVET colleges still did not even have an operating website and online learning platforms.

Material for this type of learning was being developed when the survey was conducted and providers had infrastructure challenges for the digitization of learning, which would affect training fees. Many education providers have suggested that they will have to increase fees with new intakes so that they could provide infrastructure such as laptops.

Along with the providers' challenges, students are generally unequipped to engage with online or blended training or multimodal teaching, learning and assessment, even if it becomes rapidly available through providers. At the time of the survey, only 31% of students had independent access to fixed-line and mobile internet and 42% primarily used the internet through a cell phone.



During these difficult times, education departments and providers responded to the lack of infrastructure by providing financing and equipment to students and staff. Some efforts were:

- 1.** ▶ The University of Cape Town announced that it would loan laptops to its South African undergraduate and postgraduate students who were funded through financial aid or who were eligible for financial aid.
- 2.** ▶ NSFAS published a new tender in September 2020 for more than 700,000 laptops to give to students for online learning.



There are huge discrepancies in the performance of public TVET colleges due to available resources, capacity, courses and programmes of work experience, graduate placement, stakeholder management and curriculum responsiveness. Secondary research showed that some colleges were better equipped than others in offering students study options and support, as well as preparing them for the workplace. This showed the potential TVET colleges had if the right people were onboarded and more focus was placed on building capacity. The pandemic exposed inequalities at and between education institutions. Some were ready to teach online and continue the academic term, while others faced severe constraints related to students' and staff members' lack of access to technology and poor socio-economic circumstances. The gaps and vulnerabilities of universities and other HEIs, especially in light of the pandemic, demonstrate that South Africa may not be prepared for the 4IR.

Progress in South Africa regarding skills supply and development for the digital economy

The DHET is contributing to the Presidency's integrated country strategy and plan to respond to the 4IR. In its strategic plan for 2020 to 2025, it aims to introduce compulsory digital skills training aligned to programme offerings at TVET colleges. The DHET also focused on entrepreneurship to help young people generate an income after graduating from HEIs. According to a DHET expert, the department is working on incorporating digital components and focusing more on digital entrepreneurship where there is potential. In addition, the DHET acknowledges the need to move to more advanced qualifications and offer more programmes on levels 5 and 6 at the public TVET colleges.

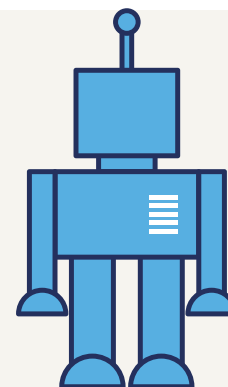


The NSF has been putting effort into implementing labour-related skills development programmes and capacity building in close collaboration with employers and with a focus on the digital sector. The NSF has also published a tender for worker education funding that includes ICT programmes in its planned implementation.

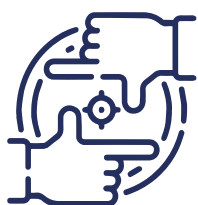


The NSF has acknowledged the need for digital courses and skills and the lack thereof in the workplace, largely focusing on more advanced digital occupations and skills. This contradicts secondary research findings that reveal much demand for entry-level and intermediate roles. It also points out the importance of working closely with industry and employers.

As a response to the need to have very specific occupational qualifications in ICT and integrate them into PSET institutions, the MICT SETA has developed 11 4IR future skills qualifications. The QCTO gazetted the qualifications on 12 and 20 August 2021. The newly developed qualifications include artificial intelligence, cloud computing, cyber security, data science, design thinking lead, design thinking practitioner, Internet of Things, robotic processing automation, quality engineering automation, systems development and e-waste. TVET colleges will have to implement these once they are fully approved. This will be an important and promising step, as they are focused on vocational skills development. However, as outlined above, many TVET colleges lack the necessary infrastructure in terms of qualified trainers and equipment to implement the programmes.

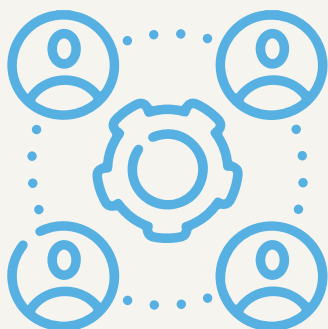


The QCTO is aware of the need to adjust to the 4IR and has taken steps towards this goal. With the aim of designing a curriculum that responds to local labour market needs or to particular requests from SETAs, employers or government to meet specific development goals, the QCTO has embarked on the reconstruction of all programmes offered at TVET colleges. In 2020, 29 NATED subjects were revised and updated by the DHET and approved by the QCTO. They also developed 21 skills programmes, of which 14 have been approved by the second QCTO council for implementation at CET colleges or any skills development provider. Out of these 14 programmes, only one is related to digital skills.



The QCTO has performed substantial work in converting the NATED qualifications into occupational qualifications that have significant relevance to industry. Engineering studies are being reconstructed in conjunction with relevant stakeholders like the DHET and the Engineering Council of South Africa (ECSA). Engagement with TVET colleges, both public and private, will be strengthened with a focus on sharing and marketing registered occupational qualifications. Quality assurance regimens that have been improved are being implemented and will continue to be enhanced.

The role of employers



Ensuring that South Africa's workforce will be ready for the 4IR will likely require a combination of effort from various stakeholders. Many experts believe that employers play an important role in aligning the courses with the skills required in the workplace and forcing the colleges to improve their digital skills offerings.

Good communication and partnerships are required between employers and HEIs to further support this cause. Ministerial targets were previously communicated to colleges, requesting that they track students, and graduate placement targets were set for colleges. Currently, however, there is limited data on the absorption of NATED graduates into employment. According to a DHET expert, some colleges have large waiting lists for courses from employers that have yet to be executed.

Labour market policy review

Relevance of labour market policy review to this study

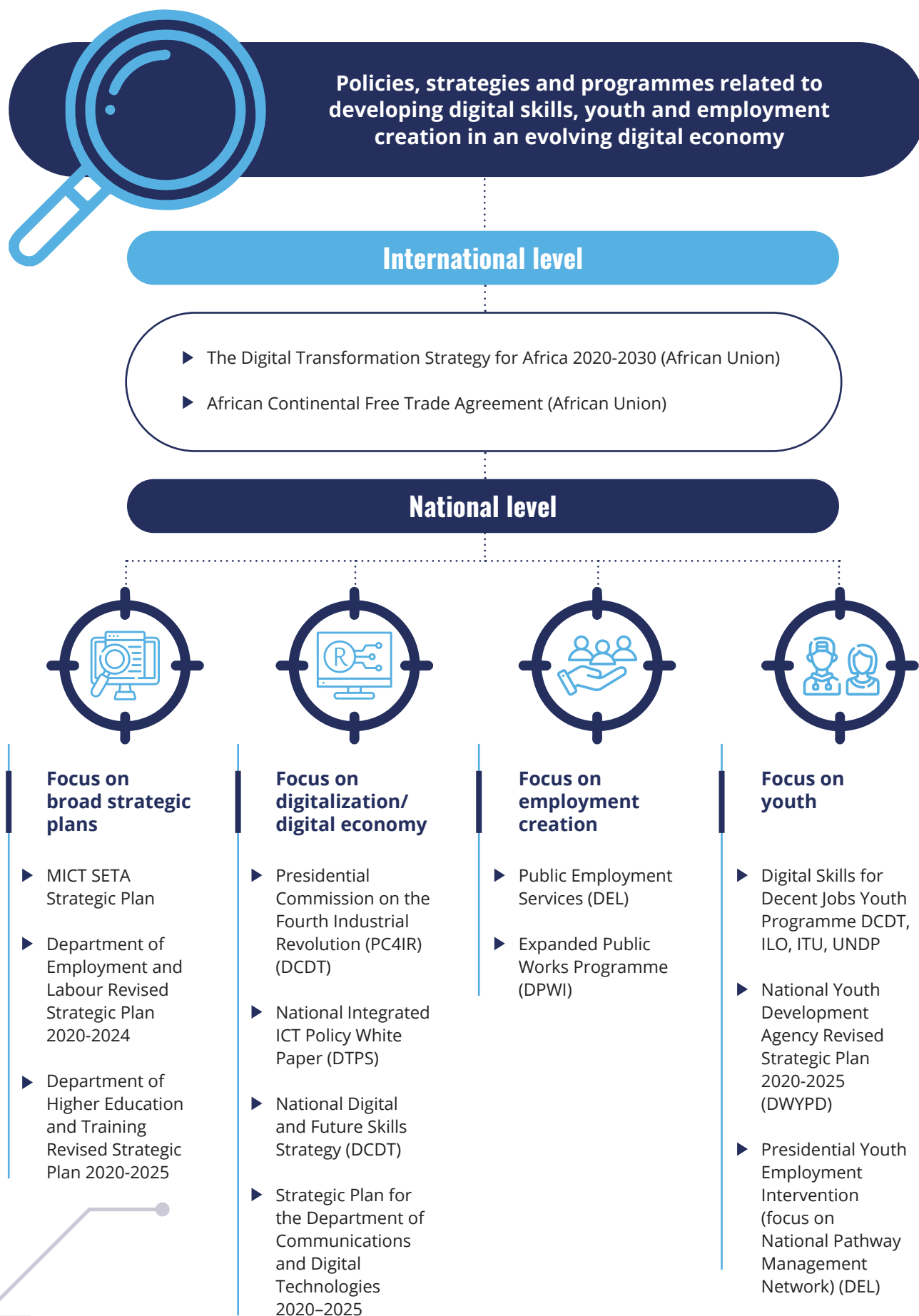
The labour market policy review as part of this project is essential to identify relevant policy and regulatory imperatives in relation to the digital economy. This informs the basis of understanding the digital economy, the skills mismatch and essentially South Africa's readiness for the 4IR. The evaluation of the policy and regulatory environment is helpful to understand to what extent South Africa has established a suitable ecosystem to equip young people with the relevant skills for the digital economy and facilitate economic, entrepreneurial and employment growth in this space.

The researchers believe this depends on four key requirements:

1. A strong foundation, which comprises relevant policies in relation to the digital economy, the digital infrastructure and the availability and usage of digital platforms in the country.
2. A broad skill set that relies on the specific development of digital skills and includes other relevant core skills for life and work in the 21st century.
3. A focus on the facilitation of entrepreneurial activities and employment opportunities, including the country's ability to sustain and grow jobs.
4. Bridging the digital divide and focus on young people, especially YNEET, and other marginalized demographic groups and regions in South Africa to work towards inclusion and justice.

As part of this project, the researchers reviewed relevant policies, strategies and programmes, and evaluated their key strengths and improvement points. The next section focuses on the development of core skills for the 21st century, specifically digital skills and their ability to grow youth employment. In addition, the researchers looked at their overall contribution to the digital economy and digital entrepreneurship in line with the key pillars outlined above – these insights are included in the appendices.

Overview of labour market policies, strategies and programmes



Overall stance on existing policies, strategies and programmes

This report outlines policies, strategies and programmes for the international as well as the national level. It discusses the extent to which these policies prioritize skills development, focus on youth and create entrepreneurial opportunities.

International level

On an international level, Africa has a clear stance on its position in the digital economy, which is set out in the African Union's Digital Transformation Strategy for Africa 2020-2030 and the African Continental Free Trade Agreement. The Digital Transformation Strategy sets the relevant framework in relation to the digital economy, as it builds on existing initiatives and frameworks. The strategy provides AU members with guidelines regarding developing digital infrastructure, the availability and use of digital platforms, employment creation and access to jobs, and focuses on vulnerable groups and inclusivity.

In relation to digital skills development, the strategy has specific targets with time frames to promote skills development. It firstly seeks to review education curricula in accordance with evolving needs and trends. Secondly, it aims to provide access to digital training and promote the development of train-the-trainer programmes for teachers. The strategy also highlights the importance of encouraging diversity and inclusion in STEM education, and the overall skill improvement of all citizens. The lack of consideration for challenges – which includes access to opportunities – students and teachers face during the skills development process however needs to be addressed. A further challenge is that the strategy does not sufficiently address the digital divide, which limits the inclusive development of current efforts relating to digital skills.

Regarding the focus this strategy gives to youth, it highlights the need to empower and transform young people into a digitally adaptive, skilled and innovative workforce. The focus is forward-looking, as it considers young people's ability to comprehend, adapt to and move with global trends, charting their own digital pathways towards inclusive growth and development. A challenge is that the strategy does not have a specific number of young people it seeks to reach, or a time frame to reach this objective. It also does not address how it seeks to deal with the underlying structural and systemic challenges related to poverty and instability that young people in Africa are facing.



The strategy prioritizes support for entrepreneurs and seeks to improve digital innovation and overall entrepreneurship. It facilitates access to finance and funding mechanisms to promote digital enterprises, including an innovation fund for entrepreneurs. The aim is to create a conducive environment to empower, encourage innovation and improve advisory services to stimulate digital entrepreneurship for digital enterprises. However, it does not specify the exact amount that will be granted to the innovation fund. A further challenge is that incentives, in the form of awards, will not promote and encourage entrepreneurial activities sufficiently if they are not combined with other interventions.

National level

On a national level, this review divides the policies, strategies and programmes into their main focus areas. The discussion will therefore be structured around strategies with a broad focus, those with a focus on digitalization or the digital economy, strategies that focus on youth and those with a focus on employment creation.



This section will discuss strategies with a **broad focus**, such as the MICT SETA Strategic Plan, the Department of Employment and Labour Revised Strategic Plan 2020-2024 and the Department of Higher Education and Training Revised Strategic Plan 2020-2025.

In relation to **digital skills development**, these plans have specific approaches, targets and timelines to develop skills. The DHET and the MICT SETA – also supported by the DEL – aim to use partnerships to gather and analyse data about the demand for specific skills in the workplace to adjust skills training. This data will assist them to address the need to increase access to occupationally directed programmes through partnerships with various stakeholders. The MICT SETA also has a programme that supports career development services in the MICT sector and seeks to guide and provide awareness with triangulated labour market information. The accreditation processes of courses the MICT SETA creates however raise concerns about the training not being up to date with current trends and demands for specific skills. A further need the DHET has to address is the Public Services Sector for Education and Training's limited capacity to develop digital skills. There is a need for these strategic plans, especially the MICT SETA's, to identify key drivers that will increase student enrolment for courses that offer advanced or digital skills, as current awareness campaigns do not yet have the intended impact. A final challenge is the concern about the money spent on workplace training and skills development.



Regarding the **focus on youth**, the strategic plans all have clear objectives and timelines set out how to support young people by combining skills development with vocational and career guidance. However, as the DEL and DHET play an important role in lowering youth unemployment, there is a need to develop a specific and urgent response to the fact that the reduction in youth unemployment is slower than forecasted in the National Development Plan.



With regards to **entrepreneurial activities**, the DHET is incorporating a focus on and support for entrepreneurial activities at a tertiary level already, with student-focused entrepreneurship programmes. The DHET also incorporates practical experience in strengthening entrepreneurship through using technical or vocational programmes to prepare students for entrepreneurship or self-employment. The MICT SETA Strategic Plan also has specific targets and timelines to support 4,300 SMEs, micro-businesses, cooperatives and organizations with entrepreneurial activities. It offers training for entrepreneurial skills and support to start a business. An option to develop and support even more entrepreneurs is to increase entrepreneurship development activities at universities in line with the DHET's capacity development plan.



This section will discuss **strategies with a focus on digitalization and the digital economy**, such as the Presidential Commission on the Fourth Industrial Revolution (PC4IR) by the DCDT, the National Integrated ICT Policy White Paper by the DTIS, the National Digital and Future Skills Strategy by the DCDT and the Strategic Plan for the Department of Communications and Digital Technologies 2020-2025.

In relation to **digital skills development**, these strategic plans are focused on digital skills development for the 4IR, rooted in the understanding that current work skills are decreasing in importance while the importance of digital skills is increasing. These strategic plans have outlined interventions on how they approach digital skills development, which include leapfrogging young people into productive work and reskilling current workers for job retention and ongoing productive work. The plans however need to specify their approach on how they intend to incorporate digital skills at primary, secondary and tertiary education levels – such as STEM subjects, programming, robotics, data analytics, IoT and machine learning or AI.

There is a particular need for a specific approach on how to improve digital skills in schools, including measurable time frames and specific targets for digital skills development. There is also a need for a greater focus on entry-level skills, with specific incentives that will encourage people to participate in learning and development opportunities. The development of infrastructure must also be strengthened and enhanced, and data must be more affordable to facilitate self-paced online learning. The improvement or enhancement of digital skills awareness should be regarded as the first step in digital skills development.



Regarding their **focus on youth**, all these plans share the belief that the youth play an important part in the digital economy. The plans incentivize companies, both local and international, who invest in or create employment for the youth. Compared to other policies, the National and Future Skills Strategy's guided, specific and achievable targets that are set on the number of young people it seeks to focus on over a period is a key strength. While the policies or strategies do focus on youth, there is a need for specific targets and timelines on how to support young people to participate in the digital economy, for example in the PC4IR. These strategic plans, especially the PC4IR, will benefit from scaling up their incentives and support for companies that upskill young people to increase the absorption rate of young people into the job market. Another option is for the policies and strategies to stipulate specific targets for the proportion of young people in the workforce, in agreement with companies.



In relation to **entrepreneurial activities**, these strategic plans focus on entrepreneurship and seek to support the rise of cooperatives and small enterprises. Their aim is to create opportunities for people to make a living for themselves and they seek to establish seed funding for digital tech startups located at tech hubs and digital incubators as a move to boost entrepreneurship. The plans also have a roadmap on how they will promote entrepreneurship and implement innovation for SMEs and micro-businesses to take advantage of the 4IR. However, the plans need to ensure that they secure more funding for their entrepreneurship support activities. There is also a need for more incentives that will or can attract more people to participate in entrepreneurial activities.



This section will discuss strategies with a **focus on employment creation**, such as the Public Employment Services by the DEL and the Expanded Public Works Programme by the DPWI.

With regards to **digital skills development**, these programmes have no specific strengths. They can however benefit from supporting the development of digital skills, as this will aid individuals in finding and applying for employment opportunities. One way of achieving this is to include digital skills training in the temporary employment that is offered as part of the programmes.

These programmes **focus on youth** – they have specific strategies and targets on how many young people they want to reach and support, for example the EPWP aims to assist 55% of the youth. Considering the high unemployment rate among young people, these programmes will however benefit from a stronger focus on creating work opportunities for youth. One possible way to do this is to collaborate with private entities and find ways to encourage them to prioritize young people. Challenges that were identified are limited funding to continue youth programmes and that projects implemented over shorter periods have limited impact.





Regarding **entrepreneurial activities**, these programmes have no specific strengths. They can however benefit from expanding their focus to entrepreneurial activities, especially considering stagnating and declining employment figures.



This section will discuss strategies with a **focus on youth**, such as the Digital Skills for Decent Jobs Youth Programme by the DCDT, ILO, ITU and UNDP, the National Youth Development Agency Revised Strategic Plan 2020-2025 by the DWYPD and the Presidential Youth Employment Intervention (focus on National Pathway Management Network) by the DEL.

All these programmes support and prioritize **digital skills development** and have strategies and targets regarding digital skills development. They also seek to create opportunities for young people to undertake shorter courses to acquire specific skills that employers require. Funding for the development of digital skills must however be increased to cater to as many young people as possible. Arguably, these programmes will benefit from more partnerships with institutions that have the capacity to develop digital skills and assist in financing and capacitating them. A further challenge is that short courses have inherent challenges, such as being limited in the content they can include, which could create a gap in relation to creating or connecting individuals to employment opportunities.



Regarding the **focus on youth**, these programmes and plans exist to support young people with skills development and employment creation, which is a key strength. The programmes will benefit from not viewing the youth as a homogeneous group but rather adjusting their approach to the specific needs of different demographic groups among young people.

Concerning **entrepreneurial activities**, these programmes have a strategic approach as well as objectives to support entrepreneurs. For example, the National Youth Development Agency (NYDA) offers support to connect young entrepreneurs to the digital economy, through connectivity and affordable data. They also focus on opportunity areas that are ripe for innovation, such as the food economy, the green economy and the waste economy. These programmes aim at removing regulatory obstacles for SMEs and micro-businesses, which will help entrepreneurs to be more efficient and have lower regulatory and bureaucratic expenses. They also want to create public spaces that allow businesses to thrive in townships, villages and urban centres. This is an important objective but has been difficult to implement. These programmes can benefit from sourcing more funding needed to promote entrepreneurship. Furthermore, especially the Presidential Youth Employment Intervention can benefit from making the application for funding for entrepreneurship less demanding to attract more aspiring entrepreneurs.



Part 3

Findings and analysis



Young people and YNEET – background information

Income and financial resources

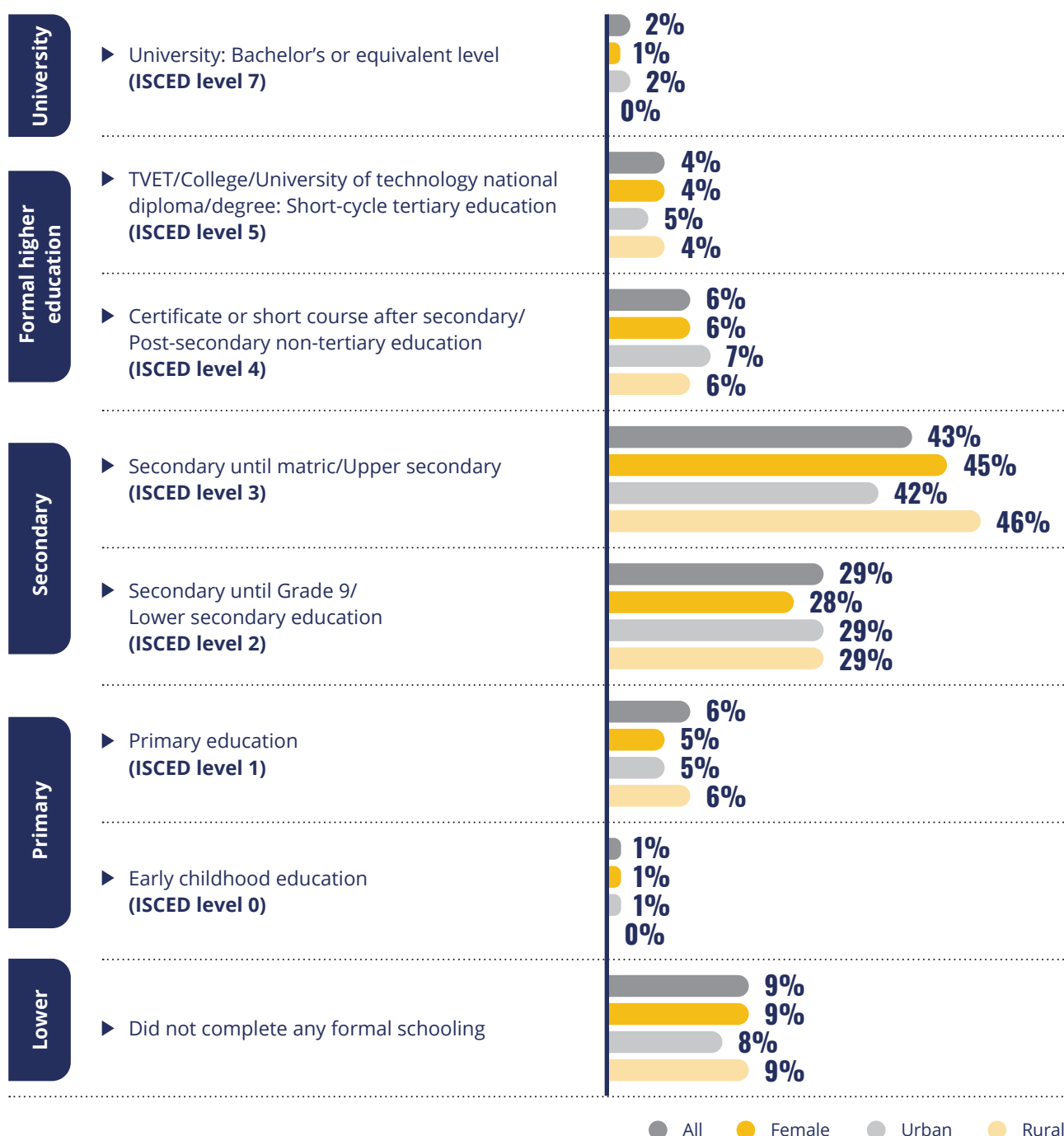
- ▶ **Around half of all survey participants struggled to make a living** – 14% of all participants did not have enough money to buy the food they needed, 34% said they are just getting by and 13% had enough money for essentials. Young people classified as YNEET were facing more challenges to make a living compared to those engaging in income-generating activities. Of all YNEET, 17% did not have enough money to buy the food they needed, 45% were struggling to make a living, 34% said they were just getting by and 13% had enough money for essentials. Youth engaging in income-generating activities were most likely to have enough money for all essentials, 20% had enough money for essentials, 42% were getting by, 29% struggled to make a living and 9% did not even have enough money to buy food.
- ▶ **People in rural areas were facing more challenges around making a living compared to urban areas** – 58% compared to 50%. Young people in urban areas were slightly more likely to lack money for food – 16% compared to 11% in rural areas. In urban areas, 17% of participants had enough money for essentials, compared to only 7% in rural areas.
- ▶ **Participants in all age groups experienced financial difficulties.** – Young people between 25 and 30 years had slightly more financial resources, with 51% reporting getting by or having enough resources compared to 47% of all participants. Young people in rural areas were facing more financial challenges, as 59% did not have the financial resources they needed in their daily lives, compared to 53% of all participants. This was likely because the younger participants were more likely to live with and be supported by their parents, whereas older young people were expected to contribute to the household to a larger extent.



Education and prior training

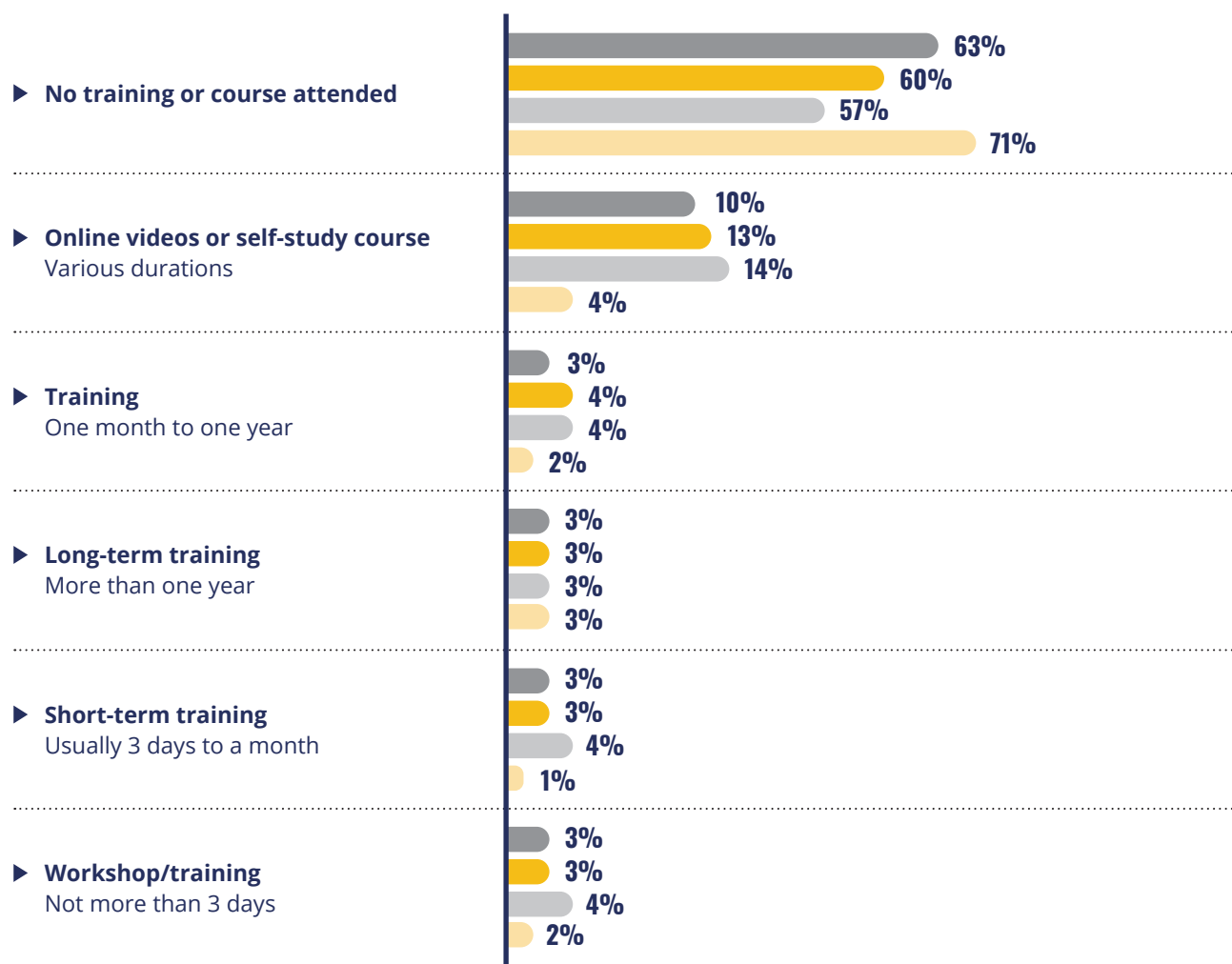
The findings show that most young people have some secondary education but still face huge barriers that keep them from completing and furthering their education. Quite a high number, 85%, had at least some secondary education, while 43% had completed matric, 12% had some post-secondary education, but only 2% had a university degree. Almost 10% stated that they did not receive any formal schooling, 6% stopped at primary education and 29% did not complete secondary education. In addition to formal education, most have done no additional courses or training, although around 10% had some training and 10% had done some online self-study. Urban youth had better access to online options, while youth in rural areas were less likely to attend training or a course.

What is your highest level of education?



Graph 7: Highest level of education and type of training or courses attended

What type of training or course have you attended in the past?



Graph 7: Highest level of education and type of training or courses attended

● All ● Female ● Urban ● Rural



Current activities young people are engaging in

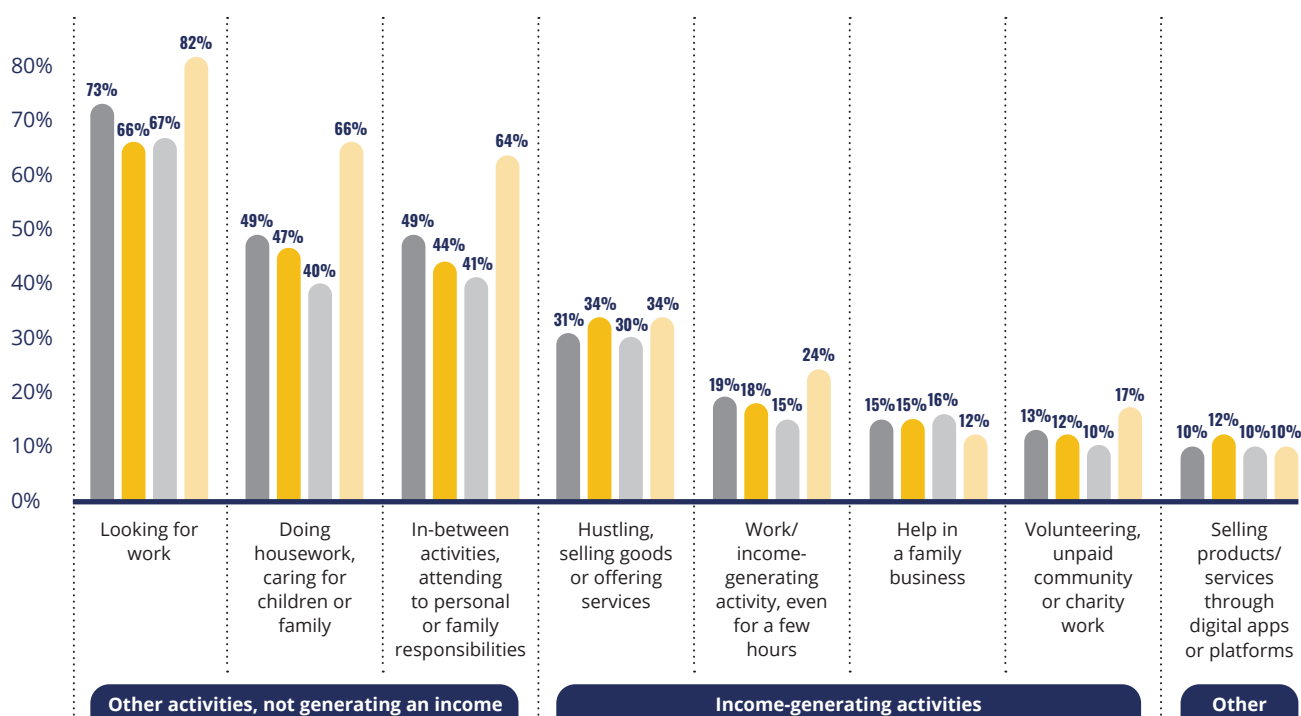
The survey results show that young people are active in their daily lives, even if they do not have full-time work or education. They are either trying to generate an income by themselves, often in an informal manner or on an hourly basis, or they engage in activities that can bring them closer to the labour market, such as looking for work or growing their skill set via volunteer work.

