MICTSETA | Media, Information And Communication Technologies Sector Education And Training Authority

SHAPING SKILLS, PIONEERING INDUSTRIES, EMPOWERING FUTURES

Sector Skills Plan
2021/22

Final Submission

31 August 2020

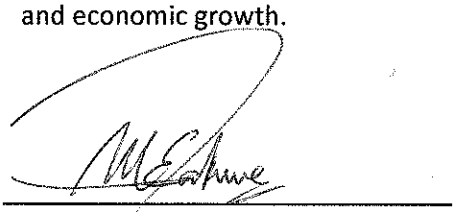
Foreword

In this annual update of the MICT SETA Sector Skills Plan, we have conducted rigorous research to ensure that the documented occupational shortages and skills gaps are true reflections of demand. Data on labour shortages is often a subject of debate. To this effect, a number of different stakeholders were consulted to construct a comprehensive picture of the Sector and its direction.

This year, we did a comprehensive analysis of 4IR technologies and their role in the MICT Sector to acquire deeper insights into the real skills shortages and support industry in closing those skills gaps. The more confidence we have in the Sectoral Priority Occupations, the more assured we are of the Strategic Plan. The combined efforts from all stakeholders to produce this document are gratefully acknowledged. The following deserve special mention:

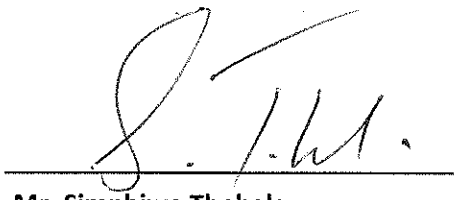
- The Ministerial representatives on MICT SETA's Board;
- Industry, via representation on MICT SETA's Board;
- Organised Labour, through representation on MICT SETA's Board; and
- All the stakeholders who kindly participated in our interviews, surveys and focus groups.

Our thanks go to all the stakeholders whose collective wisdom has been incorporated into this document. Sharing of knowledge is a catalyst for achieving South Africa's skills development potential and economic growth.



Mr. Mdu Zakwe

CEO: MICT SETA



Mr. Simphiwe Thobela

Chairperson: MICT SETA Board

Acronyms

4IR	Fourth Industrial Revolution	**MCSE**	Microsoft Certified Solutions Expert
5G	Fifth-Generation Wireless Technology	**MDDA**	Media Development and Diversity Agency
ACASA	Association for Communication and Advertising South Africa	**MICT**	Media, Information and Communication Technologies
AI	Artificial Intelligence	**MTSF**	Medium Term Strategic Framework
AR	Augmented Reality	**NAB**	National Association of Broadcasters
ATR	Annual Training Report	**NDP**	National Development Plan
B-BBEE	Broad-Based Black Economic Empowerment	**NGO**	Non-Governmental Organisation
BABOK	A Guide to the Business Analysis Body of Knowledge	**NGP**	New Growth Path
CAGR	Compound Annual Growth Rate	**NLPE**	Neuro-Linguistic Programming Executive
CBO	Community- Based Organisations	**NLRD**	National Learner Record Database
CECS	Centre of Excellence in Cyber Security	**NQF**	National Qualifications Framework
CEO	Chief Executive Officer	**NSI**	National System of Innovation
CISCO	Commercial & Industrial Security Corporation	**NSDP**	National Skills Development Plan
CISSP	Certified Information Systems Security Professional	**OFO**	Organising Framework for Occupations
COBOL	Common Business-Oriented Language	**OGS**	Online Grant System
CompTIA	Computing Technology Industry Association	**PC**	Personal Computer
COVID-19	Corona Virus Disease 2019	**PRINCE2**	Projects in Controlled Environments 2
DCDT	Department of Communications & Digital Technologies	**PICC**	Presidential Infrastructure Coordinating Commission
DHET	Department of Higher Education	**QCTO**	Quality Council for Trades and Occupations
DEF	Deaf Empowerment Firm	**QMR**	Quarterly Monitoring Report
DPSA	Department of Public Service and Administration	**SACIA**	Southern African Communications Industries Association
DTT	Digital Terrestrial Television	**SAP**	Systems Applications and Products
EE	Employment Equity	**SDF**	Skills Development Facilitator
ETQA	Education and Training Quality Assurance	**SDL**	Skills Development Levy
FOSS	Free Open Access Software	**SEDA**	Small Enterprise Development Agency
GDP	Gross Domestic Product	**SETA**	Sector Education and Training Authority
GITOC	Government Information Technology Officers Council	**SET**	Science, Engineering and Technology
HEI	Higher Education Institution	**SIC**	Standard Industrial Classification
HEMIS	Higher Education Management Information System	**SIP**	Strategic Integrated Projects
HRDSSA	Human Resource Development Strategy of South Africa	**SITA**	State Information Technology Agency
HTFV	Hard to Fill Vacancy	**SKA**	Square Kilometre Array
IBM	International Business Machines	**SLA**	Service-Level Agreement
IIBA	International Institute of Business Analysis	**SMME**	Small, Medium and Micro-enterprises
ICASA	Independent Communications Authority of South Africa	**SPO**	Sectoral Priority Occupations
ICT	Information and Communication Technology	**SSP**	Sector Skills Plan
IITPSA	Institute of Information Technology Professionals South Africa	**STB**	Set Top Box
IoT	Internet of Things	**TIA**	Technology Innovation Agency
IPAP	Industrial Policy Action Plan	**TVET**	Technical Vocational Education and Training
ISACA	Information Systems Audit and Control Association	**USAASA**	Universal Service and Access Agency of South Africa
IT	Information Technology	**VOD**	Video on Demand
ITA	Information Technology Association	**VOIP**	Voice Over Internet Protocol
M&E	Monitoring and Evaluation	**VR**	Virtual Reality
MANCO	Management Committee	**WIL**	Work Integrated Learning
MCSA	Microsoft Certified Solutions Associate	**WP-PSET**	White Paper on Post Schooling Education and Training
MCSD	Microsoft Certified Solutions Developer	**WSP**	Workplace Skills Plan

Executive Summary

The MICT Sector Skills Plan (SSP) has been developed over the period of NSDP to map out and plan for occupational skills needs in the Advertising, Film and Electronic Media, Electronics, Information Technology and Telecommunications industries. The SSP is updated each year to analyse the changes in the Sector's labour market and does so against the backdrop of the economic performance of the Sector and developmental agenda of the country. It sizes up the gap between the demand and supply for skills and finally outlines strategies for dealing with the identified challenges.

Sector Profile and Analysis

As of 2020, the MICT Sector is made up of 28 829 spread across five Sub-sectors. This represents a 6.18% decline from 30 727 in 2019. The Information Technology Sub-Sector is the largest Sub-Sector, accounting for 51% of employers. The Telecommunications and Electronics Sub-Sectors each account for 13%, closely followed by Advertising (12%) and Film and Electronic Media (11%). Overall, the number of levy-paying employers decreased slightly from 7,902 in 2019 to 7,207 in 2020.

Although the MICT Sector is characterised by rapid technological change, research points to sluggish economic growth for the Sector. While the current COVID-19 pandemic has significantly disrupted the economy, the South African MICT Sector is placed favourably to leverage the opportunities created.

The MICT Sector experienced a 2.2% growth in employment from 2018 to 2020. Employment in the Information Technology Sub-Sector is the largest of the Sub-Sectors with 85% of employees in 2020. The Sub-Sectors with the smallest portion of employees are Advertising (1%) and Film and Electronic Media (1%).

Skills Demand, Supply and Scarcity

The following is a list of the top 10 occupations with hard to fill vacancies in the MICT Sector (and the quantities needed).

- Software developer (2 740)
- Computer Network and Systems Engineer (1 780)
- ICT Systems Analyst (1498)
- Management Consultant (Business Analyst) (504)
- ICT Security Specialist (385)
- Multimedia Specialist (360)
- Programmer Analyst (351)
- Developer Programmer (306)
- ICT Project Manager (174)
- ICT Sales Representative (78)

The MICT SETA has engaged in several partnerships with TVET colleges and institutes for Sectoral and occupational excellence (ISOEs) to improve delivery of training programmes. Furthermore, the SETA has mapped occupations against career pathways so that it is easy to identify Sectoral Priority Occupations interventions and, in that way, ensure seamless funding of skills development through the 80% Sectoral Priority Occupations allocation of the discretionary grants.

Sector Skills Priority Actions

The following set out the proposed broad skills development objectives for the Sector:

1. Improve the trustworthiness of the data used for skills planning through data triangulation. Such systematic and in-depth research will be achieved through collaboration with industry bodies, universities and acclaimed research institutions. Each of the occupations with hard to fill vacancies will be mapped to learning pathways.

2. Better position the MICT Sector to enable the Fourth Industrial Revolution through increasing access to and uptake of relevant skills development interventions, and by developing required qualifications and learning interventions. This will be achieved further through support by the SETA for the development of the skills required to research, develop and commercialise 4IR technologies and products. The impact of COVID-19 in relation to the enablement of 4IR cannot be ignored therefore, in implementing 4IR priority programmes, companies that have been and will be impacted by COVID-19 are also accounted for in the SETA's strategies.
3. Set realistic targets in collaboration with industry, ensure implementation through the allocation of discretionary grants and monitor delivery of Service Level Agreement deliverables as a way of addressing sectoral occupational shortages and skills gaps. This will prioritise the development of skills that enable 4IR occupations and specialisations. The COVID-19 phenomenon has been taken into consideration with regard to the SETA's strategic planning and has been acknowledged as a catalyst for the necessary 4IR related skills development
4. Identify TVETs with the potential for meaningful collaboration and enter into partnerships with them. These partnerships will recognise some of the TVETs as Centres of Specialisation, linking them with industry and ensuring that programmes offered are aligned to identified skills gaps for ease of learner placement on programmes such as WIL.
5. Scope skills development needs and priorities in rural areas, provide career and vocational guidance, support government in addressing e-governance issues and assist aspirant training providers to attain accreditation and deliver MICT SETA programmes. The SETA will support initiatives which apply technology in a manner that enables transformation of the Sector, with regards to female learners, learners with disabilities and rural learners. The development of skills related to 4IR can contribute to assisting learners with disabilities, for instance, through the development of teaching aids.
6. Improve provision of skills development to SMMEs, entrepreneurs and community-based organisations, particularly with regard to 4IR. This will enable the development and commercialisation of technologies and products that improve localisation and increase exports. The SETA will develop cross-sectoral partnerships and projects in the delivery of learning interventions. These partnerships are especially important now during the COVID-19 phenomenon (the impact of which will outlast the pandemic) as SMMEs are in a more vulnerable position attempting to keep up with 4IR trends and technology in order to stay relevant in the current MICT Sector environment.
7. Identify and develop occupational qualifications through the QCTO for occupations in high demand in consultation with the Sector. Furthermore, the SETA will put in place mechanisms to prioritise 4IR related qualifications and ensure increased number of accredited skills development providers offering occupational qualifications in high demand on an annual basis.

The rest of the SSP follows with more details on the salient points captured in this Executive Summary. We trust it will serve as an influential guide on the Sector and inform relevant, cutting-edge interventions to move the Sector-and the country-forward.

Mr. Mdu Zakwe

CEO: MICT SETA

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SSP Research Process and Methods

In producing this SSP a mixed-method approach that included quantitative and qualitative research methods was adopted. In addition, data is triangulated across various sources (i.e. verified), thus, in the resultant SSP, ensuring a scientifically sound and accurate depiction of the Sector and its needs. The process begins with the collection of WSPs/ATRs from employers. These are then analysed to extract key trends, examples of which are the top hard to fill vacancies and skills gaps as reported by the largest number of employers. From this analysis, the data is distilled into shorter lists that are validated first in the surveys, then in the interviews and, finally, in the focus groups-with each iteration producing a progressively shorter and more accurate list. Thus, the SETA follows a process of multi-layered verification and triangulation, ensuring a thoroughly tested view of the final insights.

The following are some of the research methods that have been adopted by the MICT SETA to inform the development of the SSP.

Topic	Nature (Design) of the Study	Objectives of Study	Data Collection Tool	Sample Size and Scope	Data Sources and Data Sets	Time Frame
Stakeholder Interviews	Qualitative	The objectives of these interviews are to get an understanding of key developments in the Sector and gather insights regarding hard to fill vacancies, skills gaps, future skills and change drivers in the MICT Sector. In addition, consultations had a special focus on the impact of the Fourth Industrial Revolution (4IR) and COVID-19. This study covers the views of various stakeholders across all the Sub-sectors of the MICT Sector.	• Interview questionnaire	• The scope of the interviews was employers, industry associations, research institutions and trade unions • 35 interviews were conducted	• MICT SETA Levy Huge File • Key role players list	2020
Stakeholder Survey	Quantitative and Qualitative	• The goal of this survey was to assess stakeholders' opinions on developments and skills requirements in the Sector. The survey focussed on skills needs and the impact of 4IR and COVID-19.	• Survey	• The scope of the survey was employers, industry associations, research institutions, training providers and trade unions • 411 Surveys were conducted	• MICT SETA Levy Huge File • MICT SETA Training Provider List • Key role players list	2020

Topic	Nature (Design) of the Study	Objectives of Study	Data Collection Tool	Sample Size and Scope	Data Sources and Data Sets	Time Frame
		• The survey also sought to validate the findings from the WSP submissions with regards to hard to fill vacancies and skills gaps.				
Employer and Industry Association Focus Groups	Qualitative	The objectives of these group discussions are to test the findings of the draft SSP regarding hard to fill vacancies, skills gaps, future skills and change drivers in the MICT Sector. This study covers the views of small to large employers and industry associations across all the Sub-sectors of the MICT Sector.	• Focus group guide • Structured discussion with employers and Industry Associations.	• 6 focus groups sessions were conducted: one for each of the five Sub-sectors (IT, Telecommunications, Electronics, Film & Electronic Media, and Advertising) and an additional focus group with an industry chamber of SMMEs • Overall, 70 stakeholders attended across the 6 focus groups	• MICT SETA Levy Huge File	2020
MICT SETA COVID-19 Pulse Survey	Quantitative and Qualitative	The objective of the survey was to ascertain the impact of the COVID-19 pandemic on the Sector and employers' states of readiness to resume learning programmes and business operations given the lockdown imposed at that time.	• Survey	• The scope of the survey was employers and training providers • The sample size reached was 65	• MICT SETA Levy Huge File • MICT SETA Training Provider List	2020

Conclusion

The MICT SETA utilises various research outputs to compile the SSP. This approach enables the SETA to produce a plan that is detailed and informed by data and yet written in a language that is clear and simple; which can be understood by multiple stakeholders who use the SSP as a source. For the preparation of this SSP in 2020, the MICT SETA benefitted from receiving feedback from DHET on the past submission, which provided key guidelines, especially on Chapter 5. Given that the SSP is made up of multiple research sources and a combination of methodologies, the process may take up to four months to complete. A bibliography of sources is provided at the end of the SSP with the specific details of the sources that were utilised in the preparation of the SSP.

Chapter 1: Sector Profile

1.1 Introduction

This chapter presents and profiles the shape and size of the Media, Information and Communication Technologies (MICT) Sector including its scope of coverage and key role players, economic performance, employer profile and labour market profile. It also provides an economic trend analysis and projection of how the economy of the Sector may unfold, the potential impact of COVID-19 and concludes with implications for skills development. In profiling the five Sub-sectors of the MICT Sector, research data from multiple sources, including publicly available literature and MICT SETA databases, were analysed.

1.2 Scope of Coverage

The MICT Sector is made up of five Sub-sectors that are interrelated but also quite distinct and identifiable. These are advertising, film and electronic media, electronics, information technology and telecommunications.

The Department of Higher Education and Training, under section 9(1) of the Skills Development Act (Act No. 97 of 1998), as amended, re-established the Sector Education and Training Authorities (SETAs) within a new SETA landscape from 1 April 2020 to 31 March 2030. The Standard Industry Classification (SIC) codes that demarcate the MICT Sector, shown in the table below, fall under four different sub-industries, namely: (1) manufacturing; (2) transport, storage and communication; (3) finance, insurance, real estate and business services; and (4) community, social and personal services.

Table 1: The MICT SETA SIC Code List

Sub-sector	SIC Code	Main Activity Description
Advertising	88310	Advertising
	88311	Activities of Advertising Agents
	88313	Commercial Design
Film and Electronic Media	96110	Motion Picture and Video Production and Distribution
	96112	Related Activities - Film and Tape Renting to Other Industries, Booking, Delivery and Storage
	96113	Film and Video Reproduction
	96132	Production and Broadcast of Radio and Television Broadcast Content
	96200	News Agency Activities
	88940	Photographic Activities
Electronics	35791	Manufacture of Alarm Systems
	75216	Security Systems Services Except Locksmiths
	75217	Office Automation, Office Machinery and Equipment Rental Leasing Including Installation and Maintenance
	86004	Electronic and Precision Equipment/ Computer Repairs and Maintenance
	86010	Consumer Electronics Repair and Maintenance
	86013	Other Electronic and Precision Equipment Repair and Maintenance
	86014	Repair and Maintenance of Electronic Marine Equipment
	87142	Research and Development of Electronic Equipment and Systems
	87143	Information Technology Import and Product Integration of Pre-Manufactured Electronics IT and Telecommunications Equipment
	87146	Research and Development in The Physical and Engineering Sciences
	87147	Electronics Importation and Product Integration of Pre-Manufactured Electronics IT and Telecommunications Equipment
	96133	Installation, Maintenance and Repair of Tracking Devices for Cars
Information Technology	86001	Software Publishers
	86002	Computer Systems Design and Related Services
	86003	Computer Facilities Management Services
	86005	Computer Rental and Leasing
	86006	Computer Programming Services
	86007	Other Computer Related Activities
	86008	Call Centre and Customer Relationship Management Systems Development and Installations Activities
	86009	Computer System Design Services and Integrated Solutions

Sub-sector	SIC Code	Main Activity Description
	86011	Computer and Office Machine Repair, Maintenance and Support Services
Tele-communications	75200	Telecommunication
	75201	Wired Telecommunications Carriers
	75202	Television and Radio Signal Distribution
	75203	Cable Networks and Programme Distribution
	75204	Telephone
	75205	Wireless Telecommunications Carriers except Satellite Radio Telephone
	75209	Television Broadcasting
	75211	Telecommunications and Wired Telecommunication Carriers
	75212	Paging
	75213	Cellular and Other Wireless Telecommunications
	75214	Satellite Telecommunications
	75215	Other Telecommunications
	86012	Communication Equipment Repair and Maintenance
	87148	Telecommunications Importation and Product Integration of Pre-Manufactured Electronics IT and Telecommunications Equipment
	96131	Providing Radio and Television Transmission Signals

Source: Government Notice, No. 42589, Government Gazette, 22 July 2019

While the MICT SETA works with employers located in the Sector to develop skills, most of the skills needs, particularly ICT skills, are required throughout the economy. The SETA needs to consider this when conducting research into the demand and supply of skills. Though the MICT Sub-sectors are wide-ranging, they are nevertheless interconnected. The Sector can be disaggregated into Information and Communication Technologies (ICT) producing activities and ICT using activities. It is located on the convergence between content, commerce, community and the tools that support them.