► For the purpose of this study, participants were segmented into three categories:

1. **Young people who generated some income through work.** Examples are people selling goods or offering services offline or through digital apps and platforms, working part-time or just a few hours or helping in a family business. This group is not classified as YNEET.
2. **Young people who engaged in work-related activities but without generating an income.** Examples are people actively looking for work, people with personal responsibilities, such as housework or caring for children or family members, as well as people doing volunteer or charity work. This group is not classified as YNEET.
3. **Young people who did not engage in any work-related activities during the day.**

This suggested that, beyond the NEET group, young people are trying hard to change and improve their situation. Most participants were looking for work and 39% engaged in at least one activity that possibly generated an income. Most frequently, they are hustling or selling goods or offering services, as 31% reported; 19% reported doing some work or income-generating activities, even if just for a few hours; 15% helped in a family business and 10% were selling products or services through digital platforms and apps; 79% were engaging in at least one other activity, not for an income. Most young people (73%) were actively looking for work.

Around half (49%) were doing housework, caring for children or family members, or were in-between activities or attending to personal or family responsibilities, while 13% said they were volunteering by doing unpaid community or charity work.

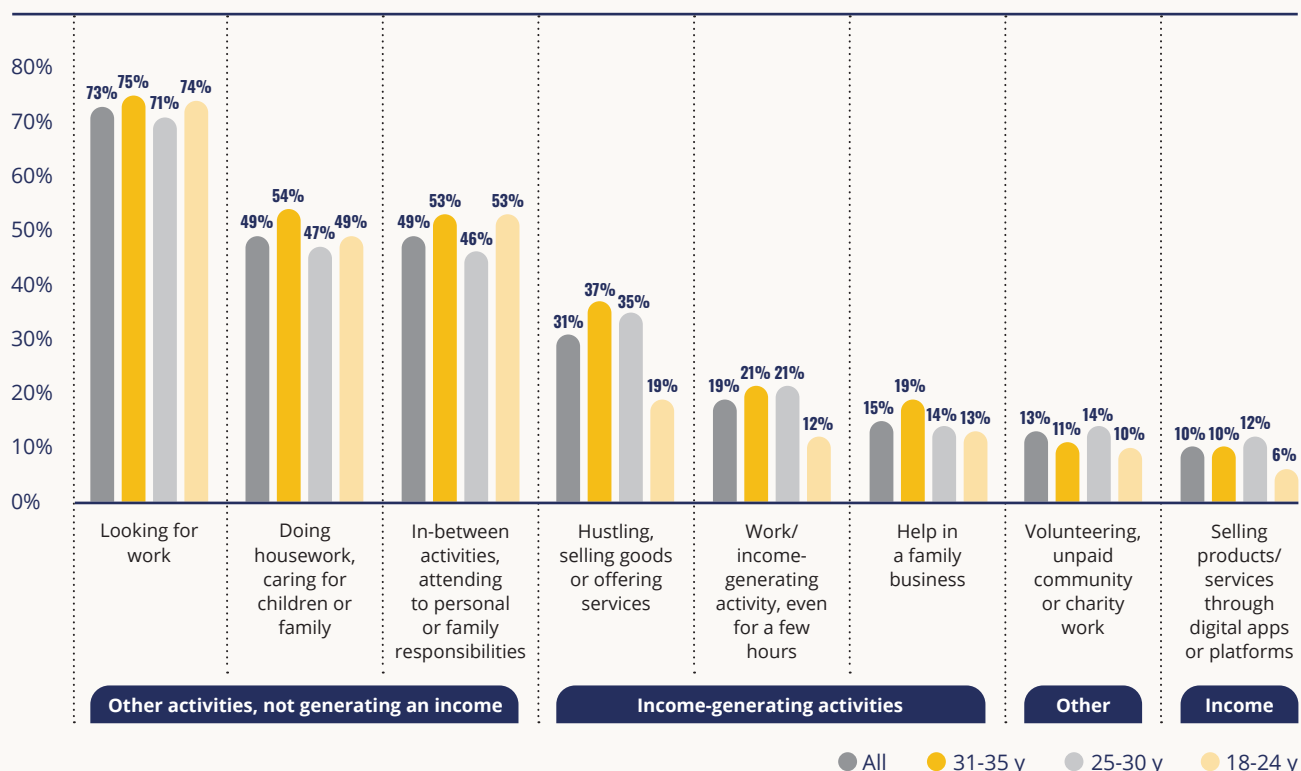


Graph 8: Proportion of young people who engage in specific income-generating or other activities, split by demographic group

● All ● Female ● Urban ● Rural

Youth in rural areas are more likely to engage in these work-related activities – 41% of participants in rural areas engaged in at least one other activity not for an income, compared to 37% of participants in urban areas. They are more likely to work or get an income for a few hours, as reported by 24% of young people in rural areas compared to 15% in urban areas. However, participants in urban areas are slightly more likely to help in a family business, reported by 16% compared to 12% of their rural counterparts.

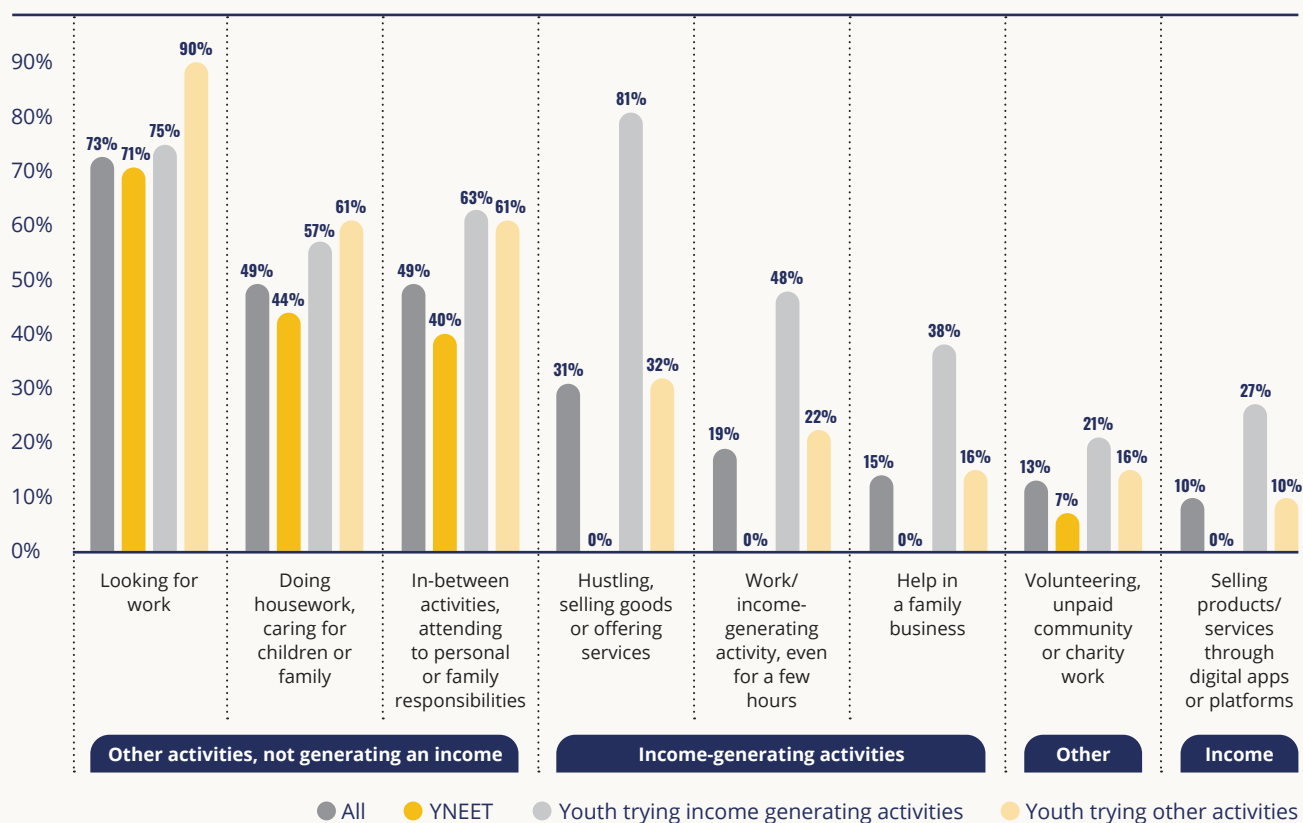
In rural areas, 89% engage in at least one other activity not for an income, compared to 75% of their urban counterparts. A high percentage (82%) of participants in rural areas were looking for work, compared to 67% in urban areas. Youth in rural areas are more likely to be involved in household and caregiving activities or general family responsibilities – 66% compared to 40% in urban areas. Rural youth are also more likely to volunteer, as reported by 17% of rural and 10% of urban participants.



Graph 9: Proportion of young people who engage in specific income-generating or other activities, split by age group



The younger the participants, the less likely they are to hustle, work for a few hours or engage in other income-generating activities. Either older individuals have always been more likely to try more activities or this indicates that individuals get more active the older they become without having stable employment or education. Older youth, between 31 and 35 years, are more likely to be involved in income-generating or other activities, compared to young people aged 30 years or younger – 44% reported that they engage in at least one other income-generating activity and 83% reported engaging in at least one other activity, not necessarily income-generating. Only 56% could be described as YNEET. In the group aged 25 to 30 years, 59% were YNEET, while 41% were involved in income-generating activities and 78% in other activities. In this survey, the youngest age group was most likely to be YNEET, namely three quarters of youth aged 18 to 24 years. Of this age group, 79% tried to engage in some activities to get closer to work opportunities but only 27% engaged in income-generating activities.



Graph 10: Proportion of young people who engage in specific income-generating or other activities, split by closeness to the labour market

By definition, YNEET are not engaging in income-generating activities. They are just a little bit less likely to look for work compared to other young people. **However, the results show that they are also less likely to engage in other activities that will not result in an income, which indicates that they feel more detached from the labour market or less in control of changing their situation.** Examples of such activities are housework, caring for children or their family, reported by 44% of YNEET compared to 49% of all participants, or attending to personal or family responsibilities in between activities, reported by 40% of YNEET compared to 49% of all participants. Only 7% of YNEET reported that they were volunteering, compared to 13% of all participants.

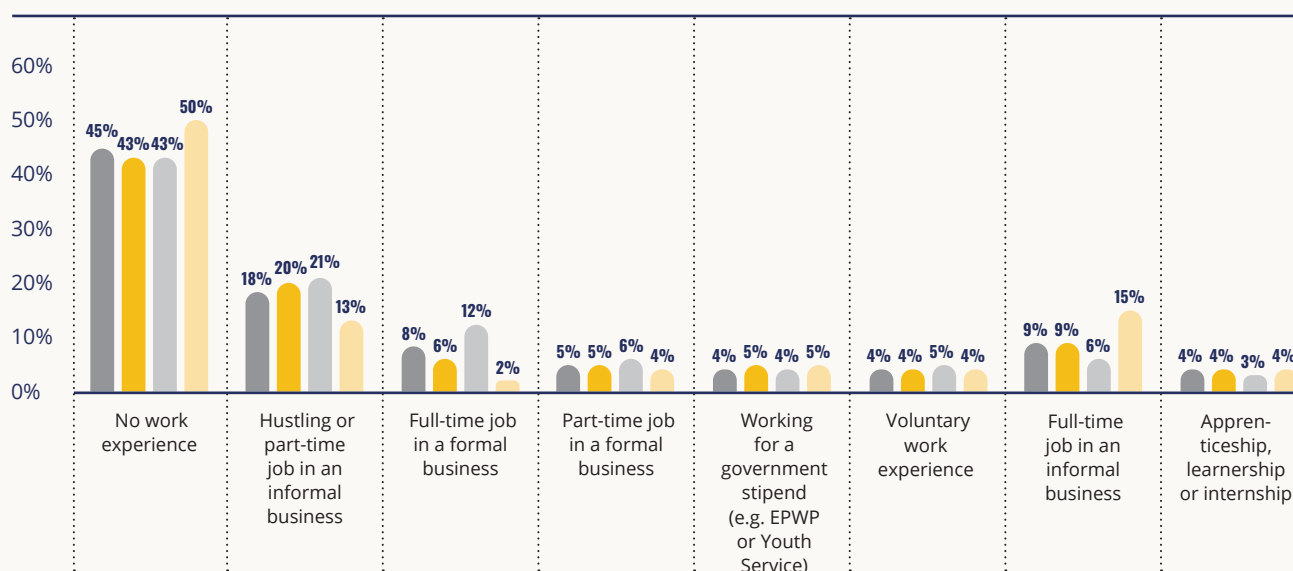
The findings also show that the informal sector is one space where young people try to make a living if they are not connected to the formal labour market. Young people also actively take responsibility for their family and in their social environment. Of all young people who were trying to make an income, the most popular way (81%) is to hustle, sell goods or offer services, followed by working or generating an income (48%), helping in a family business (38%) and using digital apps or platforms to sell their products or services (27%). For young people engaging in other activities, 90% are looking for work, 61% are doing housework, caring for children or the family or are attending to personal and family responsibilities, while 21% are volunteering.

Prior experience and future career plans

► Work experience

Just over half of all participants in the survey had some work experience and the findings show that young people in precarious employment, education or training find more opportunities in the informal sector compared to the formal sector. Nearly half (45%) of the participants said they did not have any work experience. Of all young people who had some work experience, the median duration of their previous work was 20 months, and the average figure was 24.3 months. Of all participants who listed some work experience, 50% had between 10 months and three years. In relation to their specific work experience, 18% of participants were most likely to have hustled or worked part-time in a job or informal business.

The young people's work experience shows that the informal sector is more accessible compared to the formal economy and 9% had worked full-time in an informal business. Less than 15% of participants had experience working in a formal business (9% full-time and 4% part-time). Specific employment opportunities on a contract basis, often for a stipend, such as the EPWP, continued to play an important role for young people and 4% had prior experience working in these programmes. In addition, 4% reported having done an apprenticeship, learnership or internship.



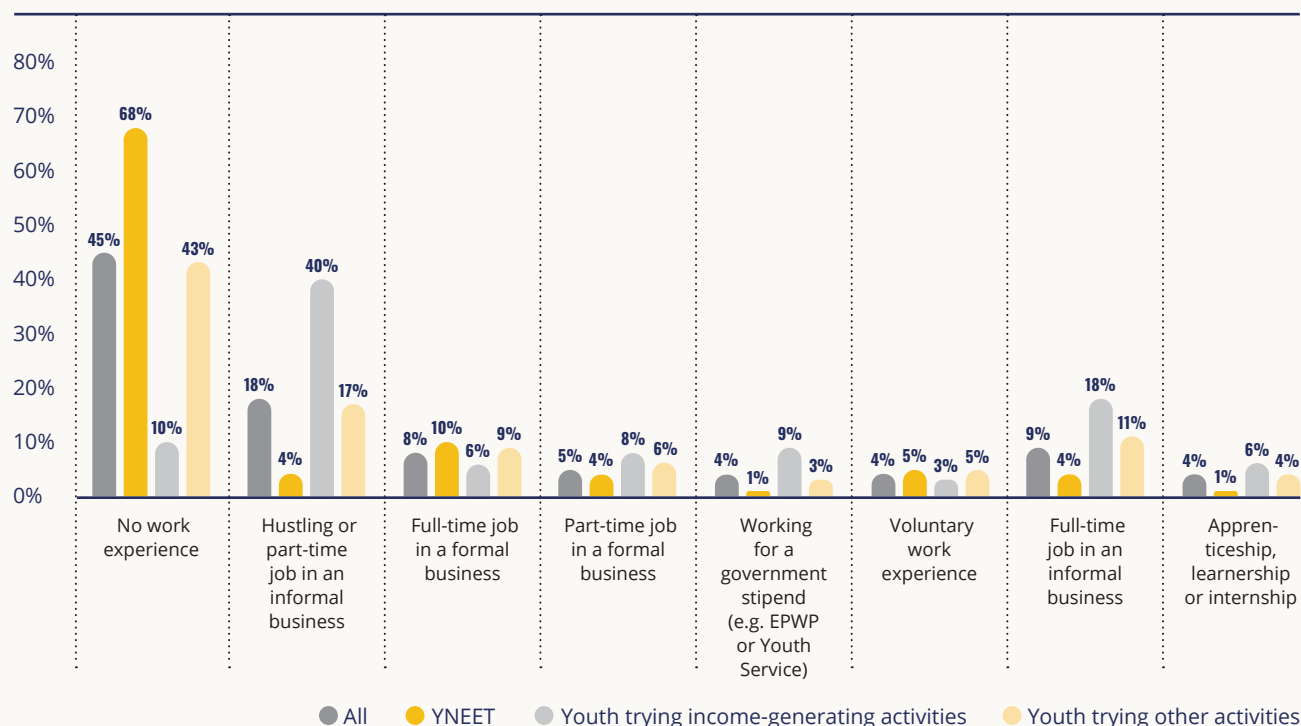
Graph 11: Different types of work experience of female, urban and rural participants

● All ● Female ● Urban ● Rural



Young people from rural areas are less likely to have work experience or access formal employment

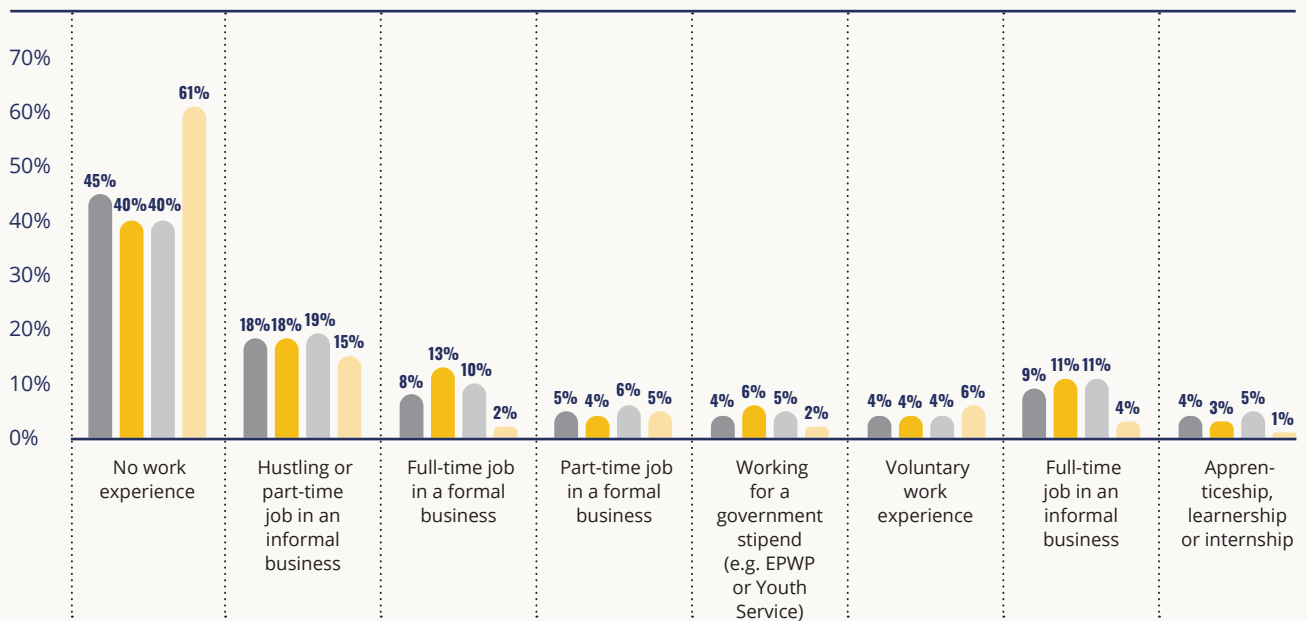
– 50% of young people from rural areas reported not having any work experience, compared to 45% of all participants. Participants from urban areas were more likely to have accessed formal employment (12% full-time and 6% part-time), compared to 2% and 4% of rural participants. Participants in urban areas were most likely to hustle or work part-time in an informal business, as reported by 21%. Participants in rural areas were most likely to have worked full-time in an informal business, as reported by 15%, or were hustling or working part-time in informal businesses, as reported by 13%. Women were slightly more likely to have work experience, as only 43% reported having none, compared to 45% of all participants. They were also slightly more likely to have hustled or worked part-time in an informal business and slightly less likely to have worked full-time in a formal business.



Graph 12: Different types of work experience of all participants, YNEET, youth engaging in income-generating activities and youth engaging in other activities



Young people who are classified as YNEET are less likely to have work experience, indicating how detached they are from the labour market, even in comparison to their peers who also have no full-time work, education or training. Almost 70% of YNEET had no work experience, compared to 45% of all participants. Of those who had work experience, they were most likely to have worked in a formal business, 10% reported having had a full-time job and 4% a part-time job. Youth who were trying to generate an income were most likely to have some work experience, as only 10% of them reported having none, mainly in the informal sector. About 40% reported that they had hustled or worked part-time for an informal business, while 18% worked full-time in an informal business. Youth who were involved in other activities were just a little bit less likely to have work experience compared to all participants (43% and 45% respectively).



Graph 13: Different types of work experience of young people, according to age

● All ● 31-35 y ● 25-30 y ● 18-24 y

The youngest participants were least likely to have work experience and if they did, it was mainly in the informal economy. About 60% of young people between 18 and 24 had no work experience at all, compared to 40% of participants who were 25 years or older. Only 6% had had a full-time job, with only a third of them in a formal business. They were more likely to have engaged in voluntary work, as reported by 6%, compared to 4% of all participants.





► Entrepreneurial experience

Young people in the survey were less likely to have entrepreneurial compared to work experience. Only one in three participants had entrepreneurial experience, mainly in the informal sector.

The median duration of previous work of participants who listed some experience was 19 months and 50% had between one and three years of entrepreneurial experience. Only 4% had tried to start a formal business, 28% of all participants had tried to hustle or start an informal business, and 7% were selling products or providing services, with very few of them using online channels.



YNEET were less likely to have entrepreneurial experience, compared to all participants. Only 10% of YNEET had some entrepreneurial experience, largely trying to hustle or start an informal business. Of all young people who were trying to generate an income at the time of the survey, four in five had some entrepreneurial experience – 60% were trying to hustle or start an informal business, 20% were selling products or providing services using social media, the internet, apps or digital platforms.



The proportion of female participants who had attempted to start an informal business or sold products and services online was 4% higher than all participants. Women were however less likely to have attempted to start a formal business. The older the participants were, the more likely they were to have some entrepreneurial experience – 72% of participants aged 18 to 24 years had no entrepreneurial experiences, compared to 60% of those between 25 and 30 years and 59% of those older than 31.

%



► Future plans to generate an income

Young people are very interested in entrepreneurship and consider it as their first option when planning how to make money. This indicates the important role entrepreneurship plays in relation to their career plans, but it also highlights how their current focus on finding a job as the main activity they are engaging in is misaligned to their ambitions and likely more a reflection of their perceived opportunities.

Few young people seek to make money in the gig economy, through casual or occasional or domestic work, highlighting that these options are rather a necessity. Young people were more interested in becoming a business owner compared to working for an employer, which was only the first option for 32%, who said they hoped to make money in a paid job. A third said they wanted to be self-employed, 21% wanted to become an entrepreneur in the informal economy and 4% hoped to hustle or work in the gig economy.

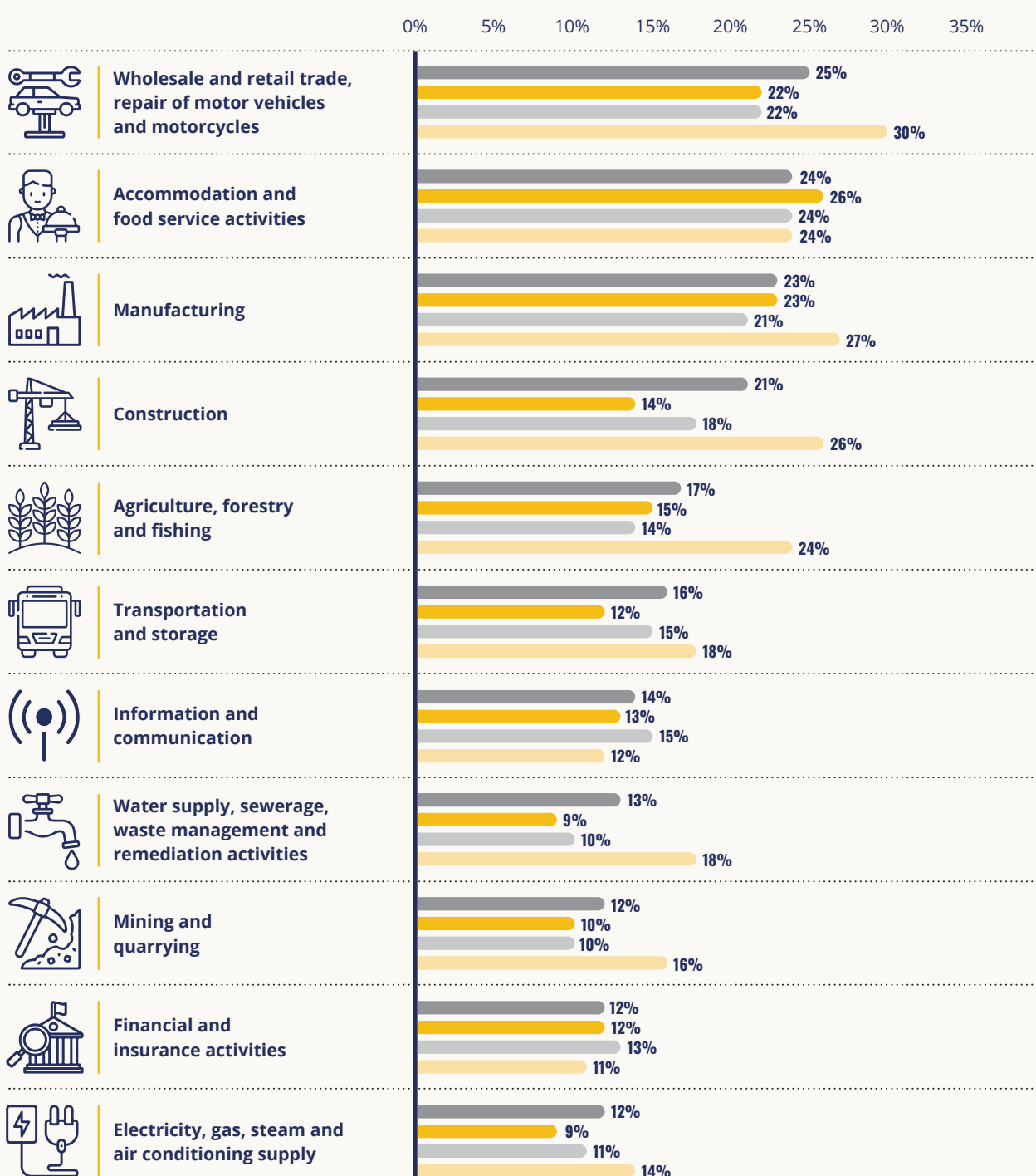


YNEET however still look towards finding a paid job for an employer, as mentioned by 39%, compared to 32% of all participants. Only 43% of YNEET were planning to be self-employed, 28% in the formal and 15% in the informal economy. YNEET were also more likely to consider casual, occasional or domestic work, as mentioned by 8%, compared to 6% of all participants.

Female and male participants have the same focus in relation to their plans on how to make money in the future. Young people in urban areas are more likely to prefer a paid job for an employer. Older participants were more likely to plan on becoming self-employed in the formal as well as the informal economy, whereas young participants had a strong preference for finding a paid job for an employer. About 60% of participants older than 30 years and 56% of those between 25 and 30 years were planning to work for themselves. Young people in urban areas were more likely to prefer a paid job for an employer, which was listed as their main option by 35%, compared to 27% of their urban counterparts. Young people in rural areas were more likely to turn to the informal sector to make money, as reported by 25% of rural participants, compared to 19% of urban ones.



In relation to the industry young people want to work in, wholesale, retail, accommodation and food service activities are the most popular. Wholesale and retail, agricultural, manufacturing and construction are more important industries for young people in rural areas. A quarter of participants said they would like to work in wholesale, retail trade or repair services, 24% in accommodation and food services and 23% in manufacturing. Around one in five wanted to work in construction and one in seven in agriculture, forestry and fishing, as well as transportation. Around one in seven were interested in the information and communication sector, which was slightly more popular among young people in urban areas. Around one in eight looked to work in mining, financial and insurance or water supply, sewerage, waste management activities or electricity, gas, steam and air conditioning supply. Female participants were particularly interested in accommodation and food service activities, as mentioned by 26%. Compared to their male counterparts, they were equally interested in manufacturing and agriculture but showed less interest in construction, transportation or water supply, sewerage, waste management activities or electricity, gas, steam and air conditioning supply.



Graph 14: Proportion of female, urban and rural participants according to industry

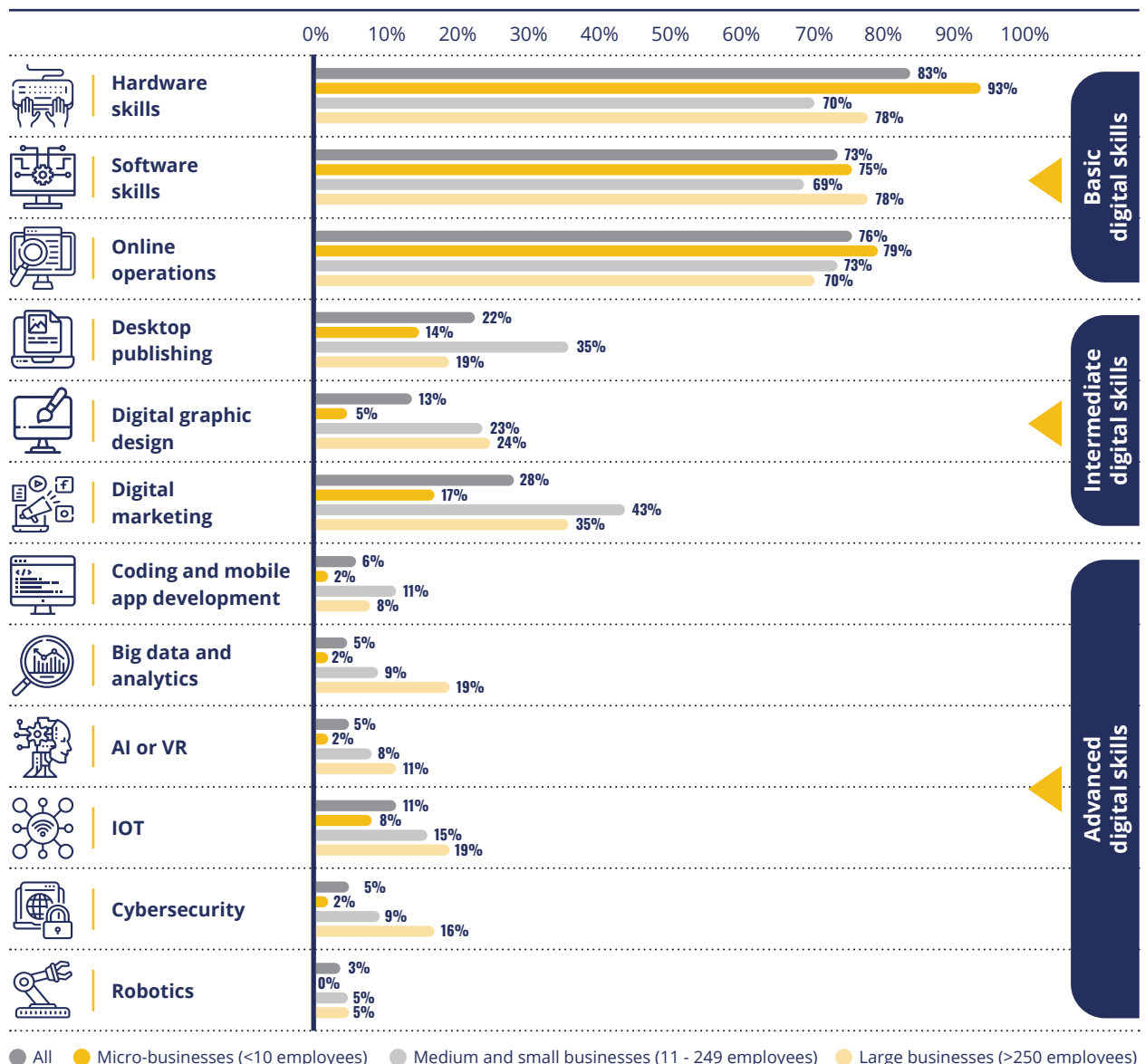
● All ● Female ● Urban ● Rural

Skills demand in South Africa's digital economy

Status quo – businesses

► Skill set of employees

The majority of businesses included in this study reported that most of their employees have basic digital skills; only one in four reported that their employees have intermediate digital skills and only one in 10 that they have advanced digital skills. The skill set of employees depends on the size of the business. Whereas most employees of businesses of all sizes have basic digital skills, some employees of larger businesses and SMEs have intermediate digital skills but only a few have advanced digital skills. Micro-businesses were most likely to report that most of their employees have basic digital skills. SMEs were most likely to report that most of their employees have intermediate digital skills, while employees of large businesses were most likely to have advanced digital skills.