1.3 Key Role Players

The key stakeholders that contribute to the Sector policy and regulatory environment include industry and employer bodies, professional bodies, and state organs. The Department of Communications & Digital Technologies (DCDT) is the key government department that has links with the work of the Sector. Professional associations advance professional learning and continuous development amongst professionals in the Sector, whilst there are several trade unions representing the interests and rights of workers within the Sector. Some of the key role players are listed in the table below.

Table 2: Key role players in the MICT Sector

Stakeholder	Role
Association for Communication and Advertising South Africa (ACASA)	ACASA is the official representative body of South Africa's advertising and communications profession. It works with national and provincial government to promote agency and industry transformation and is committed to the discovery and development of new talent through corporate social responsibility programmes. In relation to outcome 4.2 of the NSDP, ACASA trains for the advertising agencies and places people within the industry. Currently it has proposed a partnership with the MICT SETA on a 3-year learning programme.
Media Development and Diversity Agency (MDDA)	MDDA is a statutory development agency for promoting and ensuring media development and diversity. It is a partnership between the South African Government and major print and broadcasting companies to assist in, amongst others, developing community and small commercial media in South Africa. It responds to NSDP outcome 4.2 by funding projects in historically disadvantaged communities or inadequately served communities. It has partnered with key stakeholders such as Sentech and SEDA with the objective of strengthening co-operation between the parties, specifically with respect to the growth and sustainability of enhanced media diversity and delivery. The partnerships are about mentoring small enterprises, transferring skills on a wider scale, for the general skills upliftment of communities.
Southern African Communications Industries Association (SACIA)	SACIA is a non-profit organisation registered as a Section 21 company in South Africa. It is specifically designed to promote the adoption of professional standards and ethical business practice in the communications industry throughout Southern Africa. It seeks to further the interests of members through partnership and representation on a range of issues. Primary activities include Market Research & Intelligence Services, Networking activities, and the development of training and skills development programmes. SACIA's activities respond to outcome 4.2 of the NSDP.

Stakeholder	Role
Institute of Information Technology Professionals South Africa (IITPSA)	IITPSA actively engages with commerce, industry, and government in order to influence policy formulation on behalf of both its own members and other stakeholders. The Society also encourages the growth of professionalism and the responsible and professional use of Information and Communications Technology throughout the South African economy. The IITPSA responds to the NSDP outcome 4.2 by working together with other interested stakeholders to accredit university programmes with computing content at South African Universities. It also has a "Computer Professional Education Programme" that it offers online at Masters Degree level.
Information Technology Association (ITA)	The ITA stands at the threshold of a new era for the local ICT Industry, with its Membership and industry partners, it positions itself to play a crucial role in the growth and development of the ICT Sector, as well as serving as a credible, effective channel of communication between various stakeholders. One of the functions of the ITA is lobbying and negotiating at government level on behalf of its members. Members have the opportunity of influencing the South African legislative mechanism through verbal and written submissions by the ITA. This has far reaching effects, which go beyond its members and positively impact the ICT industry of South Africa as a whole. ITA responds to NSDP outcome 4.2 through learning programmes in partnership with the MICT SETA, Microsoft SA, Siemens, SAP, Axiz, and IBM. ITA is in partnership with the DCDT, DPSA, GITOC and SITA. These partnerships are about building an ongoing digital government skills programme, which covers foundational digital skills (such as computer user skills) and advanced skills (such as data analytics skills).
State Information Technology Agency (SITA)	State Information Technology Agency (SITA) is an organisation that was established in 1999 to play the role of consolidating and coordinating the State's information technology resources in order to achieve cost savings through scale, increase delivery capabilities and enhance interoperability. Currently responds to the NSDP outcome 4.2 through IT learnerships programmes which also cover individuals with disabilities.
Department of Communications & Digital Technologies (DCDT)	DCDT partners with universities and other partners such as IITPSA, ITA, ICASA and other relevant industry professional bodies to develop ICT policies and legislations that advance the South African economy. The department has special partnerships with, amongst others, civil society organisations, particularly those that have a major interest in skills building and achieving race, gender and disability equity. Through its activities it responds to NSDP outcome 4.2.
National Association of Broadcasters (NAB)	The NAB is a non-profit group of organisations and individuals working in broadcasting and related industries. The NAB assists with industry regulation and is grounded in the principles of democracy, diversity and freedom of expression. In response to NSDP outcome 4.2, it has offered internships in the past in fields such as digital marketing and continues to do so in response to changing environment cause by 4IR technologies.
Government Information Technology Officers Council (GITOC)	GITOC is a body made up of Chief Information Officers of government departments across South Africa. It aims to discuss issues of mutual interest and mainstream excellence in information technology across the public service. One of the main programmes of GITOC is free open access software (FOSS), which they intend to implement across government. As the ICT oversight body of government, it aims to respond to outcome 4.2 of the NSDP by introducing ICT curriculum at the National School of Government which will uplift and align strategic ICT pillars that are required as knowledge for Government Officials on matters pertaining to Big Data, Government, and Cybersecurity.
Information and Communication Technologies SMME Chamber (ICT SMME Chamber)	The ICT SMME Chamber is recognised for its importance and centrality in South Africa's development framework, the National Development Plan, and numerous supporting policy documents of the South African government. It plays a critical role in engaging with government and other ICT stakeholders, and in lobbying government on behalf of the ICT SMMEs on all matters of ICT SMME development and ICT Sector transformation. It responds to NSD outcome 4.6 on entrepreneurship and cooperative development, through a partnership with the Technology Innovation Agency (TIA). The Chamber supports the development of technologies from proof of concept, product prototyping, and, ultimately, demonstration of the product in an operating environment.
Universal Service and Access Agency of South Africa (USAASA)	USAASA is a State Owned Entity of government established through the Electronic Communications Act, No 36 of 2005, to ensure that "every man, woman and child whether living in the remote areas of the Kalahari or urban areas of Gauteng can be able to connect, speak, explore and study using ICT." In providing crucial infrastructure to rural communities and educational institutions, USAASA contributes to realising NSDP outcomes 4.2 and 4.5.

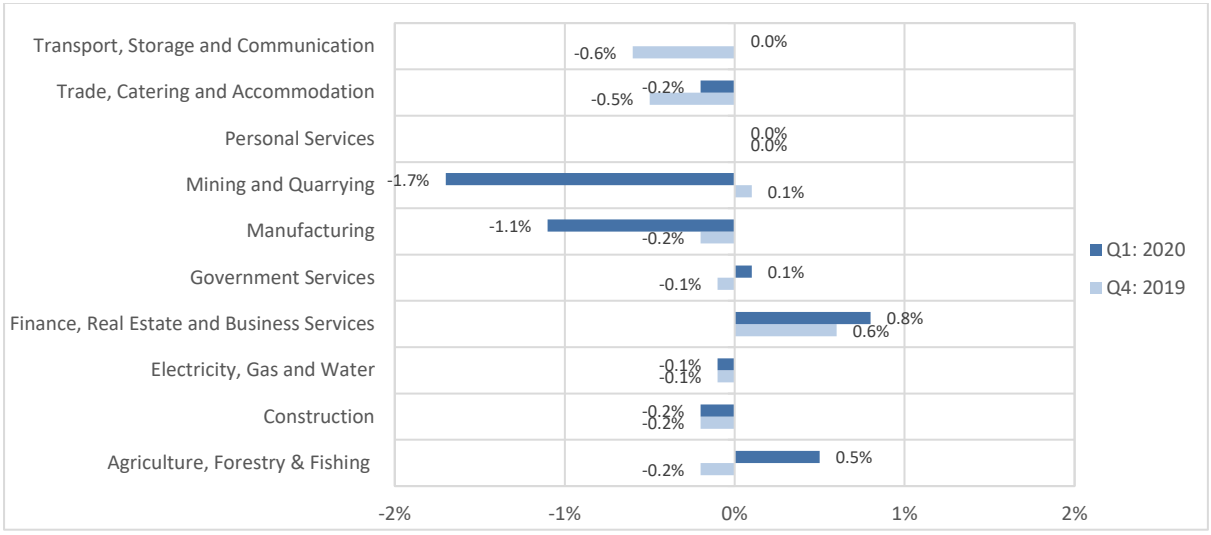
1.4 Economic Performance

The Media, Information and Communication Technologies (MICT) Sector is crucial to economic development. Although the MICT Sector is characterised by rapid technological change, research points to sluggish economic growth for the Sector. A key driver for the sluggish economic growth is the impact from the COVID-19 pandemic, described further in section 1.4.1. Additional factors are examined in sub-sections 1.4.2 to 1.4.6.

The Fourth Industrial Revolution (4IR) has brought forward new technologies such as Artificial Intelligence, Cloud Computing, Virtual and Augmented Reality and the Internet of Things, amongst others. While there is still uncertainty on the exact impacts of such 4IR technologies on the economy and society, it is certain that they have already and will continue to result in profound and rapid change (Penprase, 2018). The MICT Sector is, therefore, urged to swiftly adapt to these changes and make considerable efforts in their adoption. These technological advancements mean that business models and government decisions, amongst others, will have to transform and adapt due to a new set of opportunities, challenges and uncertainties in the environment (ICASA, 2020). These new and emerging technologies will require a significant amount of skills development in the MICT Sector so that businesses, individuals and other stakeholders are able to utilise and benefit from such technological advancements.

Figure 1 below illustrates each Sector's contribution to GDP growth in the first quarter of 2020 and last quarter of 2019. In 2019 Q4, the Transport, Storage and Communications Sector was the worst performing, relative to other Sectors. In 2020 Q1 the Sector's relative contribution to growth shifted to the top half (ranking 4th out of the 10 Sectors).

Figure 1: Sector Contribution to GDP



Source: Gross Domestic Product (GDP), 1st Quarter 2020 (StatsSA)

Following an increase of 0,8% in 2018, the South African annual real GDP increased by only 0,2% in 2019, the lowest reading since 2009 when the economy contracted by 1,5% (StatsSA, 2020).

The economic performance in the MICT SETA Sectors are briefly discussed below:

- South Africa's total ICT Sector is expected to reach R393 billion ($26.4 billion) in 2020, growing by 2.5% from 2019 (ICASA, 2020). This shows a compound annual growth rate (CAGR) of 25% over the last five years (IDC, 2020).
- The negative impact of COVID-19 on the ICT Sector in South Africa, particularly the telecommunications and IT Sub-sectors, in comparison to other Sectors, is considerably lower.
- The South African content production industry is valued at an estimated R5.5 billion ($800 million) a year and the film and electronic media is forecasted to grow by 4,0% in 2020 ((Gauteng Film Commision, 2019) (PWC, 2018).
- Total broadcasting services revenue increased by 3.8% from over R36.9 billion in 2018 to over R38.3 billion in 2019. Revenue from subscriptions increased by 7% in 2019, however advertising

and informational decreased by 11.4% and 21.8%, respectively between 2018 and 2019 (ICASA, 2020).

- Advertising revenue in South Africa increased by 2.8% in 2018 to a total of R29.5 billion, with a projected CAGR of 3,4% to a total of R34.9 billion in 2023 (PwC, 2019). In 2019, total advertising market in South Africa grew to an estimated R30.4 billion (Statista, 2019).
- In 2018, the country's entertainment and media market, comprising of consumer and advertiser spend, increased by 7.1% year-on-year from R120.4 billion to R128.9 billion. It is projected for the 5-year period ending 2023 this figure will increase at a 5.8% CAGR to R170.5 billion (PwC, 2019).
- Consumer Electronics revenue is expected to show an annual growth rate of 5.4% from 2020-2024. User penetration is currently estimated to be 23.2% in 2020 and is projected to hit 32% by 2024 (Statista, 2020).
- Over the period 2015-2018, the total telecommunications revenue increased by 6.4%. In 2019 alone, this revenue increased by 3.6% to R194.2 billion (ICASA, 2020).

Further analysis of the impact of COVID-19 and economic performance of each MICT Sub-sector is provided in the sections that follow.

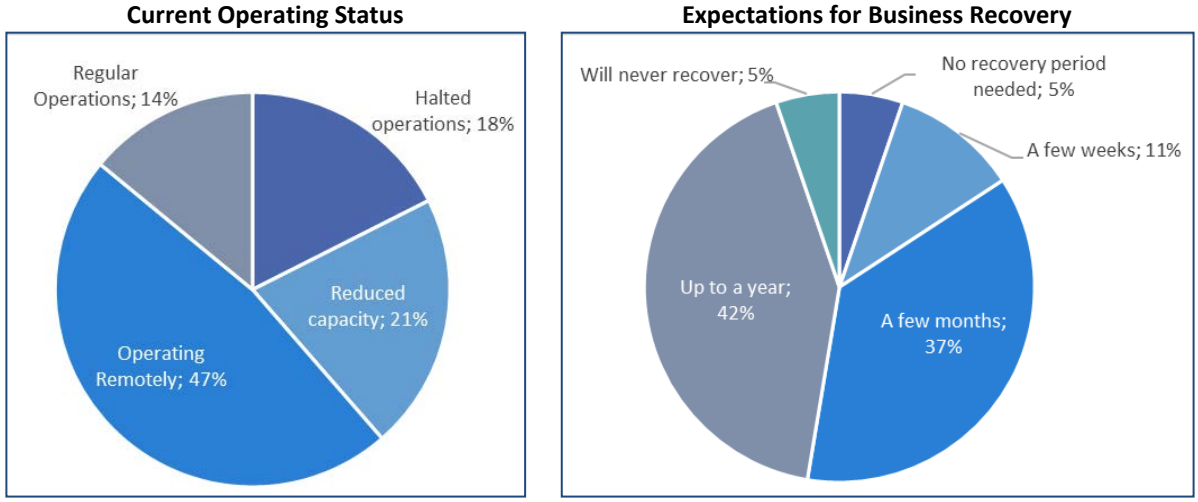
1.4.1 Impact of COVID-19

The current COVID-19 pandemic has significantly disrupted many economies around the world. In an effort to contain the pandemic and minimise its impact on the country, the South African government declared a National State of Disaster and enforced a national lockdown, which has significantly impacted South African society in the social, economic, health, environmental, and technological realms. The restrictions of movement and economic activities under the new regulations resulted in a significant halt in the South African economy, which was already in a technical recession from the fourth quarter of 2019 (Sekyere, et al., 2020). The National Treasury had estimated economic growth of 0.9% in 2020, rising to 1.3% in 2021 and 1.6% in 2022 (National Treasury, 2020). However, due to the COVID-19 pandemic which hit the country in March 2020, these estimates have been drastically revised. The South African Reserve Bank expects GDP to contract by 6.1% in 2020 as a result of the pandemic, as compared to the 0.2% previously predicted, which is worse than during the 2008–2009 financial crisis. The Bank expects GDP to recover in following years, with an expected growth of 2.2% in 2021 and 2.7% in 2022. In addition to this, the South African Rand has seen a significant depreciation (Mboweni, 2020).

The South African ICT Sector is one of the most powerful tools available during the COVID-19 pandemic (Mthembu, 2020). Thus, the negative impact on the MICT Sub-sectors is expected to be considerably less than other Sectors of the South African economy. There is high demand for up to date and accurate medical information, statistics, as well as information on new government regulations, to inform all South Africans about the pandemic. Some telecommunications service providers responded speedily in providing solutions to assist the country's response to the pandemic, such as the provision of zero-rated services for health and educational purposes. Telecommunications companies have also worked alongside government to assist in tracing and tracking those who have been exposed to COVID-19 patients, using geolocation solutions, without infringing on the privacy and human rights of South African citizens (Mthembu, 2020).

MICT SETA conducted a pulse survey regarding the impact of COVID-19 on the enterprises in the MICT Sector. As shown in Figure 2 below, 18% of businesses in the Sector have halted operations, and 21% have had to reduce their operational capacity. Almost half (47%) have been able to continue operating remotely. 42% of businesses in the Sector indicated that they expect that their business will take up to a year to recover from the impact of COVID-19, and 5% of businesses indicated that they will never recover from this impact. Furthermore, three quarters (75%) of businesses' workforce numbers have changed due to COVID-19.