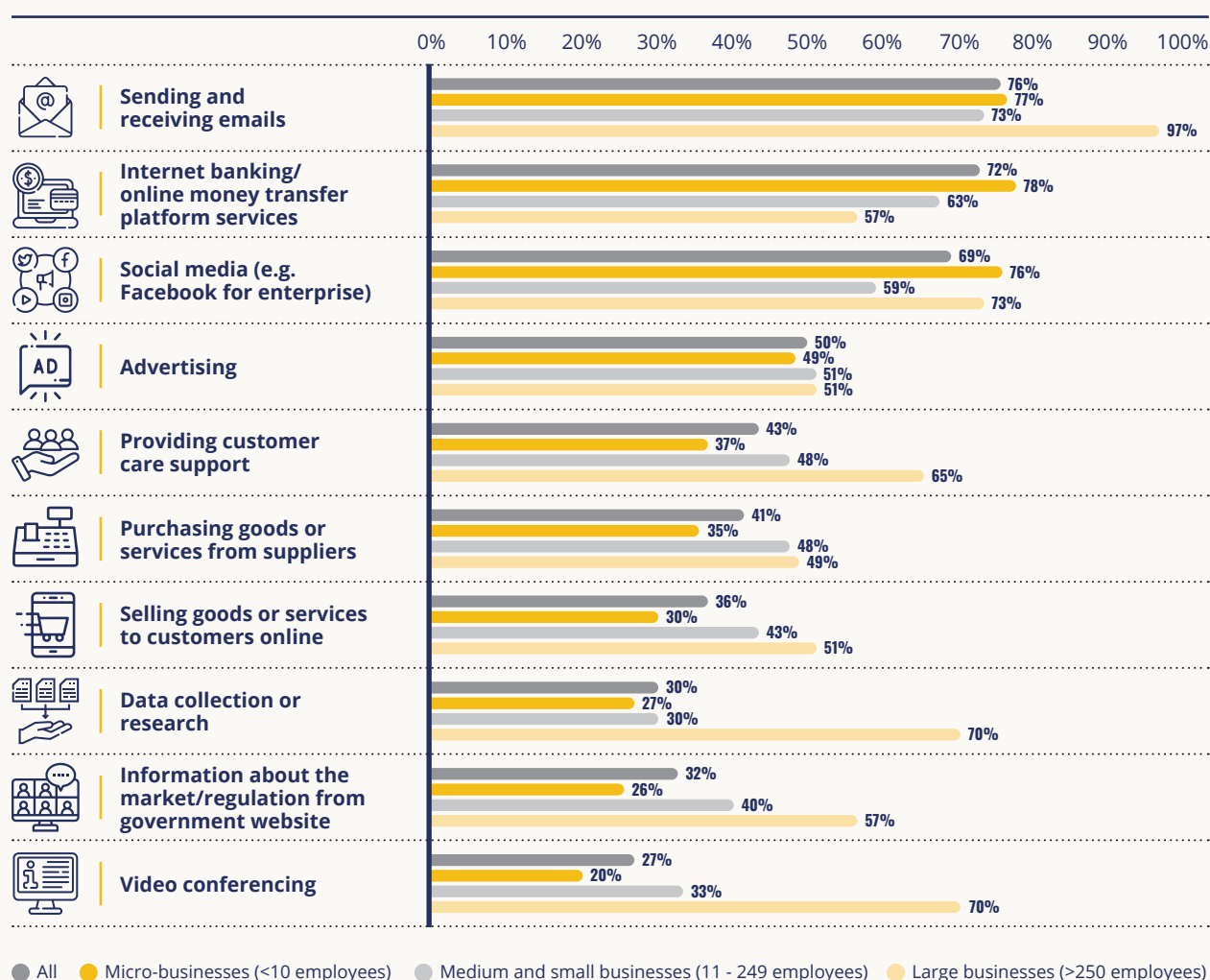


Graph 15: Proportion of businesses that reported that most employees have specific digital skills, split by business size



Businesses were asked whether most of their employees have specific digital skills. In relation to basic digital skills, 83% of businesses said most of their employees have basic hardware skills, 73% that they have basic software skills and 76% that they can use online operations. Micro-businesses were most likely to report that their employees have basic digital skills – 93% said they have hardware skills compared to 78% of large businesses and 70% of SMEs. Three quarters reported that they have software skills, compared to 78% of large businesses and 69% of SMEs.

The findings show that simple online operations are the most frequent tasks that employers perform when using the internet. In addition, businesses of all sizes use the internet for marketing and e-commerce services, with around half reporting that their employees complete these tasks. The most frequent tasks employees perform while using the internet are to send and receive emails (76% of all businesses and 97% of large businesses), internet banking (72%) and social media (69%). Around half of all businesses of all sizes reported that their employees use the internet for advertising and 65% of large, 48% of SMEs and 37% of micro-businesses said their employees use it to provide customer care and support. E-commerce is increasingly important and around half of all employees of large businesses and SMEs, but only a third of micro-businesses, use the internet to sell or purchase goods and services.



Graph 16: Proportion of businesses that reported that employees perform different tasks using the internet



Only one in four businesses reported that their employees have intermediate digital skills. In relation to intermediate digital skills, 28% said their employees have digital marketing skills, 22% have desktop publishing skills and 13% digital graphic design skills. SMEs were most likely to report that their employees have intermediate digital skills – 43% of SMEs reported that they have digital marketing skills, compared to 35% of large and 17% of micro-businesses; 35% said they have desktop publishing skills, compared to 19% of large and 14% of micro-businesses; and 23% said they have digital graphic design skills, compared to 24% of large and 5% of micro-businesses.



Our findings show that more advanced tasks such as data collection, research and online meetings are common to large businesses but less frequent for SMEs and micro-businesses. Employees of large businesses frequently use the internet for meetings or to conduct research, but such tasks are less common for SMEs and micro-businesses. About 70% of large businesses said their employees use video conferencing, compared to 33% of SMEs and 20% of micro-businesses. This indicates that employees of larger businesses have more capacity and were more likely to work from home during the Covid-19 lockdowns. Similarly, 70% of large businesses said their employees collect data or conduct research, 57% of them with a focus on market research or information about regulations. In comparison, 40% of SMEs and 26% of micro-businesses reported that their employees use the internet to gather information about the market and regulations.



Only around one in 10 businesses reported that most of their employees have advanced digital skills; the findings show that these are concentrated in large businesses. When asked about advanced digital skills, 11% said their employees have digital skills to use the IoT, 6% had coding and mobile app development skills, 5% are familiar with big data analytics or cybersecurity, and 5% can use AI or VR. Only 3% have skills in the field of robotics. Coding and mobile app development skills are most common in SMEs, reported by 11% of them, compared to 8% of large and 2% of micro-businesses. Large businesses were most likely to report that their employees have other advanced digital skills: 19% reported they have IoT skills, compared to 15% of SMEs and 8% of micro-businesses; 19% of large businesses reported that most of their employees have big data analysis skills, compared to 9% of SMEs and 2% of micro-businesses; 16% of large businesses said their employees have cybersecurity skills, compared to 9% of SMEs and 2% of micro-businesses; 11% of large businesses said they have skills to use AI and VR, compared to 8% of SMEs and 1% of micro-businesses; 5% of large businesses and SMEs, but no micro-businesses, said their employees have skills to use robotics.





Employees' skill set also depends on the industry a specific business works in. Businesses in the financial services or ICT sector are most likely to report that most of their employees have a range from basic to advanced digital skills. Businesses in manufacturing are most likely to report that their employees have basic digital skills, while businesses in agriculture and tourism are least likely to do so. Businesses in the ICT or financial services sector as well as manufacturing are most likely to report that their employees have intermediate digital skills. Businesses in community, social or personal services as well as agriculture and tourism are least likely to do so. Businesses in the ICT and financial services sector are most likely to report their employees have advanced digital skills, compared to trade, community, social or personal services, which are least likely to do so.

The table below shows the list of specific digital skills included in the survey questionnaire and the proportion of businesses that reported that most of their employees have this specific digital skill.

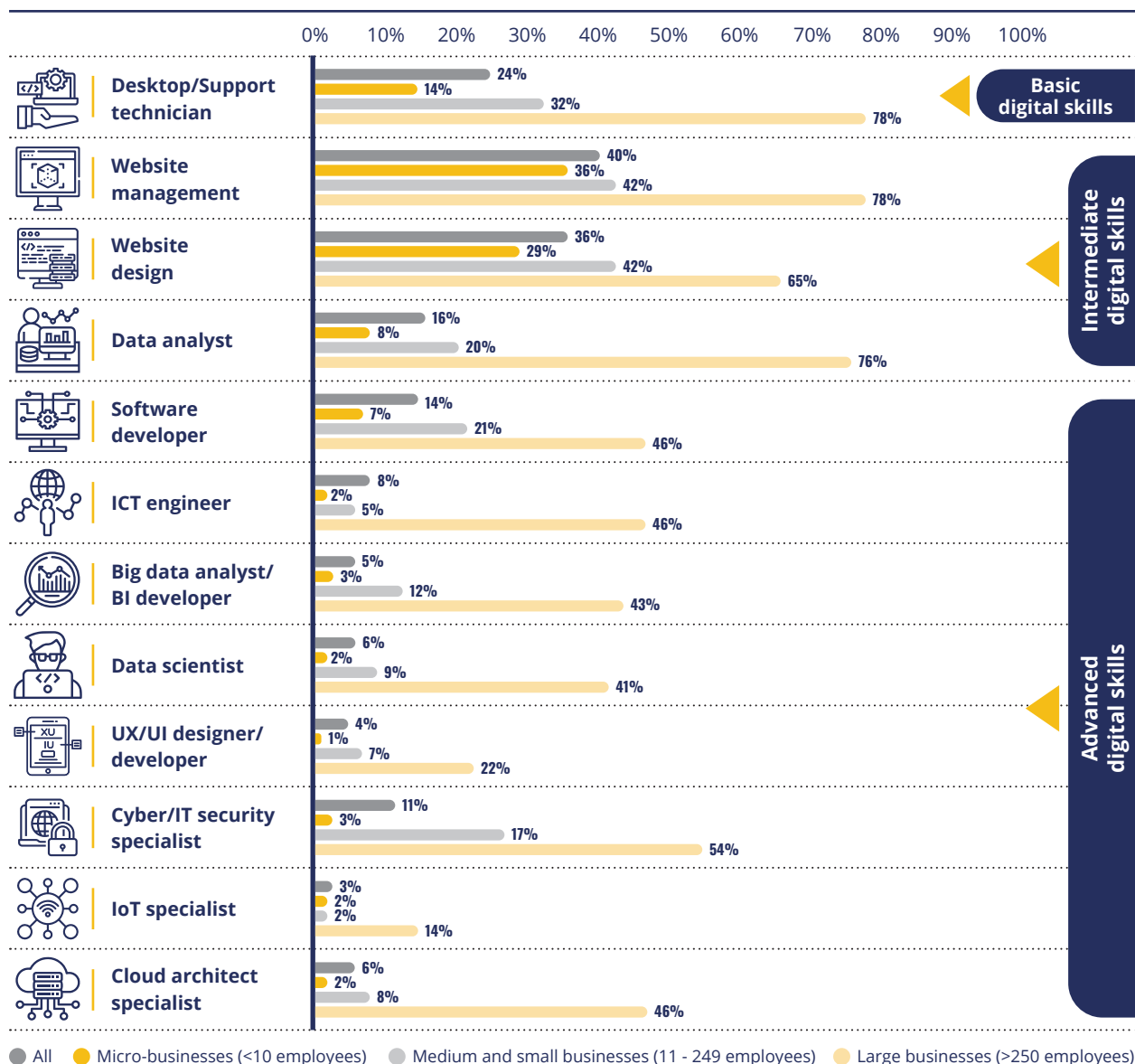
	Trade	Community, social and personal services	Financial services	Manu- facturing	Agriculture	Tourism	ICT (IT/digital tech)
Basic hardware skills	80%	90%	83%	95%	63%	62%	90%
Basic software skills	71%	66%	85%	93%	59%	62%	77%
Online operations	73%	82%	83%	91%	59%	62%	64%
Desktop publishing	25%	10%	39%	37%	9%	5%	31%
Digital graphic design	14%	8%	17%	20%	6%	5%	28%
Digital marketing	31%	18%	33%	40%	19%	19%	28%
Coding and mobile app development	6%	4%	15%	5%	0%	0%	15%
Big data and analytics	4%	3%	17%	5%	13%	0%	13%
AI or VR	4%	3%	4%	7%	9%	0%	15%
IoT	12%	9%	20%	7%	16%	5%	18%
Cybersecurity	4%	0%	13%	12%	3%	5%	13%
Robotics	1%	0%	11%	9%	0%	0%	8%

Table 8: Proportion of businesses that reported that most of their employees have a specific digital skill, split by industry type

► Occupations currently employed in businesses

Businesses are most likely to employ people in occupations that require skills that can be obtained through PSET, but not necessarily through a university degree or advanced digital skills training.

The most frequent occupations are website management and design. Large businesses are more likely to have occupations that require the use of digital technologies. Many SMEs have occupations that require basic and digital skills, but few have occupations that require advanced digital skills, except for software developers and IT and cybersecurity specialists.



Graph 17: Proportion of businesses that reported that they employ people in a specific occupation



Young people can be prepared for the occupations that require the use of digital technologies – occupations in which businesses currently employ people – through specific training programmes. They do not have to complete a course or degree over multiple years. These occupations are also suitable for entry-level roles. Regarding occupations that require the use of digital technologies that are suitable for young people with secondary education, 24% of all businesses – but 78% of large businesses and 32% of SMEs – have desktop or support technicians. Regarding occupations that require intermediate digital skills, which young people usually acquire at college or through other PSET, website management is most common, as reported by 40% of all businesses, 78% of large businesses, 42% of SMEs and 36% of micro-businesses. Website design is nearly as frequent, with 36% for all, 65% of large businesses, 42% of SMEs and 29% of micro-businesses. Data analysts are very common in large businesses, as reported by 76%, and less common in SMEs (20%) and micro-businesses (8%), adding up to 16% of all businesses.



Our findings showed that few SMEs and micro-businesses had occupations that required more advanced digital skills, but these were very common in large businesses. These findings were driven by the fact that smaller businesses were less likely to be able to afford full-time staff providing these services but do still need or could benefit from them in the digital economy. Providing these services on a part-time or freelance basis can help to overcome this gap. Occupations that required more advanced digital skills were very common in large businesses. More than half of large businesses (54%) have IT and cybersecurity specialists, compared to 17% of SMEs and 3% of micro-businesses. Around half had software developers (46%), cloud architect specialists (46%), ICT engineers (46%), big data analysts or business intelligence (BI) developers (43%) and data scientists (41%). Fewer had UX and UI designers and developers (22%) and IoT specialists (14%). The most common occupations at SMEs were software developers (21%) and IT and cybersecurity specialists (17%). Around one in 10 had ICT engineers (12%), data scientists (9%) and cloud architect specialists (8%). Very few had UX and UI designers and developers (7%), big data analysts or BI developers (5%) and IoT specialists (2%). Micro-businesses were most likely to have software developers (7%) but less than 3% had any of the other occupations.

Considering the large contribution the financial services sector makes to total employment in South Africa, it currently provides the most occupations that require the use of digital technologies. The number of financial businesses that have such occupations is above average, higher than the other sectors most relevant to employment creation. The number of businesses in the ICT sector with such occupations is nearly as high, but fewer people are employed in the sector, which contributes to less than 1% of total employment. Businesses in community, social and personal services contribute 24%, and those in trade contribute 21% of all employment. Less than 5% of businesses in these sectors have occupations that require more advanced digital skills, except for 8% of trade businesses, which require IT or cybersecurity specialists. Manufacturing is another sector in which many businesses have occupations requiring digital technologies, especially basic to intermediate digital skills.



The table below provides an overview of the proportion of businesses that employ staff in occupations that require the use of digital technologies, split by sector.

	Trade	Community, social and personal services	Financial services	Manu- facturing	Agriculture	Tourism	ICT (IT/digital tech)
Desktop/Support technician	18%	12%	46%	40%	16%	24%	46%
Website management	39%	31%	50%	57%	22%	33%	62%
Website design	33%	30%	50%	45%	13%	57%	44%
Data analyst	10%	8%	37%	30%	22%	19%	28%
Software developer	15%	5%	30%	24%	6%	5%	31%
ICT engineer	6%	2%	15%	11%	9%	5%	21%
Big data analyst/BI developer	3%	1%	26%	2%	3%	14%	13%
Data scientist	2%	3%	28%	5%	6%	0%	13%
UX/UI designer/developer	3%	2%	22%	1%	0%	0%	8%
IT/Cybersecurity specialist	8%	4%	33%	21%	3%	10%	13%
IoT specialist	0%	1%	11%	0%	9%	5%	21%
Cloud architect specialist	2%	2%	24%	12%	0%	10%	15%

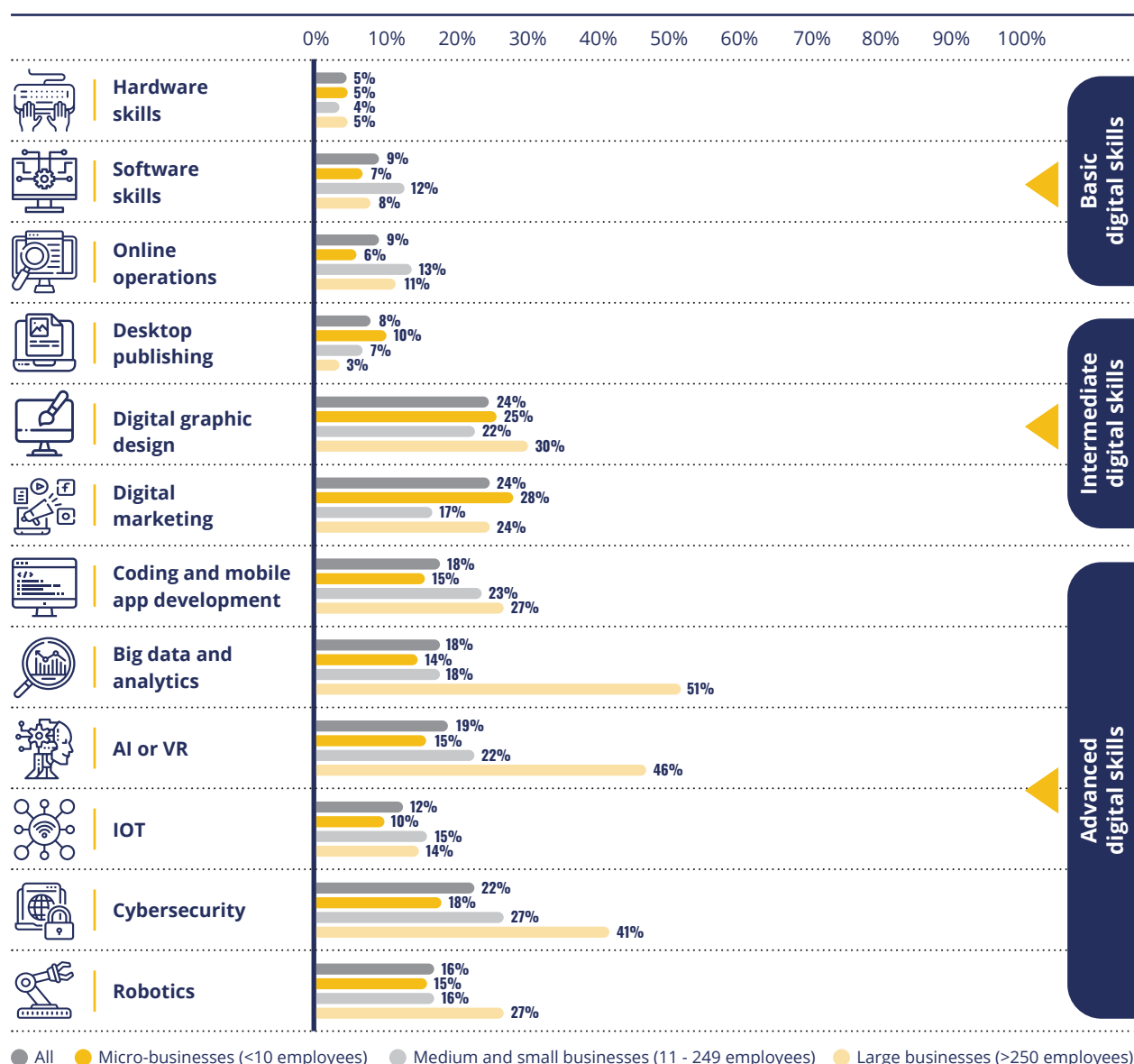
Table 9: Proportion of businesses that reported that they have occupations requiring the use of digital technologies, split by industry group



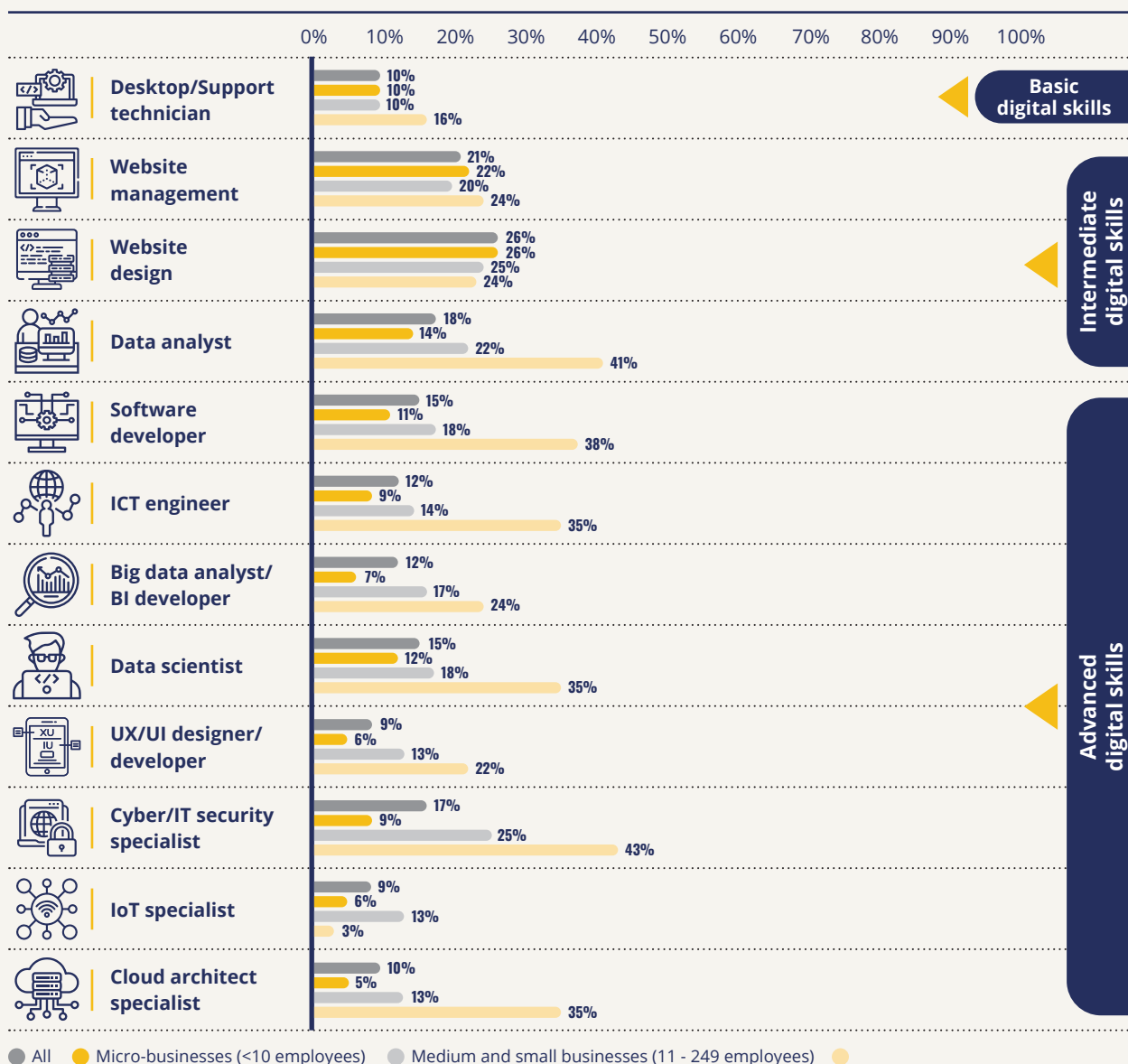
Current demand – businesses

► Digital skills and occupations in demand by businesses

The study highlights the importance of intermediate digital skills for businesses in South Africa, which are even a priority for micro-businesses, in addition to advanced digital skills, which are still the skills in highest demand by large businesses. Currently, businesses have the biggest demand for digital graphic design and digital marketing skills, as mentioned by 24% of all businesses. This highlights the importance of intermediate digital skills for businesses in South Africa. Whereas these skills are a priority demand for micro-businesses, 28% reported that they need digital marketing skills but find it difficult to obtain them; 25% have the same challenge with digital graphic design skills. These skills are also important for SMEs and larger businesses. The skills speak to the occupations that are highest in demand, namely website design, mentioned by 26%, and website management, mentioned by 21% of all businesses. Industry associations also emphasize the demand for intermediate skills, especially among SMEs and micro-businesses. A National Business Initiative (NBI) expert stressed the need among SMEs and micro-businesses for digital capacity, for example websites that can be based on a Wordpress template and do not have to be developed from scratch, as well as digital marketing and cloud-based services. Other experts highlighted the need for digital marketing and social media analytics for small and medium-sized retailers as well as skills to use the cloud platform or specific services and applications that companies use, such as Salesforce.



Graph 18: Proportion of businesses that reported that they need a specific digital skill and find it difficult to obtain in the South African market



Graph 19: Proportion of businesses that reported that they need to fill a specific vacancy and find it difficult to obtain

It is important to highlight that the demand the businesses reported does not necessarily lead to work opportunities, especially not at SMEs and micro-businesses, and particularly not full-time jobs. Smaller businesses have limited capacity and resources to pay for these services, said an NBI expert. Businesses must realize the potential and return on investment of such digital services and might be able to pay for part-time or hourly services.





The demand large businesses mentioned reflects existing employment opportunities that they are either not able to fill or that could be created if suitable talent was available. This demand is mainly in the space of advanced digital skills and related occupations, especially for people with work experience.

Large organizations have a bigger need for more advanced digital skills. Around half of them reported that they struggle to find candidates with big data analytics, AI or VR (46%), cybersecurity (41%) or robotics as well as coding and mobile app development skills (27%). In addition, key experts highlighted a demand for app testing services. Like the demand for specific skills, large companies have the highest demand for occupations that require advanced digital skills, which are often taught at higher education institutions. About 43% of large businesses need IT and cybersecurity specialists and are struggling to find them, 41% need data analysts, 38% require software developers and 35% need ICT engineers, data scientists and cloud architect specialists. In relation to software development, there are many front-end web developers, but recruiters highlight the particular demand for software developers who are specialized in a specific area of development and those who develop the solutions, write the code and are familiar with full stack development.



For occupations that require advanced digital skills, experienced people are particularly in demand.

“The biggest need in the ICT sector is at the intermediate and senior level – people with a few years of work experience and upwards,” an HR officer at a software company said. Whereas key experts highlight that there is a greater supply in the market at graduate entry level for individuals who can fill roles that require advanced digital skills, they indicate that higher education institutions could teach more practical knowledge and how to use the specific systems and applications that are used in the world of work. The HR officer also recommend that “the curriculum has to be more up to date with the technology tech stack. Object-orientated coding is being taught, but they should also learn other frameworks and languages, and focus on how to solve issues. Generally, they must ensure that the quality of the coding is up to industry standards.”



Specific digital skills that require specialized training, such as cybersecurity, coding or data analysis, are in demand. Overall, the third skill in high demand is cybersecurity, as 22% of all businesses mentioned. Researchers and industry associations also emphasize it. Coding and mobile app development remain in high demand and 18% of businesses mentioned it. Other occupations in demand are data analysts, data scientists and software developers. The CEO of a digital skills training organization has “seen a need from employer for software development and all digital skills to incorporate the cloud into the business”. Other skills in high demand based on this survey are AI and VR, big data analytics, as well as and robotics and IoT.



The study points to the demand for basic digital competencies and skills as an essential requirement for employees in the digital economy, especially in specific niches. The demand for desktop publishing and basic software or online operation skills is generally low, and only 5% of businesses reported a need for and difficulty finding people with hardware skills. Experts however pointed out that basic digital skills are a requirement for almost all employees in the current working environment and that it therefore remains important to ensure young people have these skills. “There is a need to focus on digital competencies – when we refer to information and data, it highlights that people need to be able to handle information – not necessarily analytics,” a Stellenbosch University academic said.



The need for basic digital skills is particularly important in specific geographic areas and industries. One example is areas where businesses mainly employ the local community and have little or no access to the talent pool in urban areas or abroad. This need was highlighted by a representative of a multinational company in the mining industry: “We don’t have a huge demand for more advanced digital skills, as these are mainly served from the bigger cities or internationally. It is however very important that the people working on the ground have the basic digital software and hardware skills. Training is required to use digital skills or tools more widely. The average employee does not have digital skills.” In addition, some businesses have a specific need in this space: 17% of businesses with 25 to 99 employees reported a need for online operations such as email communication, sending quotes and safety measures or scanning for viruses. This sentiment was echoed by industry group representatives such as in the automotive industry, who reported that they “see a need for computer skills on an entry to intermediate level, especially office-based computer skills such as Excel, Word and Adobe Acrobat, as well as Outlook skills so that they can attend to emails, prioritize and flag email, and handle customer enquiries.”



► Demand for core skills for life and work in the 21st century

The results of this survey indicate that businesses' demand for core skills for life and work in the 21st century is similar to the demand for digital skills. Experts confirmed the importance of these specific skills and emphasize that they are essential for individuals to apply other technical skills, such as digital skills in the working environment. This indicates the relevance of these skills for the digital economy across all levels, at entry level as well as for experienced appointments. In relation to young people learning basic and intermediate skills to increase income-generating opportunities, experts state that a combination of skills are needed in the world of work – an interplay between digital skills, business skills and core skills. This is particularly relevant for YNEET as a target group. “Working with YNEET, one cannot only focus on technical skills. There is a huge need for so-called soft skills or job critical skills as well as transferable skills such as problem solving, curiosity or business presentation,” an expert consultant said. In relation to skilled individuals, an HR officer highlighted the challenge that “at graduate level, people often cannot do problem solving and even if they are developers, they lack the core skills and struggle to think out of the box.”

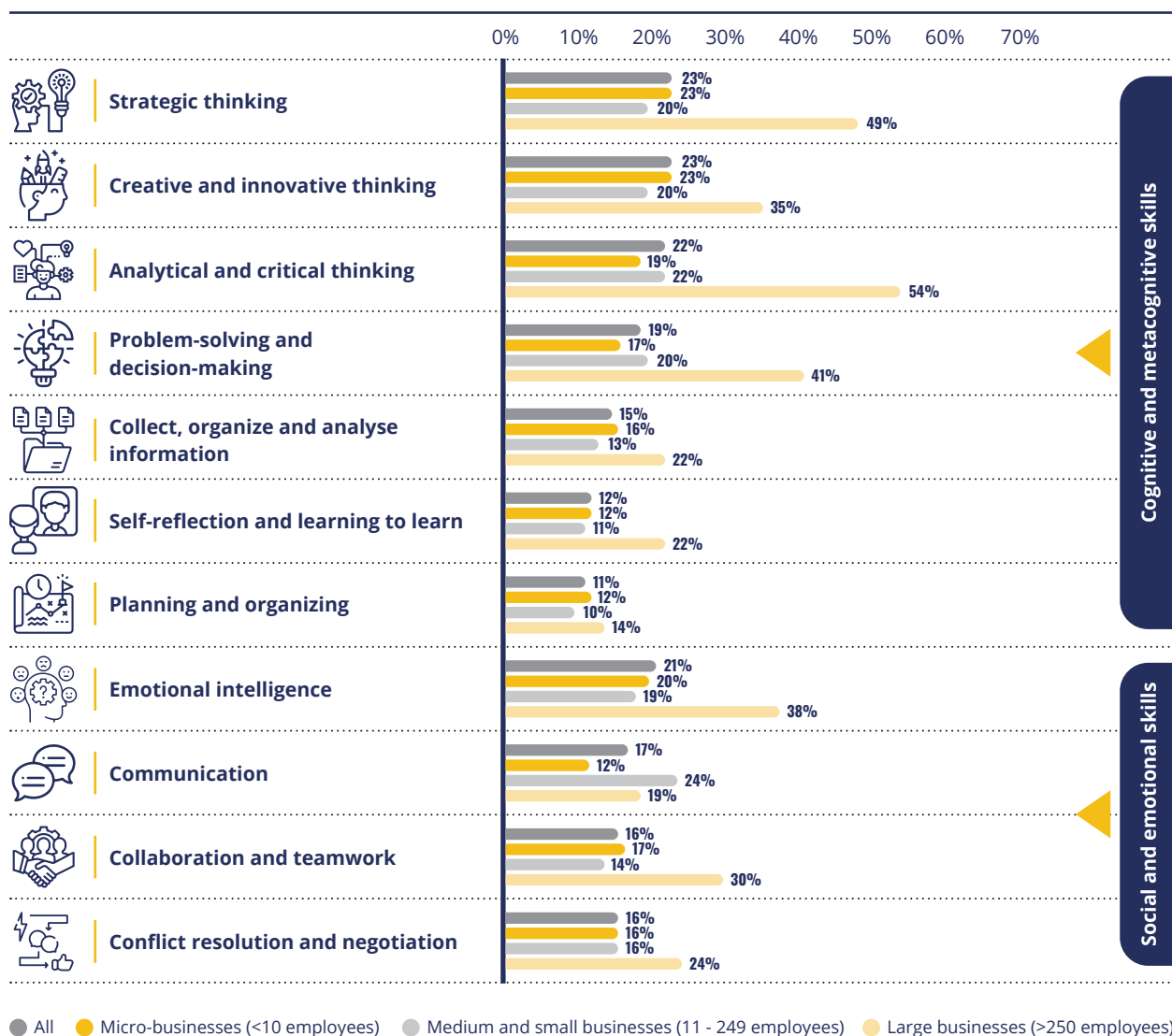


The biggest demand is for cognitive and metacognitive skills, especially strategic, creative, innovative, analytical and critical thinking. Key experts confirmed that these skills are difficult to find in the South African market, making it even more challenging to recruit individuals in the digital economy. The most in-demand skills are strategic, critical and innovative thinking (mentioned by 23% of the businesses), analytical and critical thinking (22%) and problem solving and decision-making (19%). An information source who works in HR at a software company stated that “there is a need for problem solving and structured thinking, and these additional skills are an additional challenge”. Large businesses have a particularly high demand for these skills: 54% mentioned analytical and critical thinking skills, 49% mentioned strategic thinking and 41% highlighted problem solving and decision-making. Large businesses also need creative and innovative thinking skills, and 35% of them mentioned this. Other relevant cognitive and metacognitive skills are the ability to collect, organize and analyse information (mentioned by 15% of all businesses), self-reflection and the ability to learn (12%), and planning and organizing skills (11%).



In addition, there is a need for emotional and social skills, especially among young employees.

Businesses indicate a requirement for emotional intelligence (mentioned by 21%), other emotional and social skills such as communication (17%), collaboration and teamwork (16%) and conflict resolution and negotiation (16%). Large businesses have a particularly high demand for emotional intelligence. One expert said young people often have behavioural challenges and lack mentors or more experienced peers who can translate the world of work to them. “There is a need for a psychological and holistic approach that includes confidence building, self-awareness, problem solving and teamwork.”



Graph 20: Proportion of businesses that reported demand for a specific skill



► Key gaps and opportunities for young people, with a focus on YNEET

By comparing businesses' demands with young people's current skill set, the researchers identified a range of key gaps in the market.

1. Our survey and secondary research show a demand for all types of advanced skills, some at entry level but even more for individuals with work experience. **Considering young people's current low-level digital skills, it can be challenging to train them to have a good level of advanced digital skills that they can use in a working environment.** A researcher and trainer in this field highlighted that most YNEET have not used any basic digital skills before their training, so it was not possible to teach skills like coding. More advanced digital skills can be taught in follow-up courses after they gained the basic digital skills. Experts also mentioned that specific advanced skills alone are not sufficient to increase the employment opportunities, because many graduates, also in the IT field, struggle to access employment and opportunities.

2. This highlights the importance of facilitating practical experience for young people to apply their advanced digital skills in a working environment and train core skills for life and work in the 21st century in combination with digital skills so that youth can access opportunities that require work experience. Businesses need people who can apply these skills in a practical work context, as described by experts: "One factor is that businesses do not have the bandwidth, resources or capacity to get the young people who have the theoretical knowledge from academic thinking into systems thinking." Young people's limited exposure to the world of work also remains a challenge. An academic source described how "some think if you train advanced skills, someone will be able to get a job or run a business. But you can't train anyone in a special course, for example augmented reality, and expect them to make a job out of that."

3. This study and secondary research highlighted a need for all types of intermediate digital skills. The demand for intermediate digital skills opens opportunities to upskill young people, as these skills can be taught in a shorter timeframe and it is possible to use them at an entry level. For example, young people can design and develop websites using specific systems or programmes without being able to code from scratch. The study showed that this demand is high for SMEs and micro-businesses, but their capacity to pay for such services remains a concern. There are however options for how these services could be made more affordable for businesses, for example young people could offer them on a part-time or freelance basis. This opens the possibility of core skills for life and work in the 21st century so that youth can use digital skills in a working or entrepreneurial context. In addition, the study highlighted the possibility of training young people to understand and work with specific systems and programmes, such as Salesforce and Cisco, that are widely used in industry or by specific potential employers. If this training can be offered in collaboration with a business that has an existing demand, it has the potential of post-training employment.

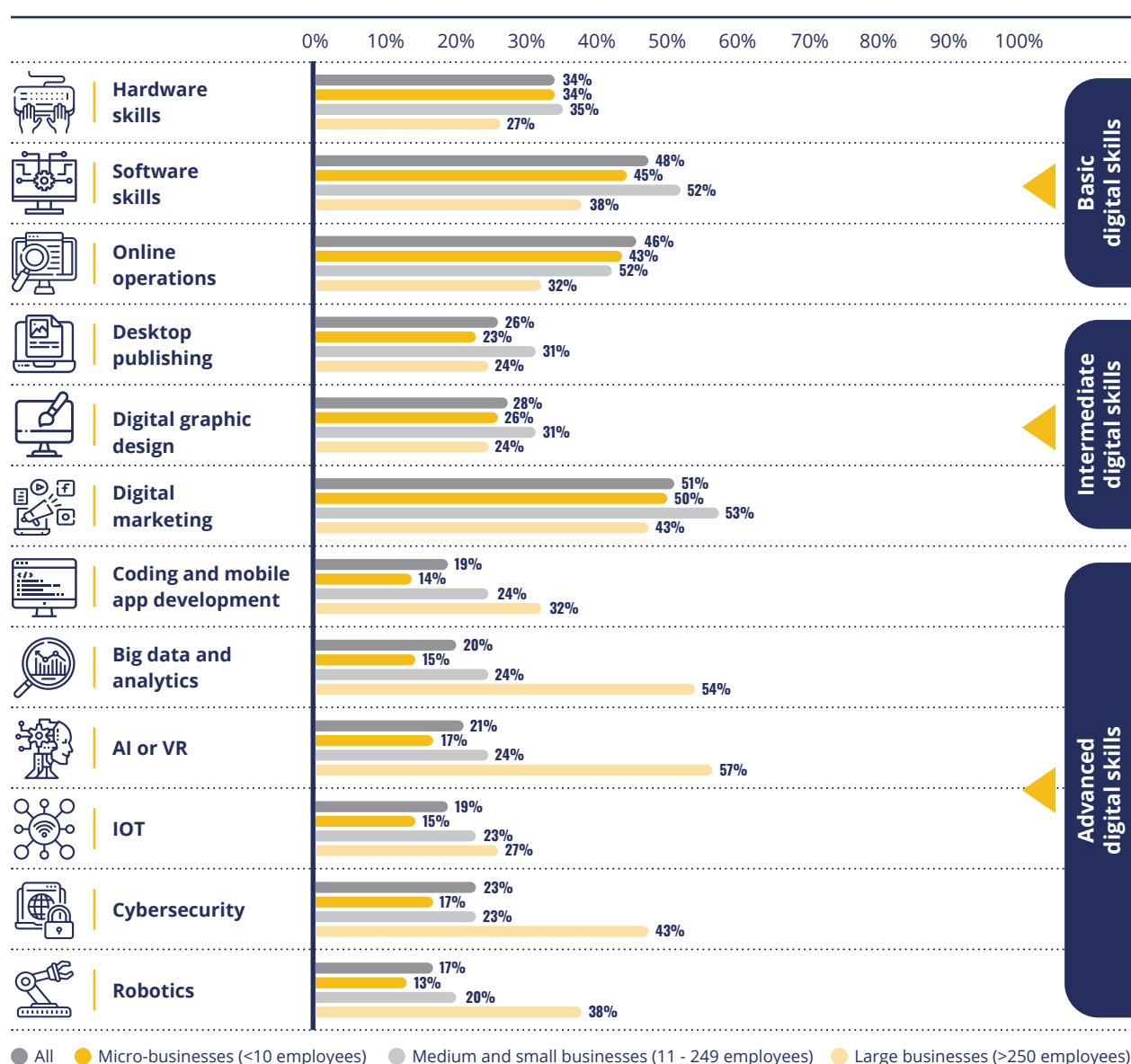


Future demand

► Digital skills and occupations

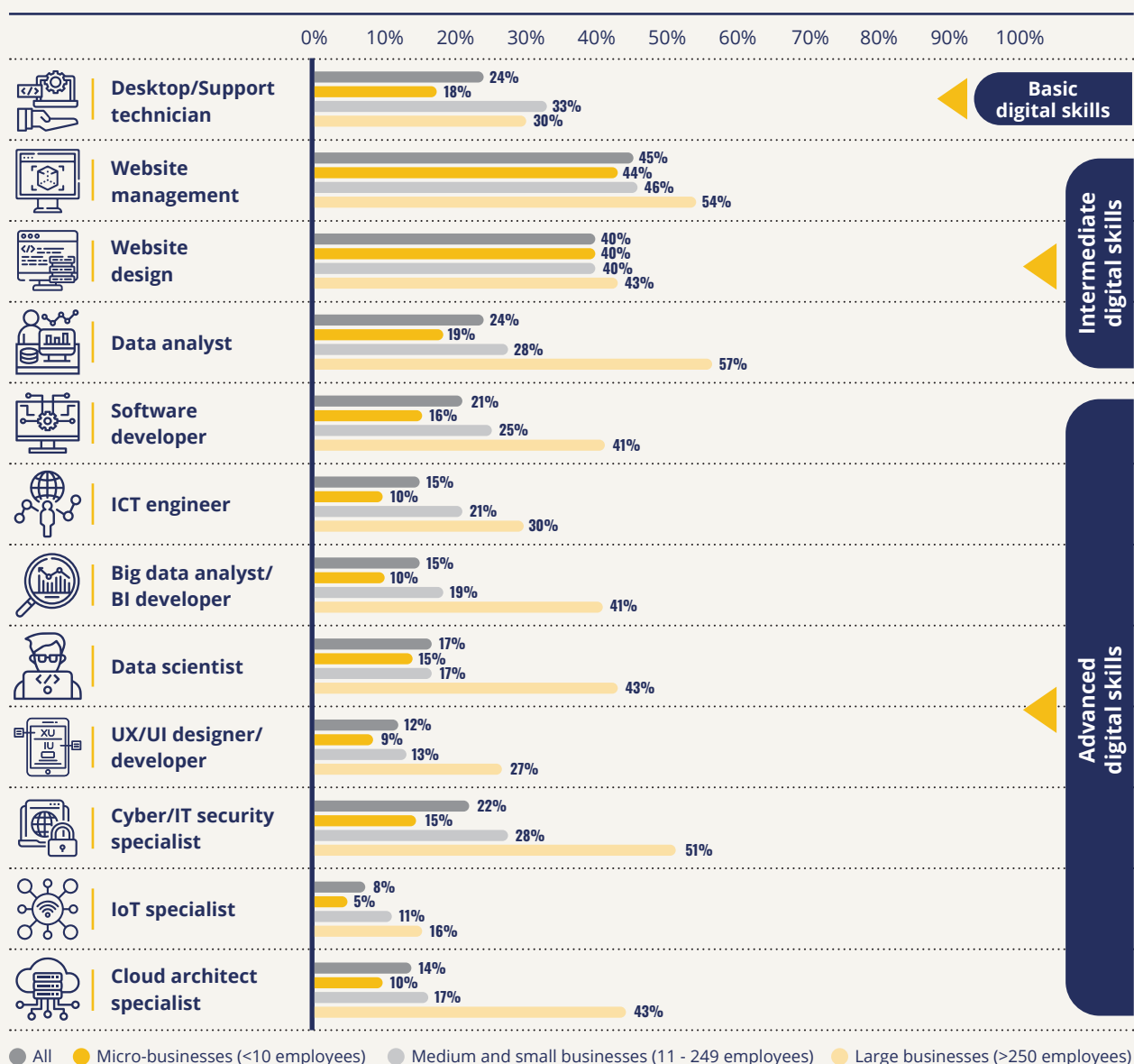
Concerning future demand, businesses reported how important they expect specific digital skills to be for them in five years. They expect basic and intermediate digital skills to be most important.

In terms of advanced digital skills, businesses expect cybersecurity to be most important. One in three businesses believe hardware skills to be the most important basic digital skill, and around half of them mention software skills and online operations, such as completing an online form. Digital marketing is expected to be the most important digital skill in five years, mentioned by 51% of businesses. This is followed by digital graphic design (28%) and desktop publishing (26%). These basic and intermediate digital skills are important to businesses of all sizes, but SMEs project them to be slightly more important compared to large or micro-businesses. This focus on specific intermediate digital skills is also reflected in the occupations that businesses are looking for – 45% believe website management and 40% believe website design will be most important in five years.



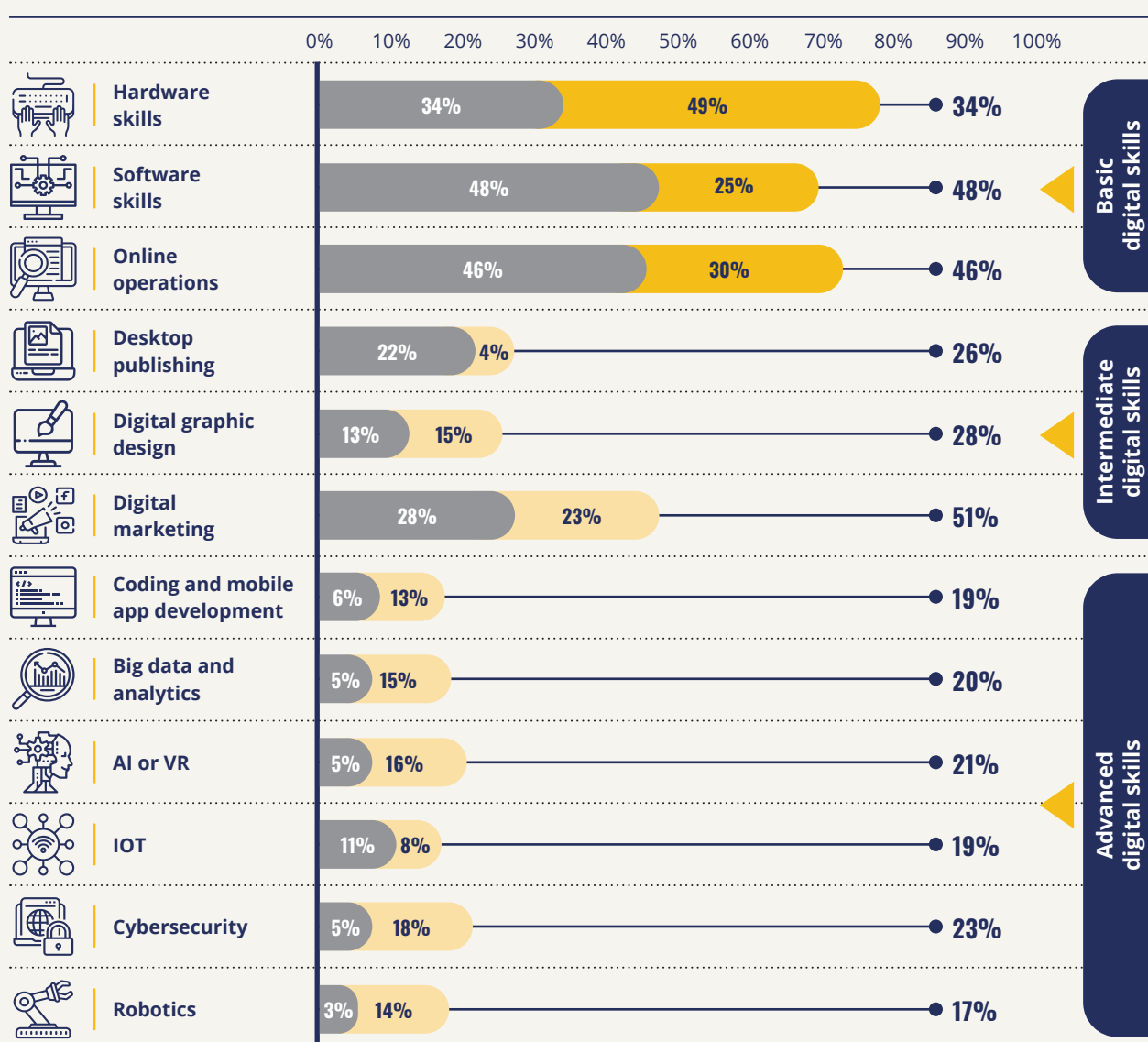
Graph 21: Proportion of businesses that expected a specific digital skill to become of key importance to them in five years

Large businesses indicated a huge need for advanced digital skills and occupations that will require the use of technology. The projected importance mirrors their current needs. They expect their biggest needs to be big data analytics (54%), and AI or VR (57%). This is followed by cybersecurity (43%), robotics (38%), coding and mobile app development (32%), and IoT (27%). SMEs and micro-businesses also believe these skills are important: around one in four SMEs and one in six micro-businesses mentioned specific advanced digital skills. Some 30% of SMEs and 17% of micro-businesses said cybersecurity was most important. Important occupations are desktop support and technicians, as well as data analysts, which were both mentioned by 24% of businesses. Concerning specific occupations, 51% of large businesses said they will need IT and cybersecurity specialists, 43% mentioned data scientists and cloud architect specialists, and 41% mentioned software developers and ICT engineers. Less frequent but still important will be big data analysts and BI developers (30%), and UX/UI designers and developers (27%). The need for IoT specialists is expected to be rather low. It was only mentioned by 8% of all and 16% of large businesses, indicating that this is likely to remain a technology and skill only required for specific tasks.



Graph 22: Proportion of businesses that expected specific occupations to become of key importance to them in five years

The expected importance of specific occupations requiring digital skills can be compared to employees' current skill set. This shows that businesses expect all intermediate and advanced digital skills to become more important than what their employees currently have. The number of businesses mentioning a specific skill as important in the future, compared to the proportion of businesses that report that their employees currently have it, increases the most for digital marketing skills, as an additional 23% list this skill. It is followed by cybersecurity (18% more), AI and VR (16% more) and digital graphic design as well as big data analytics (15% more). At 8% and 4% respectively, the increases for IoT and desktop publishing are the smallest. The proportion of businesses that said basic digital skills will be important is lower than the proportion whose employees currently have such skills. This does not necessarily indicate that basic digital skills will become less important, as many businesses expect them as a minimum requirement of all employees and look to other digital skills as important to grow their businesses.

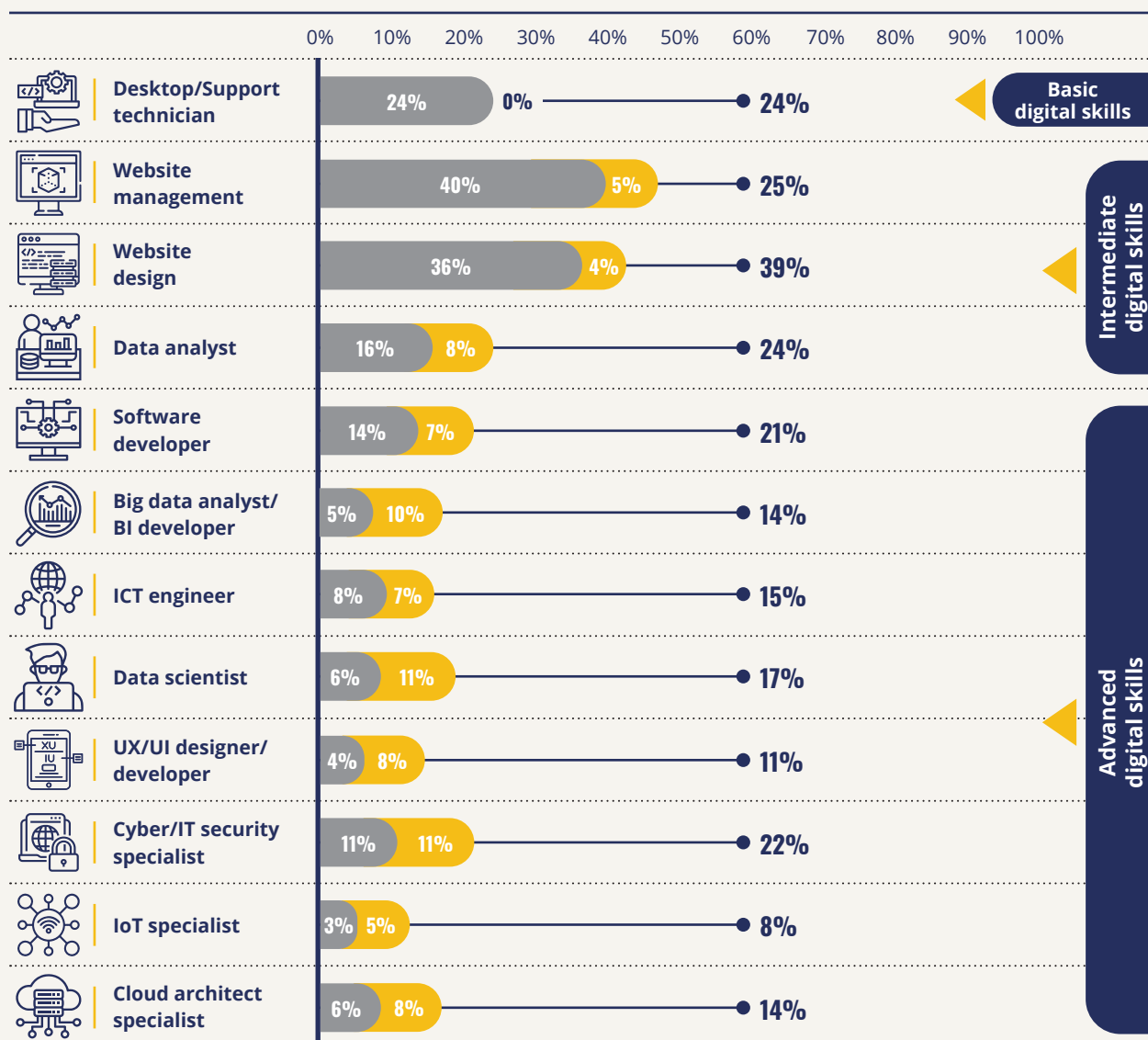


Graph 23: Proportion of businesses indicating that specific digital skills will be of key importance to them in five years compared to employees' current skill set

● Skill level of current employees
 ● Future need lower than current skill level of employees
 ● Future need higher than current skill level of employees

This trend is mirrored for specific occupations, as businesses expect that their importance will increase compared to the current skill set. The number of businesses that listed a specific occupation compared to the number reporting that their employees currently have it increased the most for advanced digital skills, which indicates that businesses will need more employees with a higher education and work experience in this field. This increase is the highest for IT and cybersecurity specialists and data scientists (11%), big data analysts and BI developers (10%), and data analysts, cloud architect specialists and UX and UI designers and developers (8% each). The increase is smaller for ICT engineers and software developers (7%), website design and IoT specialists (5%) and website design (4%).

While the need for occupations requiring intermediate digital skills is expected to increase at a slightly slower rate in the next five years, these occupations will remain important. The findings suggest that intermediate digital skills are a suitable focus area to upskill young people with the aim of creating decent and sustainable jobs. The number of businesses that listed a specific occupation compared to the number reporting that their employees currently have it increased by 8% for data analysts, 7% for software developers, 5% for website managers and 4% for website designers.



Graph 24: Proportion of businesses indicating that specific occupations will be of key importance to them in five years compared to employees' current skill set

● Current occupations
● Future need higher than existing occupations

The expected importance of specific digital skills and occupations can be used to project future demand by considering the current demand as well as the supply in relation to these skills. This study has shown that there is already a demand for digital skills and occupations in South Africa. This demand will intensify if the increased importance of the specific occupations is not met by an increased supply of the required skills and abilities. The extent to which businesses will be able to find employees with these specific skills depends on the supply in the next five years.

In addition to the existing limitations and barriers of higher learning institutions described in this report, experts such as an HR manager, a recruiter and a youth organization representative list a range of concerns about the future availability of candidates with specific digital skills.

- 1.** Businesses are “poaching for a very limited pool of skilled people in the country”.
- 2.** Their experience is that “junior people are lost from the technical side as they do more admin or operational things after doing some programming”.
- 3.** “Businesses are sending services offshore, for example developing and data analytics services, even though it’s more expensive”.
- 4.** There’s the migration of services and highly skilled individuals, which has created the perception that “we are losing a lot of developers from South Africa to other countries because people want to leave South Africa and are less open to working remotely from here”.



Industry-specific demand

Businesses working in trade

	1.	2.	3.
	School education (secondary school completed or not)	Post-school education and training (PSET) (entry level and experienced)	Higher education institutions/ Advanced skills (entry level and experienced)
Opportunities: Occupations most in demand		- Website designers - Website managers - Data analysts	IT/Cybersecurity specialists
Skills demand: Most important and needed digital skills		- Digital graphic designers - Digital marketers - Coding and mobile app developers	- Big data analysts - AI and VR specialists - Cybersecurity specialists
Skills demand: Most important and needed core skills for life and work in the 21st century	Social and emotional skills	Social and emotional skills	Social and emotional skills

Table 10: Overview of skills and occupations most in demand by businesses working in trade

Businesses working in trade need intermediate digital skills and related occupations as well as selected advanced digital skills, such as cybersecurity. They report the highest demand for intermediate digital skills and related occupations: digital marketing (21%) and digital graphic design services (16%). Businesses expect these skills to also be most important in the future. One in four mention digital marketing and one in five digital graphic design. This is also reflected by the occupations they need: website designers (25% currently need them, and this will increase to 36%) and website managers (19% currently need them, and this will increase to 47%).

In addition, 20% reported a demand for coding and app development services. The need for software developers is also expected to increase and will be of key importance to 21% of businesses. In relation to more advanced digital skills, 23% have a demand for cybersecurity, 18% highlighted a need for big data analytics and 21% for AI and VR. While there is currently only a small demand for desktop and support technicians, 26% of businesses working in trade expect this to increase. In addition, previous studies highlighted a need for social and emotional skills in the sector.

Digital skills		Current demand	Future importance
	Basic hardware skills	5%	2%
	Basic software skills	12%	5%
	Online operations	9%	5%
	Desktop publishing	12%	7%
	Digital graphic design	26%	20%
	Digital marketing	21%	25%
	Coding and mobile app development	20%	12%
	Big data analytics	18%	8%
	AI and VR	21%	15%
	IoT	13%	9%
	Cybersecurity	23%	16%
	Robotics	15%	11%

Table 11.1: Proportion of trade businesses that reported that they need specific digital skills

Occupations requiring the use of technology		Current demand	Future importance
	Desktop support technician	10%	26%
	Website manager	19%	47%
	Website designer	25%	36%
	Data analyst	20%	26%
	Software developer	11%	21%
	Big data analyst/BI developer	13%	16%
	ICT engineer	14%	18%
	Data scientist	17%	18%
	UX/UI designer/developer	13%	13%
	IT/Cybersecurity specialist	19%	24%
	IoT specialist	12%	9%
	Cloud architect specialist	9%	12%

Table 11.2: Proportion of trade businesses that reported that specific digital skills will be important to them in five years



Businesses providing community, social and personal services

	1.	2.	3.
	 School education (secondary school completed or not)	Post-school education and training (PSET) (entry level and experienced)	Higher education institutions/ Advanced skills (entry level and experienced)
Opportunities: Occupations most in demand		- Website designers - Website managers	
Skills demand: Most important and needed digital skills		- Digital graphic designers - Digital marketers	- AI and VR specialists - Cybersecurity specialists
Skills demand: Most important and needed core skills for life and work in the 21st century	Social and emotional skills	Social and emotional skills	Social and emotional skills

Table 12: Overview of skills and occupations most in demand by businesses providing community, social and personal services



Service businesses mainly need website managers and designers, as well as support with digital marketing. They report the highest demand for intermediate digital skills and related occupations, namely digital graphic design services (20%) and digital marketing (25%). Businesses also expect these skills to be very important in the future, with the need for digital marketing mentioned by 55%. This is reflected by the occupations they need, such as website designers (24% currently need them, and this will increase to 51%) And website managers (18% currently need them, and this will increase to 54%). The need for cybersecurity services (16%) and AI and VR (15%) is expected to remain steady. In addition, previous studies have highlighted a need for social and emotional skills in the sector.

Digital skills		Current demand	Future importance
	Basic hardware skills	2%	29%
	Basic software skills	5%	49%
	Online operations	5%	48%
	Desktop publishing	7%	14%
	Digital graphic design	20%	18%
	Digital marketing	25%	55%
	Coding and mobile app development	12%	9%
	Big data analytics	8%	9%
	AI and VR	15%	15%
	IoT	9%	9%
	Cybersecurity	16%	16%
	Robotics	11%	11%

Table 13.1: Proportion of service businesses that reported that they need specific digital skills



Occupations requiring the use of technology		Current demand	Future importance
	Desktop support technician	9%	14%
	Website manager	18%	54%
	Website designer	24%	51%
	Data analyst	11%	14%
	Software developer	9%	14%
	Big data analyst/BI developer	6%	6%
	ICT engineer	8%	7%
	Data scientist	9%	12%
	UX/UI designer/developer	8%	6%
	IT/Cybersecurity specialist	9%	9%
	IoT specialist	5%	5%
	Cloud architect specialist	4%	11%

Table 13.2: Proportion of service businesses that reported that specific digital skills will be important to them in five years



Businesses in the financial services sector

	1.	2.	3.
	School education (secondary school completed or not)	Post-school education and training (PSET) (entry level and experienced)	Higher education institutions/ Advanced skills (entry level and experienced)
Opportunities: Occupations most in demand		▶ Website managers ▶ Website designers ▶ Data analysts ▶ Data management technicians	▶ Data scientists ▶ IT/Cybersecurity specialists ▶ Software developers (programme developers and analysts) ▶ Big data analysts/ BI developers ▶ ICT systems analysts ▶ IT systems architects ▶ Data management managers and digital/ technology/ cybersecurity officers
Skills demand: Most important and needed digital skills	▶ End-user skills ▶ Document management	▶ Digital graphic designers ▶ Coding and mobile app developers ▶ Intermediate digital skills related to data management	▶ Cybersecurity specialists ▶ Big data analysts ▶ AI and VR programmers ▶ Robotics engineers ▶ Cloud computing specialists
Skills demand: Most important and needed core skills for life and work in the 21st century	▶ Social and emotional skills	▶ Social and emotional skills	▶ Cognitive and metacognitive skills ▶ Social and emotional skills

Table 14: Overview of skills and occupations most in demand by businesses in the financial services sector

Financial services businesses need a vast range of advanced digital skills and related occupations, but also intermediate digital skills. Secondary research indicated a demand for basic digital skills such as end-user skills and document management. The intermediate digital skills in highest demand are digital graphics and coding and mobile app development, with a current demand of 20% and a growing future demand of around 30%. Secondary research also indicated a demand for intermediate digital skills related to data management. Occupations requiring intermediate digital skills include website managers (currently 22% and expected to grow to 48%). Website designers are indicated at 17% with an expected future demand of 39%, while data analysts are currently in demand by 24%, with their likely importance in five years at 43%. Secondary research also indicated a demand for data management technicians.

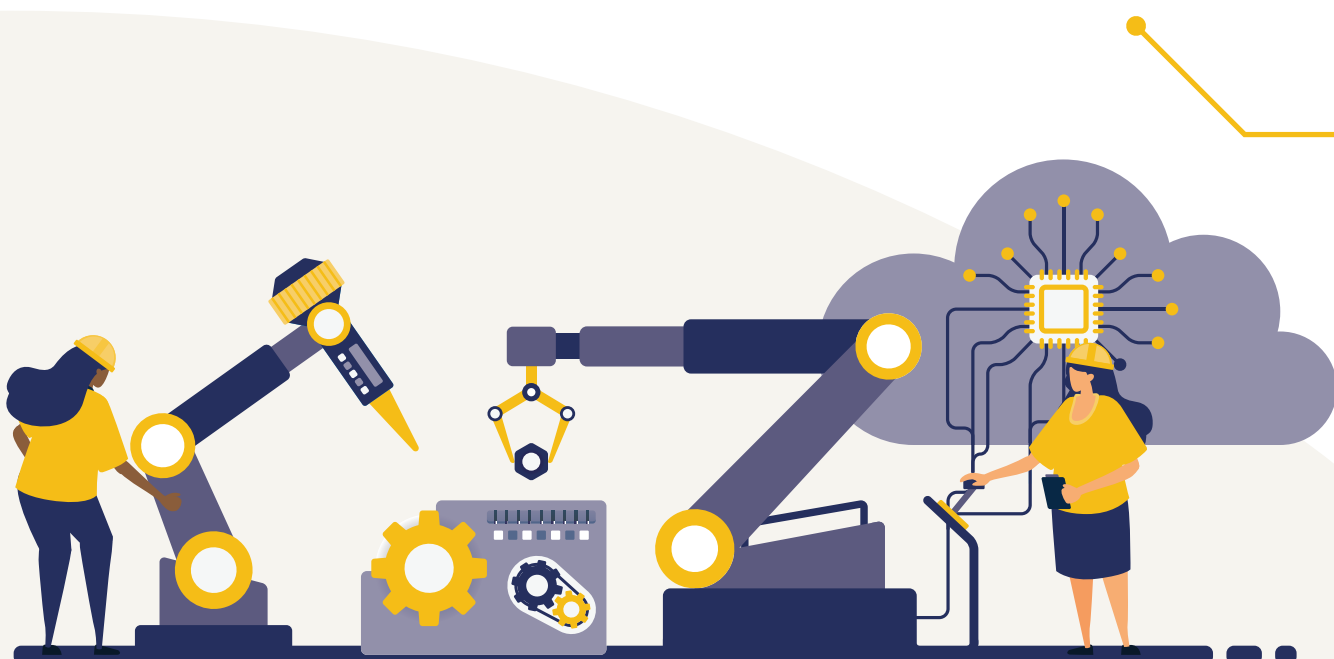
Advanced digital skills in demand include cybersecurity (39%), big data analytics (28%), AI and VR (28%), and robotics (26%). Businesses in financial services expect the demand for these skills to either grow or remain steady over the next five years. Secondary research also indicated a demand for advanced digital skills related to cloud computing. The related occupations that are currently in high demand are data scientists (26%) and IT and cybersecurity specialists (33%). The demand for both these occupations over the next to five years is expected to remain fairly steady. Software developers are also in demand, at 22%, which is expected to grow to 37% in five years. Big data analysts and BI developers are in demand at 17%, with an expected growth to 35%. Secondary research also indicated a demand for occupations such as ICT systems analysts and IT systems architects and managers such as data management managers and digital/technology/cybersecurity officers. In addition, previous studies highlighted a need for cognitive and metacognitive skills, as well as social and emotional skills, in the sector.