Figure 2: COVID-19 Impact on MICT Sector



Source: MICT SETA COVID-19 Pulse Survey, 2020

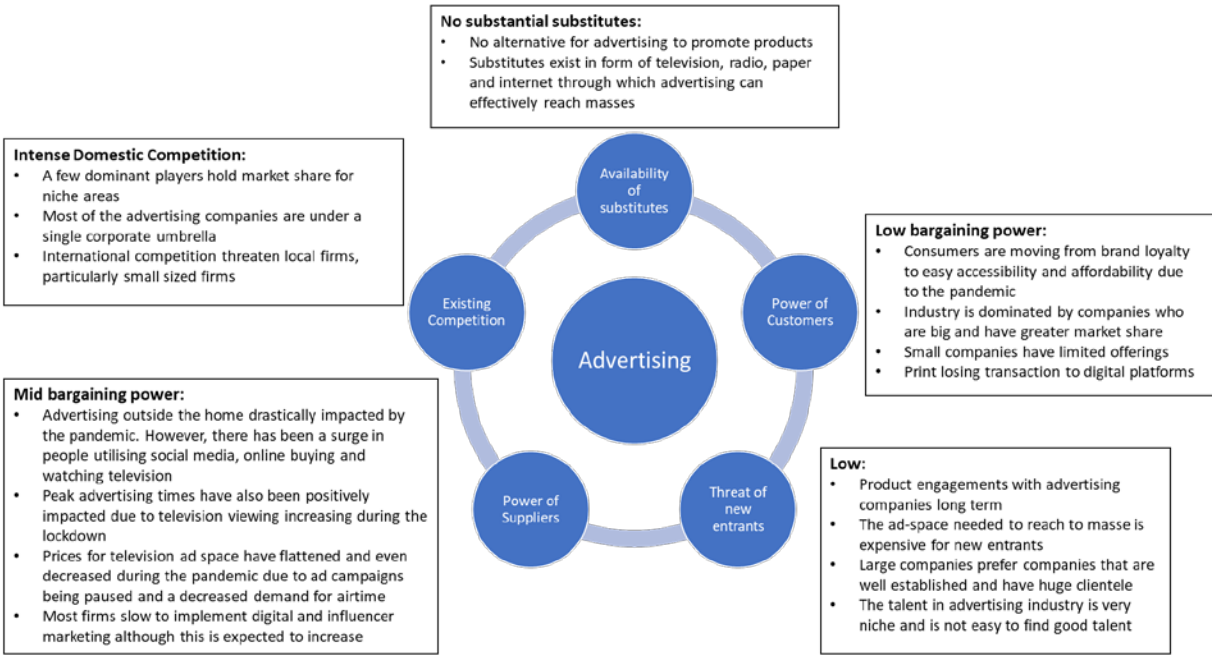
1.4.2 Advertising

In 2019, the total advertising market in South Africa grew to an estimated R30.4 billion. TV and video advertising spending are estimated to account for the largest share (approximately 21%), with internet said to be the second largest (Statista, 2019). However, according to the 2018 to 2023 compound growth rates, TV's 1.8% CAGR in this period will be surpassed by internet's 12.4% CAGR, meaning that by the end of 2023, internet advertising will replace TV advertising as the key advertising contributor for the first time. At the same time, mobile will represent 50% of internet advertising revenue, an increase of 40% from 2018. These figures illustrate the importance of mobile platforms in the development of South Africa's advertising industry (Statista, 2019).

Newspaper advertising is expected to consistently experience year-on-year falls from 2019 to 2023. Much of the rise in internet advertising revenue, excluding Google and Facebook, is due to lower quality content that is often user-generated. This is often significantly more revenue generating than expensive, high quality content. Many media owners have responded to the opportunities and challenges associated with the monetisation of more content through digital ads. Social media platforms remain a significant driving force in internet advertising, mainly due to their reach and ability to target users more intensely (PwC, 2019). These forms of digital advertising are likely to become significantly more popular amongst advertising agencies in light of the spike in at-home media consumption and increased use of social media platforms during the COVID-19 pandemic. Furthermore, businesses that are closed under lockdown will generate less revenue and therefore spend less on advertising.

The following diagram presents a Porter's Analysis of competition in the advertising Sub-sector.

Figure 3: Advertising Porter's Analysis



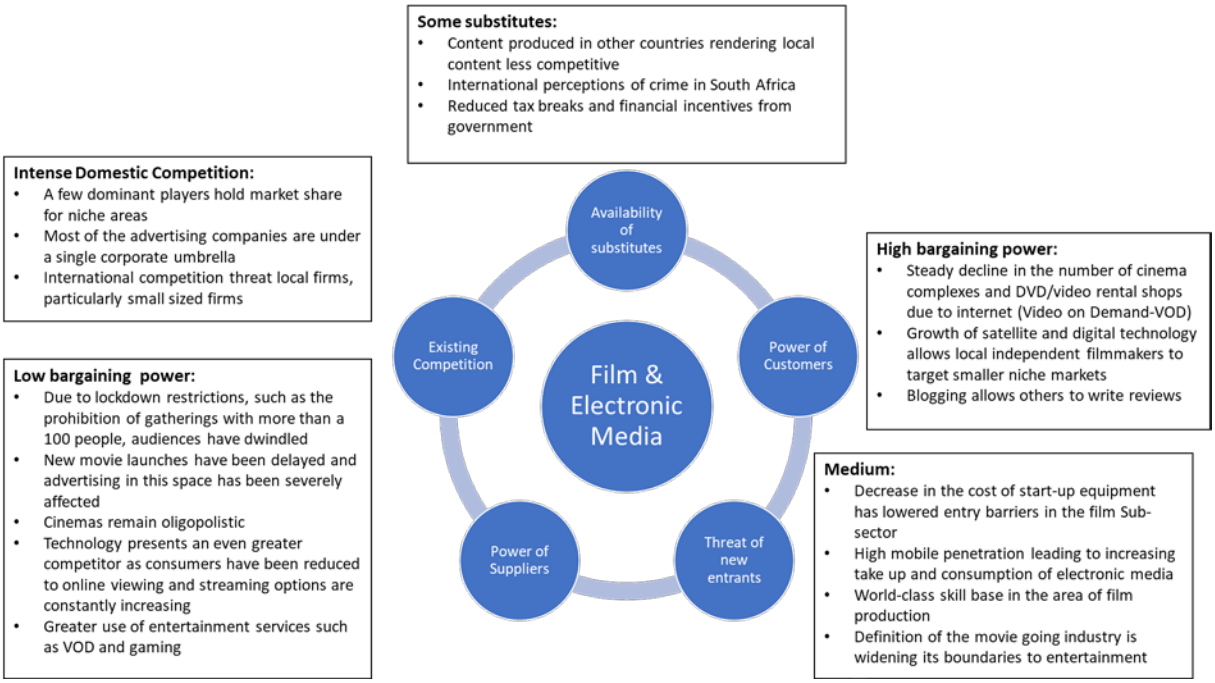
1.4.3 Film and Electronic Media

South Africa is a leader in film production, satellite distribution and interactive content, with more content consumed in the country than anywhere else in Africa. The film industry has the potential to generate significant returns for the country in which the films get shot. The production of a popular film can make a nation an ideal tourist destination as well as increase investment into the economy. The South African content production industry is valued at an estimated R5.5 billion a year. Total revenue in the film Sector, including box office and cinema advertising, amounted to R1.8 billion in 2018 and is expected to grow at a 2.7% CAGR to R2 billion by 2023. Box office revenue increased by 11.5% in 2018 to R1.3 billion, with an estimated projection of R1.5 billion by 2023. Cinema advertising is expected to grow slightly quicker than box office. In 2018, cinema revenue sat at R428 million and is expected to rise to R543 million by 2023, accounting for 27% of overall revenue (PwC, 2019). In 2018, South Africa had a total of 765 screens across the country, which is projected to rise to 785 screens by 2023.

Social distancing due to COVID-19 has led to a spike in at-home media consumption as well as a growth in news broadcasting numbers as South Africans turn to news providers for timely and trusted information on the pandemic (Hall & Li, 2020). However, the limitations in the production of valuable broadcast content, such as live sports, have resulted in a significant decrease in income for advertising and media companies. Film and media outlets, such as playhouses and theatres, will therefore need to avail artists a digital platform to perform live-streaming activities which includes stand-up comedy, poetry sessions and music, amongst others (Mthembu, 2020). This is not only to keep people entertained, but to continue showcase the work of these creatives and promote local content consumption.

The following diagram presents a Porter's Analysis of competition in the Film and Electronic Media Sub-sector.

Figure 4: Film and Electronic Media Porter's Analysis

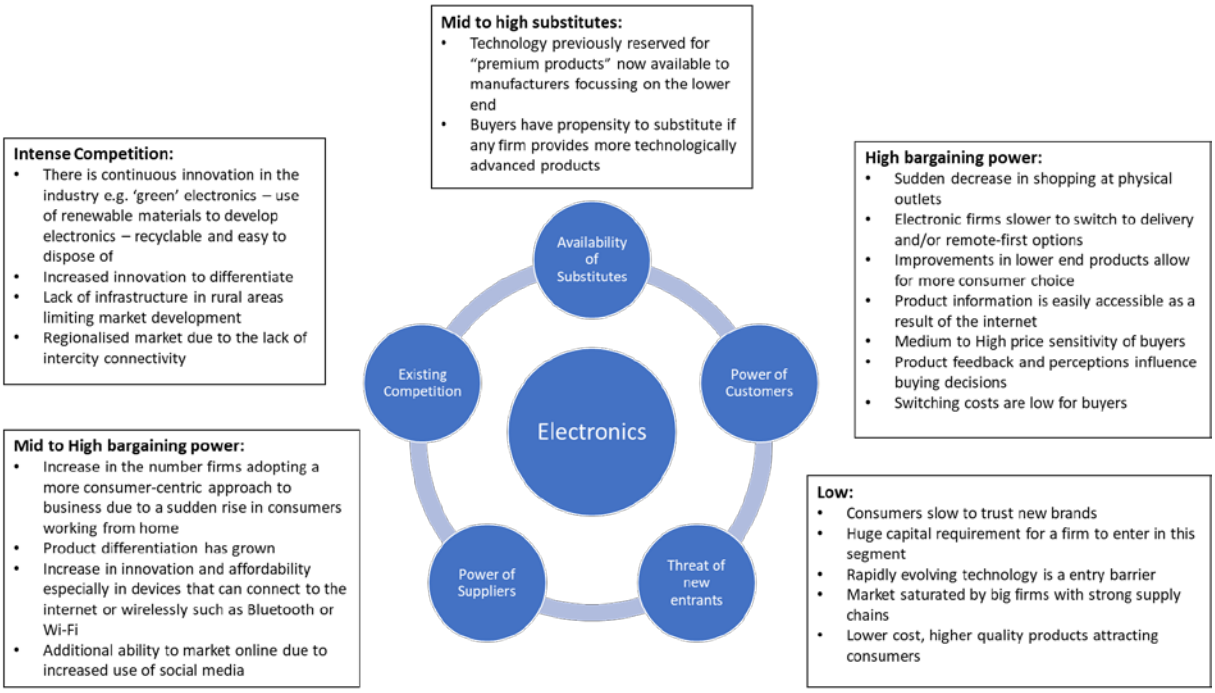


1.4.4 Electronics

South Africa's poor economic performance, rising utility prices, weakened currency and increased costs of living negatively affect the economy, however, despite these challenges consumer electronics continue to record positive growth rates. The Electronics and Media industry in South Africa consists of physical media, consumer electronics and communication devices, amongst others (Statista, 2018). Electronics and media industry revenue is expected to show an annual growth rate (CAGR) of 4.4% between 2020 and 2024, resulting in a market volume of US$1,307m by 2024.

The following diagram presents a Porter's Analysis of competition in the Electronics Sub-sector.

Figure 5: Electronics Porter's Analysis



The market's largest segment is Consumer Electronics with a market volume of US$846m in 2020. Consumer Electronics revenue is expected to show an annual growth rate of 5.4% from 2020 to 2024. The number of users in the consumer electronics market was estimated at 10.41 million in 2018,

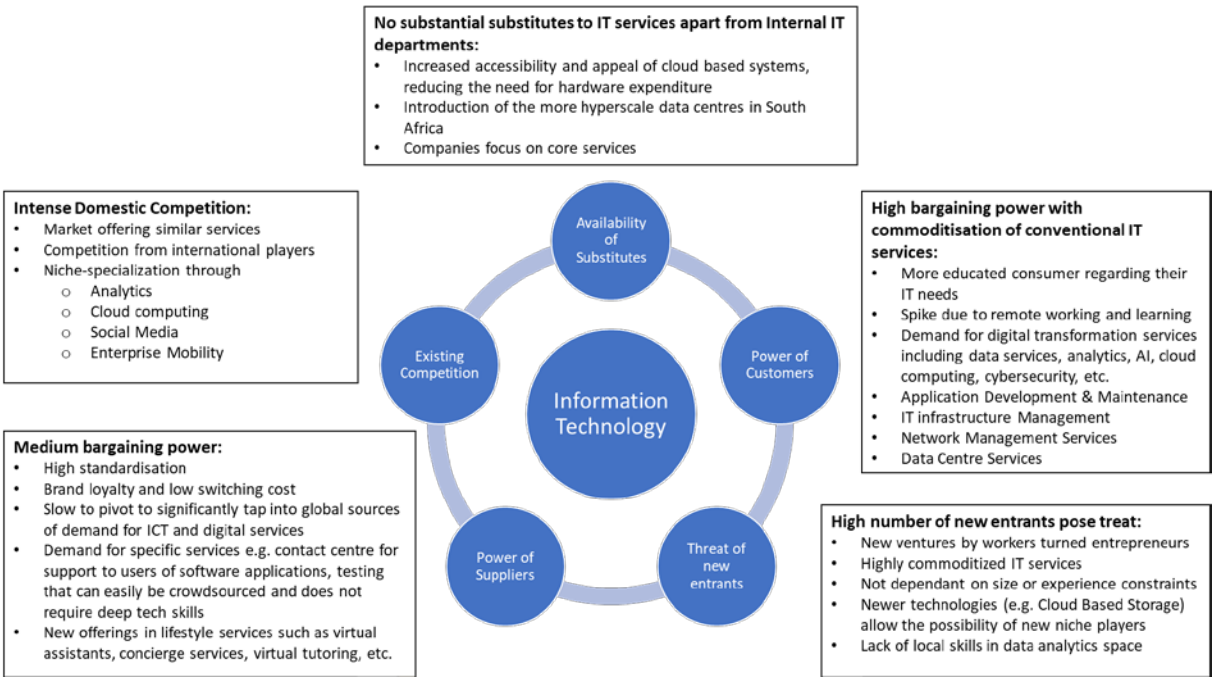
increasing to 12million in 2019. User penetration is currently estimated to be 23.2% in 2020 and is projected to hit 32%, approximately 19.9 million users, by 2024 (Statista, 2020). Additionally, it is estimated that 15% of total market revenue will be generated through online sales by 2024. The revenue and number of users may be expected to increase further in 2020, in light of COVID-19, with more consumers working remotely and most educational institutions resorting to online learning.

1.4.5 Information Technology (IT)

The South African ICT Sector is well established and continues to demonstrate dynamic growth each year. South Africa serves as the African leader of the ICT industry. Over the 5-year period ending 2019, the ICT Sector is recorded to have increased its combined revenue by 5.9% (ICASA, 2020). Telecommunication services revenue increased by 3.6% in 2019 (compared to 14.4% in 2018), broadcasting services revenue increased marginally by 3.8% in 2019 (3.7% in 2018) and postal services revenue has significantly increased by 19.9% in 2019 (-0.1% in 2018). South Africa's total ICT Sector is expected to reach R393 billion ($26.4 billion) in 2020, growing by 2.5% from 2019 (IDC, 2020).

The following diagram presents a Porter's Analysis of competition in the IT Sub-sector.

Figure 6: Information Technology Porter's Analysis



There is significant opportunity for the provision of affordable ICT infrastructure and digital technology solutions using the Internet of Things and 4IR technologies such as Artificial Intelligence, High Performance Computing, Robotics and Blockchain (Mthembu, 2020). The evolution and adoption of these technologies have the potential to reduce labour and transactional costs, increase productivity and improve information flows in the economy.

1.4.6 Telecommunications

The telecommunications Sector is a significant part of modern lifestyles. Total telecommunication revenue in South Africa increased by 3.6% in 2019, as compared to an increase of 14.4% in 2018. Total fixed internet and data revenue increased by 33.2% in 2019, total mobile services revenue decreased by 1.5% and total fixed line revenue decreased by 10.7%. Prepaid revenue mobile voice increased by 43.9%, whilst revenue from both prepaid mobile data and messaging decreased by 37.9% and 32.7%, respectively (ICASA, 2020).

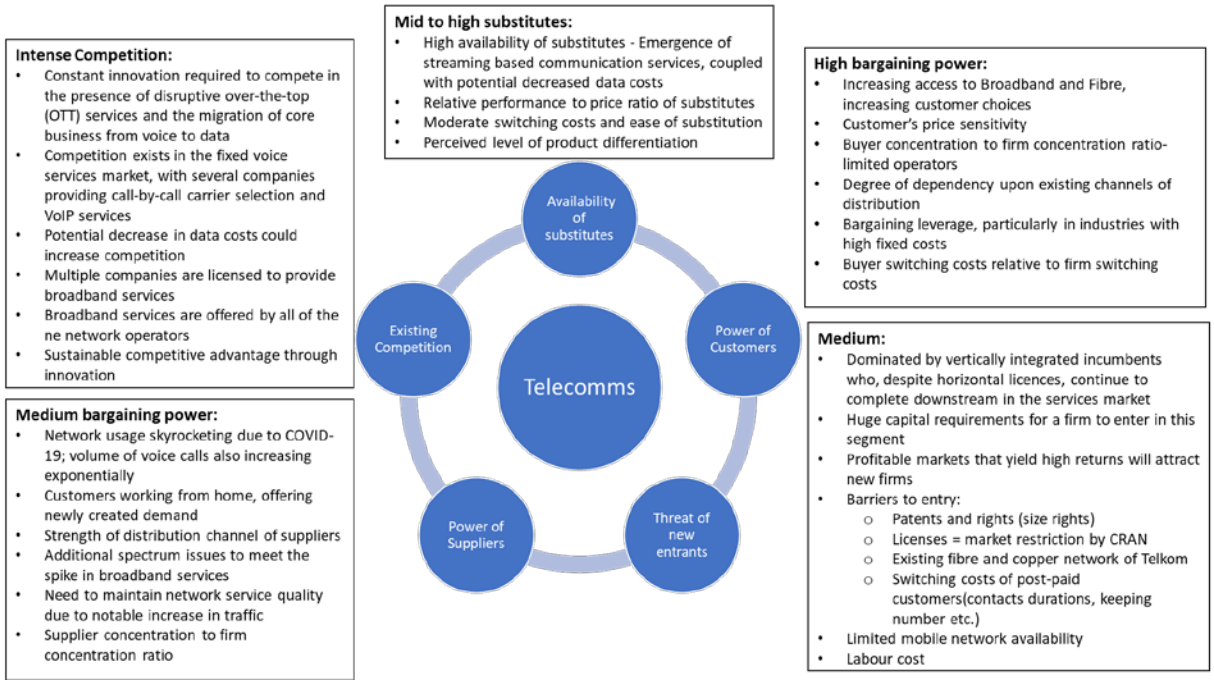
In 2018, at least one member in 64.7% of households in South Africa could access the Internet either at home, the workplace, place of study or Internet café (Stats SA, 2019). The national population coverage for 3G network increased from 99.5% in 2018 to 99.7% in 2019, and coverage for 4G/LTE network increased from 85.7% in 2018 to 92.8% in 2019. South Africa's fibre network and data centre

markets are expanding rapidly (ICASA, 2020). Moreover, Fifth Generation wireless technology (5G), which is significantly faster than its predecessors, is expected to launch to South African consumers in 2020.