Digital skills		Current demand	Future importance
	Basic hardware skills	7%	35%
	Basic software skills	9%	54%
	Online operations	13%	37%
	Desktop publishing	2%	39%
	Digital graphic design	20%	30%
	Digital marketing	11%	50%
	Coding and mobile app development	20%	33%
	Big data analytics	28%	46%
	AI and VR	28%	39%
	IoT	13%	15%
	Cybersecurity	39%	43%
	Robotics	26%	26%

Table 15.1: Proportion of finance businesses that reported that they need specific digital skills

Occupations requiring the use of technology		Current demand	Future importance
	Desktop support technician	11%	43%
	Website manager	22%	48%
	Website designer	17%	39%
	Data analyst	24%	43%
	Software developer	22%	37%
	Big data analyst/BI developer	17%	35%
	ICT engineer	11%	20%
	Data scientist	26%	33%
	UX/UI designer/developer	13%	20%
	IT/Cybersecurity specialist	33%	33%
	IoT specialist	11%	17%
	Cloud architect specialist	13%	24%

Table 15.2: Proportion of finance businesses that reported that specific digital skills will be important to them in five years



Manufacturing businesses

	1.	2.	3.
	School education (secondary school completed or not)	Post-school education and training (PSET) (entry level and experienced)	Higher education institutions/ Advanced skills (entry level and experienced)
Opportunities: Occupations most in demand	▶ Desktop support technicians	▶ Website managers ▶ Website designers ▶ Data analysts ▶ Data management technicians	▶ Software and application developers ▶ Big data analysts/ BI developers ▶ Data scientists ▶ IT/Cybersecurity specialists ▶ Cloud architect specialists ▶ Robotics engineers ▶ Blockchain and AI specialists, forensic investigators and developers
Skills demand: Most important and needed digital skills		▶ Digital marketing ▶ Digital graphic design ▶ Coding and mobile app development	▶ Big data analysts ▶ Cybersecurity specialists ▶ Robotics engineers ▶ IoT specialists
Skills demand: Most important and needed core skills for life and work in the 21st century	▶ Social and emotional skills	▶ Social and emotional skills	▶ Social and emotional skills ▶ Cognitive and metacognitive skills

Table 16: Overview of skills and occupations most in demand by manufacturing businesses

Manufacturing businesses need a vast range of intermediate and advanced digital skills, and related occupations. Intermediate skills in current demand include digital marketing (currently needed by 39% and expected to grow to 50% over the next five years), digital graphic design (currently needed by 35%, expected to grow to 39%), and coding and mobile app development, which is expected to remain steady at 28%. Occupations related to intermediate digital skills with expected growing demand are website managers (currently at 35%, expected to grow to 49%) and desktop and support technicians (16% to 34% over the next five years). The need for website designers (44% to 46%) and data analysts (27% to 29%) will remain fairly steady.

Advanced digital skills in high demand include big data analytics (27% to 30%), cybersecurity (29% to 35%), robotics (28% to 37%) and IoT (16% to 30%). Related occupations include software and application developers, where the current demand of 30% is expected to grow to 37%. Big data analysts and BI developers, data scientists and cloud architect specialists are all currently in demand (16%), with IT and cybersecurity specialists at 24%. Secondary research also indicated a demand for robotics engineers and blockchain and AI specialists, forensic investigators and developers. In addition, previous studies have highlighted a need for cognitive and metacognitive skills, as well as social and emotional skills in the sector.

Digital skills		Current demand	Future importance
	Basic hardware skills	4%	52%
	Basic software skills	5%	54%
	Online operations	5%	52%
	Desktop publishing	7%	41%
	Digital graphic design	35%	39%
	Digital marketing	39%	50%
	Coding and mobile app development	28%	22%
	Big data analytics	27%	30%
	AI and VR	13%	17%
	IoT	16%	30%
	Cybersecurity	29%	35%
	Robotics	28%	37%

Table 17.1: Proportion of manufacturing businesses that reported that they need specific digital skills

Occupations requiring the use of technology		Current demand	Future importance
	Desktop support technician	16%	34%
	Website manager	35%	49%
	Website designer	44%	46%
	Data analyst	27%	29%
	Software developer	30%	37%
	Big data analyst/BI developer	16%	18%
	ICT engineer	10%	18%
	Data scientist	16%	23%
	UX/UI designer/developer	6%	13%
	IT/Cybersecurity specialist	24%	32%
	IoT specialist	4%	7%
	Cloud architect specialist	16%	16%

Table 17.2: Proportion of manufacturing businesses that reported that specific digital skills will be important to them in five years



Agricultural businesses

	1.	2.	3.
	School education (secondary school completed or not)	Post-school education and training (PSET) (entry level and experienced)	Higher education institutions/ Advanced skills (entry level and experienced)
Opportunities: Occupations most in demand		▶ Website managers ▶ Data analysts	▶ Data scientists
Skills demand: Most important and needed digital skills	▶ Online operations ▶ Hardware skills ▶ Software skills ▶ Basic end-user skills	▶ Online operations ▶ Digital marketers ▶ Hardware skills ▶ Software skills ▶ Intermediate level programmers	▶ AI and VR programmers ▶ IoT specialists ▶ Programmers, data analysts and blockchain specialists
Skills demand: Most important and needed core skills for life and work in the 21st century	▶ Social and emotional skills	▶ Social and emotional skills	▶ Social and emotional skills

Table 18: Overview of skills and occupations most in demand by agricultural businesses

Businesses working in agriculture need basic and intermediate digital skills as well as selected advanced digital skills. Basic digital skills that are in demand are online operations (38%), hardware skills (22%, with an expected growth to 31%) and software skills (22%, with an expected growth to 38%). Intermediate skills such as digital marketing are in demand at 31%, expected to grow to 34% over five years. Related occupations requiring intermediate skills include website managers (16%, expected to grow to 25%) and data analysts (also 16%, expected to grow to 19%).

Advanced digital skills that are in demand include AR and VR at 16%, expected to grow to 22%, and IoT, also at 16% but expected to grow to 19%. Secondary research indicated a demand for advanced digital skills related to programming, data analysis and blockchain. Occupations in agriculture that require advanced digital skills include data scientists (22%). In addition, previous studies have highlighted a need for social and emotional skills in the sector.

Digital skills		Current demand	Future importance
	Basic hardware skills	22%	31%
	Basic software skills	22%	38%
	Online operations	38%	38%
	Desktop publishing	6%	3%
	Digital graphic design	3%	13%
	Digital marketing	31%	34%
	Coding and mobile app development	13%	19%
	Big data analytics	13%	19%
	AI and VR	16%	22%
	IoT	16%	19%
	Cybersecurity	9%	19%
	Robotics	6%	9%

Table 19.1: Proportion of agricultural businesses that reported that they need specific digital skills

Occupations requiring the use of technology		Current demand	Future importance
	Desktop support technician	9%	9%
	Website manager	16%	25%
	Website designer	9%	34%
	Data analyst	16%	19%
	Software developer	3%	13%
	Big data analyst/BI developer	9%	16%
	ICT engineer	6%	13%
	Data scientist	22%	16%
	UX/UI designer/developer	0%	6%
	IT/Cybersecurity specialist	3%	13%
	IoT specialist	6%	9%
	Cloud architect specialist	0%	16%

Table 19.2: Proportion of agricultural businesses that reported that specific digital skills will be important to them in five years



Tourism businesses



Table 20: Overview of skills and occupations most in demand by tourism businesses



Tourism businesses mainly need support with **digital marketing and graphic design**. There is also **potential for more advanced digital skills**. Digital marketing is already in high demand with 29% and is expected to grow to a huge demand of 57%. Digital graphic design is currently in demand at 19%, with an expected growth to 29% in the next five years. Secondary research also indicated a demand for **advanced digital skills** related to AI, IoT, big data, mobile connectivity, automation, robotics and 3D printing. In addition, previous studies have highlighted a need for social and emotional skills in the sector.

Digital skills		Current demand	Future importance
	Basic hardware skills	0%	29%
	Basic software skills	0%	57%
	Online operations	5%	57%
	Desktop publishing	5%	19%
	Digital graphic design	19%	29%
	Digital marketing	29%	57%
	Coding and mobile app development	14%	5%
	Big data analytics	10%	19%
	AI and VR	10%	5%
	IoT	0%	10%
	Cybersecurity	5%	10%
	Robotics	0%	0%

Table 21.1: Proportion of tourism businesses that reported that they need specific digital skills



Occupations requiring the use of technology		Current demand	Future importance
	Desktop support technician	0%	29%
	Website manager	14%	57%
	Website designer	14%	57%
	Data analyst	5%	19%
	Software developer	5%	29%
	Big data analyst/BI developer	10%	57%
	ICT engineer	0%	5%
	Data scientist	0%	19%
	UX/UI designer/developer	0%	5%
	IT/Cybersecurity specialist	0%	10%
	IoT specialist	0%	10%
	Cloud architect specialist	5%	0%

Table 21.2: Proportion of tourism businesses that reported that specific digital skills will be important to them in five years



Businesses in the ICT sector



1.

School education

(secondary school completed or not)

2.

Post-school education and training (PSET)

(entry level and experienced)

3.

Higher education institutions/ Advanced skills

(entry level and experienced)

Opportunities: Occupations most in demand

- ▶ Desktop support technicians

- ▶ Desktop support technicians
- ▶ Website managers
- ▶ Data analysts
- ▶ Computer network technicians
- ▶ Website technicians
- ▶ System administrators
- ▶ Management consultants (business analysts)
- ▶ Database designers and engineers

- ▶ Software developers and analysts
- ▶ Big data analysts / BI developers
- ▶ ICT engineers
- ▶ Data scientists
- ▶ UX/UI designers and developers
- ▶ IoT specialists
- ▶ Cloud architect specialists
- ▶ ICT communication assistants
- ▶ ICT security specialists
- ▶ ICT systems analysts
- ▶ Advertising specialists
- ▶ Telecommunication network engineers

Skills demand: Most important and needed digital skills

- ▶ Coding and mobile app developers
- ▶ Digital graphic designers
- ▶ Digital marketers

- ▶ Big data analysts
- ▶ AI and VR programmers
- ▶ Cybersecurity specialists
- ▶ Robotics engineers
- ▶ Advanced digital skills related to cloud computing, IoT and information systems

Skills demand: Most important and needed core skills for life and work in the 21st century

- ▶ Social and emotional skills

- ▶ Social and emotional skills

- ▶ Social and emotional skills
- ▶ Cognitive and metacognitive skills

Table 22: Overview of skills and occupations most in demand by businesses in the ICT sector

There is a huge demand for digital skills in the ICT sector. Businesses need a vast range of occupations requiring intermediate and advanced digital skills. Intermediate digital skills that are in high demand include coding and mobile app development, as well as digital graphic design and digital marketing. Occupations requiring basic and intermediate skills include desktop and support technicians, website managers and data analysts. Secondary research also indicates a demand for intermediate-level computer network technicians, website technicians, system administrators, management consultants (business analysts) and database designers and engineers.

Advanced digital skills in high demand, with steady growth expected, include big data analytics, AI and VR, cybersecurity and robotics. Secondary research also indicated a demand for advanced digital skills related to cloud computing, IoT and information systems. Related occupations in huge demand include software developers, big data analysts, BI developers, data scientists, ICT engineers, UX and UI designers and developers, IoT specialists and cloud architect specialists. Secondary research also indicated a demand for ICT communication assistants, ICT security specialists, ICT systems analysts, advertising specialists and telecommunication network engineers. In addition, previous studies have highlighted a need for cognitive and metacognitive skills, as well as social and emotional skills in the sector.

Digital skills		Current demand	Future importance
	Basic hardware skills	5%	18%
	Basic software skills	5%	18%
	Online operations	8%	18%
	Desktop publishing	8%	10%
	Digital graphic design	18%	13%
	Digital marketing	18%	21%
	Coding and mobile app development	28%	28%
	Big data analytics	26%	28%
	AI and VR	23%	33%
	IoT	10%	21%
	Cybersecurity	23%	23%
	Robotics	21%	26%

Table 23.1: Proportion of ICT businesses that reported that they need specific digital skills

Occupations requiring the use of technology		Current demand	Future importance
	Desktop support technician	15%	10%
	Website manager	18%	15%
	Website designer	13%	18%
	Data analyst	23%	21%
	Software developer	36%	21%
	Big data analyst/BI developer	23%	21%
	ICT engineer	21%	33%
	Data scientist	23%	26%
	UX/UI designer/developer	18%	23%
	IT/Cybersecurity specialist	10%	28%
	IoT specialist	15%	18%
	Cloud architect specialist	21%	26%

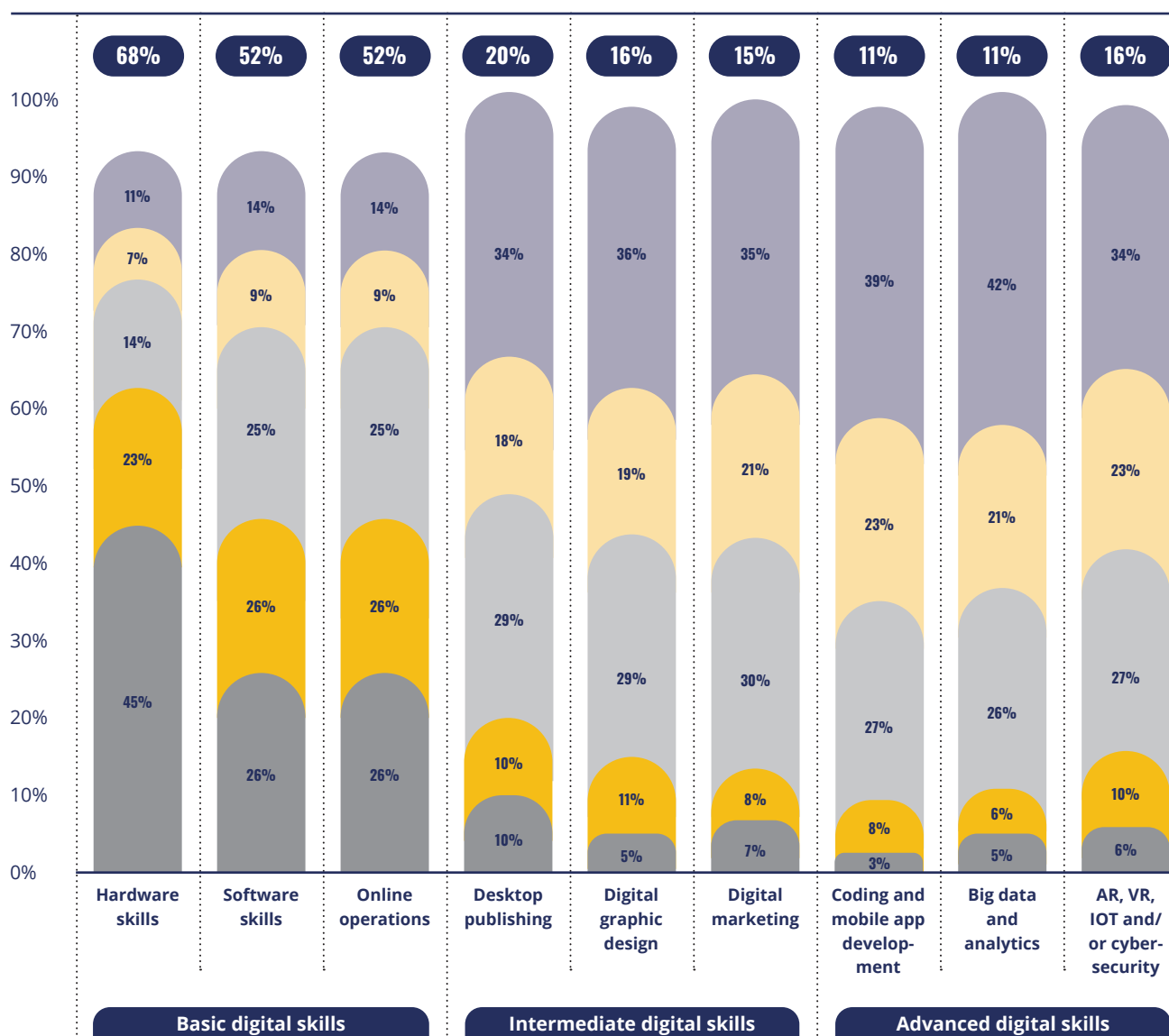
Table 23.2: Proportion of ICT businesses that reported that specific digital skills will be important to them in five years



Skill level of young people in South Africa

Digital skill levels among SA's young people

Around half of all the young participants in the study reported that they have basic digital skills. Hardware skills are most common, with 45% reporting that they have used them a lot and 23% saying they have used them a bit. This is followed by software skills and online operations. Less than 20% reported having specific intermediate digital skills like desktop publishing, digital graphic design or digital marketing. Advanced skills are rather rare among the young people who participated in this survey.



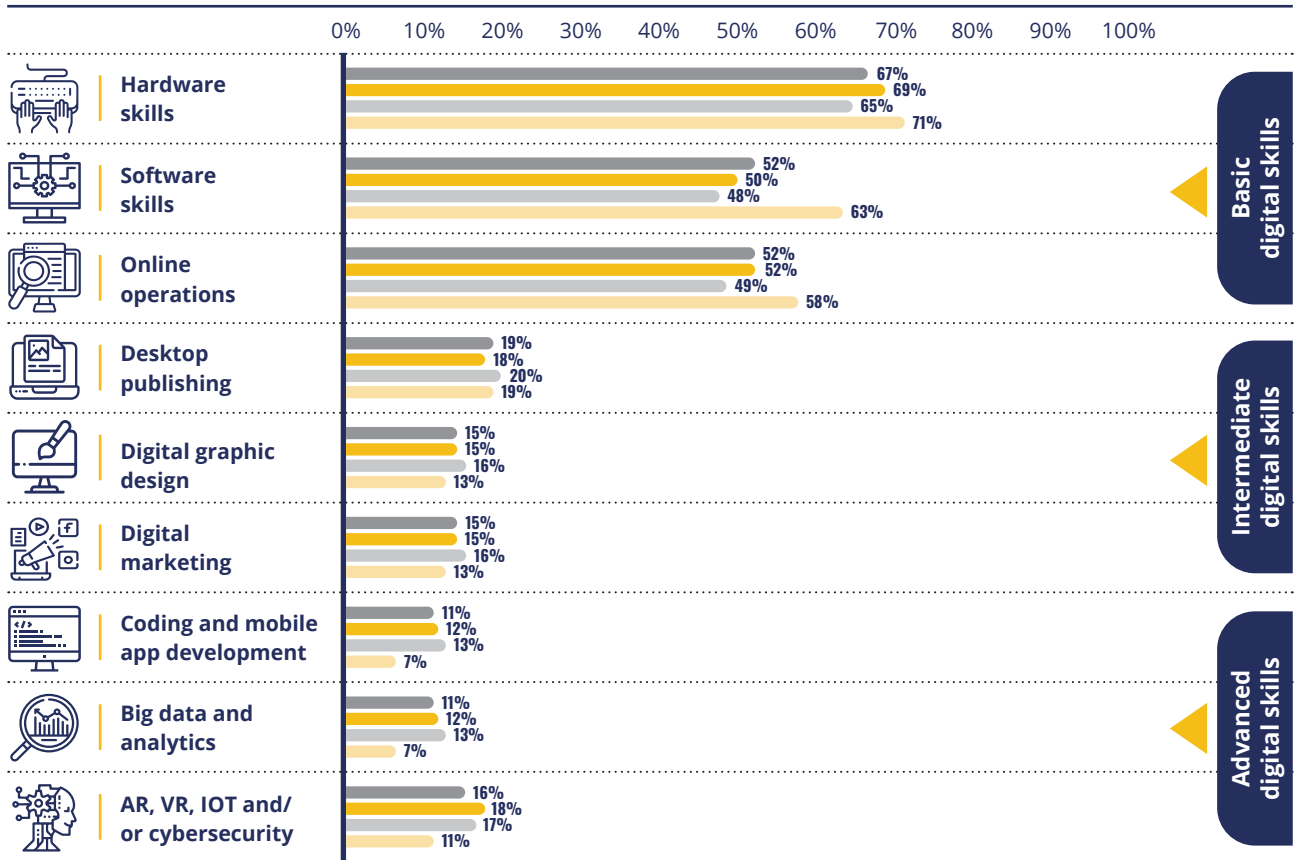
● Proportion who say they have this skill

- I have used this skill a lot (regularly)
- I have used this skill a little bit (at least once)
- I know about this skill but I have not really used this skill or don't have it myself
- I have heard about it but I don't really know what it means
- I have never heard about this skill

Graph 25: Proportion of young people indicating that they have basic, intermediate or advanced digital skills

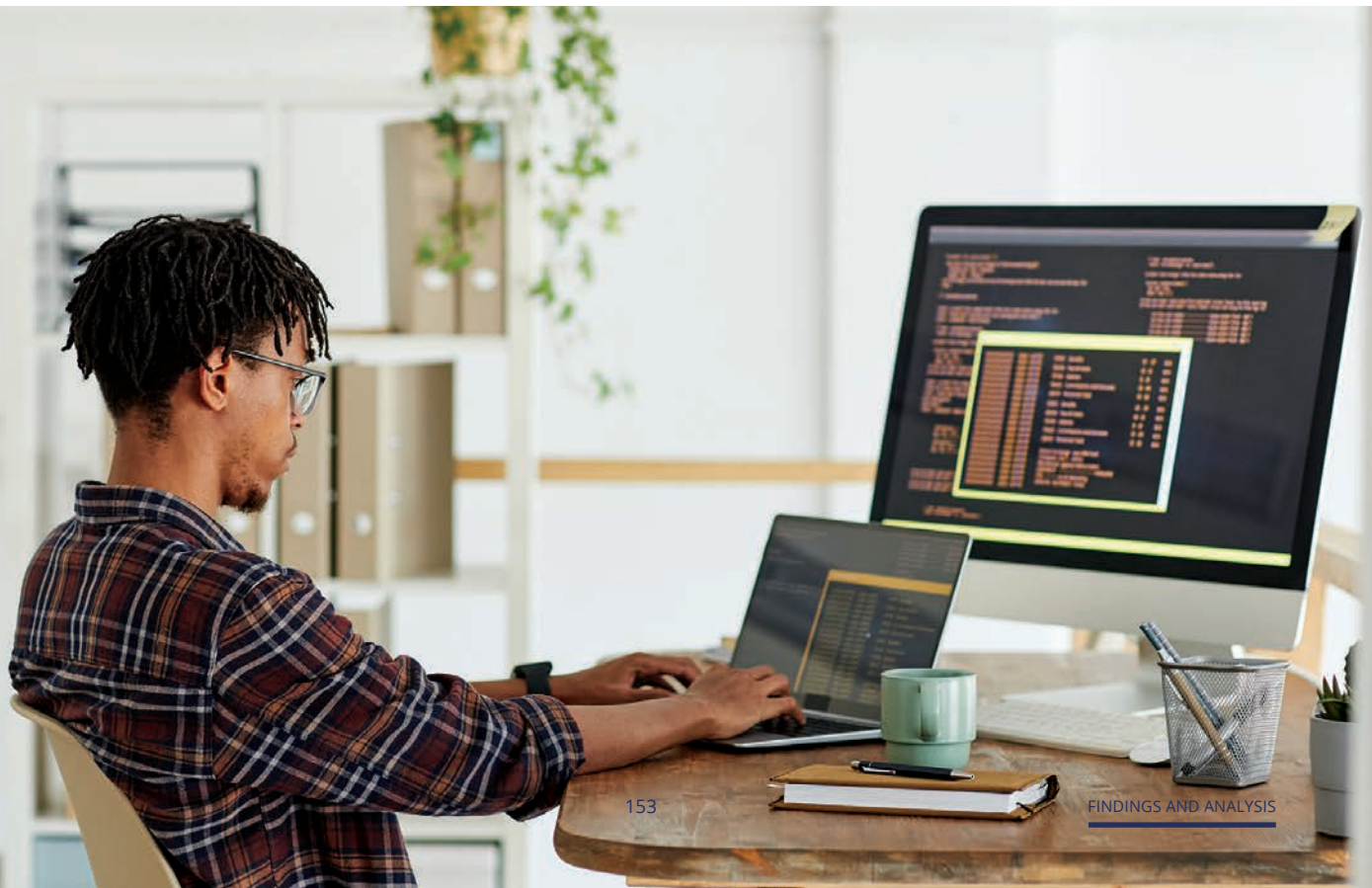


Concerning intermediate digital skills, the skill set of all age groups was similar, with participants aged 18 to 24 being least likely to have digital graphic design or marketing skills. Participants aged 18 to 24 were least likely to have advanced digital skills, which likely means that the slightly older young people have gained more experience or attended specific training.

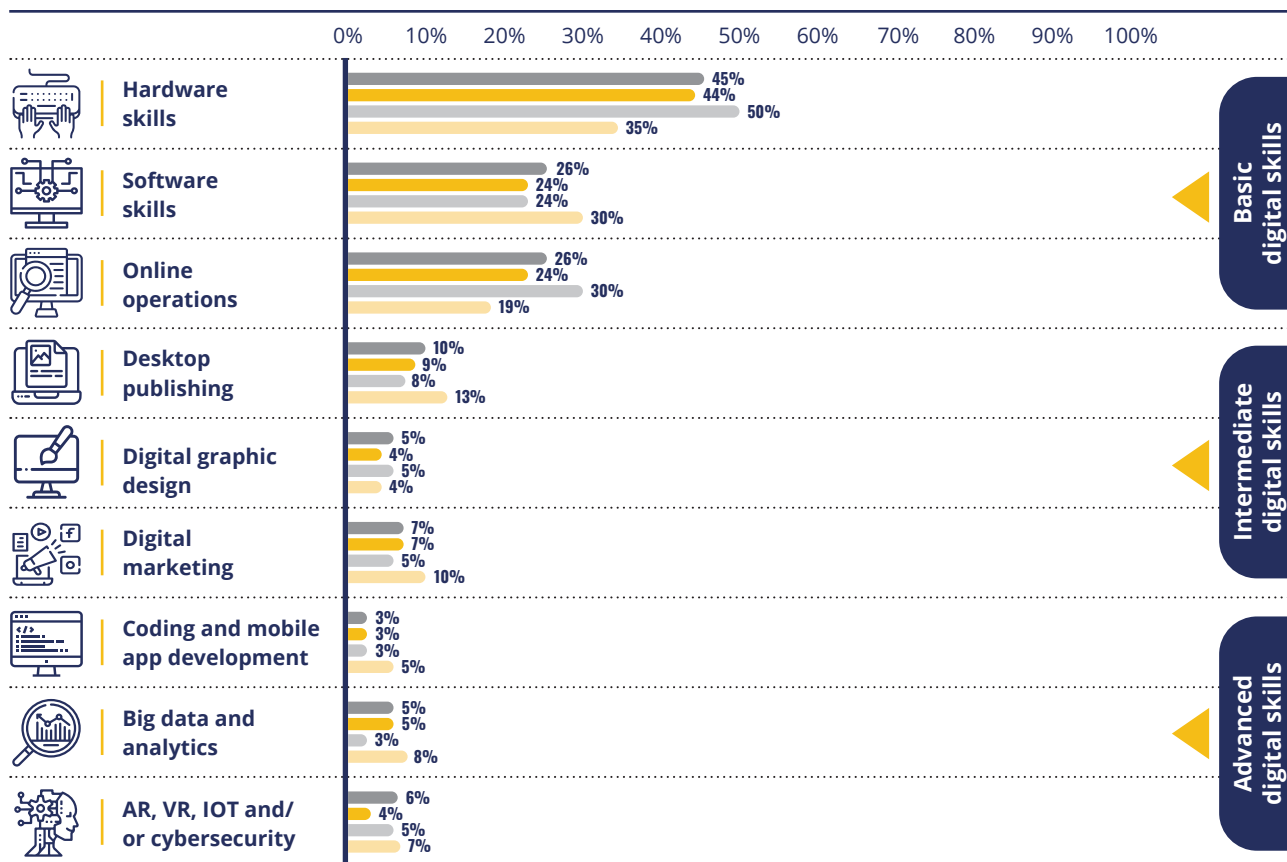


Graph 26: Proportion of participants reporting that they have used basic, intermediate or advanced skills, according to age group

● All ● 31-35 y ● 25-30 y ● 18-24 y



Young people from urban areas were more likely than those from rural areas to have hardware and online operations skills. The urban and rural groups were equally likely to have used digital graphic skills, coding and app development skills or AI, VR, IoT or cybersecurity skills and less likely to have other digital skills.



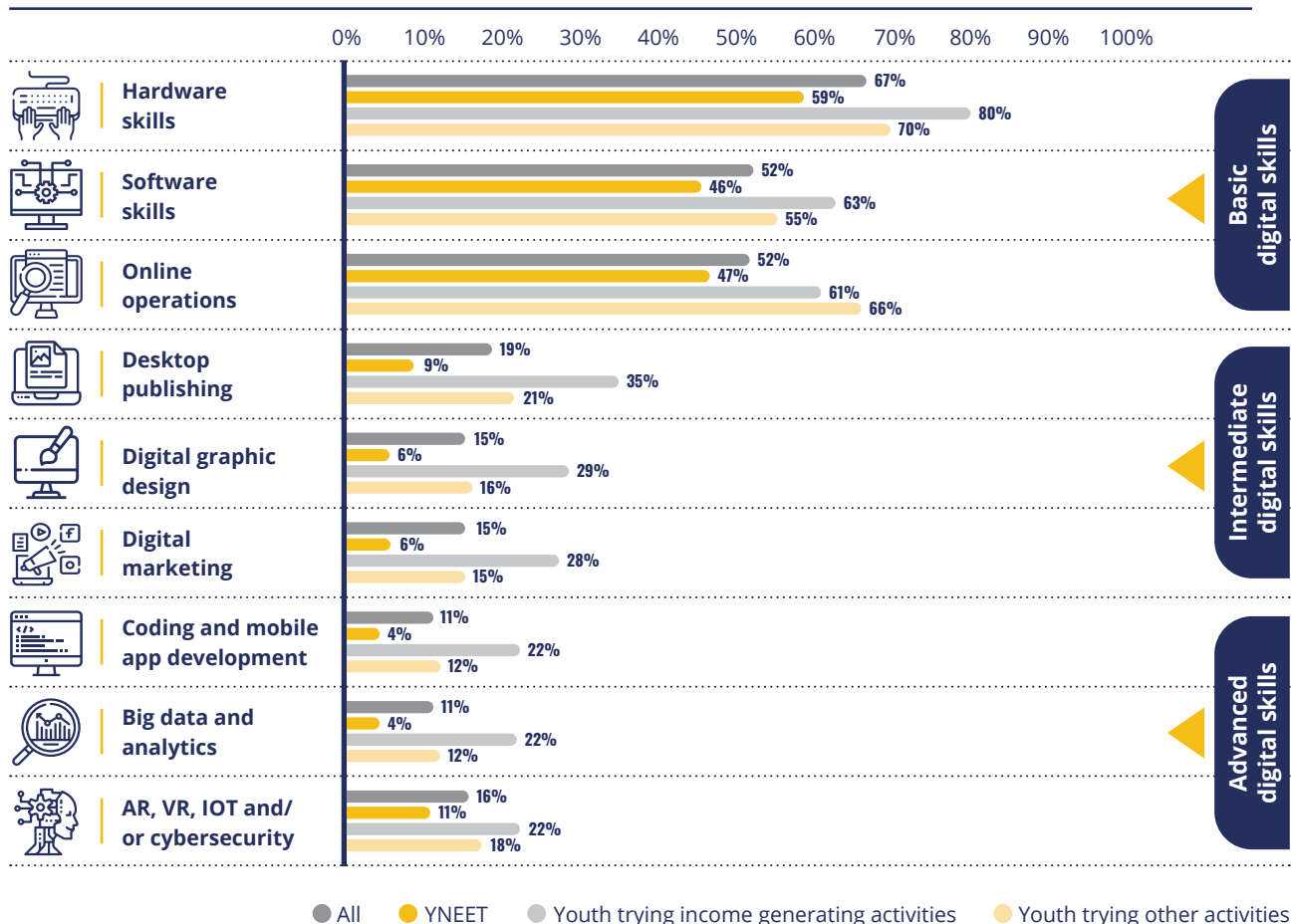
Graph 27: Proportion of female, urban and rural participants reporting that they have basic, intermediate or advanced digital skills that they have used a bit or a lot.

● All ● Female ● Urban ● Rural



Overall, the study found that YNEET largely have a similar skill set, whether they live in rural or urban areas. YNEET have lower levels of broad digital skills and young people trying to make an income have more of these broad digital skills compared to all participants. YNEET are in particular less likely to have intermediate and advanced digital skills.

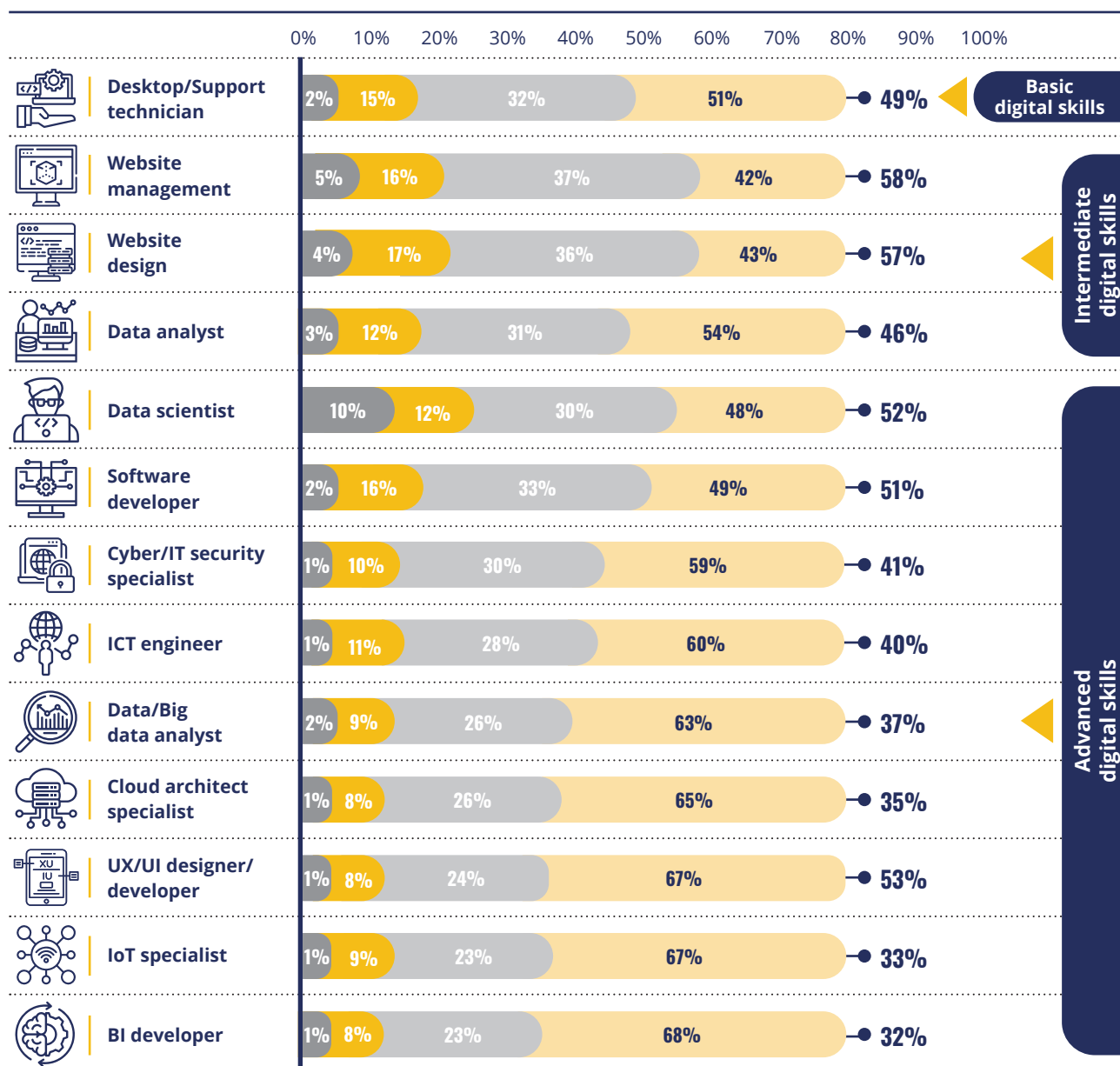
Young people who are pursuing an income-generating activity are most likely to have specific digital skills. The difference is particularly high for advanced and intermediate digital skills, as young people making an income are nearly twice as likely to have many of these skills.



Graph 28: Proportion of all participants, YNEET, youth engaging in income-generating activities and youth engaging in other activities reporting that they have basic, intermediate or advanced digital skills that they have used a bit or a lot



Ability to apply for specific occupations that require technology and digital skills



Graph 29: Percentage of participants who reported having heard about and feeling ready to apply for specific roles that require digital skills and the use of technology

- I have heard about it and could apply
- I know about this role but I could not apply to it
- I have heard about it but I don't know what they do
- I have never heard about this role

Young people have the highest level of awareness of specific occupations that require intermediate digital skills, such as website management and website design. This is followed by data scientists, software developers and desktop and support technicians. They are least aware of all other occupations that require specific advanced digital skills, and less than 1% feel equipped to apply for such positions.

Core skills for work and life in the 21st century

Most young people in the survey have foundational literacy as well as other core skills for life and work in the 21st century. Almost 70% said they have used foundational literacy skills a lot and 17% a little bit. Regarding cognitive and metacognitive skills, 73% of young people have used analytical and critical thinking skills, 67% have used problem solving and decision-making skills and 62% have used self-reflection and skills for learning to learn. In relation to social and emotional skills, 45% have used communication skills a lot and 25% a bit, 35% have used collaboration and teamwork a lot and 29% a bit and 30% have used conflict resolution and negotiation skills a lot and 29% a bit. The least frequently used skill is career management – 22% reported having used it a lot and 32% a little bit.

YNEET are slightly less likely than young people in general to have foundational literacy as well as other core skills for life and work in the 21st century. In relation to cognitive and metacognitive skills, they are 3% less likely to have analytical and critical thinking skills or problem solving and decision-making skills. Roughly the same applies to self-reflection, social and emotional skills, communication skills and collaboration and teamwork or conflict resolution and negotiation skills.

Compared to all participants, women reported lower skill levels in relation to core skills for work and life in the 21st century. They are nearly as likely to have foundational literacy skills, but reported lower skill levels in terms of self-reflection, problem solving and decision-making, as well as analytical and critical thinking skills. In terms of social and emotional skills, female participants were less likely to report conflict resolution and negotiation skills, collaboration and teamwork skills as well as communication skills. About half said they have used career management skills, which is 6% lower than all participants.



Skills mismatch

This study identified key gaps in relation to the inclusion of young people, especially YNEET, in South Africa's digital economy

1

There is a need to strengthen young people's general skill set. Basic digital skills must be the norm, as about 50% still lack software and online operating skills and about 30% lack hardware skills. To overcome the digital divide, specific short-term and inclusive training programmes can be offered.



2

There is a key gap in relation to all types of intermediate digital skills. There is also a need to train core skills for life and work in the 21st century so that youth can use digital skills in a working or entrepreneurial context. Young people can be supported by equipping them with the understanding of specific systems and programmes that are widely used in the industry or by specific potential employers.



3

There is also a gap in relation to all types of advanced digital skills. There is a further need to train core skills for life and work in the 21st century so that youth can access opportunities that require work experience. Young people can potentially be equipped with practical experience in applying advanced digital skills in a working environment. Young people with some work experience and prior knowledge can benefit from applying their digital skills in a leadership, supervisory or even managerial role.



► Considering the projected demand for specific skills in the digital economy and the potential to prepare young people for this, the study identified specific gaps:

1.

There is a need to train young people to use software, applications and systems that are essential in a working environment, and improve skill sets so that they can provide technical and desktop support.

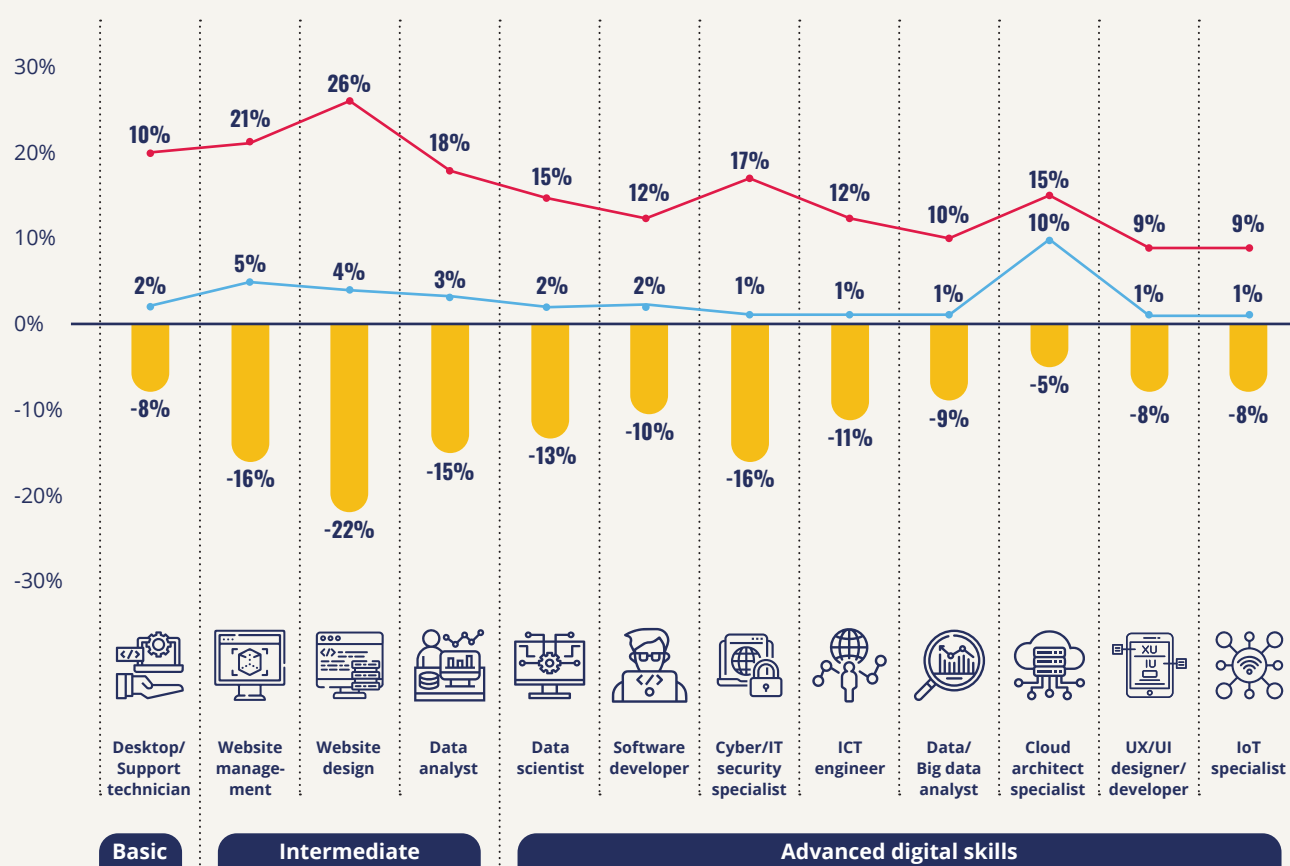
2.

There is a need for young people with work experience and practical skills. This presents the prospect of creating entrepreneurial opportunities and preparing young people to provide digital services to businesses.

3.

It is important to create awareness that the low number of students in STEM fields may limit growth in the digital economy. Colleges and other training providers highlighted a gap in specific specialized skills, such as cybersecurity. There is an opportunity for courses and training programmes that are suitable for YNEET and can teach young people specific skills, such as cybersecurity and coding.

The researchers compared employers' existing needs with the skill set of young people included in our survey to identify the gaps regarding specific occupations that are important for the digital economy. The biggest gaps relate to occupations that require intermediate skills, especially website design, which is in demand by 26% of all employers but has been used by only 4% of survey participants. This is followed by website management, in demand by 21% of businesses but used frequently by only 5% of young people. The third biggest gap is in relation to IT and cybersecurity specialists, in demand by 17% of businesses while only 1% of young people feel equipped to apply. Other important occupations requiring PSET are data analysts, in demand by 18% of all businesses and with only 3% of survey participants feeling equipped to apply, and software developers, in demand by 15% of businesses while only 2% of young people feel ready to apply. The gap between the proportion of businesses seeing a demand and the proportion of young people feeling equipped to apply is more than 10% for big data analysts, BI developers and ICT engineers. It is slightly lower for cloud architect specialists, UX and UI designers and developers, and IoT specialists.



Graph 30: Comparison of existing demand for specific occupations that require technology reported by businesses in the survey, compared to the proportion of young people who feel ready to apply for these roles

- % of employers who struggle to fill this position
- % of youth who feel equipped to apply for this occupation
- Gap in relation to specific occupation



Pathways to YNEET gaining in-demand skills

Key barriers and challenges

► Availability

Formal education is one possible pathway for young people to acquire skills. Work-based training, internship programmes and integrated learning (WIL) are options that offer more practical skills. Some companies allow people without any work experience to work in stimulated environments where they can apply academic and technical skills that can make them more employable. These programmes include internships, learnerships and apprenticeships.

Government departments and institutions also offer a range of education and training programmes for young people. Youth Build is a community-based National Youth Service programme that offers volunteers comprehensive training focused on the integration of academic achievement, work experience, social action, leadership development and personal transformation. An example of such a programme includes the intake of 100 volunteers who spend eight to 12 hours in class and on site, learning the construction trade according to the Youth Build model. Another example is the Department of Social Development's Youth Development Programme. The programme gives people aged 14 to 35 the opportunity to improve their career paths by developing life, personal and work skills and receiving mentorship. It also offers youth the opportunity to secure internships through the EPWP. The EPWP is a Department of Public Works programme that aims to provide poverty and income relief through temporary work for unemployed people aged 16 to 35. This gives them skills and work experience, which should improve their chances of future employment and trigger their entrepreneurial spirit. The government also initiated the National Youth Service Programme, which is aimed at engaging young people in community service and helping them acquire skills that are necessary to access employment opportunities.

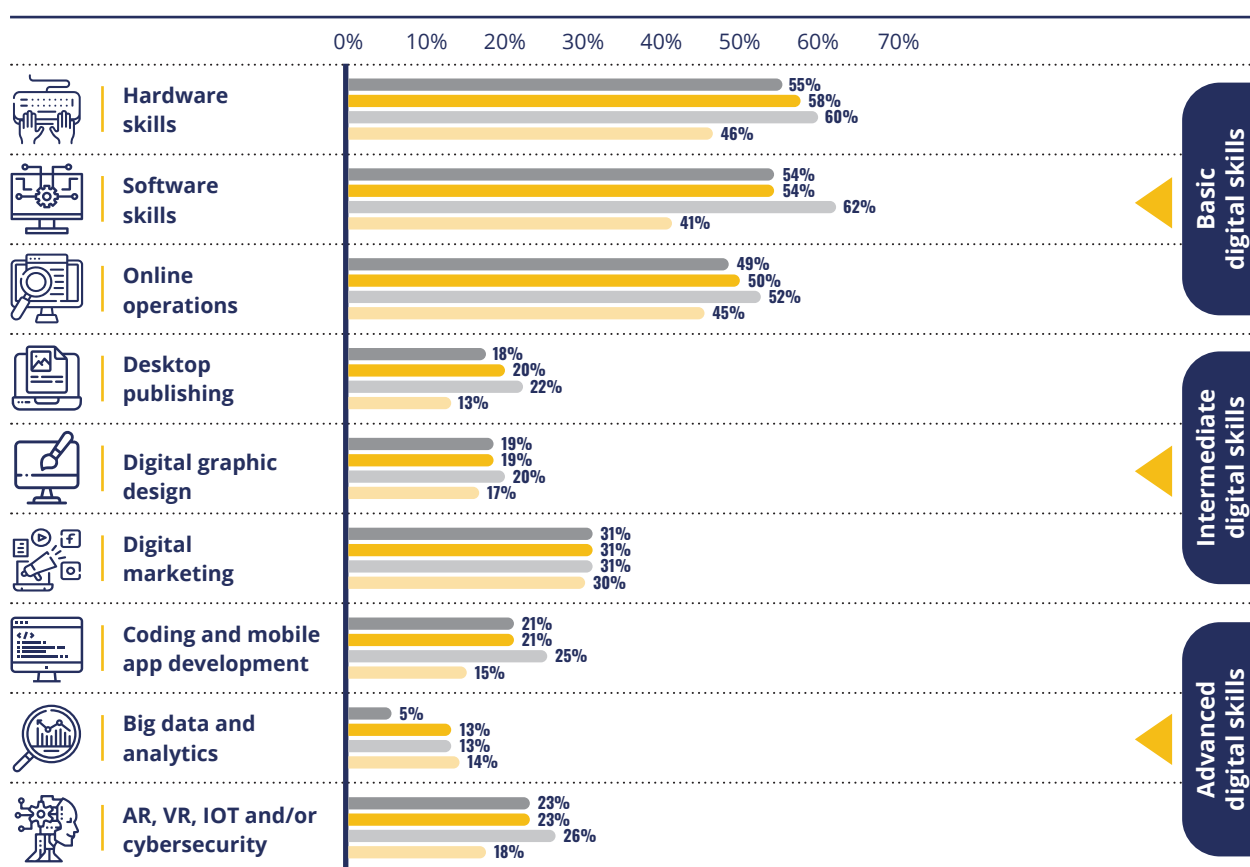
In addition, non-profit organizations and the private sector offer many support programmes and opportunities. These do not reach all young people, considering the large number and geographic spread of YNEET in South Africa.



► Awareness of opportunities and skills required

Participants see a range of opportunities in the digital economy, mainly learning and entrepreneurial. In relation to their awareness of the skills they need to participate in the digital economy, participants consider basic digital skills as more important than advanced skills.

In relation to specific opportunities in the digital economy, many young people are unsure or see no opportunities at all, which points to a lack of awareness. Not all participants answered the question “Which opportunities do you see in the digital economy?” – of those who did, 11% see no opportunity, 9% were unsure, 10% mentioned opportunities to learn and gain an education, 8% see more job opportunities and 6% see opportunities specifically for digital and online businesses. Some participants also see entrepreneurial opportunities, such as using digital platforms and channels to advertise and market (mentioned by 8%), doing online sales (7%) or starting a digital or online business (5%). They consider digital marketing to be the most important intermediate digital skill.

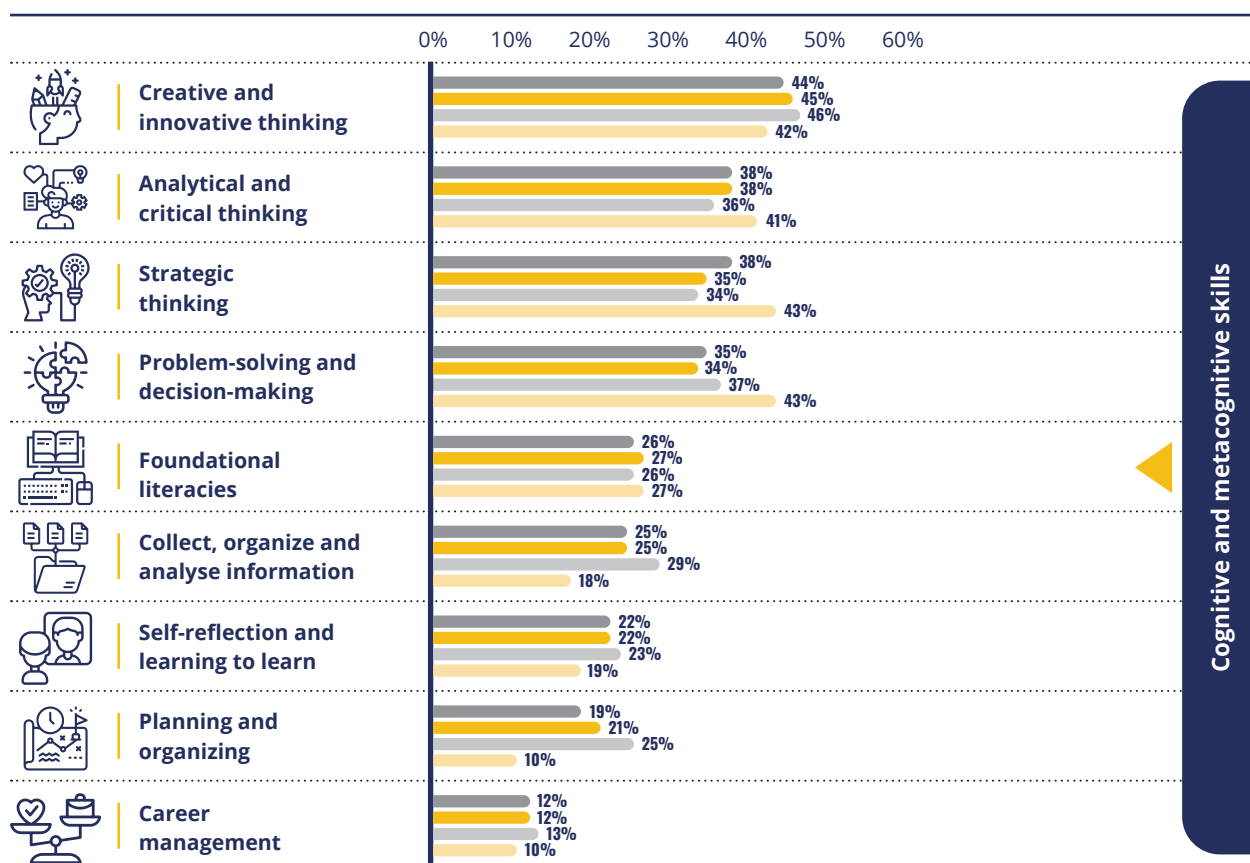


Graph 31: Proportion of young people in survey who consider specific digital skills as important to participate in the digital economy

● All ● Female ● Urban ● Rural



In relation to the core skills required for work and life in the 21st century, participants listed core digital economy skills but underestimate basic cognitive and metacognitive skills. The skills they consider most important are aligned to businesses' perception that there is "a need for problem-solving, structured thinking, thinking outside the box", mentioned by a software company's HR officer. About 45% of young people believe creative and innovative thinking is important, 38% mentioned analytical, critical and strategic thinking and 35% mentioned problem solving and decision-making. Experts also emphasized the need for self-awareness, while only 22% of young people mentioned the importance of self-reflection and learning to learn. Only 12% see a need for career guidance, even though a lack of information about subjects and courses that will get them to their chosen career remains a key barrier that is preventing young people from furthering their skills.

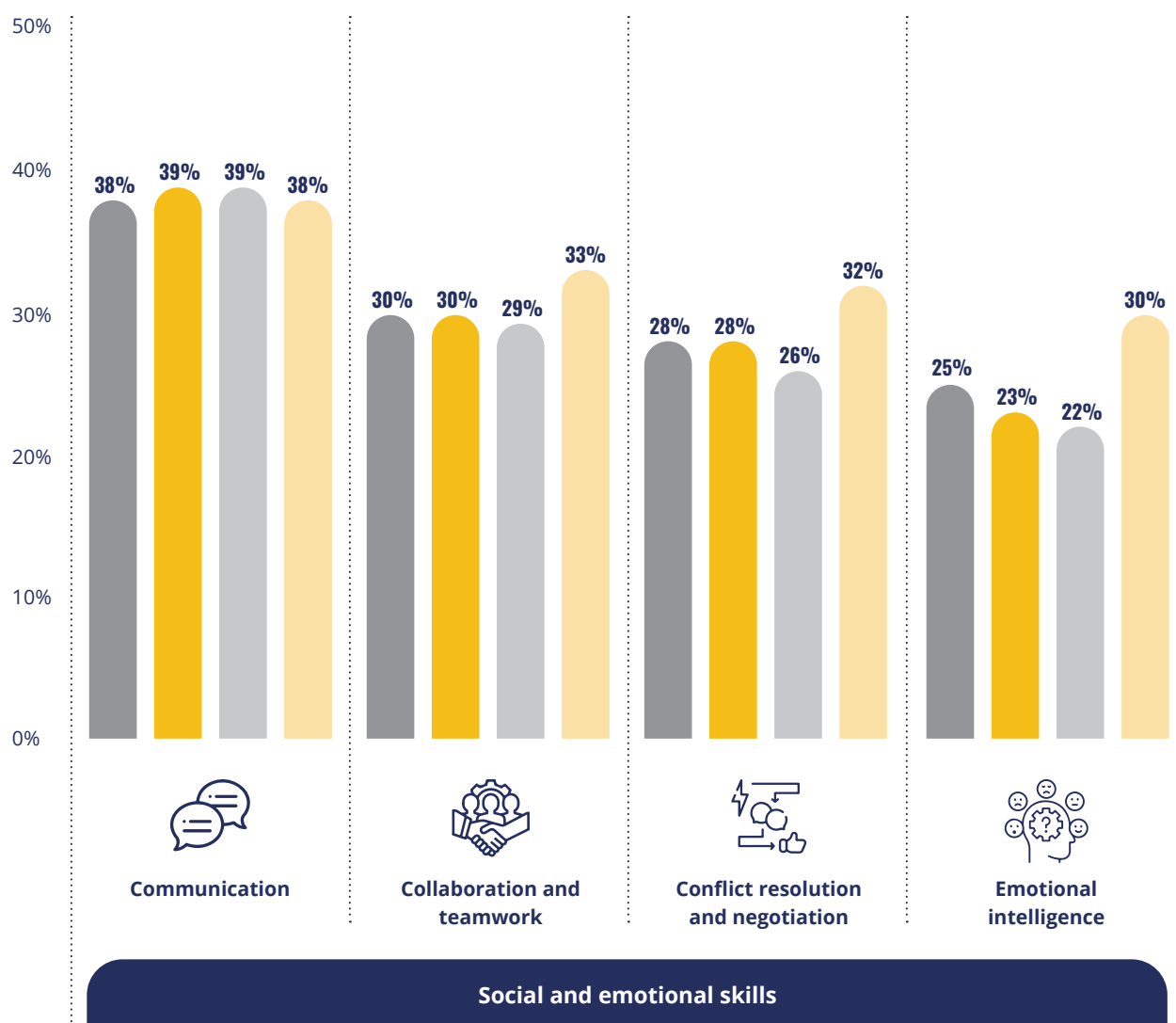


Graph 32: Proportion of young people in the survey who consider specific cognitive and metacognitive skills as important to participate in the digital economy

● All ● Female
● Urban ● Rural



Less than half of participants are aware of the importance of social and emotional skills in the digital economy. Key experts, however, emphasize these skills and see a need for a “holistic development in confidence building, self-awareness, presentation and teamwork”. Communication is seen as the most important, as mentioned by 38%, followed by collaboration and teamwork, mentioned by 30%.



Graph 33: Proportion of young people in the survey who consider specific social and emotional skills as important to participate in the digital economy

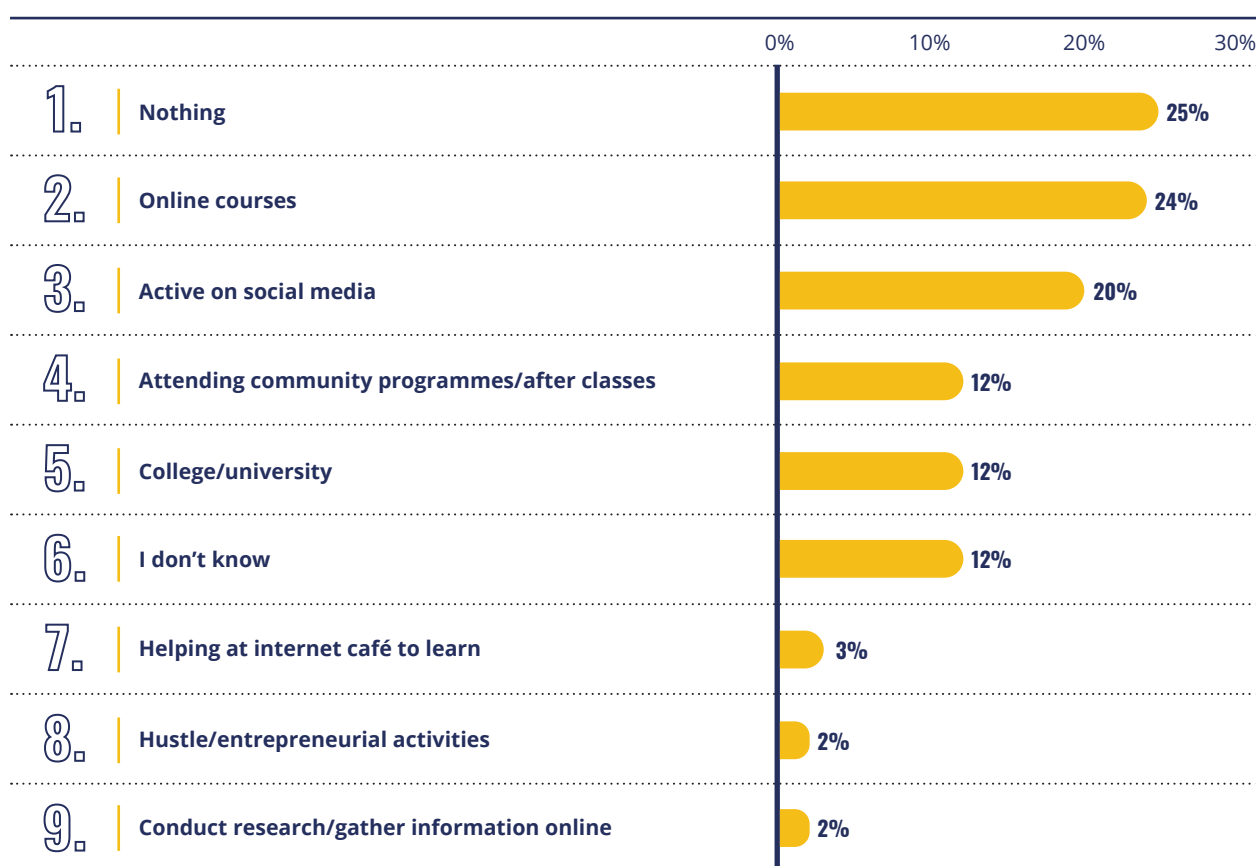
● All ● Female ● Urban ● Rural

Exposure to information – such as skills development and employment opportunities – is important, as it can help young people grow professionally and in their personal lives. However, limited access to information and resources remains a challenge to be addressed. Public communication by organizations focused on youth development, such as the National Youth Development Agency (NYDA), largely happens through the internet. The NYDA website communicates its services and contact details, but this form of information sharing works for people with internet access.

► Attempts

Overall, young people actively try to access opportunities to improve their skills, despite information and financial constraints. Reports indicate that many YNEET attend skills training courses while already enrolled in youth development and employability programmes. However, a lack of information about subjects and courses that will get them to their chosen career remains a key barrier. Survey participants listed a range of options that young people are attempting to develop digital skills. About a quarter reported that young people are using online courses, 20% said they are active on social media and 12% reported that young people are attending college, university or community programmes.

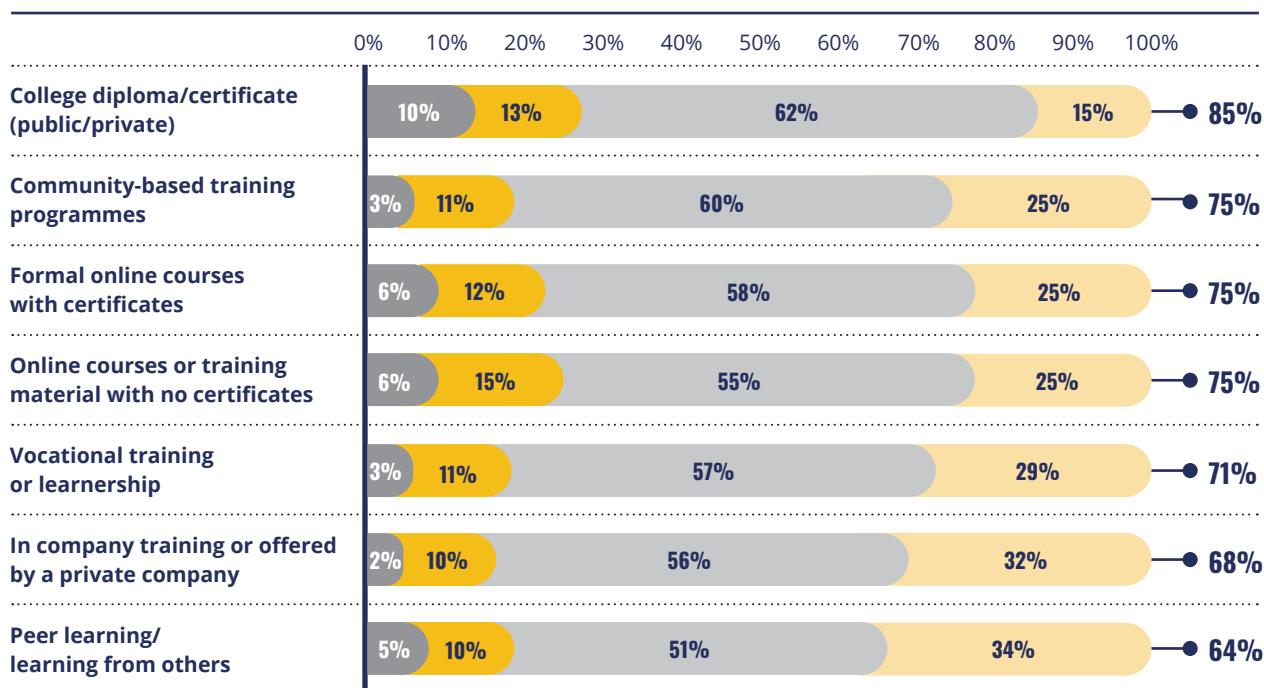
However, 25% of participants said there is nothing they can do and 12% are unsure, which indicates that not all young people feel that developing their skill set is in their control. Young people use a range of websites and platforms for career guidance, but a lack of perceived options and opportunities can negatively affect their motivation.



Graph 34: Proportion of young people listing different options to gain digital skills



Our findings are supported by quantitative data that the Siyaka Youth Foundation analysed, which indicates that YNEET have completed multiple skills development programmes to ensure that they keep up with labour market requirements. Participants in our survey have applied for or tried to complete different types of education – 23% applied or tried to get a college diploma or certificate but only 10% succeeded in doing so; 14% applied or started a community-based training programme but only 3% completed it; 75% are aware of online courses or training and, while 21% started or applied, only 6% completed them; 14% applied or started a vocational training or learnership programme but only 3% completed it.