The impact of COVID-19 exposed the lack of access to the internet and digital devices that would enable South Africans to work remotely and continue with other aspects of their lives via online channels (Ahmed, 2020). A majority of businesses, in mitigation and innovation to reduce the impact of the COVID-19 pandemic on business operations, have increased their use of virtual connections (StatsSA, 2020). This is likely to encourage demand by business and other services for telecommunication and internet products (IT Web, 2020).

The following diagram presents a Porter's Analysis of competition in the Telecommunications Sub-sector.

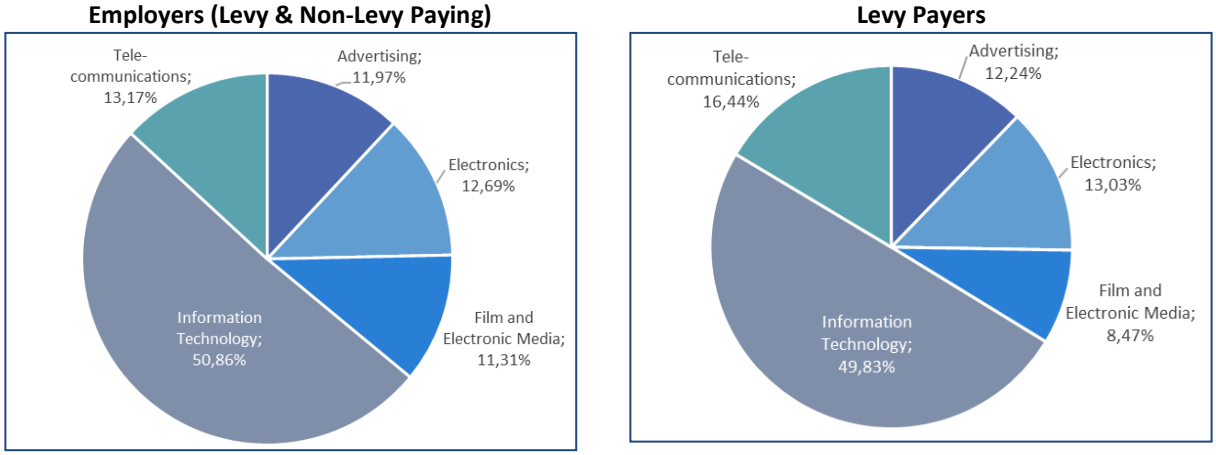
Figure 7: Telecommunications Porter's Analysis



1.5 Employer Profile

As of 2020, the MICT Sector is made up of 28 829 spread across five Sub-sectors. This represents a 6.18% decline from 30 727 in 2019. The Information Technology Sub-sector is the largest Sub-sector, accounting for 51% of employers. Telecommunications and Electronics Sub-sectors each account for 13%, closely followed by Advertising (12%) and Film and Electronic Media (11%).

Figure 8: MICT Sector of Employers per Sub-sector



Source: MICT SETA Levy Huge File, 2020

Figure 8 above shows the levy paying organisations, which represent one quarter (25%) of all employers in the Sector. The number of levy-paying employers decreased slightly from 7,902 in 2019 to 7,207 in 2020 as companies battle tough economic times and a rise in self-employment (e.g. freelancers, mobile filmmaking, and social media "influencers"). Levy contributions, however, increased. As levy contributions are a percentage of an employer's payroll, an increase in salaries for existing employees or an increase in the number of employees (especially those earning higher salaries) will increase the payroll and, consequently, the levy contribution. The Information Technology Sub-sector contributes the highest total value at 50% amongst levy paying employers. This Sub-sector's contribution increased from 46% in 2019. The percentage of levy paying employers in the Telecommunications Sub-sector increased from 11% in 2019 to 16% in 2020. While the Advertising and Electronics Sub-sectors showed a similar contribution to the Sector at 12% and 13%, respectively, levy payers in the Film and Electronic Media Sub-sector made the smallest levy contribution, at 8%.

Table 3 shows that small sized enterprises, which employ no more than 49 employees, have consistently dominated the MICT Sector, accounting for approximately 96% of all employers. The number of small enterprises in the Sector sits at 27 505 in 2020. Medium enterprises make up 3% of the employer base in the Sector, whilst enterprises employing over 150 employees (large enterprises) make up only 1% of the Sector.

Table 3: MICT Sector Size of Employers per Sub-sector

	Large (150+)		Medium (50-149)		Small (0-49)	
	2019	2020	2019	2020	2019	2020
Advertising	21	24	74	61	3 485	3 353
Electronics	77	77	139	140	3 624	3 445
Film and Electronic Media	57	57	79	73	3 256	3 124
Information Technology	181	184	454	452	14 696	13 998
Telecommunications	68	67	132	147	3 592	3 585
Grand Total	404	409	878	873	28 653	27 505

Source: MICT SETA Levy Huge File, 2019 & 2020

Table 4 below reflects the number of employers per province. Gauteng province hosts the largest proportion (47% - 62%) of employers across the five Sub-sectors. Overall, Northern Cape reflected the smallest proportion of employers, after Mpumalanga, North West and Limpopo.

Table 4: MICT Sector Size of Employers Per Province

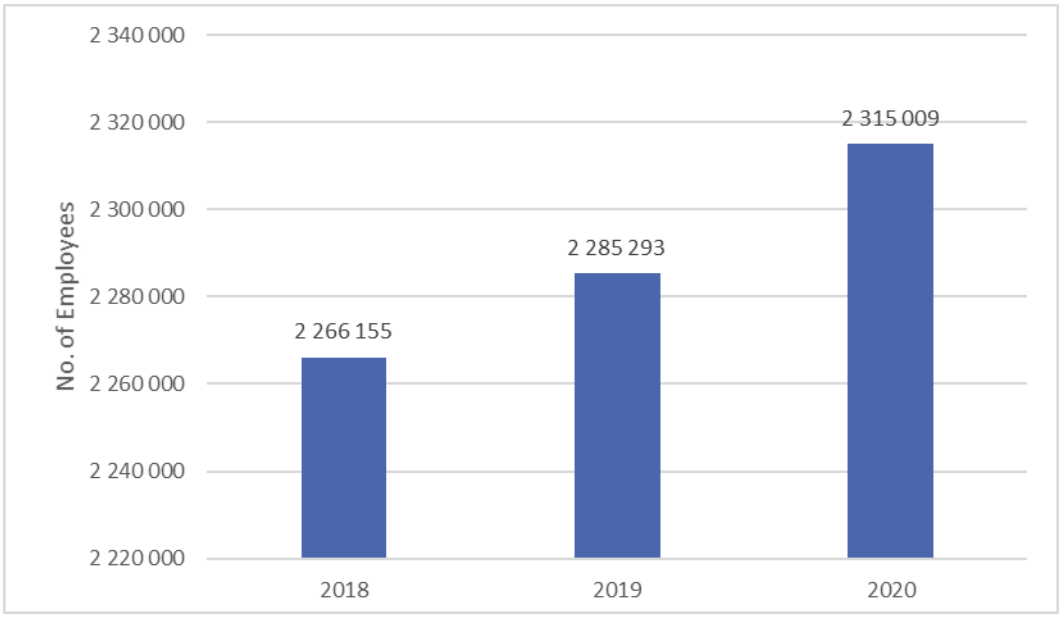
	Advertising		Electronics		Film and Electronic Media		Information Technology		Tele-communications	
	No.	%	No.	%	No.	%	No.	%	No.	%
EC	91	2.63%	129	3.53%	77	2.36%	549	3.75%	154	4.06%
FS	32	0.92%	101	2.76%	66	2.02%	281	1.92%	115	3.03%
GP	2018	58.51%	2086	57.02%	1520	46.62%	8749	59.70%	2366	62.33%
KZN	481	13.96%	470	12.86%	220	6.74%	1813	12.37%	325	8.56%
LP	9	0.26%	43	1.18%	59	1.81%	133	0.91%	62	1.64%
MP	22	0.63%	140	3.82%	60	1.83%	283	1.93%	132	3.48%
NW	55	1.58%	65	1.78%	35	1.08%	154	1.05%	69	1.82%
NC	2	0.06%	19	0.52%	9	0.28%	55	0.38%	29	0.78%
WC	740	21.45%	605	16.53%	1214	37.25%	2638	18.00%	543	14.31%
Total	3449	100%	3658	100%	3260	100%	14655	100%	3795	100%

Source: MICT SETA Levy Huge File, 2020

1.6 Labour Market Profile

Employment in the MICT Sector has grown steadily over the past three years, reaching a total of 2,315,009 employees in 2020. This translates to a 2.2% increase in employment from 2018 to 2020. The changes in employment are illustrated in Figure 9 below.

Figure 9: Employment in the MICT Sector

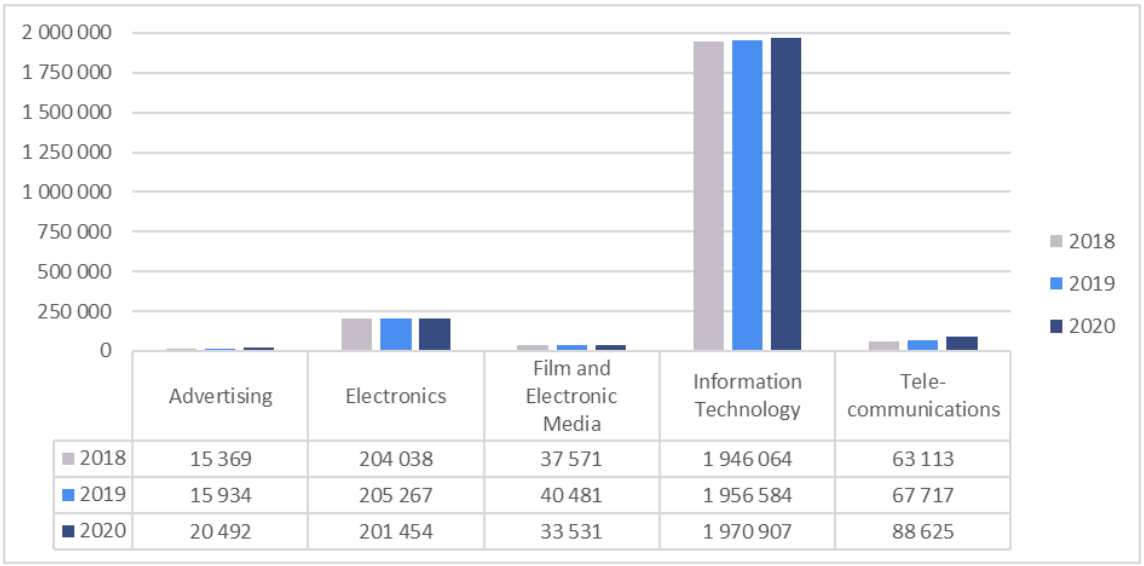


Source: MICT SETA Levy Huge File, 2020

1.6.1 Employment Trends Across Employers in the Industry

The MICT Sector experienced a 2.2% growth in employment from 2018 to 2020. The figure below shows that employment in the Information Technology Sub-sector is the largest of the Sub-sectors with 85.14% of employees in 2020. The Sub-sectors with the smallest portion of employees are Advertising (0.89%) and Film and Electronic Media (1.45%). As with the relative share of the number of companies in each Sub-sector, the relative share in terms of number of employees has remained stable between 2018 and 2020.

Figure 10: Number of Employees by Sub-sector



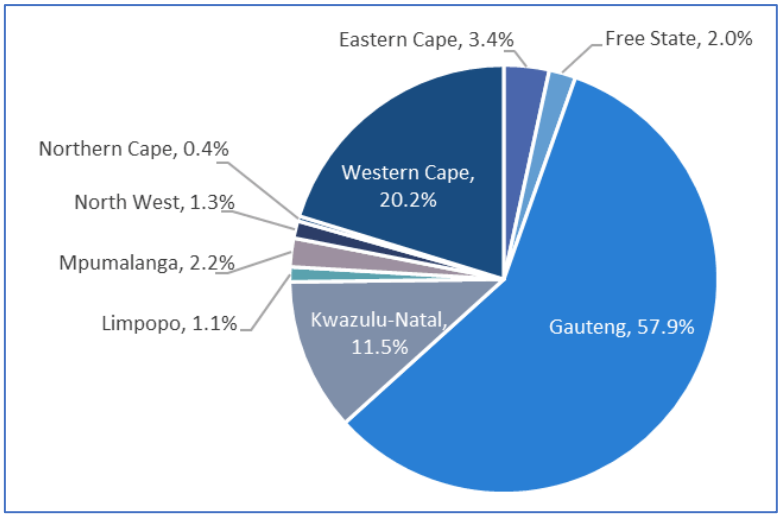
	Advertising	Electronics	Film and Electronic Media	Information Technology	Tele-communications
2018	15 369	204 038	37 571	1 946 064	63 113
2019	15 934	205 267	40 481	1 956 584	67 717
2020	20 492	201 454	33 531	1 970 907	88 625

Source: MICT SETA Levy Huge File, 2020

1.6.2 Employee Geographic Distribution

The figure below shows the spread of all employees across the provinces. The province with the largest number of employees is Gauteng (57.9%), followed by the Western Cape (20.2%) and KwaZulu-Natal (11.5%). These three provinces account for nearly 90% of all employees in the Sector. Northern Cape (0.4%) has the fewest number of employees in the country, followed by Limpopo (1.1%) and North West (1.3%).

Figure 11: Employee Geographic Distribution

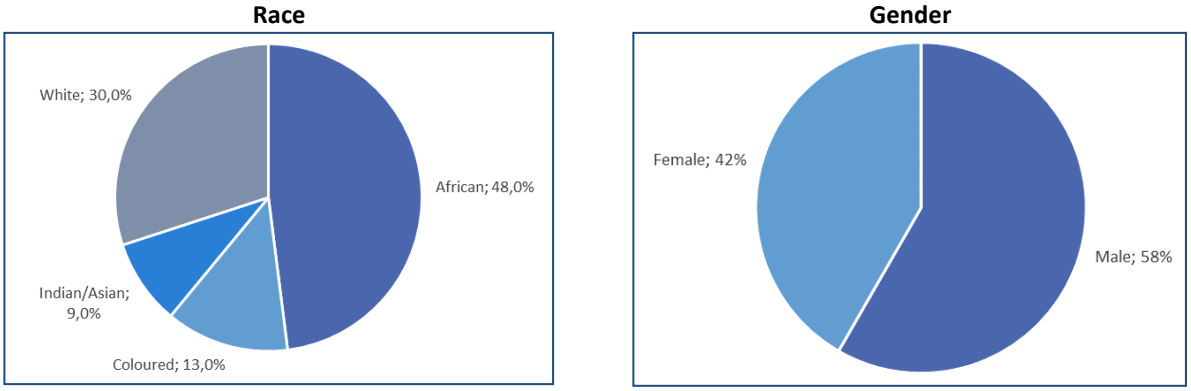


Source: MICT SETA Levy Huge File, 2020

1.6.3 Race and Gender Profiles

The highest proportion of people employed in the Sector are African (48%), followed by White (30%). These two race categories make up just over three quarters (78%) of the total number of employees in the MICT Sector – this is similar to the employment profile in South Africa as a whole, where the highest proportion of people employed are African (75%), followed by White (11%) (Stats SA, 2020). Compared to 2019, the proportion of African and White employees in the MICT Sector changed slightly, with African employees increasing by 4,2% and White employees decreasing by 3%, although this is largely in the lower and midlevel occupational groups. Coloured employees account for 13% and Indian/Asian employees account for 9% of employees in the Sector (Figure 12). In South Africa, Coloured employees account for 10% of the total number of employed people and Indian employees account for 3%.

Figure 12: Race and Gender Profiles of Employees



Source: MICT SETA Levy Huge File, 2020

There are more male employees (58%) in the Sector than females. These results have remained similar over the past 3 years. Similarly, there are more male employees in South Africa (56%) than there are female employees (44%) (Stats SA, 2020). Whilst Africans make up the largest employee group by race, they still occupy relatively lower positions compared to other race groups and enjoy less representation at senior level. The table below demonstrates that only 8% of African employees occupy managerial positions and 31% occupy professional positions.