Graph 35: Proportion of young people who have completed or attempted specific types of education compared to those who have not tried or heard about it

- I completed this education or training
- I applied but was not accepted/I tried it but did not continue
- I have heard about it but never applied/never tried it
- I have never heard about it





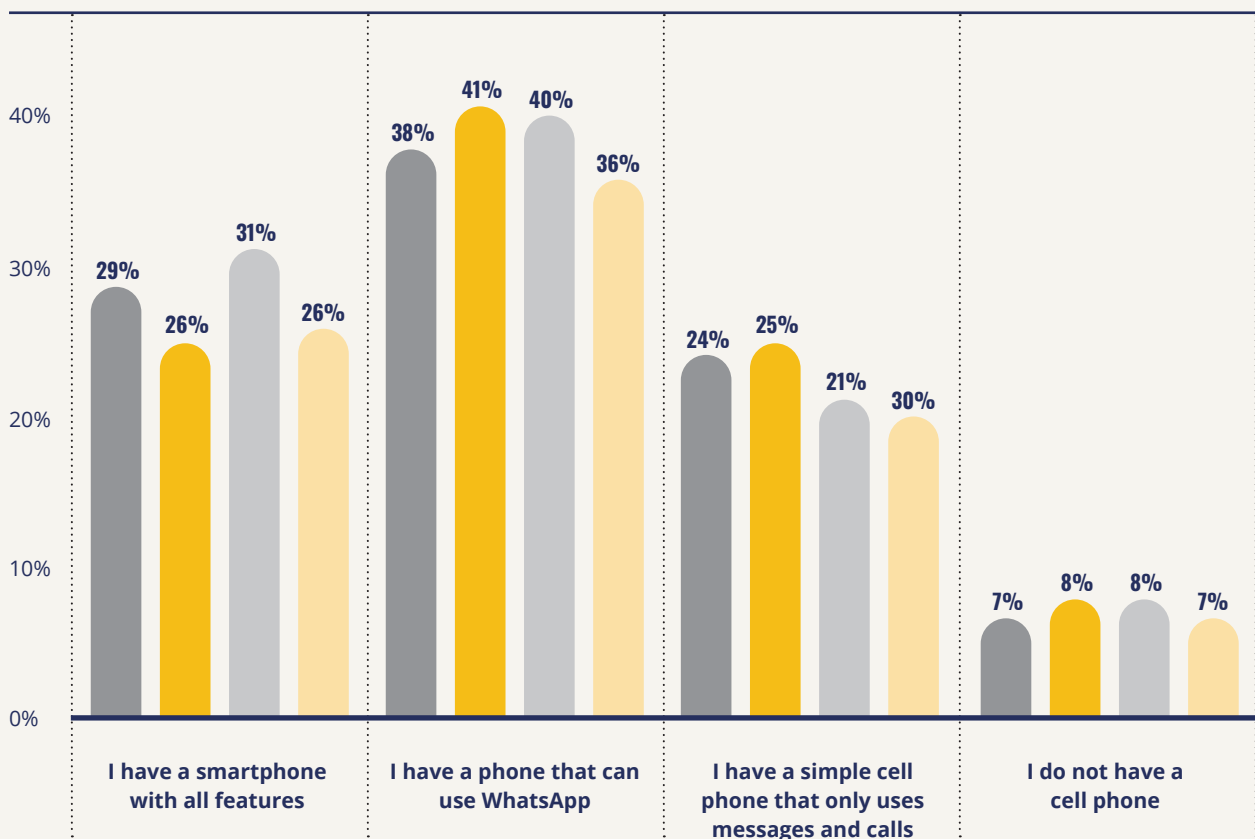
Image 1: Websites, search engines and other online platforms used for career guidance, learning, development and job applications mentioned by young people in the survey – the size of the word indicates the prominence

Young people use a range of online platforms for career guidance, learning and development, mainly via Google searches. These include Facebook, Indeed, LinkedIn and Gumtree, as well as government websites such as the [NYDA](#) site. [Searching for employment](#) can teach young people about perseverance and self-motivation. However, young people state that they are frustrated by trying to further their education, due to a lack of information on subjects and courses that will get them to their chosen career, not knowing the application due dates, and encountering hidden application fees. Acknowledging and dealing with feelings of hopelessness and wanting to give up after numerous rejections and lengthy periods of unemployment should be incorporated in [YNEET skills training programmes](#). Developing mental strength – such as through self-motivation techniques – could be considered as part of skills needed in everyday life, including the world of work.

► Internet access and affordability

Most survey participants had access to a phone with basic features. A third of participants in urban areas and a quarter in rural areas had a smartphone. The survey showed that the digital divide disadvantages young people, especially in rural areas. Around a third of participants had no internet access and young people in rural areas were more affected. A lack of internet access makes it difficult for young people to attend online courses. Information sources who work with YNEET emphasize the importance of in-person training.

Connectivity remains a key factor that excludes many young people, mainly due to the high cost of mobile data and a lack of internet access. This was highlighted by key experts, who made statements like “mobile data is very prohibitive; data is very expensive; accessibility will be possible through fibre, but this is currently a challenge”. This is also a key barrier to young people’s access to online courses and training programmes. An expert from the Presidency said: “There is a concern in relation to the uptake of Microsoft courses offered free of charge through Nemisa. Lack of access to the internet or data remains a key concern.”



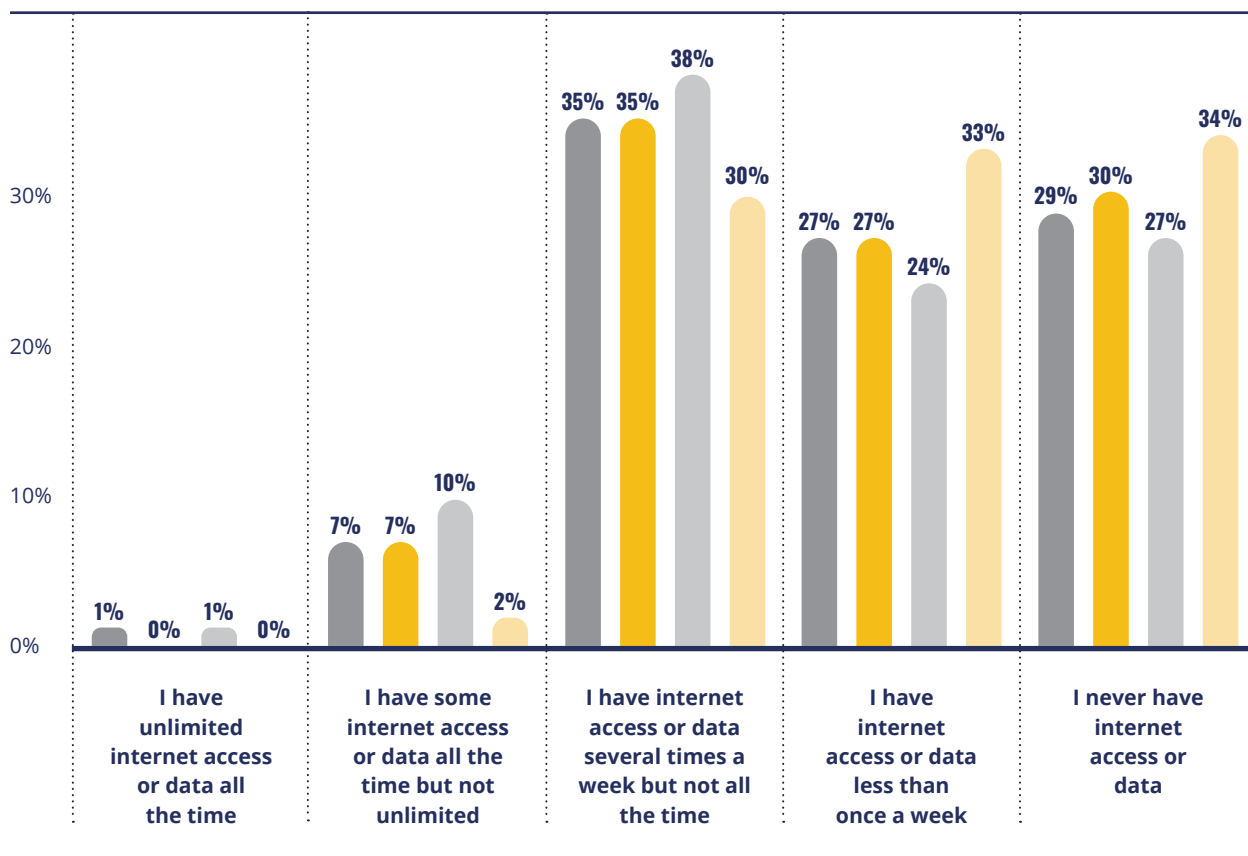
Graph 36: Proportion of participants in the survey with access to mobile devices and the internet

● All ● Female ● Urban ● Rural



Many young people in South Africa, especially those from marginalized or rural communities, lack access to work opportunities and support services. One example is the NYDA, which has 15 full-service branches across the country, mainly in metropolitan areas. The agency also has district offices in smaller towns, giving more people access to their services.

YNEET indicated that they do send out multiple job applications. However, these applications rarely produce results. Instead, young people incur the costs of transport, the internet and printing. Research by the University of Johannesburg indicated that, on average, a person spends more than R500 a month while searching for a job.



Graph 36: Proportion of participants in the survey with access to mobile devices and the internet

● All ● Female ● Urban ● Rural





► Ability to gain an education or develop skills

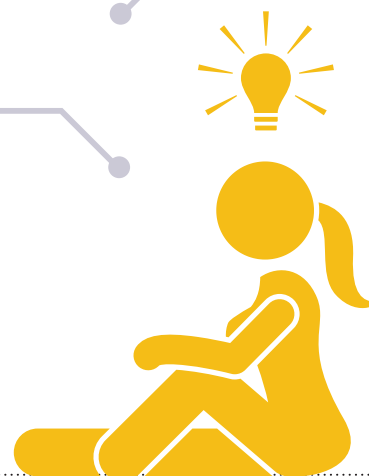
Based on our survey, most young people have some secondary education but face barriers that keep them from completing this education phase and then access tertiary education. The completion rates on secondary and tertiary education levels are very low, especially among black South Africans.

Some 9% did not complete any formal schooling, 1% completed early childhood education (International Standard Classification of Education level 0), 6% completed primary education (ISCED level 1), 29% completed secondary education until Grade 9 (lower secondary education or ISCED level 2), 43% completed secondary education until matric (upper secondary education or ISCED level 3), and 10% have a post-secondary education (ISCED level 4 to 7). Tertiary education in particular is expensive, which mainly affects youth from impoverished backgrounds.

The lack of awareness about available information and resources needed for young people to upskill themselves is a further gap that needs to be addressed. Around 10% have some training and another 10% have done some online self-study, mainly urban youth with better access to online platforms. Youth in rural area are less likely to attend training or courses than those in urban areas. And although young people are familiar with colleges in South Africa, only 20% of participants have tried to apply and only half were able to complete their courses.

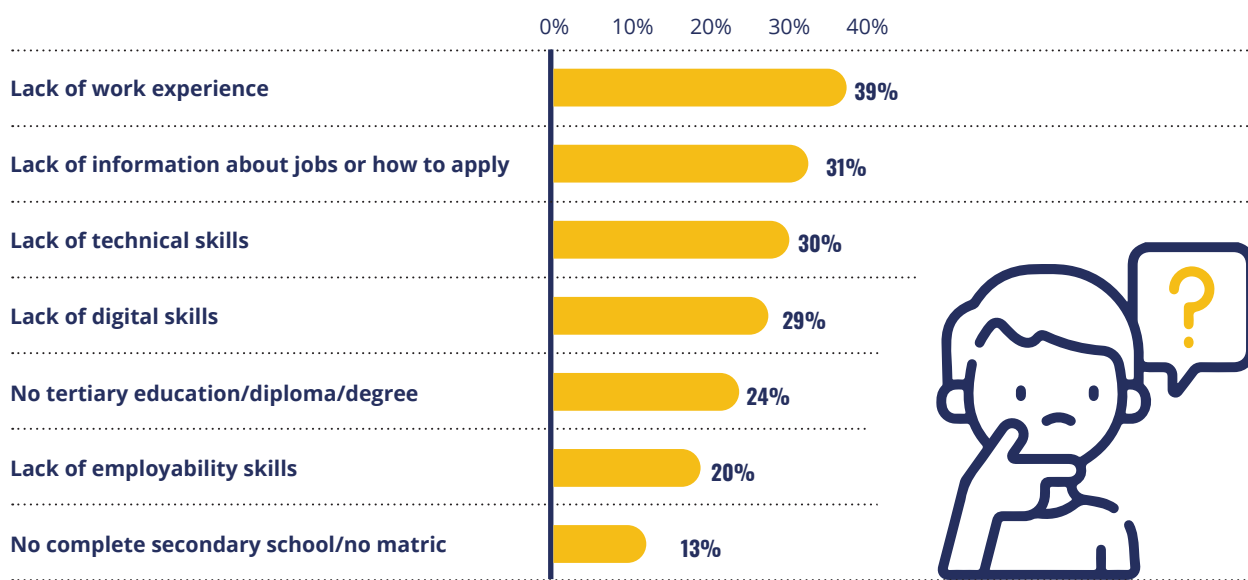


Key experts the researchers consulted highlighted that training and skills alone do not necessarily increase young people's chances of employment. They explained that young people often lack the required social capital and guidance to access employment opportunities.



The survey indicates that young people have low self-confidence about finding work. Only 1% of participants are confident that they will find a job and around 15% believe they have a good chance. One in five participants believe they have no chance of finding a job, again highlighting how detached young people feel from the labour market. Young people in rural areas feel even more removed from employment opportunities, compared to those in urban areas.

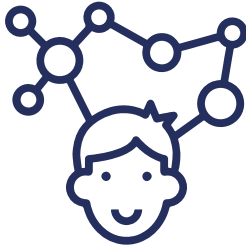
They consider lack of work experience as the main obstacle, as mentioned by 39% of participants, followed by a lack of information about jobs and how to apply (31%). They also see a lack of technical and digital skills as a barrier, mentioned by 30% and 29% respectively.



Graph 37: Proportion of participants listing specific barriers and challenges keeping them from accessing employment



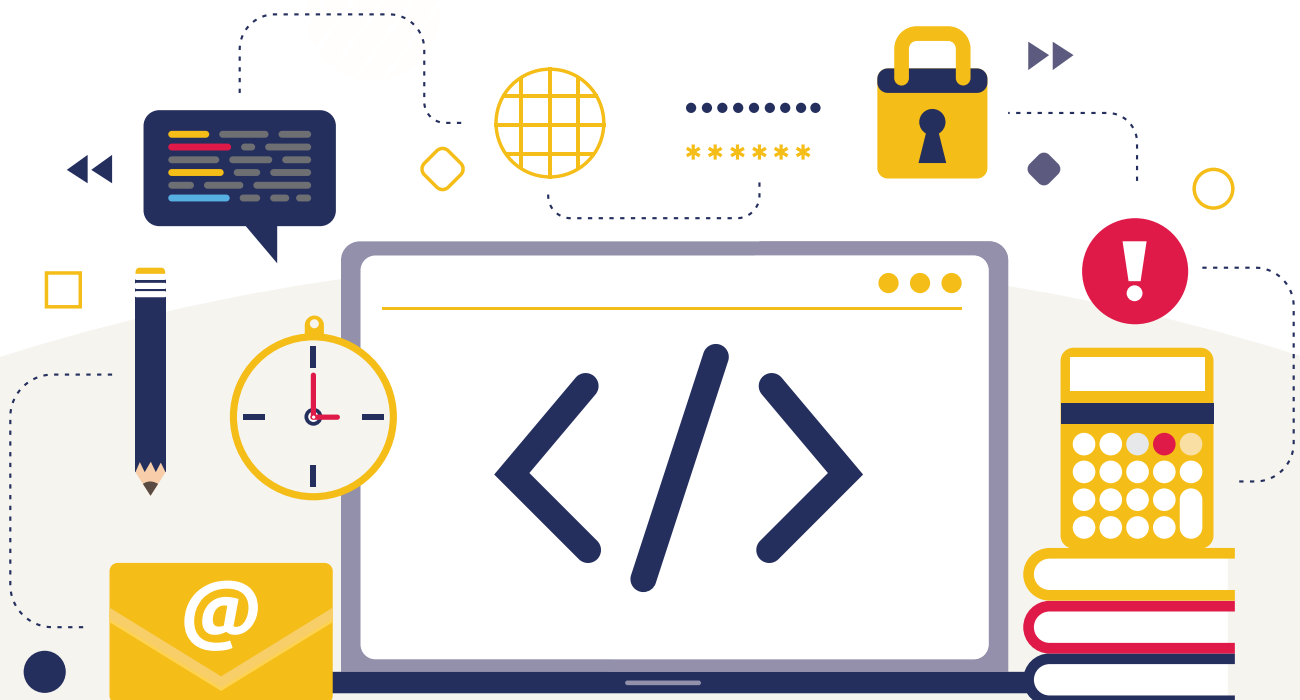
Entrepreneurship is often seen as an alternative option for young people to generate an income. This is described as a key lever of change in this report.

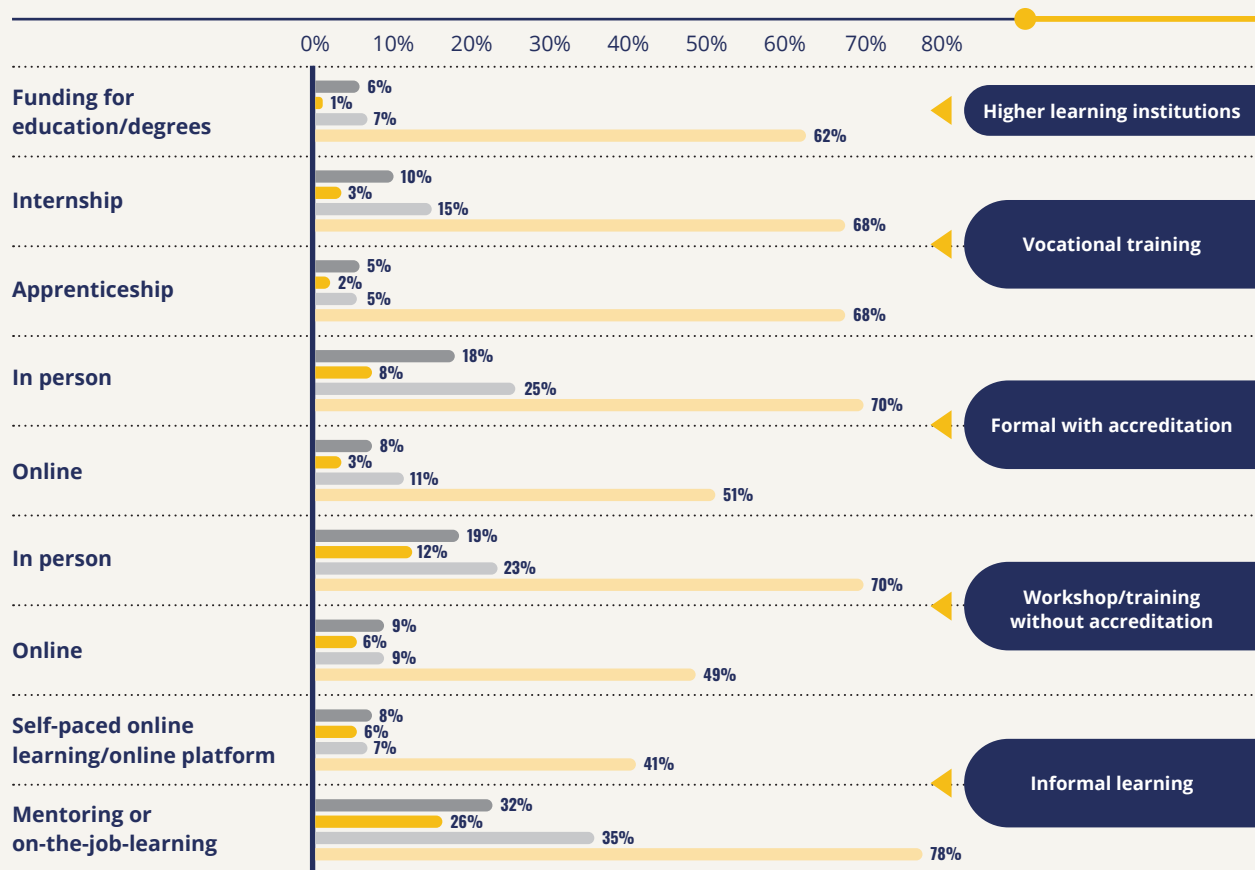


Young people also believe that a lack of work experience and technical skills – including digital skills – stand in their way of becoming successful entrepreneurs. Almost half of participants stated that their lack of digital skills hampers their inclusion in the digital economy. However, only half of all businesses in the survey provide learning and development opportunities to their employees. An information source from a youth employment NPO said, “Many employers do not have the bandwidth, the resource or capacity to onboard young people who only have theoretical knowledge. We need to get young people from academic thinking into system thinking and businesses understanding.”



Some 6% of employers provide funding for education or degrees, 10% say they offer internships and 5% have apprenticeships available. In terms of formal training with accreditation, 18% offer in-person training, which remains the most popular format, although online training also plays an important role. A further 7% offer blended formal training and 9% offer blended workshops or training. Slightly more businesses (19%) offer in-person workshops and training without accreditation. Some 8% reported that they offer self-paced online learning or access to various platforms, while 32% offer mentoring or on-the-job learning. The larger the business, the more likely they are to offer learning and development opportunities, especially vocational and tertiary education.





Graph 38: Proportion of businesses providing specific types of learning and development opportunities

- All
- Micro-businesses (<10 employees)
- Medium and small businesses (11 - 249 employees)
- Large businesses (>250 employees)

It's important to take labour market requirements into account when selecting a field of study, as this could help avoid a mismatch between a person's qualification and the available jobs and job requirements. There is a disconnect between qualifications and labour market requirements; it is reported that certain majors held by graduates influence their employment status. For example, graduates in the fields of health and education have a relative advantage, while those in the humanities and social sciences are at a relative disadvantage when it comes to employment opportunities. Career guidance may help prevent this disconnect.

Increasing young people's exposure to suitable job and networking opportunities while they are still studying could help them meet more labour market requirements. Employers prefer candidates with previous work experience and higher qualifications, which is a challenge for qualified yet inexperienced young people. Coupled with limited exposure to work opportunities and sparse networking skills, this is an impediment to young people's ability to translate their education and skills into employment.

Key success factors

► Facilitating access to resources



Access to resources is a key lever of change for young people. About 56% of our participants said they mostly need financial support to gain digital skills. Some 48% highlighted a need for a device (smartphone, tablet or laptop) to access the internet. Organizations try to address this by offering stipends for transport and living expenses. Demonstrated practice programmes that teach digital skills to YNEET provide a monthly stipend so that participants can pay for transport, food and essentials and are able to focus on the course – these include [CapaCiti](#) and the [Future Innovation Lab](#). An information source who provides training for YNEET said: “If you focus on NEET, you see that these young people are really disadvantaged. There are a lot of inequalities and some people are hungry. If they receive a stipend, they must also use it for the family unit.”

Access to resources can also be provided on a community level, especially skills programmes that provide the necessary equipment to access training material. Programmes such as the [Global Skilling Initiative](#) provide access to libraries, computer labs and TVET colleges, as well as help with connectivity to complete training.



► Ensuring connectivity

Making access to the internet more reliable and affordable is a key success factor for specific interventions and programmes. Some 44% of survey participants said it was one of the most important factors in helping them develop digital skills. Community-owned internet service providers like [Zenzeleni](#) reach remote and marginalized communities. Another example is SABEN, a non-profit organization that provides high-capacity bandwidth, VoIP and video conferencing services to schools and colleges in collaboration with [SANReN](#) and [TENET](#). Communal spaces in close proximity can eliminate the entry barrier and costs of travelling to skills programme venues. Community centres such as the [Siyafunda Community Technology Centre](#) provide e-learning accredited courses and skills training through initiatives such as the Empower Educate E-connect project.

► Providing relevant information about the digital economy and existing opportunities



Some 47% of participants said information about where to acquire specific skills is the most important form of support, after access to resources. Information about in-demand skills and occupations can help young people make informed professional career decisions and grow in their professional lives. Specific information on how to use digital and other core skills for work and life in the 21st century is also relevant during higher education. An academic expert said “many young people at TVET colleges have better digital skills than the generation of lecturers – young people often don’t see the link between what they are being taught and how they can use it”.

Helpful information published online by youth development organizations such as the NYDA is a good example of the power of the internet. Access to information on in-demand skills and occupations can help young people make informed professional career decisions.

► Adjusting training to the specific needs of YNEET

Training courses and programmes must address the specific context of YNEET and consider the fact that they have low levels of education, limited skills and little prior exposure to work. For young people with some PSTe, short-term training may help those seeking employment gain the basic skills, or provide specific digital skills, required for work. A senior TVET professional said: “They include college students, who are an ideal target group for short courses to gain skills and micro-credentials. When they leave the college, they will have done a range of short courses in addition to their diploma or degree.”

Courses that aim to prepare young people for employment are most impactful if they provide training over a minimum of three months. Key sources who have experience with different formats run courses from three to six months and emphasize that they have to spend some time with young individuals, as quick interventions do not work.

The experts also prefer in-person training, because of the barriers to reaching and engaging YNEET online. As a specific format, an academic expert recommended in-person training in a fully equipped lab over the duration of a few months. The expert added that participants should get a stipend, but also added that “this is not feasible across the country because capacity is missing or it is too expensive.”



In terms of specific training formats, almost 90% of participants consider community-based training and online certificate courses as most helpful in developing digital skills. Colleges also play an important role and may benefit from adjustments to their curricula and specific capacity-building lecturer training to best prepare young people for the digital economy. Vocational training and learnerships are considered the third most helpful type of training, mentioned by 85% of participants. Key experts and previous studies see a huge opportunity in vocational training and learnerships.

► Including core skills in addition to digital skills



Information sources highlighted the need to add core skills for work and life in the 21st century to digital skills in training programmes for YNEET. A researcher said “there is a need for skills for work readiness (basic skills) to be included in the work context, especially with a focus on inclusion”. An NPO executive added that programmes should combine technical content with soft skills and career pathway guidance and said this could help to address “behavioural challenges the young people come with as they have a lack of peers who can translate the world of work to them, and personal issues that are holding them back”.

► Ensuring accreditation or offering specific certificates and credentials



A TVET professional highlighted the need for credentials to help young people access work opportunities and described several routes to obtaining specific certificates and credentials. “There is space for open learning platforms – credentials can be gained in the form of a digital batch which can serve as a pre-entry to a TVET college.”

Credentials for specific courses can play a particularly important role in the field of digital skills, even more than degrees or diplomas. As the HR officer of a software company said, “the mindset in the digital space is that self-taught or TVET developers can be better, as they have an innovative approach and perspective”.

An HR officer of a software company shared her experience that candidates who are self-taught or studied at colleges instead of universities tend to be more innovative and pragmatic. “The mindset in the digital space is that self-taught or TVET developers can be better, as they have a different approach and perspective.”

► Collaborating closely with employers

Work experience is considered a key lever of change to help youth access employment, as they will gain much-needed practical skills. Collaborating closely with potential employers is considered a key factor for specific support programmes. Firstly, they provide capacity, which businesses need to onboard more young people. Secondly, training programmes linked to a specific need of a company make young people more employable after completing the course. Key experts highlighted that “the focus of all work with young people should be on unlocking demand – we should support growth in the SME and micro-business space and also look at the informal sector”. Thirdly, they can help connect young people to opportunities that are usually reserved for candidates with some work experience, because, as a research expert said, “the entry requirement is often three to five years’ work experience and we have to close that work experience gap, so that young people can flow into the industry sector”.

Formal occupational training programmes are one option to achieve this. Key experts highlighted that “digital programmes are suitable for apprenticeships like network, cloud and coding ones, as the skills are best learned on the job”. And even though there has been progress in South Africa with occupational qualifications for digital skills, there are still points of improvement to modernize apprenticeships, “as they are focused on traditional traits in South Africa”. Experts and previous studies see a huge opportunity in vocational training and learnerships. Not all participants consider it helpful, though, which highlights a need for better communication about the potential of this training.



► Helping YNEET gain work and practical experience



If it is not possible to offer work experience, it is important to have training be as practical as possible. Key sources emphasized that training should be application-based. “Employers don’t ask about theory; they want to know what you have done, so you need to show your capabilities and skills. It is important that young people should be able to translate their experience into a language that an organization understands.”

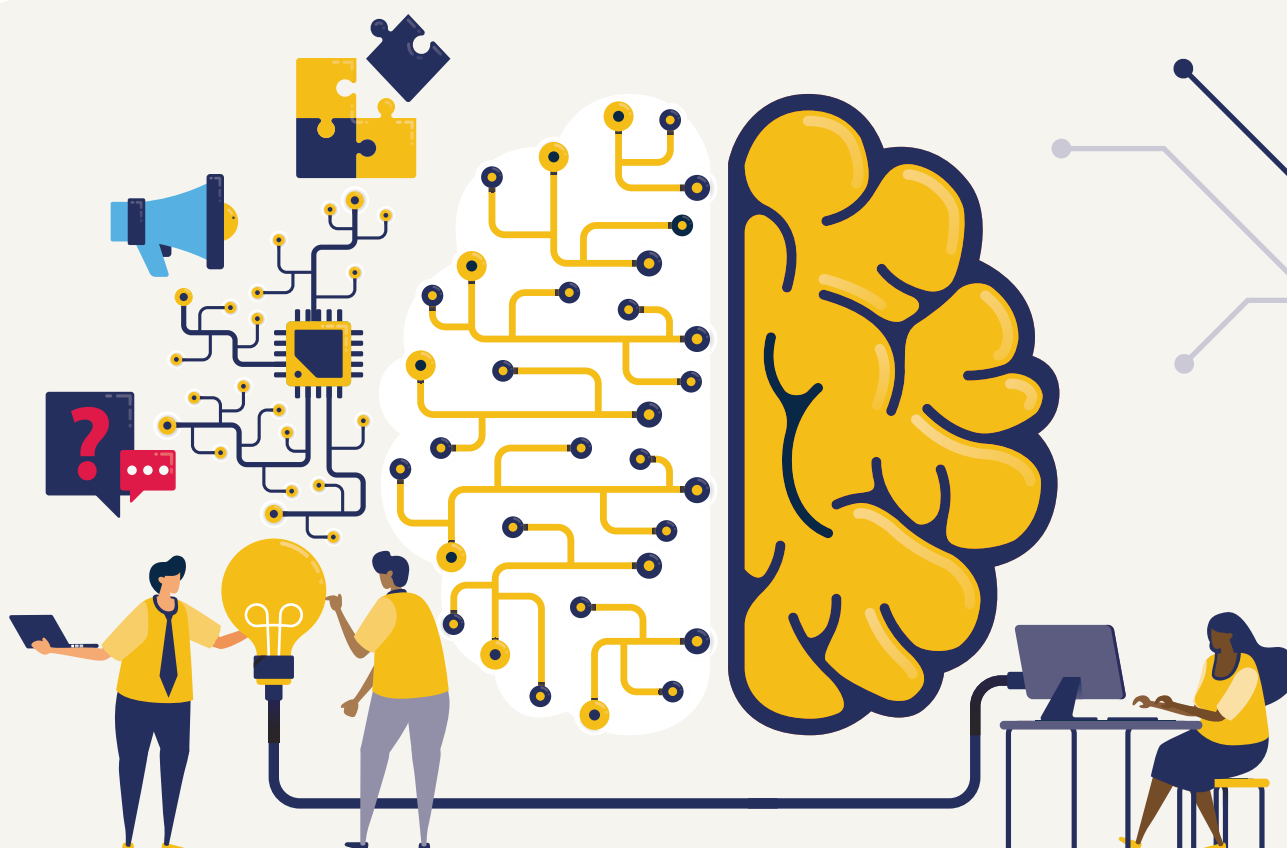
► Facilitating entrepreneurial opportunities



Facilitating entrepreneurial opportunities as part of specific training or other support programmes may help link young people to income-generating opportunities.

Academic and industry experts consider entrepreneurial (and intrapreneurial) skills to be essential for young people in the digital economy. “Young people have to understand the business context, be able to sell themselves and offer digital products and services.”

Educational institutions play an important role in preparing young people to become entrepreneurs. For the DHET, entrepreneurship is a strategic priority, as it offers specific exit support and pathways – colleges should promote entrepreneurship and establish entrepreneurship hubs. There is potential to link this entrepreneurial support to the digital economy. The DHET emphasizes that there is growth potential in digital entrepreneurship but not much is happening in this space yet.



Part 4

Recommendations



Objective 1: Broaden the overall understanding of the skills mismatch

Objective 1.1: Assess the skills demand and supply in the digital economy, within the levels and sectors prioritized

Priority target groups

The focus on YNEET is essential for an inclusive approach to skills development and employment creation in South Africa. The study recommends focusing on demographic groups that experience particularly high levels of vulnerability, such as young people who identify as female, live with a disability or live in rural areas. This includes young people across all geographic regions who do not have access to a simple phone or technological device. This study recommends identifying and choosing six pilot areas. Three should be in urban areas, focusing on townships and informal settlements in big metros where young people experience high levels of exclusion from the labour market but are still in reach of businesses that operate in cities or towns. The other three should be in rural areas, preferably municipalities that are part of the pilot programmes for the district development model to streamline all interventions and facilitate the process of scaling them across other regions.

Priority skills in demand

► The study recommends focusing on the following priority digital skills, which are high in demand:



Basic digital skills

Online operations (in demand by small businesses)



Intermediate digital skills

Digital website and graphic design, as well as digital marketing



Advanced digital skills

Cybersecurity, mobile app testing and development, as well as coding

Priority sectors

The study recommends prioritizing the wholesale and retail trade sector, manufacturing as well as the financial services sector. These have been identified as most suitable and impactful for programmes that may support YNEET, for the following reasons.