Table 5: Race Profile by OFO Major Group

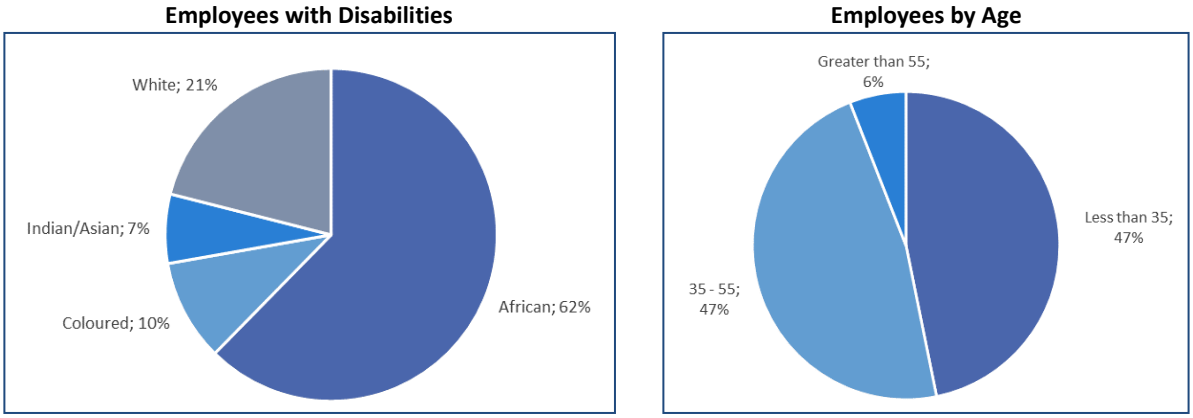
	African		Coloured		Indian		White	
OFO Major Group	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Managers	6935	8%	3181	14%	3396	20%	13497	24%
Professionals	27118	31%	6705	29%	6995	41%	26692	48%
Technicians and Associate Professionals	19113	22%	4479	19%	2862	17%	8273	15%
Clerical Support Workers	18583	21%	6228	27%	1800	11%	3862	7%
Service and Sales Workers	5708	7%	1115	5%	1433	8%	1132	2%
Skilled Agricultural, Forestry, Fishery, Craft and Related Trades Workers	4117	5%	861	4%	268	2%	1277	2%
Plant and Machine Operators and Assemblers	1820	2%	395	2%	91	1%	175	0%
Elementary Occupations	3584	4%	373	2%	53	0%	282	1%
Grand Total	**86978**	**100%**	**23337**	**100%**	**16898**	**100%**	**55190**	**100%**

Source: MICT SETA WSP/ATR, 2020

1.6.4 Disability and Age Profiles

The table below shows that within the MICT Sector, the majority of the employees with disabilities are African at 62%. This is followed by White employees (21%) and Coloured employees (10%). The Indian/Asian category only accounts for 7% of employees with disabilities within the MICT Sector.

Figure 13: Disability and Age Profiles of Employees



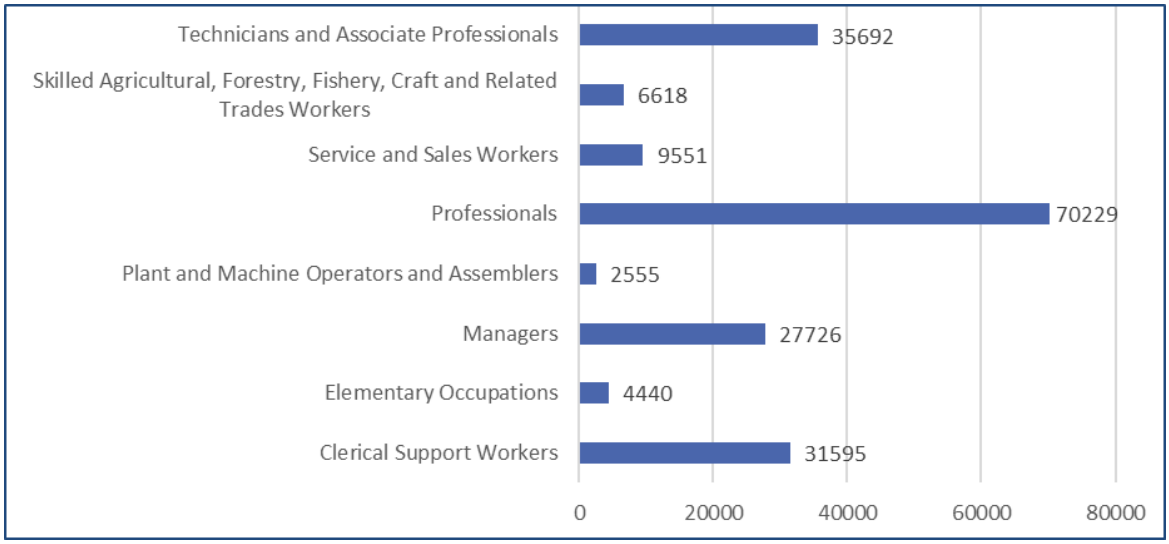
Source: MICT SETA WSP/ATR, 2020

In addition, employment in the MICT Sector is dominated by younger employees. In 2020, only 6% of people employed in the MICT Sector are older than 55 years of age, a 1% decrease from 2019. Of the remaining 94% of employees, half (47%) are younger than 35 years of age, and the other half (47%) are between the ages of 35 and 55. Unlike in the MICT Sector where the least number of people employed are older than 55, the age group with the smallest number of people employed in South Africa, with only 7% is between 15-24 years of age. Most employees in South Africa are between 25-44 years of age (61%) and 33% are 45 years and older (Stats SA, 2020)

1.6.5 Occupational Segmentation

Understanding the occupational divide of employees in a Sector is important; specifically, to determine where skills development interventions are most required. The figure below shows that Professionals are the dominant occupational category in the MICT Sector. This is followed by Technicians and Associate Professionals, Clerical Support Workers, and Managers. Employment within Managers, Professionals, and Associate Professionals' categories typically require a degree, diploma, or NQF level 6 qualifications as an entry. Combined, these categories account for the bulk (72%) of employees in the Sector. As compared to other economic Sectors, which employ more people in elementary occupations, this Sector reflects the converse and could be attributed to the professional services orientation of offerings by employers in the Sector. The figure below shows this breakdown.

Figure 14: Occupations by OFO major Groups



Source: MICT SETA WSP/ATR, 2020

1.7 Conclusion

The South Africa economy remains in a recession, contracting by 2% in the first quarter of 2020. However, the Transport, Storage & Communications showed positive performance (0.5% vs -7.2%). While the current COVID-19 pandemic has significantly disrupted the economy, the ICT Sub-sector is currently one of the most powerful tools available. The effect of the COVID-19 pandemic on employment is already apparent as the Unemployment Insurance Fund (UIF) is facing a massive uptake in UIF claims from retrenched workers and applications from employers for COVID-19 relief for furloughed employees (Rasool, 2020). Furthermore, COVID-19 will also adversely affect skills development (expanded on in Chapter 3). The SETA intends to play its part in mitigating this by supporting vulnerable parties such as SMMEs, which make up the largest proportion of MICT employers, and underrepresented groups.

The labour market in the Sector has continued to experience growth in employment since 2018, with the Information Technology Sub-sector remaining the largest employer of all the Sub-sectors. The number of medium and large businesses per Sub-sector remained largely stable; however, the number of small enterprises has decreased. The Sector race and age profiles broadly represent the demographic composition of the country with the largest proportion of representation being Africans, and a significant number of employees aged younger than 35 years. Gauteng holds the largest number of employees in the Sector.

With regards to the occupational segmentation, the majority of employees are within skilled occupations. A number of employers and other key role players are responding to the skills demands of 4IR through research and interventions in relatively novel areas such as big data analytics, thus competitively positioning the South African labour force. It appears, therefore, that the MICT Sector is generally investing in human resources and that there is a demand to develop skills. This demand, however, is negatively impacted by the fact that the majority of companies in the Sector are small, limiting their capacity to train employees or to provide mentorship to learners.

Chapter 2: Key Skills Change Drivers

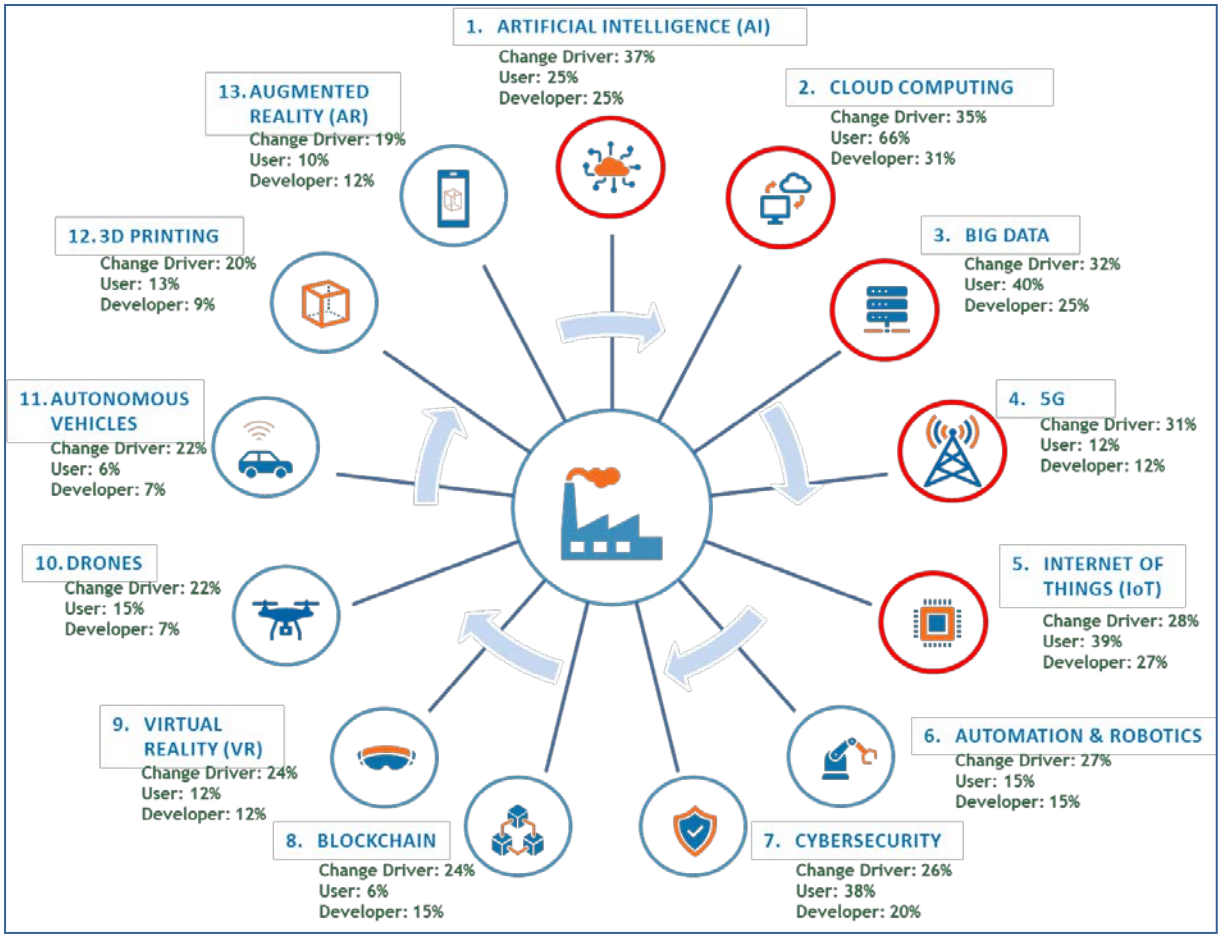
2.1 Introduction

Having explored the profile of the Sector in chapter one, this chapter examines the factors influencing the demand and supply of skills in the MICT Sector. The chapter draws on a review of current literature, surveys, interviews and focus groups with various stakeholders across all Sub-sectors within the MICT Sector. It identifies five change drivers that are a result of "4IR", outlining how these change drivers may or are already impacting aspects of skills demand and supply in the MICT Sector. This chapter further takes into account the overall impact of COVID-19, and analyses policies that affect skills demand and supply in the Sector.

2.2 Factors Affecting Skills Demand and Supply

While the Sector contributes positively to the GDP, the Fourth Industrial Revolution (4IR) will alter the way communities live and work through a fusion of technologies, blurring lines between the physical, digital, and biological spheres. The COVID-19 pandemic has accelerated the use of digital technologies and has revealed the urgency with which the Sector must transform with regard to both skills demand and supply. Key technologies such as 5G and Cloud Computing have become important as many South Africans are working remotely, using digital platforms such as Zoom for videoconferencing, for example. 4IR is a complex application of Science, Technology, Engineering and Mathematical (STEM) knowledge, and with it comes a heightened need for cybersecurity skills as these skills underpin the safety and protection of information that is used across 4IR technologies. With South Africa striving towards being an E-Skilled economy, as outlined in the National Development Plan Vision 2030, key change drivers that affect the MICT market and socio-economic systems are identified here.

Figure 15: 4IR Technologies as Change Drivers



Source: MICT SETA SSP Survey, 2020

The diagram above demonstrates the presence and influence of 4IR technologies in the MICT Sector, ranked by "Change Driver" (the percentage of stakeholders who view the technology as a change driver). "User" indicates the percentage of stakeholders who use the 4IR technology in operations and "Developer" indicates the percentage of stakeholders who develop products in the 4IR technology. Circled in red in the diagram are the five 4IR technologies which ranked highest for driving change in the Sector: Artificial Intelligence, Cloud Computing, Big Data, 5G and the Internet of Things. These are discussed in the section below.

2.2.1 4IR Technologies as Change Drivers

2.2.1.1 Artificial Intelligence

"Artificial Intelligence" (AI) has been identified as a key change driver in the MICT Sector. It refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions. The term may also be applied to any machine that exhibits traits associated with a human mind such as learning and problem-solving. The ideal characteristic of AI is its ability to rationalise and take actions that have the best chance of achieving a specific goal (Investopedia, 2020). Nearly half (46%) of South African companies are actively piloting AI within their organisations. Businesses are experimenting with a range of different technologies, including Chatbots, Robotic Process Automation and Advanced Analytics. AI technologies most useful to 67% of South Africa organisations include machine learning, smart robotics and biometrics (BusinessTech, 2019).

AI experts have highlighted that the simple lack of technical skills is not the only thing that slows the progress of AI, but also a greater need for a culture of experimentation. "Though AI is in its early stages of development in South Africa, it bodes well for AI maturity in the country that businesses are actively experimenting with exciting new AI use cases," said Lillian Barnard, MD at Microsoft (Business Tech, 2019). The level of skill required by AI is advanced and needs to be financially and technically supported by the industry and government. Other examples of AI relevant to the MICT Sector include virtual agents such as "chatbots" and recommendation systems. Ultimately, South Africa still lags behind in terms of improving the quality of education, research, innovation and infrastructure required to create an enabling environment for AI adoption (Accenture South Africa, 2017). An example of the use of robotics in the MICT Sector is the use of drones, as opposed to handheld cameras, in filming. Drone and AI technologies may also be integrated to create autonomous drones that are able to perceive their environments and self-operate (Built In, 2019).

2.2.1.2 Cloud Computing

"Cloud Computing" has emerged as a key driver of digital transformation in South Africa. It is described as the delivery of different services through the Internet. These services include tools and applications such as data storage, servers, databases, networking, and software (Investopedia, 2019). It is a disruptive delivery model of Information Technology (IT) services which is based on a business model that is flexible and on-demand. Companies offering these computing services, called cloud providers, typically charge based on usage, similar to the billing of utility services such water or electricity. Cloud computing has become a new reality in South Africa, with software spending reaching an estimated R32 billion in 2019, an 11.4% increase from 2018. South African organisations are consuming significant amounts of cloud services, including software as a service, platform as a service and infrastructure as a service (Gartner, 2019).

The rise of cloud computing puts pressure on skills development, more so now during the COVID-19 pandemic, as more companies are becoming dependent on cloud computing services. Individuals with the skills to design and deploy such technology are in high demand and often poached not only in South Africa, but by global companies. A study by the International Data Corporation (IDC) revealed that more than 90% of South African organisations are either already engaged in developing these skills or in the process of planning for the development of such skills (Nebula, 2018). Furthermore, it was stated that providing data access from any place or time is the top reason for cloud adoption. It is said that globally, cloud data centres will process 94% of workloads in 2021, further emphasising the importance of meeting the demand for these skills (Hosting Tribunal, 2020).

2.2.1.3 Big Data Analytics

“Big data”, another 4IR change driver identified in the MICT Sector, refers to the large, diverse sets of information that grow at ever-increasing rates. It encompasses the volume of information, the velocity or speed at which it is created and collected, and the variety or scope of the data points being covered. Big data often comes from multiple sources and arrives in a variety of formats (Investopedia, 2019). Properly managing ‘Big data’ is now an important assignment for many organisations, especially with the rapid uptake of 4IR technologies. However, many organisations are still unaware of the opportunities and insights that big data holds for them.

Big data has grown by more than 50% CAGR since 2010, which has in turn enabled AI uptake (Accenture, 2018). In South Africa, many organisations have now realised the potential of ‘Big Data and Analytics’, however, limited IT budgets and the dearth of skilled resources impede its adoption. Furthermore, organisations are now developing skills internally by sharing resources, undertaking training programmes, and partnering with vendors. This plays a crucial role for organisations to establish a data-driven culture and encourage knowledge sharing to develop internal capabilities (IDC, 2017). The demand for highly qualified big data analysts and artificial intelligence professionals is outperforming supply to the point where it can take many months to fill vacancies (IOL, 2017). This is due to big data analytics being a relatively new field, and the existing workforce is having to retrain in work with large sophisticated datasets. Larger companies swiftly recruit new graduates, thus, making it difficult for smaller MICT companies to keep up with the changing labour market.

2.2.1.4 5G

The fifth-generation wireless technology (“5G”) has been identified as a key driver of network transformation in South Africa. It has been associated with the need for a greater and wider adoption of emerging technologies. This technology is expected to be more effective, more efficient and as much as 100 times faster than its predecessor, 4G (Corfe, 2018). As capacity demands driven by growing internet data traffic increases – further emphasised by the current world of remote work during the COVID-19 pandemic – 5G will significantly speed up data communication (Statista, 2020). 5G will also advance machine-based, IoT-centric functionalities, for example, in automotive for autonomous and self-driving cars. While 5G is going to be a big enabler for economies and will drive efficiency for many complex operations, much needs to be done right before 5G can be rolled out (Connecting Africa, 2020). Governments need to find ways to mitigate the risk of being left behind as technology sweeps the rest of the world into 5G and beyond. Companies currently struggle to attract and retain staff with scarce skills in hard-to-fill occupations (i.e. computer network and systems engineers, cybersecurity specialists, and those with cloud computing skills), and 5G will make this task even more difficult. Organisations will need to find new resources and capabilities by increasing the skillsets of their own staff, as well as demanding new skills of their providers (GCN, 2019). Once the relevant skills to enable such technology are developed, 5G will ultimately be "a big game changer".

2.2.1.5 Internet of Things (IoT)

The “Internet of Things’ (IoT) is another 4IR change driver identified in the MICT Sector. It refers to a network comprised of physical objects capable of gathering and sharing electronic information. IoT includes a wide variety of “smart” devices, from industrial machines that transmit data about the production process to sensors that track information about the human body (Investopedia, 2020). IoT allows for remote management or monitoring of connected devices. This information can then be supplied to an AI platform, which may be tasked with responding appropriately based on data received. IoT will continue to grow as cloud computing and cloud app offerings expand in the coming years. IoT thus links to virtually all of 4IR change drivers, further expanding the impact of 4IR. There is limited recognition of emerging 4IR occupations in the OFO, thus limiting funding and formalised training opportunities in “new-age” fields such as IoT. In consultations, stakeholders expressed a need for more “IoT specialists”. However, currently no such occupation exists in the strictest sense, instead IoT specialists may emerge as specialisations of existing fields such as software development and design.

2.3 Skills Implications of Change Drivers

Change drivers affect how businesses operate and survive into the future. Thus, new ways of doing things, including skills training, are required to exploit new opportunities in the market that emerge as a result of 4IR. Furthermore, the COVID-19 pandemic has spurred on the uptake of 4IR technologies and the relevant skills that are required to enable it. The above-mentioned change drivers call for the continued development of technologies and skills. Whilst it may be true that 4IR may invalidate jobs that place emphasis on routine or menial tasks, it also presents an opportunity for the creation and/or advancement of jobs. To this effect, South African organisations are increasingly investing in 4IR technologies. However, funding, formalised training and overall development of emerging occupations is hampered by limited recognition of emerging 4IR occupations in the OFO such as an IoT specialist within the IoT realm, cloud architect for cloud computing and AI specialist within artificial intelligence. In general, due to the limited number of candidates possessing 4IR relevant skills and experience such as cybersecurity specialists within the 5G or cloud computing space; or an appropriate skills base to expand from, there is increased competition amongst employers for the few relevantly skilled candidates in the Sector such as drone operators, thus exerting further pressure to accelerate the development of skills.

In order to keep up with the increasing use of artificial intelligence and robotics: accelerating the reskilling of workers, redirecting the workforce to areas that create new forms of value and strengthening the talent pipeline from its source (Accenture, 2018). These suggestions may be adopted for other change drivers and speak to the need for increased research output, technical upskilling (especially for unskilled labourers) and collaboration amongst stakeholders. To this effect, the SETA is actively engaged with stakeholders such as the QCTO, training providers and industry in the development of new qualifications and improvement of existing qualifications to meet 4IR demands.

2.4 Policy Frameworks Affecting Skills Demand and Supply

South Africa's development trajectory is underpinned by the National Development Plan (NDP), which challenges the country to achieve sustained levels of economic growth through to 2030. There are a range of "levers", "pillars" or policy interventions that are understood to contribute to this planned growth. The MICT Sector is an integral part of South African society and is impacted by various policy interventions, some of which are outlined in the table below. There are also certain skills that will contribute to realising these national strategies such as developing ICT skills, programming skills and software development skills - MICT SETA will also need to consider partnering with government in order to realise these strategies.

Table 6: MICT Sector Policy interventions

Planning Priority	*Skills Implications*
National Development Plan (NDP)	The NDP Vision 2030 (November 2011) identifies as one of its core priorities, reducing unemployment to 6% by 2030. Other objectives include eradicating poverty and reducing inequality. In meeting the objectives of the plan, the following are identified: – A larger, more effective innovation system closely aligned with firms that operate in Sectors consistent with the growth strategy; – Support for small businesses through better coordination of relevant agencies, development of finance institutions, and public and private incubators; – An expanded skills base through better education and vocational training; Identify business incubation for SMEs generally and the expansion of business services in particular as priority actions for growth and development. The MICT Sector will contribute towards the National System of Innovation and will thus, play a role in supporting its effectiveness and efficiency.
Medium Term Strategic Framework (MTSF) 2019-2024	The outcomes for 2019 - 2024 are published as annexures to the MTSF: it is premised on achieving 5 outputs leading to the achievement of 'Outcome 5: A Skilled and Capable Workforce to Support an Inclusive Growth Path'. This is part of a comprehensive plan for implementing the NDP, the MICT SETA is committed to implementing the 4 sub-outcomes through strategic partnerships: – Sub-outcome 1: A credible institutional mechanism for labour market and skills planning – Sub-outcome 2: Increase access and success in programmes leading to intermediate and high-level learning – Sub-outcome 3: Increase access and efficiency of high-level occupationally directed programmes in needed areas

Planning Priority	*Skills Implications*
	– Sub-outcome 4: Increase access to occupationally directed programmes in needed areas and thereby expand the availability of intermediate level skills with a special focus on artisan skills.
White Paper on Post Schooling Education and Training (WP-PSET)	The white paper envisages an expanded, effective, and integrated post-school system in South Africa. It is premised on achieving: – Expanded access to TVET and University education; Establishment of community colleges and skills centres, to mainstream vocational education and training; – Establishment of a national skills planning mechanism within DHET; A strengthened NSA to perform a Monitoring and Evaluation role in the skills system; – Opening up workplaces to give more youth access to work integrated learning opportunities The white paper further notes the potential for significant restructuring of the skills system resulting with a further reduction of SETA numbers over the medium to long term. The white paper calls for an efficient skills development system where strategic plans form the foundation of the service level agreements that SETAs sign with DHET.
National Skills Development Plan (NSDP)	The NSDP is informed by and consolidates the NDP, NGP, WP-PSET and IPAP and seeks to "improve access to occupations in high demand and priority skills aligned to supporting economic growth, employment creation and social development whilst also seeking to address systemic considerations" (DHET, 2019). A call for increased emphasis on improving "both basic skills and technical skills, with a specific focus on 'historically disadvantaged individuals'" is made and eight outcomes are presented to this effect. In addressing the NSDP and new SETA landscape, MICT SETA has incorporated and aligned the outcomes into its Recommended Priority Actions (Chapter 6.3), thus ensuring continued relevance and responsiveness to key issues.
New Growth Path (NGP)	One of the NGP focus areas focuses on meeting the shortages in important skills for the economy and sets targets for: – the training of engineers underpinned by improved science and mathematics education and expanded bridging programmes for HE courses; improved skills for workers through the provision of certificated programmes facilitated, financed and managed by SETAs; a TVET college system that produces higher graduation rates; provision of ICT skills in schooling, adult education and public service The MICT Sector in line with the NGP places emphasis on the development of ICT skills, as well as the increased supply of highly skilled labour in the economy.
Industrial Policy Action Plan (IPAP)	The IPAP has identified a number of priority Sectors which it aims to support for development in the country. Those that have a direct link with the MICT Sector include: – Facilitate upgrading of manufacturing facilities and capabilities for domestic production, growth of exports and Commercialisation of technologies. Projects such as a South African garment-sizing database using three-dimensional (3-D) body-scanner technology, and computer-aided design using 3-D scanner data; Skills development for thee business process outsourcing Sector As stakeholders in the Sector start to engage in these programmes, the MICT SETA would be a skills development partner, ensuring that the requisite skills are being developed.
National Integrated ICT Policy White Paper	The National Integrated ICT Policy White Paper, published in September 2016 by the Department of Communications & Digital Technologies (DCDT), replaces all the previous white papers on telecommunication (1996) and postal services (1998). The policy outlines the plan for the rollout of broadband services across the country and directs the allocation of spectrum to all licensed operators, new entrants and SMMEs. The White Paper also covers interventions to boost the manufacturing and software development Sectors particularly through advancing affordable devices and innovative services and applications relevant to the South African context. The aim is to support for development in the country. The direct link with the MICT Sector includes: – Facilitate upgrade of manufacturing facilities and capabilities for domestic production and growth of exports; Commercialisation of technologies; Skills development for business process outsourcing Sector.

2.5 Conclusion

With the Presidential Commission on the Fourth Industrial Revolution established and the COVID-19 pandemic causing a ripple in the way businesses and the industry operates, it seems South Africa is set to follow a highly skilled intelligence and digital path. The change drivers in the Sector suggest an opportunity for ever-increasing access in the intelligence and digital spectrum – an access that needs to be maintained and secured. Therefore, skills development must follow course with specialised skills to set up and maintain new technologies. However, this must be balanced with also catering for lower-end skills. Ensuring inclusive digital revolution means paying attention to those still becoming digitally literate. However, with the renewed government commitment to leveraging technology for development and the huge shifts within the MICT Sector, additional resources are to be leveraged for skills development.

As the technology matures, government and organisations will need to find new resources and capabilities by increasing the skillsets of their own staff as well as demanding new skills of their providers (GCN, 2019).

Chapter 3: Occupational Shortages and Skills Gaps

3.1 Introduction

The previous chapter examined the factors influencing the demand and supply of skills in the MICT Sector. Leading on from that, this chapter explores the extent and nature of demand for skilled labour in the MICT Sector. The chapter also gauges the type and extent of training available to the Sector. In order to compile the Sectoral Priority Occupations list and occupational shortages, an analysis of WSP submissions by employers was conducted. While few limitations to the WSPs were realised, including the vagueness in descriptions of occupations, a survey was distributed to key stakeholders in the industry to complement the WSP information, whereby respondents were asked to identify key hard to fill vacancies (HTFVs), skills gaps and change drivers in the Sector. Further information was then gathered through stakeholder interviews, after which Sub-sector specific focus groups were held with stakeholders to validate the data collected. The research thus triangulated various sources of data to provide as complete and valid picture of skills demand and supply in the Sector.

3.2 Sectoral Occupational Demand

3.2.1 Advertising Sub-sector Occupations with Hard to Fill Vacancies

Using the OFO, the table below provides the top occupations with vacancies that are hard to fill in the Advertising Sub-sector. These five vacancies have been identified by stakeholders and include Multimedia Specialist, Digital Artist, Marketing Practitioner, Multimedia Designer and Copywriter.

Table 7: Advertising Hard to Fill Vacancies

OFO Code	Occupation	Reason	Quantity Needed in Sub-sector
2019-251301	Multimedia Specialist	Lack of skilled people	126
2019-216601	Digital Artist	Lack of skilled people	110
2019-243103	Marketing Practitioner	Not enough opportunities for workplace placement	80
2019-216603	Multimedia Designer	Lack of skilled people	48
2019-264201	Copywriter	Lack of skilled people	45

Stakeholders in the advertising Sector noted that Multimedia Specialist was the most difficult occupation to find suitably qualified people for. The majority of stakeholders in the Sector indicated that “lack of skilled people” was the main reason for these vacancies being hard to fill, with particular reference to niche skills such as digital marketing and social media management. Due to increased digitisation in the Sector, stakeholders attributed the lack of relevantly skilled candidates to the lag in digital skills training. Candidates are required to possess digital marketing skills to complement their traditional marketing expertise. Digital Marketers and Social Media Influencers are examples of emerging occupations spurred on by increased consumer online presence caused by the COVID-19 pandemic.

Whilst there are enough marketing practitioners graduating, there are not enough employment opportunities for new entrants in the form of, for instance, internships. Under increasing financial strain, especially under the COVID-19 pandemic, employers are hesitant to invest resources into recruiting and training interns.

Another contributing factor to hard to fill vacancies is decreased budgets leading to salaries in the Sector being relatively lower than in the past. It was also suggested that whilst there may be shortages in the formal Sector, the informal Sector, comprising freelancers, has more candidates, and thus less shortages, but these tend not to be recognised in research if they are not in the employ or ownership of a company.

3.2.2 Film and Electronic Media Sub-sector Occupations with Hard to Fill Vacancies

Table 8 presents the top 5 hard to fill occupations of the Film and Electronic Media Sub-sector, by OFO code, which include Media Producer, Multimedia Specialist, Sound Technician, Director (Film, Television, Radio or Stage) and Film and Video Editor.

Table 8: Film and Electronic Media Hard to Fill Vacancies

OFO Code	Occupation	Reason	Quantity Needed in Sub-sector
2019-265412	Media Producer	Lack of skilled people	100
2019-251301	Multimedia Specialist	Lack of skilled people	96
2019-352103	Sound Technician	Equity consideration	96
2019-265401	Director (Film, Television, Radio or Stage)	Lack of skilled people	40
2019-265403	Film and Video Editor	Lack of skilled people	20

The areas of scarcity for most of the Film and Electronic Media occupations exist primarily in more technical roles specific to the Sector and less on generic skills. Most of the shortages are due to a lack of skilled people in the Sector, with Sound Technicians being the exception. Whilst there may be plenty of Sound Technicians in the Sector, few of them are black-resulting in a shortage when equity is considered.

With viewers consuming a lot more content during the COVID-19 lockdown, especially via Video on Demand, there is a greater demand for productions, with all of the above-mentioned occupations, from Media Producer to Film and Video Editor, being required. However, this is diminished by the lockdown restrictions on travel and congregation in South Africa and around the world limiting shooting.

It was also found that that although people may have technical competence, they were not always able to translate that into the overall concept and visual the director has in mind. Location scouts, for example, need a sense of what the final picture will look like on screen as well as the practicalities of moving equipment around. Sound engineers may know how to collect and mix samples of sound, but in a movie production they need to know how to work with voice and with silence too. In addition to the reasons mentioned above, location also has a bearing on occupational shortages. Economic hubs such as Gauteng and the Western Cape tend to have different hard to fill vacancies to less economically active areas, especially rural areas, due to rural-urban migration.

3.2.3 Electronics, Information Technology and Telecommunications (ICT) Sub-sectors Occupations with Hard to Fill Vacancies

There are similarities between the Electronics, Telecommunications and Information Technology Sub-sectors. Consequently, these Sub-sectors are addressed as one ICT Sub-sector due to the overlapping nature of their occupational demands. To accommodate this amalgamation and the larger size of the ICT Sub-sector, provision is made for 10 hard to fill vacancies instead of 5. Table 9 below presents the top 10 hard to fill vacancies within the ICT Sub-sector over the next year.

Table 9: ICT Occupations with Hard to Fill Vacancies

OFO Code	Occupation	Reason	Quantity Needed in Sub-sector
2019-251201	Software Developer	Lack of skilled people	1435
2019-252301	Computer Network and Systems Engineer	Lack of skilled people	1070
2019-251101	ICT Systems Analyst	Lack of skilled people	1036
2019-252901	ICT Security Specialist	Lack of skilled people	270
2019-251203	Developer Programmer	Lack of skilled people	252
2019-672205	Telecommunications Technician	Lack of skilled people	220
2019-215301	Telecommunications Engineer	Lack of skilled people	168
2019-215201	Electronics Engineer	Lack of skilled people	156

OFO Code	Occupation	Reason	Quantity Needed in Sub-sector
2019-311401	Electronic Engineering Technician	Lack of skilled people	100
2019-333903	Sales Representative (Business Services)	Lack of skilled people	96

Software Developer, Developer Programmer and ICT Systems Analyst are some of the top 10 occupations which continue to be hard to fill within the Sub-sectors. The top programming languages were found to be Python, C and C++. On the other hand, there has been a decline in demand for people to maintain legacy systems (such as COBOL developers). As organisations work remotely due to the COVID-19 pandemic, technologies such as Cloud Computing find greater demand in storing and transferring data from anywhere and at any time, and Cloud Architect is an emerging occupation that has picked up even more during the pandemic. In addition, with the rise in e-learning during the pandemic, occupations such as Software Developer and Developer Programmer are required to develop and maintain such platforms.

With regard to telecommunications, which incorporates both the retail side and the technical side, network specific professionals, such as Telecommunications Technician and Computer Network and Systems Engineer, continued to be in demand. However, pointing to a limitation of the OFO, stakeholders pointed out occupations such as Telecommunications Engineers are broadly defined and do not recognise emerging specialities.

Electronics Engineers and Electronic Engineering Technicians are occupations which have emerged as being hard to fill in the Electronics Sub-sector. The Sub-sector has also experienced increased demand for Sale Representatives for business services.

3.3 Skills Gaps

The MICT Sector is increasingly operating in an ever-changing environment where new trends are emerging all the time. Reasons for skills gaps emerging include workers in the Sector having to constantly upgrade their skills to keep abreast of the latest developments (e.g. certified skills affecting IT Security Specialists and Computer Network and Systems Engineers). This is ever more prevalent with the emerging 4IR technologies. Another reason for skills gaps is that as people skilled in technologies move on or retire, there is still a need for maintenance of old technologies. That means gaps exist for old technologies where new entrants lack such skills as well as for all the new technologies being rapidly introduced. The broad categories of critical skills gaps that exist amongst employees working across the five Sub-sectors of the MICT are management and leadership skills, customer service skills and technical skills. These are further outlined in the table below by occupation (with OFO codes) and OFO Major group.

Table 10: Skills gaps and the top occupations that they apply to[1]

Skills Gap	Lower-Level (plant operators and elementary)	Midlevel (technicians, associates, artisans and clerical)	Senior (managers and professionals)
Business Etiquette	• 2019-862918-Electrical or Telecommunications Trades Assistant • 2019-811201-Commercial Cleaner	• 2019-351201-ICT Communications Assistant	• 2019-243403-ICT Sales Representative
Certified skills (CompTIA A+, Network+, MCSA, MCSE, Azure, CISCO, etc.)	N/A	• 2019-351301-Computer Network Technician • 2019-672205-Telecommunications Technician	• 2019-252901-ICT Security Specialist • 2019-251101-ICT Systems Analyst • 2019-252301-Computer Network and Systems Engineer
Financial Management	N/A	N/A	• 2019-121901-Corporate General Manager

[1] The OFO major group classifications do not consider seniority by experience or rank. Thus, "midlevel" and "senior" include junior to senior technicians and professionals, for example.