1.

Wholesale and retail trade

The sector is the second most important for employment creation, contributing to 21% of all jobs in South Africa. The study has identified a high demand for the specific skills that are recommended as priority skills for training and support programmes for YNEET. In addition, there is a growth in e-commerce in South Africa, intensified by the Covid-19 lockdowns, therefore there is a need for and potential to strengthen the digitalization of the industry in the next few years.

2.

Manufacturing

The sector is the fourth most important one for employment creation, contributing to 10% of all jobs in South Africa. It is a key priority for the government and all interventions, as it forms an important pillar in strengthening the local economy, reducing imported items and simultaneously creating jobs. The study also identified a high demand for the specific priority training and support skills that would benefit YNEET.

3.

Financial services

The sector is the third most important for employment creation, contributing to 16% of all jobs in South Africa. The study has identified a high demand for the advanced digital skills that are recommended as priority skills for training and support programmes for YNEET, such as cybersecurity, coding and mobile app development. In addition, the sector employs people with a diverse skill set and is therefore a suitable environment to provide learning and training programmes to upskill young people.



Objective 1.2: Identify digital skills policy and regulatory imperatives, including access and connectivity

The policy environment in South Africa is advanced, comprehensive and suitable to prepare young people for the digital economy. This is highlighted in the policy review in the study, which outlines that the core pillars of the digital economy are covered in the policy framework in South Africa, namely relevant policies in relation to the digital economy, a focus on digital infrastructure, the availability and usage of digital platforms as well as the development of digital skills. In addition, the policies and programmes aim to link this focus to creating employment and facilitating entrepreneurial activities and take an inclusive approach by focusing on young people and vulnerable groups, especially YNEET, in line with the priorities of this study. The study has derived the following imperatives from the digital skills policy and regulatory environment.

1.

Facilitate the implementation of the existing policies and programmes.

2.

Increase awareness among young people about opportunities in the digital economy as well as support programmes and offering, in line with pillar five of the National Digital and Future Skills Strategy (building digital skills awareness). This includes all support to build the capacity of young people to understand how they can explore opportunities in the digital economy.

3.

Contribute to the ongoing advancement and alignment of the accreditation framework, including the development of micro-credentials.

4.

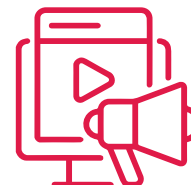
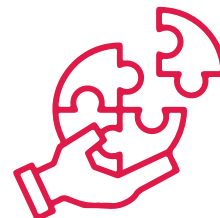
Ensure the alignment of all skills development programmes to the National Digital and Future Skills Strategy.

5.

Support the implementation of the national strategies at provincial and local levels.

6.

Contribute to the provision of infrastructure, funding of existing approaches as well as the engagement of stakeholders, especially by inviting businesses and partners from the private sector that can support the provision of learning and employment opportunities of young people.



Based on this understanding, the study recommends incorporating an element of awareness creation among young people about the existing policy landscape and opportunities through information sharing, for example by including information on existing platforms (as specified in the recommendations for the SAYouth platform) and short-term in-person workshops in communities. The ongoing advancement and alignment of the accreditation framework should also be supported, including the development of micro-credentials by providing capacity support as required. This could take the form of additional research into how to align the South African frameworks to international frameworks or how to incorporate the accreditation into existing training programmes, support interventions or platforms for young people.

Objective 1.3:

Understand the ecosystem for skills development in a digital economy and related enablers in the context of South Africa

The report outlines key barriers and challenges in relation to skills development in a digital economy. The study identified enablers to support young people in developing relevant skills.

- 1.** Facilitate access to resources:
 - ▶ Provide the required infrastructure and technology to enable young people to use the internet, for example the provision of phones or laptops. One option to achieve this is to collaborate with businesses that have old stock of phones and laptops that can be distributed to young people. Another option is community centres with low-cost technology that is solar-powered, in line with existing pilot programmes, such as the Bulungula Tech Centre in the Eastern Cape that has Raspberry Pi computers that are all connected to a central server over a local network.
 - ▶ Offer financial and material support they require to be able to participate in training programmes, for example transport, financial support to access online courses or a stipend to cover living expenses so that they can focus on the training programme.
- 2.** Ensure connectivity with a focus on rural and marginalized areas, where young people are still negatively affected by the digital divide. One option to achieve this is to scale community-owned internet service providers like Zenzeleni.
- 3.** Distribute material that provides an overview of the opportunities for young people in the digital economy and informs young people which skills are most important to access these opportunities and where they can access them.
- 4.** Adjust training formats to the specific needs of YNEET by offering long-term in-person training.
- 5.** Include core skills in addition to digital skills to equip young people with a holistic skill set. This includes social and emotional skills to guide young people on how to live up to expectations in a working environment, as well as cognitive and metacognitive skills to prepare young people to use their skills in a practical context.
- 6.** Ensure accreditation with local or international institutions, for example SETAs offer micro-credentials or provide specific certificates that communicate a specific skill in a credible manner to an employer.
- 7.** Collaborate closely with employers to assess current vacancies, existing demand and design programmes that prepare young people to work in these occupations.
- 8.** Help YNEET gain work or practical experience as part of support programmes and interventions, either through internships or apprenticeships or placements with companies for work experience. Alternatively, practical skills can be taught in an environment that mirrors the work context or through project-based learning.
- 9.** Facilitate entrepreneurial opportunities to prepare young people to use their skills by providing a service to more than one company.

Objective 2: Inform the co-design of digital skills development initiatives



The study recommends that DCDT, ILO, ITU and UNDP constituents prioritize the support of key initiatives of the Presidential Employment Stimulus programme as well as the National Pathway Management Network as one of its core interventions to support its focus areas. Collaborations with TVET colleges are also important, as well as developing the capacity required to scale good, demonstrated practice interventions and programmes in South Africa.

Objective 3: Provide recommendations for priority activities for YNEET

High-touch programmes equipping young people with skills that are in demand in the digital economy

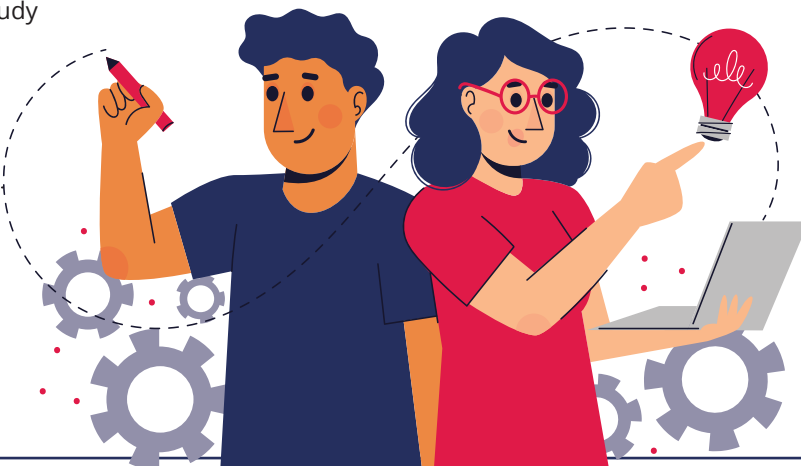
The first recommendation for priority activities for YNEET is to offer longer-term training programmes that last six to 12 months and will equip young people with the skills most demand in the digital economy. The study recommends assessing the skills level of young people and to offer entry-level courses for young people with no or limited prior exposure and advanced courses for those with some experience or those who have completed a course.

1.

For entry-level courses, the study recommends focusing on basic digital skills, especially basic software skills and online operations as well as intermediate digital skills, such as digital marketing and graphic design.

2.

For advanced courses, the study recommends focusing on cybersecurity, mobile app testing or development, as well as coding.



Preparation programmes for young entrepreneurs to offer digital services to businesses

The second recommendation is to provide support for young entrepreneurs to offer digital services to businesses. This support programme should last six to 12 months and comprise the training of digital skills, the practice of entrepreneurial skills and the facilitation of initial work experience or contractual agreements. It is recommended that young people should be recruited through colleges, potentially in collaboration with entrepreneurial centres at the colleges.

In terms of digital skills training, the study recommends focusing on intermediate digital skills, especially website and digital graphic design, as well as digital marketing for SMEs and micro-businesses. Smaller businesses have a demand for intermediate digital skills but often have limited resources and may not be able to onboard people on a full-time basis. SMEs and micro-businesses are however likely to be in closer proximity to YNEET and the entry barriers to work with them are lower compared to large corporates. To facilitate practical training or work experience, the programme should place young people with SMEs that have a need for support but might not be able to pay young people for practical experience and fund participants to work for businesses part-time. If possible, the programme must provide resources required to work as freelancers (such as a laptop and connectivity) and link young people to their first freelance opportunities.

Support for young people to access existing online content

The third recommendation is to offer in-person programmes that connect young people to existing online content by running awareness campaigns about specific digital skills that young people will learn in these courses to prepare them for the digital economy. Internet access should be facilitated through in-person programmes at specific training centres or community hubs. This will address the key barrier keeping young people from accessing and using existing services, namely a lack of information and connectivity. This study has highlighted that there are multiple existing online platforms with training courses that are available to young people at no cost, such as the Nemisa platform's Microsoft courses.



Objective 4: Inform a series of other system-level interventions

Objective 4.1: Strengthen and upgrade digital literacy, skills curricula and competency standards



“Digital Skills Accelerator” that supplements the current TVET curriculum

The study recommends opening a Digital skills Accelerator that supplements the current TVET curriculum in all occupation programmes. The idea has been developed by Deon Halls, former deputy principal of the College of Cape Town, and colleagues in the TVET environment. This accelerator will be a centralized team that develops a hybrid learning management system that offers training courses that can be used as self-paced courses by the students or educators. The courses will focus on the digital skills that are most in demand, especially “hands-on” and practical skills training, such as specific systems, platforms or software that businesses use. The team will offer support to the colleges to train students through online content and centrally trained facilitators. This will be in the form of upskilling, in addition to the DHET’s prescribed courses and modules that are already included in the curriculum. The study does not recommend updating the curriculum itself because this is likely to be a longer process and because the curriculum has been reviewed and revised by the department and purposefully focuses on basic teaching and training, which is highly beneficial.

The Digital skills Accelerator can also provide these training programmes to university students, as the study has identified a need for a specific practical understanding of the systems and programmes that are being used by companies among college as well as university graduates.

Objective 4.2: Integrate digital literacy and skills training into existing educational programmes at national, provincial and district level and at different levels/parts of the education system

Offer digital training as part of work-based learning (WBL), for instance via employment intensive investment programmes such as the EPWP

The study recommends offering digital skills training as part of work-based learning to increase the impact it can have on employment creation. This study has identified the EPWP as a suitable existing programme for young people who have limited options to access the formal labour market. One recommendation is to collaborate with EPWP initiatives – the priority should be rural and marginalized areas – and offer in-person digital skills training to programme participants. These programmes can last a minimum of one week and young people can work through existing online content on platforms that are free of charge or affordable under the supervision of facilitators. It is also recommended to incorporate career guidance to provide advice on which additional courses young people can complete throughout their work experience. Such interventions will speak to the existing gap of a lack of work experience, as identified by businesses and young people. Businesses offer limited training opportunities for young people who have just completed their education, often because they lack the capacity to onboard people who are not ready to be fully functional.

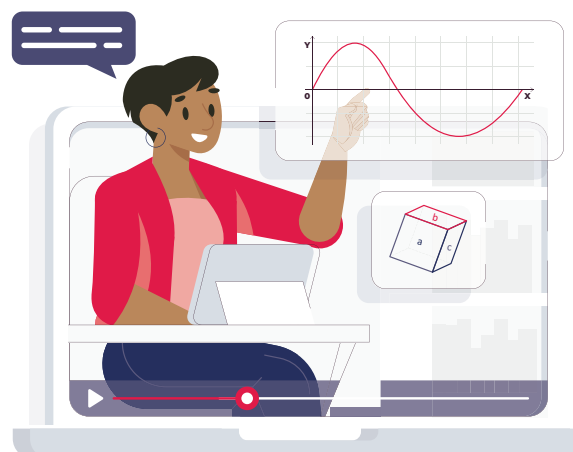
Objective 4.3:

Capacitate training institutions, trainers and teachers to deliver training programmes with digital skills components

Provide teaching support to TVET colleges to incorporate information technology and computer science

One recommendation is to provide teaching support to TVET colleges to incorporate an information technology and computer science course or increase the number of students currently studying it. It is recommended that this type of training should focus on two components. Firstly, equip educators with basic digital skills through using existing content on online platforms that are available to TVET colleges or partner organizations, such as Nemisa. Secondly, develop specialized knowledge of the course curriculum and a didactical understanding of the requirements to teach this course. This content will have to be developed, preferably in collaboration with educators who are already teaching this course.

The second recommendation is to offer capacity support to these institutions by onboarding, allocating and subcontracting educators who have the required knowledge and skills to specific TVET colleges to teach in this field for a certain period.



Provide strategic and operational support to TVET colleges

The third recommendation is to set up and subcontract working teams to specific TVET colleges to provide strategic and operational support to TVET institutions to roll out the 11 4IR Future Skills Qualifications that the QCTO gazetted. This should include investments in digital infrastructure for the delivery of digital skills and the digitization of learning programmes. These working teams will be tasked with all requirements to set up the course, prepare educators and attract students to enrol. They should also establish close links to businesses that can offer work-based learning or practical experience.



Train-the-trainer initiative for educators at TVET institutions

The fourth recommendation is to start a train-the-trainer initiative at TVET institutions. To achieve this, the study recommends identifying educators with digital skills and prior exposure to become facilitators, offering in-person training to these facilitators (via online content on platforms that are free of charge or affordable) and organizing sessions in which facilitators train other educators. Some TVET institutions have started such initiatives and were able to upskill their educators. It is possible to learn from their experience and help other colleges to establish similar train-the-trainer programmes.

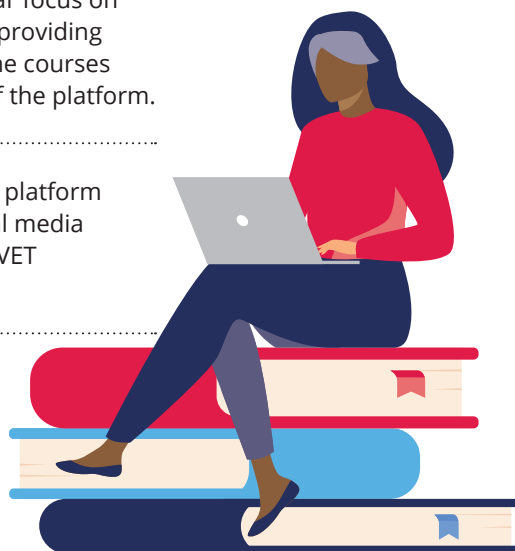
Objective 4.4:

Establish a platform or forum to integrate trained job seekers with opportunities in the digital economy

This report recommends supporting SAYouth, an existing platform, through targeted activities that focus on connecting young people to opportunities in the digital economy instead of establishing a new platform. SA Youth is a free national network that links business to a pool of young entry-level talent. It is a collaboration between government, business and civil society and is part of the Presidential Youth Employment Intervention. It is operated by Harambee, a key South African youth partner with 10 years' experience in developing solutions to tackle youth unemployment. It is 100% free for young people and employers, and young people join the SAYouth platform via a data-free mobisite, SAYouth.mobi. Young people can upload their profile or share information in a 20-minute video and the platform will collect data descriptors in the form of a digital CV to match young people when opportunities arise.

The study identified the following recommendations to strengthen the SAYouth platform and its reach:

1. Provide relevant information about the demand of skills for the digital economy to young people that can be integrated into the platform. The information can be presented in the form of a short article or video, and summarize the insights of this research project. The specific piece of information can also link young people to existing training platforms.
2. Support the provision of training courses through the SAYouth platform. This will require a collaboration with training providers that currently operate online platforms to incorporate their services on the platform. The researchers recommend approaching companies that already offer licenses to young people in South Africa to access courses, for example Microsoft.
3. Develop a system to provide accreditation or credentials for the courses on the platform. This will include identifying the best types of credentials that can be offered for specific courses and training programmes on the platforms and assessing how the NQF in South Africa and international frameworks speak to each other. It is recommended to align this activity to the existing efforts of government institutions, including the QCTO and SETAs, who are already working on this.
4. Encourage young people using the SAYouth platform to further their education at a public TVET college with a particular focus on an occupational qualification. This can be achieved by providing information about public TVET colleges in their area, the courses they can study there and how they can apply as part of the platform.
5. Support ongoing efforts to increase the visibility of the platform through communication campaigns on radio and social media and by sharing information with school learners and TVET college students.
6. Make the platform more accessible for young people who are living with disabilities, such as having an audio option for people with a visual impairment.



Appendices



Summary of key findings emerging from the analysis of skills demand and supply in South Africa's digital economy

Digital skills that are most in demand

1.

Basic digital skills

- ▶ **Digital competencies**
An essential requirement for almost all employees
- ▶ **Online operations**
Demand in small businesses (mentioned by 17% of businesses with 25 to 99 employees); examples: email communication, sending quotes, safety or scanning for viruses

2.

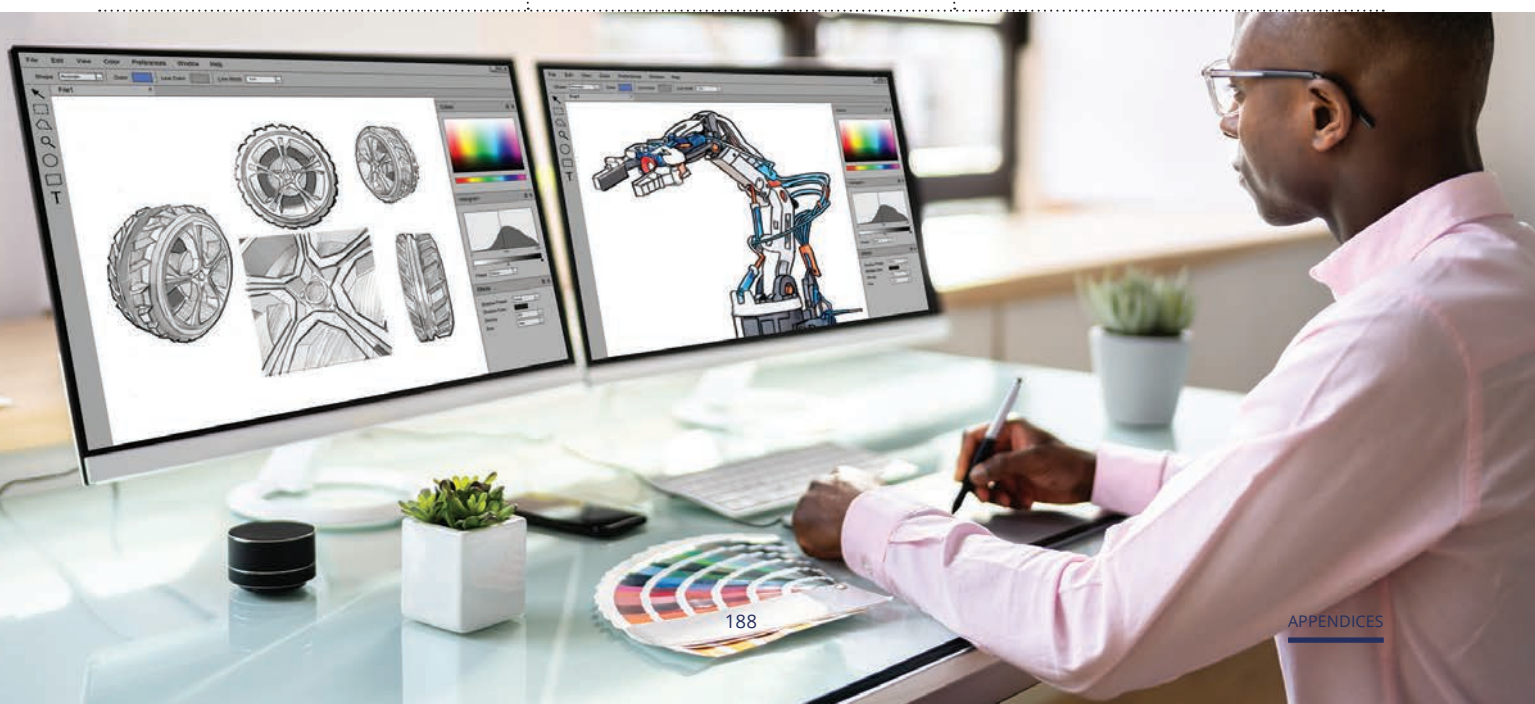
Intermediate digital skills

- ▶ **Digital graphic design**
High demand for SMEs and large businesses
- ▶ **Digital marketing**
High demand for micro-businesses
- ▶ **Coding and mobile app development**
High demand for large businesses

3.

Advanced digital skills

- ▶ **Big data analytics**
Huge demand for larger businesses
- ▶ **AI and VR**
Huge demand for larger businesses
- ▶ **Cybersecurity**
High demand for SMEs and huge demand for larger businesses
- ▶ **Robotics**
High demand for large businesses



Occupations requiring technology and digital skills that are most in demand

1.

Basic digital skills

- ▶ Desktop support technician, especially for larger businesses and in the ICT sector
- ▶ Employment opportunities that require basic hardware and software skills on the ground in specific locations or regions where it is difficult to attract talent from urban areas or international talent pools, for example mining operations

2.

Intermediate digital skills

- ▶ **Website design and management**
High demand for SMEs and micro-businesses (also entry level)
- ▶ **Data analysts**
Huge demand for large businesses, especially with 3 to 5 years' work experience (also entry-level data analysts)
- ▶ **Software developer**
 - Using content management systems at entry level
 - Junior software developers at entry level

3.

Advanced digital skills

- ▶ **Software developer**
Huge demand for large businesses (three to five years' work experience, especially full stack/specialization)
- ▶ **IT/Cybersecurity specialty**
High demand for SMEs and huge demand for large businesses
- ▶ **Data scientist**
Huge demand for large businesses
- ▶ **Big data analyst/BI developer**
Huge demand for large businesses
- ▶ **Cloud architect specialist**
Huge demand for large businesses
- ▶ **ICT engineer and UX/UI designer/developer**
High demand for large businesses



Skill set of YNEET

1.

Basic digital skills

- ▶ More than half of participants report having basic digital skills, mainly hardware skills



2.

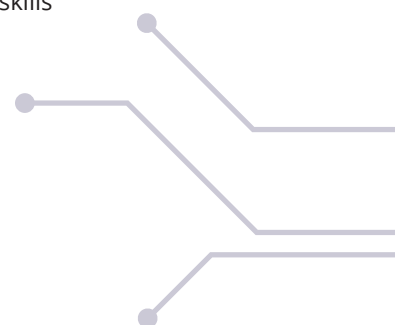
Intermediate digital skills

- ▶ YNEET do not have sufficient intermediate digital skills
- ▶ Only 18% report having desktop publishing skills, and only 8% use it regularly
- ▶ Only 13% report having digital graphic design or marketing skills, and only 4% use it regularly
- ▶ YNEET feel most equipped to apply to become a data scientist
 - 10% say they could apply
 - 5% say they could apply for jobs in website management
 - 4% say they could apply for website design jobs

3.

Advanced digital skills

- ▶ YNEET lack advanced digital skills
 - About 13% have AI, VR, IoT or cybersecurity skills, and 5% use it regularly
 - Less than one in ten have coding, mobile app development or big data analytic skills, and only 3% use it regularly
 - Less than half have heard of other specific occupations that require advanced digital skills



Key gaps (2023)

- ▶ General skill set of young people are lacking
 - Basic digital skills are the norm
 - 50% still lack software and online operating skills
 - 30% lack hardware skills
- ▶ An inclusive approach is needed to overcome the digital divide

- ▶ All types of intermediate digital skills are lacking
- ▶ Train core skills for life and work in the 21st century so that youth can use digital skills in a working or entrepreneurial context
- ▶ Understanding of specific systems and programmes that are used widely in the industry or by specific potential employers

- ▶ All types of advanced digital skills are lacking
- ▶ Train core skills for life and work in the 21st century so that youth can access opportunities that require work experience
- ▶ Practical experience of applying advanced digital skills in a working environment
- ▶ Digital leadership or digital skills on a managerial level

Future projection (five-year timeframe) in terms of skills needed in South Africa's digital economy

Digital skills that are most in demand

1.

Basic digital skills

- ▶ **Hardware skills**
Very important for SMEs and micro-businesses
- ▶ **Software skills**
Particularly important for businesses of all sizes
- ▶ **Online operations**
Particularly important for SMEs and micro-businesses, and very important for large businesses

2.

Intermediate digital skills

- ▶ **Digital marketing**
Particularly important for businesses of all sizes
- ▶ **Digital graphic design**
Very important for SMEs and micro-businesses
- ▶ **Desktop publishing**
Very important for SMEs

3.

Advanced digital skills

- ▶ **Cybersecurity**
Very important for SMEs and particularly important for large businesses
- ▶ **Big data, AI and VR**
Particularly important for large businesses
- ▶ **Robotics**
Particularly important for large businesses
- ▶ **Coding and mobile app development**
Very important for large businesses
- ▶ **IoT**
Very important for large businesses



Occupations requiring technology and digital skills that are most in demand

1.

Basic digital skills

- ▶ Around one in four businesses believe desktop support technicians will be important in the next five years; this is more than twice the number of businesses that report a current demand

2.

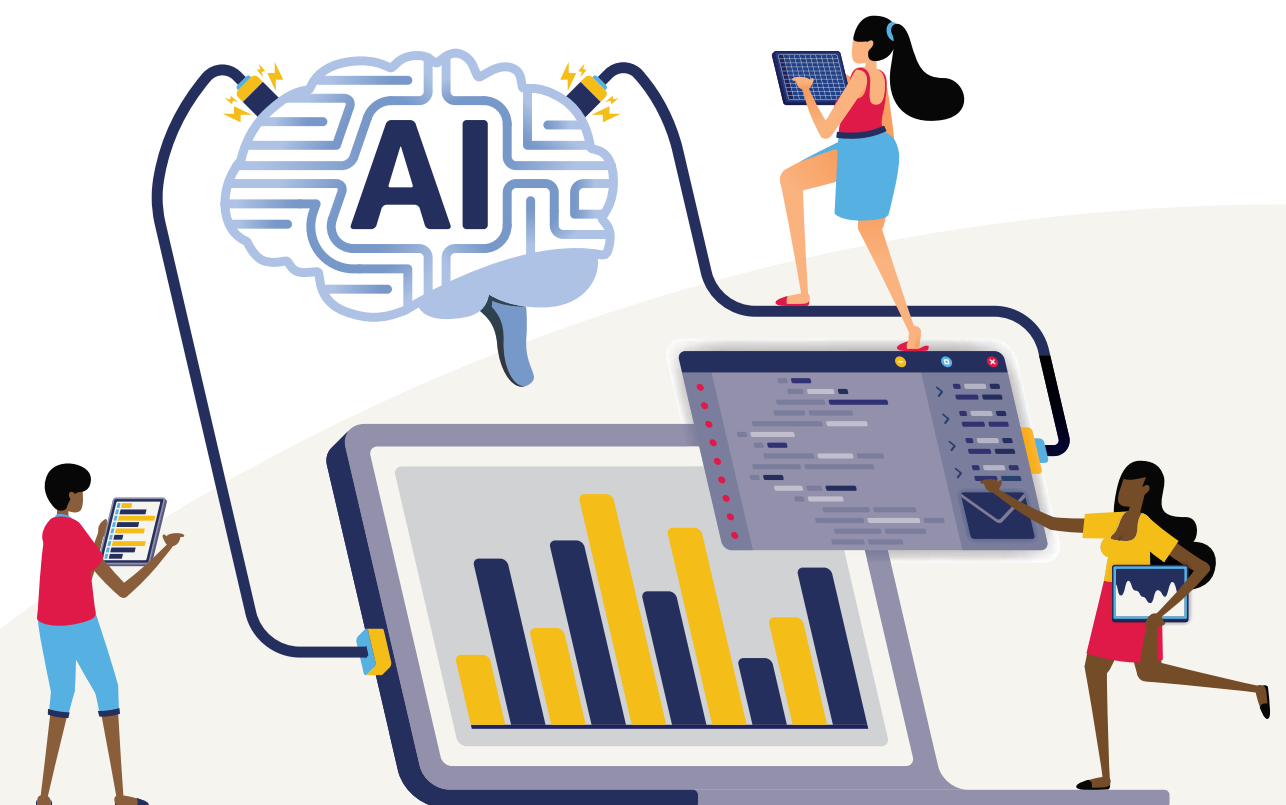
Intermediate digital skills

- ▶ **Website management and design**
Huge demand for businesses of all sizes
 - Increased importance is highest for website management and design compared to all other occupations requiring intermediate and advanced digital skills
- ▶ **Data analysis and software developer**
High demand for SMEs and huge demand for large businesses

3.

Advanced digital skills

- ▶ **IT/Cybersecurity specialist**
High demand for SMEs and huge demand for large businesses
- ▶ **Big data analyst/BI developer/data scientist/cloud architect specialist**
Huge demand for large businesses
- ▶ **ICT engineer/UX and UI designer or developer**
High demand for large businesses



Potential to upskill YNEET

1.

Basic digital skills

- ▶ An increased focus on digital skills at colleges should ensure a bigger supply of graduates with basic digital skills



2.

Intermediate digital skills

- ▶ Young people can learn intermediate digital skills through a wide range of short courses, especially online
- ▶ There is a limited number of graduates in ICT degrees at TVET colleges
- ▶ The incorporation of more and new occupational courses at TVET colleges is expected to be a multiyear process and it is expected that supply will not be able to keep up with demand

3.

Advanced digital skills

- ▶ Higher education institutions play an important role in teaching advanced digital skills – all universities teach ICT courses
- ▶ There is a supply of graduates with ICT qualifications (demand for individuals with work experience)
- ▶ Young people can use online platforms or courses that teach advanced digital skills
- ▶ Low enrolment rates in STEM courses at universities limit the skill set and talent available to the labour market

Projected future gaps

- ▶ There is an opportunity to train young people to use software, applications and systems that are essential in a working environment
- ▶ Skill sets should be improved so that young people can provide technical and desktop support

- ▶ There is a need for young people with work experience and the application of skills
- ▶ Create entrepreneurial opportunities and prepare young people to provide digital services to businesses

- ▶ Low student numbers in STEM fields can limit possible growth in the digital economy
- ▶ Colleges and training providers highlight a gap in relation to specific specialized skills, such as cybersecurity
- ▶ There is an opportunity to develop courses and training programmes that are suitable for YNEET and prepare people for specific occupations, such as cybersecurity or coding

Summary of key recommendations to facilitate a better matching of skills demand and supply in South Africa's digital economy



Objective 1: Broaden the overall understanding of the skills mismatch

Sub-objectives		Practical recommendations
1.1 Assess the demand for and supply of skills for the digital economy.		• Work with priority target groups, e.g. vulnerable groups. • Focus on priority skills in demand. • Select priority sectors most suitable and impactful for programmes that support YNEET.
1.2 Identify digital skills policy and regulatory imperatives.		• Follow imperatives from the digital skills policy and regulatory environment. • Strengthen the policy environment, including creating awareness among young people of the existing policy landscape and opportunities.
1.3 Understand the ecosystem for skills development in a digital economy and related enablers in the context of South Africa.		• Incorporate enablers of relevant digital skills into all programmes and interventions, including facilitating access to resources and opportunities, adjusting training formats and collaborating with employers.

Objective 2: Inform the co-design of digital skills development initiatives

Practical recommendations	
▶ Prioritize activities for the DCDT, ILO, ITU and UNDP's constituents, including supporting key initiatives of the Presidential Employment Stimulus programme and the National Pathway Management Network. ▶ Collaborate with TVET colleges. ▶ Provide capacity to scale good, demonstrated practice interventions and programmes.	

Objective 3:

Provide recommendations for priority activities for YNEET

Practical recommendations



Offer **high-touch programmes** that equip young people with skills in **demand** in the digital economy, including longer-term training programmes (lasting six to 12 months) and skills-based courses (e.g. entry level and advanced).



Offer **preparation/ support programmes** for young **entrepreneurs** to offer digital services to businesses (including entrepreneurial skills and contractual agreements) and recruit young people through colleges or place them with SMEs that have a need for support.



Provide **support for young people in accessing existing online content** through awareness campaigns about which specific digital skills they will learn in specific courses and by facilitating internet access.



Objective 4: Inform a series of other system-level interventions

Sub-objectives



Practical recommendations

4.1

Strengthen and upgrade digital literacy/ skills curricula and competency standards.



Launch the **Digital Skills Accelerator** team to **supplement the current TVET curriculum** – the team will develop and offer hybrid, self-paced training courses on digital skills (with a focus on hands-on and practical skills) and offer support to colleges.

4.2

Integrate digital literacy and skills training into existing educational programmes at all levels.



Offer **digital training as part of work-based learning (WBL)**, for instance EPWP, including using existing online content on free/affordable platforms and providing advice on additional courses young people can complete.

4.3

Capacitate training institutions, trainers and teachers to deliver digital skills training.



- Provide **teaching support to TVET** institutions to incorporate IT and computer science courses or increase the number of students.
- Provide **strategic and operational support to TVET** institutions to roll out the 11 4IR future skills qualifications.
- Start a **train-the-trainer initiative** for educators at TVET institutions.

4.4

Establish a platform/ forum to integrate trained job seekers with relevant opportunities.



Use and leverage the existing SAYouth platform, including providing information about skills demand, developing a system to provide accreditation/ credentials for the courses and making the platform more accessible for young people with disability.



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