Skills Gap	Lower-Level (plant operators and elementary)	Midlevel (technicians, associates, artisans and clerical)	Senior (managers and professionals)
			• 2019-121101-Finance Manager • 2019-122101-Sales and Marketing Manager
Communication	N/A	• 2019-422601-Receptionist (General)	• 2019-122102-Sales Manager • 2019-133102-ICT Project Manager • 2019-251101-ICT Systems Analyst
Customer Service	• 2019-862918-Electrical or Telecommunications Trades Assistant	• 2019-351201-ICT Communications Assistant • 2019-672205-Telecommunications Technician	• 2019-243403-ICT Sales Representative
Python (Coding language)	N/A	N/A	• 2019-251203-Developer Programmer • 2019-251201-Software Developer
Sales Skills	N/A	• 2019-333903-Sales Representative (Business Services)	• 2019-122101-Sales and Marketing Manager • 2019-243403-ICT Sales Representative • 2019-243401-ICT Account Manager
Problem Solving	N/A	• 2019-352106-Production Assistant (Film, Television or Radio)	• 2019-251203-ICT Systems Analyst • 2019-121901-Corporate General Manager
C (Coding language)	N/A	N/A	• 2019-251203-Developer Programmer • 2019-251201-Software Developer
Leadership	N/A	• 2019-334103-Call Centre Team Leader	• 2019-133102-ICT Project Manager • 2019-121901-Corporate General Manager • 2019-122102-Sales Manager
Business Management	N/A	• 2019-333910-Business Support Coordinator	• 2019-112101-Director (Enterprise / Organisation) • 2019-122201-Advertising and Public Relations Manager

Source: WSP/ATR Submission, 2020; MICT SETA SSP Survey, 2020

Employers in the Sector require a combination of hard and soft skills. Nuance within occupations is also emphasised, for instance Software Developers that can code in Python are more sought after and Sales Representatives and Account Managers need to have strong product knowledge, which requires greater technical knowledge. Design thinking is another emerging skill in South Africa that promises to accelerate innovation. Liedtka (2018) notes that, "design-thinking processes counteract human biases that thwart creativity while addressing the challenges typically faced in reaching superior solutions, lowered costs and risks, and employee buy-in." This appears to be a "future skill" in South Africa that may do for innovation in the MICT Sector what Total Quality Management did for manufacturing in the 1980s (Liedtka, 2018).

Given the pressures imposed on businesses by the COVID-19 pandemic, with only 14% of MICT businesses being able to operate without issue during the lockdown (see Figure 2), businesses need a competitive edge and prudent management to realise opportunities created by the pandemic. Skills such as financial management, leadership and business management are increasingly important to keep businesses open, with Enterprise Directors, Finance Manager and Sales and Marketing Managers being some of the affected occupations. Soft skills such as customer service, sales skills and problem solving are also important in a time of COVID-19 to ensure retention of market base and continued income generation for businesses. Sales and Marketing Managers, ICT Systems Analysts and Advertising and Public Relations Managers, amongst others, are affected..

3.4 Extent and Nature of Supply

This section looks at the provision of education and training of skills, with the focus specifically on MICT-accredited qualifications. It also reviews provision in higher education, TVET colleges and

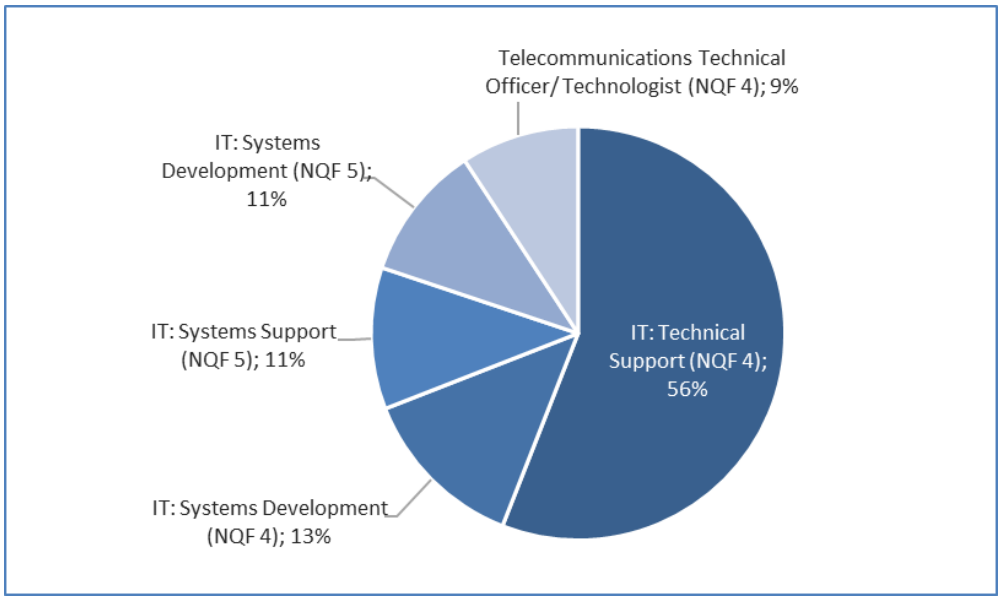
vendor programmes. It assesses the gaps in the supply pipeline in order to help identify where the MICT SETA can most effectively intervene.

3.4.1 MICT SETA Accredited Qualifications

An analysis of the total learnerships and skills programmes population to date as reflected below indicates that a significant portion of total enrolment has been in the following five qualifications:

- Information Technology: Technical Support (NQF 4)
- Information Technology: Systems Development (NQF 4)
- Telecommunications Technical Officer/ Technologist (NQF 4)
- Information Technology: Systems Support (NQF 5)
- Information Technology: Systems Development (NQF 5)

Figure 16: Top 5 Qualifications enrolled for



Source: MICT SETA QMR, 2019

The NQF Level 4 qualification in Technical Support drew the most learners (56%) in 2019. The two level 5 qualifications in ICT – for Systems Support and Systems Development – match the demand for occupations in high demand within the Sector. Systems Development, for example, allows for specialisation in one of the following disciplines: Procedural Programming; Object Oriented Programming; Fourth Generation Language Programming; Website development; Multimedia; Electronic Commerce.

While there has been an increase in students enrolling for NQF 5 qualifications specialising in advertising, stakeholders in the Advertising Sub-sector raised concerns over the lack of training in digital marketing. Since specialised advertising courses were mainly offered by private universities and colleges, such as Higher Certificates and Advanced Diplomas in digital content creation and marketing, there is limited access for those without financial backing to enrol in such programmes. Furthermore, there is a need for increased awareness of non-traditional career paths amongst high school learners. A study by Cambridge International showed that most South African students still prefer to embark on more “traditional careers” like medicine and dentistry, engineering and psychology (Cambridge International, 2018). Students may be more inclined to follow non-traditional careers in spaces such as Advertising or Film and Electronic Media if they receive more exposure to these careers at high school level. Stakeholders also noted that many of their desired training courses are offered online but these were not SAQA accredited, complicating their funding and promotion as courses of choice.

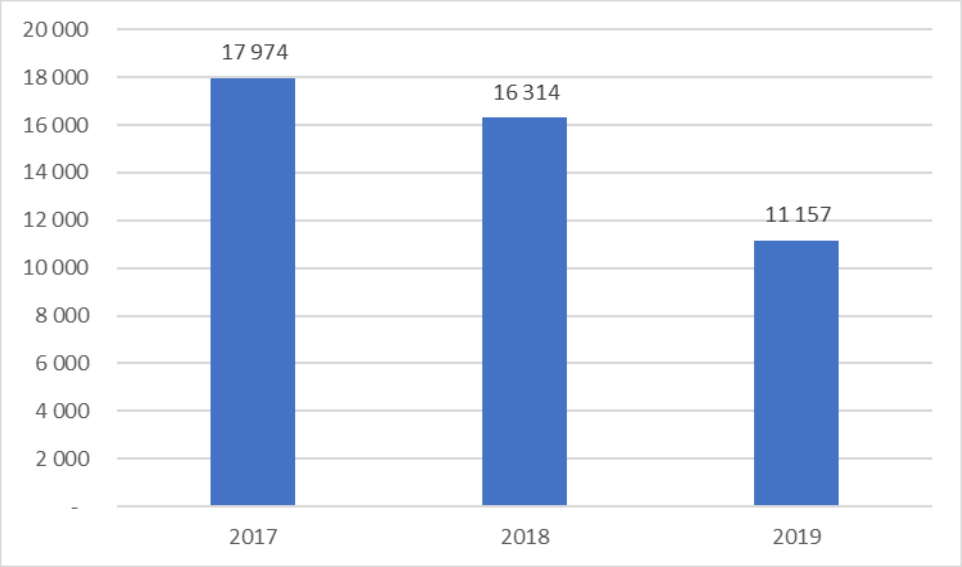
The establishment of new, small-scale firms and cooperatives in film production in rural areas and townships has opened opportunities for skills development, especially where they have been able to access DTI funding. In 2019, there was demand for the Further Education and Training Certificates in

Film and Television Production Operations (NQF 4) as well as the National Certificate in Film and TV Production (NQF 5) (MICT SETA QMR, 2019). Like in advertising, programmes relating to Film and Electronic media are predominantly offered by private institutions and costly. Collins and Snowball (2013) point to lack of government support for training initiatives in film, which together with the short-term, precarious nature of employment contracts, means that only children from wealthy families are likely to choose film as a career.

Enrolments in MICT SETA qualifications

Over the past 5 years, over 68,000 learners enrolled for an NQF qualification registered with the MICT SETA. Figure 17 shows that enrolment in learnerships and skills programmes have shown steady decline over the past 3 years, decreasing from 17 974 learners in 2017to 16 314 learners in 2018, and declining further to 11,157 in 2019.

Figure 17: Learnerships & Skills Programmes Enrolment 2017-2019

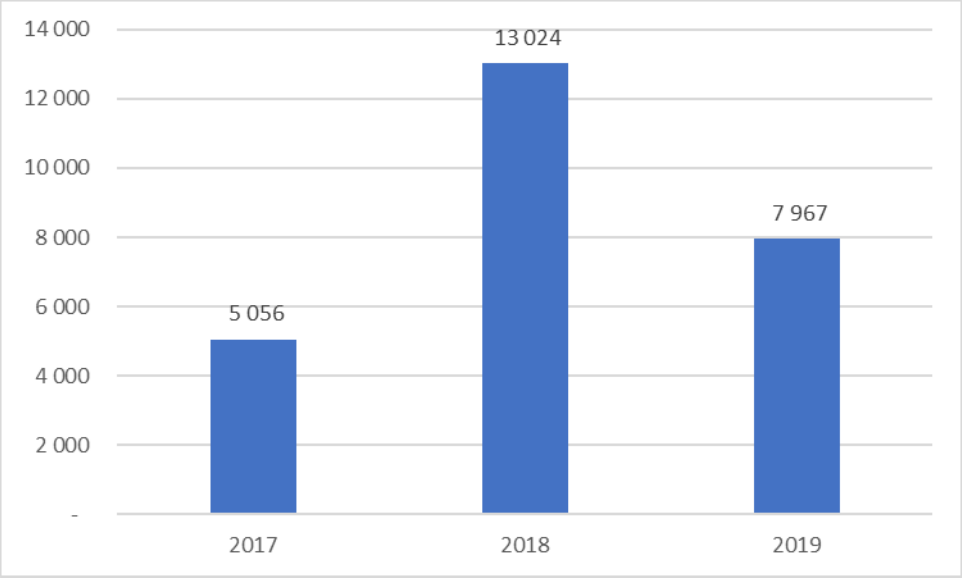


Source: DHET NLRD Database, 2019

Completions

Figure 18 below shows the total number of completed learnerships and skills programmes from 2017 to 2019. While there was significant growth in the number of completions of learnerships and skills programmes from 2017 (5,056) to 2018 (13,024), completions decreased to 7,967 in 2019.

Figure 18: Learnerships & Skills Programmes Completions 2017-2019



Source: DHET NLRD Database, 2019

Equity Demographics

The NSDP seeks to promote equity. The MICT SETA programmes appear to have consistently managed to attract black women into the Sector. Stakeholders in the Sector confirmed that there was a rise in the number of women in learnerships, especially in ICT technical areas which were traditionally dominated by men. However, it was noted that there were very few black candidates being trained as "creatives" in both the Advertising and Film and Electronic Media Sub-sectors.

3.4.2 Qualifications Under Development

MICT SETA is developing qualifications still to be accredited by the QCTO in response to the findings of this and previous SSPs. A number of consultative road shows were held to explain the process followed to develop these qualifications. To date, a number of qualifications are under development and are being realigned to various occupations. These include: the Further Education and Training Certificate (FETC): Advertising, National Certificate (NC): Advertising, NC: 2D Animation, NC: 3D Animation and Visual Effects, FETC: Music Industry: Sound Technology, NC: Music Industry: Sound Technology, NC: Business, NC: Business Analysis Support Practice and FETC: Computer Programming (QCTO, 2020).

In addition to the above, qualifications for the following 4IR-related occupations are being developed:

- Artificial Intelligence
- Cybersecurity
- Cloud computing
- Data science
- Software development
- Internet of things
- Robotic Processing Automation
- Design thinking
- Quality engineering Automation
- e-waste

The process to finalise and accredit the above-mentioned qualifications is underway.

3.4.3 Higher Education

The higher education Sub-sector in South Africa comprises 26 public universities and 123 private universities. These universities are responsible for generating a skilled workforce and yield academics who are able to produce the research output and innovation needed to drive economic growth in the country (Department of Higher Education and Training, 2019).

Table 11 shows that there has been a continuous increase in students enrolling in programmes across all major fields of study at public higher education institutions. As of 2018, there were 1,085,568 total enrolments in these institutions. The major field with the highest number of enrolments was Science, Engineering and Technology, with just over 320,000 enrolments, followed by Business and Management (283,194) and Other Humanities (267,553). While this indicates that there has been positive growth in public universities, faster growth is necessary to realise the NDP goal of a 1.6 million headcount by 2030.

Table 11: Enrolments in public HEIs by major field of study[2]

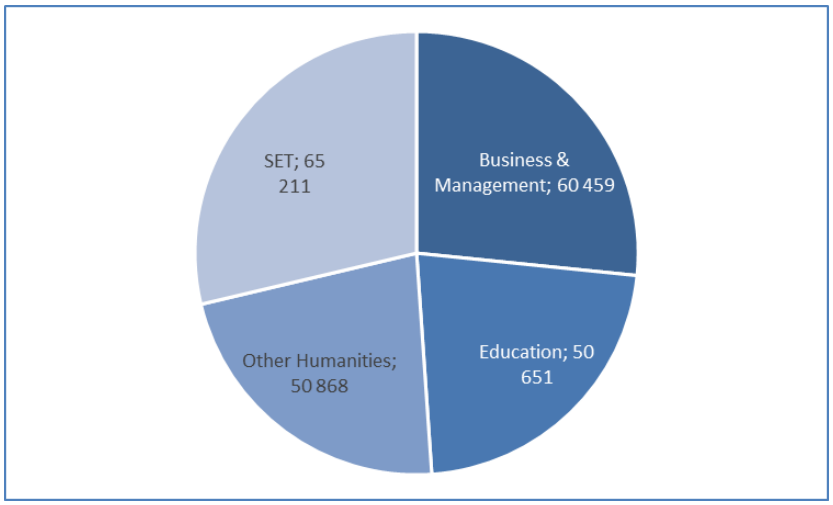
	2016	2017	2018
Business and management	264,934	278,930	283,194
Education	176,986	195,113	214,151
Other humanities	238,535	252,826	267,553
Science, Engineering and Technology (SET)	295,383	310,115	320,671
Total	**975,837**	**1,036,984**	**1,085,568**

Source: DHET HEMIS, 2018

[2]Publicly available data is only available up to 2018.

Figure 19 presents the graduations across major fields of study in all public higher education institutions in 2018. While the total number of graduates increased by 7%, the number of people completing their qualifications as compared the number of enrolments remains a challenge in the country.

Figure 19: Graduations for 2018 in public HEIs by major field of study[3]



Source: DHET HEMIS, 2018

Science, Engineering and Technology (SET) continues to have the greatest number of graduates of the four major fields in public HEIs, with the number of Computer and Information Sciences graduates increasing steadily since 2016 (DHET, 2018). Increasingly, universities have been providing innovative opportunities for students to experiment with developing ICT applications. The Universities of the Witwatersrand and Johannesburg and the Tshwane University of Technology, for example, have "innovation hubs", which are creative spaces where people can meet, brainstorm and work on projects. The hubs are also an environment in which skills are learnt and exchanged across a number of disciplines. The MICT SETA has been involved in supporting these initiatives.

Table 12 below shows the total number of enrolments in private higher education institutions across NQF fields. Such institutions offer programmes spanning from NQF levels 5 to 10. Of the 197,898 students enrolled in these institutions in 2018, 58% (115,566) were enrolled in Business, Commerce and Management Studies. 6% of students were enrolled in Culture and Arts and 5% in Communication Studies and Language.

Table 12: Enrolments in Private HEIs by NQF Field[4]

NQF Field	2018	
	No.	%
Agriculture and Nature Conservation	339	0,2%
Culture and Arts	11,714	5,9%
Business, Commerce and Management Studies	115,566	58,4%
Communication Studies and Language	9,872	5,0%
Education, Training and Development	22,140	11,2%
Manufacturing, Engineering and Technology	861	0,4%
Human and Social Studies	7,469	3,8%
Law, Military Science and Security	7,992	4,0%
Health Sciences and Social Services	2,347	1,2%
Physical, Mathematical, Computer and Life Sciences	16,206	8,2%
Services	3,114	1,6%
Physical Planning and Construction	278	0,1%
Total	**197,898**	**100%**

Source: DHET, Statistics on Post-School Education and Training in South Africa, 2018

[3] Publicly available data is only available up to 2018.

[4] Publicly available data is only available up to 2018.

In private institutions, the Culture and Arts and Communication Studies and Language NQF fields find expression in the Film and Electronic Media and Advertising Sub-sectors. Culture and Arts, encompassing design studies, visual and performing arts, cultural studies, music, sport, film, television, constituted 5.9% (11,714) of total enrolments in private universities. In 2018, 5% (9,872) of enrolments were in the Communication Studies and Language field, which includes communication and information studies, language, literature studies.

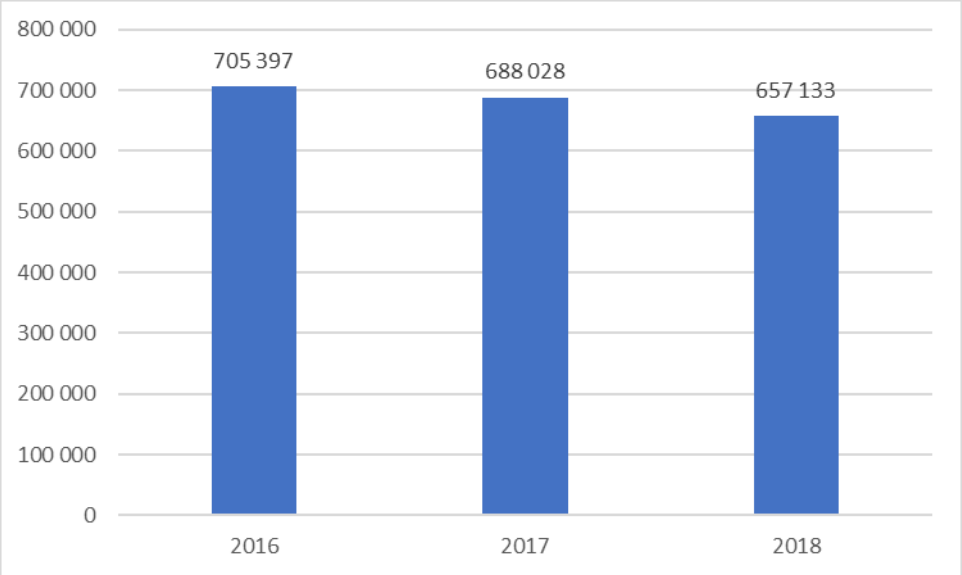
According to DHET's "Skills for and through SIPS" report, which assessed skills development in relation to government's Strategic Integrated Projects, university curricula have generally not kept pace with the rate of change of technology. The report argues for "curricula to be more relevant and academics to have more practical experience to ensure that graduates were prepared for the workplace". It was also suggested that "substantially more mentoring, coaching, and open learning should be available to support graduates in the workplace". Moreover, in the case of Data Scientists: "There are very few South African lecturers with expertise in this field. Currently most are foreign and need to be harnessed to develop a new breed of local data scientists for this expanding field" (Economic Development Department & DHET, 2014).

3.4.4 TVET Colleges

DHET has been promoting TVET colleges to be learning institutions of choice. The White Paper of Post School Education and Training is aspiring for a quality post school education which includes expanded access to public TVET colleges. In addition to increased access, the strategic objective of the public TVET colleges Sector is to improve success in programmes that produce quality education at intermediate and higher levels, by providing technical and vocational qualifications.

Figure 20 depicts the total student enrolments in TVET colleges over the 3-year period ending 2018.

Figure 20: Number of students enrolled in TVET colleges, 2016 to 2018[5]



Source: DHET, Statistics on Post-School Education and Training in South Africa, 2018

As seen above, there has been a slight decline in enrolments from 2016 (705,397) to 2018 (657,133). This may be linked to potential students being discouraged by the opportunities available to TVET graduates. It has been suggested that graduates are not being absorbed enough by the Sector and many remain unemployed. Under increasing financial strain, especially under the COVID-19 pandemic, employers are hesitant to invest resources into recruiting and training interns.

The decline from 2016 (705,397) to 2018 (657,133) translates to an 7% decrease in TVET enrolments over the 3-year period. The NDP indicates that headcount enrolment in TVET colleges should reach 2.5 million by 2030.

[5] Data on enrolments in TVETs is only publicly available up to 2018.

TVET colleges offer a variety of learning programmes and qualifications, typically ranging from NQF level 2 to NQF level 5. Of particular importance are the occupational qualifications offered by TVET colleges, which encompass workplace-based learning programmes, many of which are funded by the SETA. These occupational programmes provide learners with the opportunity to obtain qualifications or part-qualifications that meet the various workplace skills demands in the Sector, as outlined in the beginning of this Chapter (DHET, 2018). However, some stakeholders noted that TVET college graduates are generally not in a position to pass requisite international exams and are therefore not always in high demand upon graduation.

3.4.5 Vendor Programmes

Vendor Specific Programmes provide opportunities for students to integrate disciplinary and theoretical knowledge with work, through the application and use of knowledge and skills in real and professional work contexts (MICT SETA, 2020). These programmes are designed to meet the advancements in the applications and technologies used by companies and business units, and as a result, are most common and relevant to the ICT Sub-sector. Vendor programmes are usually short and focused programmes that are designed by software and hardware companies as an effective means to introduce new technologies or applications to both existing and new entrants in the labour market.

Vendor courses have the benefit of keeping up to date with rapidly changing technology. But for the same reason, these courses can quickly become obsolete if the product turns out to have a short shelf-life. There is also a concern that training content is focused on the vendor's products and therefore not generic enough to educate on the underlying principles. Consequently, there has been an apparent increase in the demand for customised training solutions rather than more comprehensive off-the-shelf training that covers a broader range of technology solutions. At the same time, stakeholders in the Sector reported that employers increasingly want employees to cross-certify with multiple vendors. Having multiple skills is becoming an inherent job requirement lately, with certified skills such as CompTIA A+, Network+, MCSA, MCSE, Azure, CISCO, etc. being the third most in-demand skills for midlevel to senior employees[6] across the Sector. These skills also rank in the top 10 skills gaps in Telecommunications across occupational groups (MICT SETA SSP Survey, 2020). To respond to the persistent demands for vendor certificates, the MICT SETA continues to map these programmes against existing NQF qualifications.

Assessment of Education and Training

In 2019, the SETA conducted an impact study aimed at assessing the success of the SETA's learning programmes. In addition to literature review, the study included consultations with learners, training providers and employers. The study revealed that 46% of learners are employed after completing programmes, 68% of which are employed as a result of the programmes. However, 41% of learners report that their current occupations do not match their qualifications, suggesting a misalignment between skills supply and demand. The study showed numerous benefits emanating from the programmes, relating mostly to gaining particular skills (as well exemplified in vendor specific short programmes) and work exposure, as well as significant achievement of various outcomes reported by employers. However, there is still much room for improvement.

There is an urgent need for higher education to respond to the technologies that have emerged from the Fourth Industrial Revolution (4IR), given the challenges and opportunities that are presented by such technologies (Penprase, 2018). Curricula across major fields of study will need to be redesigned and improved to address the need for students to develop the capacity in rapidly emerging areas such as data science, Artificial Intelligence and robotics, amongst others. In addition to this, lower NQF qualifications and other learning interventions will be required to incorporate an element of 4IR literacy.

[6] The OFO major group classifications do not consider seniority by experience or rank. Thus, "midlevel" and "senior" include junior to senior technicians and professionals, for example. See Table 10 (page 25).

COVID-19 is expected to impact education and training in the Sector. While enrolments in public and private universities prove to be increasing, graduates may find it increasingly difficult to find employment due to the negative impact of COVID-19 on employment. Online learning and the adoption of e-learning tools to facilitate blended learning are increasingly popular as they provide opportunities for continuous and efficient skills development in the Sector (Rasool, 2020).

In order to attract and retain learners, stakeholders stress the importance of keeping programmes relevant and up to date, with special regards to 4IR, and directing additional resources towards developing appropriate occupations and qualifications. The SETA continues to respond to this demand through its SSP and revised Sectoral Priority Occupations. Overall, it appears that while the learning interventions that are undertaken in the Sector have some relevance to employers and are beneficial to workers, there is room for further improvement and refinement.

Qualification and Occupation Mapping

The MICT SETA initiated a process of mapping key occupations in the Sector to various qualifications and learning pathways. From this mapping exercise the MICT SETA gained intelligence and insight from the Sector in terms of how to address key occupations in the Sector. It is anticipated that the Sectoral Priority Occupations interventions identified will help address the skills shortages in the Sector, as well as enable the employers in the Sector to bridge the gap between skills demand and supply. Table 13 below provides a list of possible qualifications mapped to occupations in the Sector.

Table 13: Possible Qualifications mapped to Occupations

Qualification	Career Prospects/Job Roles
BSc. or Nat. Dipl majoring in: – Business Computing – Computer Engineering – Computer Science/ Studies/ Systems – IT (Web Design & Development) – Information Systems/ Technology	– ICT Systems Analyst – Web Technician – Systems Administrator – Computer Network Technician – Software Developer – Computer Network and Systems Engineer – ICT Security Specialist
B. Arts/Learnerships majoring in: – Acting – Drama and Performance Studies – Film and Television	– Actor – Director
B. Arts/Learnerships majoring in: – Audio-Visual Communication – Translation and Professional Writing – Creative writing	– Scriptwriter – Creative Director
BTech or Nat. Dipl. majoring in: – Motion Picture Production – Multimedia – Film and Video Technology	– Multimedia Specialist – Film and Video Editor
B.Com or Nat. Dipl majoring in: – IT Management – Applied Information Systems	– Chief Information Officer – ICT Project Manager – IT Manager
B.Com/BTech/Dipl. majoring in: – Business Management/ Management Sciences – Project Management	– Management Consultant – Business Analyst – Service Solutions Project Manager
B.Engineering/Nat. Dipl/Learnership majoring in: – Electronic Engineering – Computer Engineering	– Computer Network and Systems Engineer Developer Programmer – Software Developer – Telecommunications Technologist – Electronic Engineering Technician
BA Honours in: – Film and Documentaries – Media and communication – Development and communication – Digital Media Design	– Editor – Director – Content producer

Qualification	Career Prospects/Job Roles
B.Com/Nat.Dipl/Learnership majoring in: – Strategic Brand Management – Digital Marketing – BA Creative Brand Communications – Marketing Management/ Communication	– Brand Strategist – Brand Auditor – Digital Marketing Strategist – Copywriter – Social Media Coordinator
Diploma/Learnerships/Higher Certificates in: – Marketing & Advertising Communications – Art Direction Diploma – Graphic Design – Copywriting	– Creative Director – Campaign Coordinator – Graphic Designer – Digital marketer
Dipl./Learnerships/Nat. Certificates in: – Electronic/ Engineering Studies – Information Technology (Networking) – Telecommunications – Information Systems	– Telecommunications Technician – Computer Network Technician – Systems Administrator – Electronic Engineering Technician

Source: DHET, The National Career Advice Portal, 2020

3.5 Sectoral Priority Occupations

The compilation of the Sectoral Priority Occupations (SPO) list follows a process that combines both analytical and qualitative inputs. This involves analysis of WSPs, employer surveys, desk-based research as well as validation through focus groups with stakeholders in the Sector. In addition, interviews are conducted with a number of stakeholders, which include industry bodies and professional associations, government stakeholders, trade unions and other key informants. Interviews focused on developments in the Sector, emerging trends as well as future skills needs. Given the dynamic nature of the MICT Sector, these interviews helped to identify new trends regarding new occupations as well as future skills needs in the economy.

With regard to the quantitative analysis, occupations and specialisations flagged as hard to fill in WSP/ATR submissions were tested for prioritisation against systemic and volumetric considerations via surveys, interviews and focus groups. Appropriate interventions were then determined per occupation based on prior and planned skills development for those occupations, adjusted based on SETA experience. The quantity to be supported by the SETA was determined based on planned APP targets per type of intervention and distributed across the occupations based on the extent of Sector demand as reported in the WSP/ATR submissions.

Given the central role that 4IR plays in the MICT Sector, important 4IR-related skills requirements were particularly taken into account in the determination of hard to fill vacancies and the SPO list. Consultations sought to unpack the business and skills fundamentals underpinning 4IR. The occupations in the SPO list are linked to 4IR change drivers articulated in Chapter 2. Following the production of the draft SPO list, input is incorporated from deliberations at Executive Committee and Board level, and the final SPO list is signed off by the MICT SETA Board.

The limitation of the data presented is that even though it takes into account other sources such as employer surveys, interviews and focus groups, the input data from employer WSPs is not without challenges. Stakeholders who formed part of the validation processes reflected that OFO codes were vague and confusing with several overlaps in occupational descriptions. In some instances, OFO codes did not exist for their desired occupations.

The SETA is, however, confident that based on the rigorous, practical and balanced approach adopted for the determination of the MICT Sector SPO list, and that the identified priority occupations and interventions will help underpin the skills development planning and implementation required to address skills issues and opportunities in the Sector; including critical areas such as 4IR.

The following table presents the 2021/22 SPO List and the interventions planned thereof.

Table 14: Top 10 Sectoral Priority Occupations List for the MICT Sector

SETA Name	Period	OFO Code	Occupation	Specialisation/ Alternative Title	Intervention Planned by the SETA	NQF Level	NQF Aligned	Quantity Needed	Quantity to be supported by the SETA
MICT SETA	2021/22	2019-251201	Software Developer	-Software Architect -Information Architect Software -Software Designer -Software Engineer -ICT Risk Specialist	Bursary (diploma)	6	Y	2740	2600
					Bursary (degree)	7	Y		
					Bursary (degree)	8	Y		
					Internship	6	N		
					Internship	7	N		
					Internship	8	N		
					MCSD Certification	5	N		
					Scrum Certification	6	N		
MICT SETA	2021/22	2019-252301	Computer Network and Systems Engineer	-Computer Systems / Service Engineer -Systems Integrator -Computer Systems Integrator -Network Engineer -Communications Analyst (Computers) -Systems Engineer -Network Support Engineer -ICT Customer Support Officer -Network Programmer / Analyst -Computer Network Engineer	Bursary (diploma)	6	Y	1780	1710
					Bursary (degree)	7	Y		
					Bursary (degree)	8	Y		
					Bursary (degree)	9	Y		
					Internship	6	N		
					Internship	7	N		
					Internship	8	N		
					CISCO Certification	5	N		
					CISCO Certification	6	N		
					CISCO Certification	7	N		
					CompTIA Network+ Certification	5	N		
MICT SETA	2021/22	2019-251101	ICT Systems Analyst	-Computer Analyst -ICT Systems Contractor -ICT Systems Coordinator -Capacity Planner Computing -LAN / WAN Consultant / Specialist -ICT Systems Architect -Systems Programmer -Internet Consultant / Specialist -ICT Systems Consultant -ICT Business Systems Analyst -ICT Systems Specialist -ICT Systems Advisor -ICT System Designer -ICT Systems Strategist	Bursary (diploma)	6	Y	1498	1400
					Bursary (degree)	7	Y		
					Bursary (degree)	8	Y		
					Internship	6	N		
					Internship	7	N		
					Internship	8	N		
					MCSA Certification	5	N		
					MCSE Certification	5	N		
					Work integrated Learning	4	Y		
					Work integrated Learning	5	Y		

SETA Name	Period	OFO Code	Occupation	Specialisation/ Alternative Title	Intervention Planned by the SETA	NQF Level	NQF Aligned	Quantity Needed	Quantity to be supported by the SETA
MICT SETA	2021/22	2019-242101	Management Consultant (Business Analyst)	-Management Consulting Specialist -Superannuation Transitions Specialist -Technology Development Coordinator -Operations Analyst -Service Solutions Project Manager -Small Business Consultant / Mentor -Capital Expenditure Analyst -Commercial Analyst -Corporate Planner -Farm Management Consultant -Business Coach -Financial Systems Advisor -Resource Development Analyst -Purchase Advisor -Business Support Project Manager -Strategic Developer / Facilitator -Business Consultant -Management Reporting Analyst -Business Turnaround Management Consultant -Ecommerce Programme Manager	Bursary (diploma)	6	Y	504	480
					Bursary (degree)	7	Y		
					Bursary (degree)	8	Y		
					IIBA Certification (BABOK)	5	N		
					IIBA Certification (BABOK)	6	N		
					Work integrated Learning	4	Y		
					Work integrated Learning	5	Y		
MICT SETA	2021/22	2019-252901	ICT Security Specialist	-Internet Security Architect / Engineer / Consultant -Security Administrator -ICT Security Architect -Database Security Expert -Information Technology Security Manager	Bursary (diploma)	6	Y	385	340
					Bursary (degree)	7	Y		
					Bursary (degree)	8	Y		
					Internship	6	N		
					Internship	7	N		
					Internship	8	N		
					CompTIA Security + Certification	5	N		
					CompTIA Security + Certification	6	N		
					CISSP Certification	5	N		
					CISSP Certification	6	N		
					Work integrated Learning	4	Y		
					Work integrated Learning	5	Y		

SETA Name	Period	OFO Code	Occupation	Specialisation/ Alternative Title	Intervention Planned by the SETA	NQF Level	NQF Aligned	Quantity Needed	Quantity to be supported by the SETA
MICT SETA	2021/22	2019-251301	Multimedia Specialist	-Digital Media Specialist -Multimedia Developer -Graphical Programmer -Computer Games Programmer -Multimedia Programmer -Animation Programmer	Bursary (diploma)	6	Y	360	350
					Bursary (degree)	7	Y		
					Bursary (degree)	8	Y		
					Internship	6	N		
					Internship	7	N		
MICT SETA	2021/22	2019-251202	Programmer Analyst	-Software Configuration / Licensing Specialist -Designer (Hardware - Digital / Software) -Architect (Applications / Call Centre / Computing / Desktop / Ecommerce) -Education Systems Coordinator -Computing (Development / Field) Engineer -Cross Enterprise Integrator -Engineer (Applications / Content / IT / Software / Systems / WAN) -Architect (Enterprise / Internet / IT / Network / Software / Unix / Web) -Database Designer	Bursary (diploma)	6	Y	351	330
					Bursary (degree)	7	Y		
					Bursary (degree)	8	Y		
					Internship	6	N		
					Internship	7	N		
					Internship	8	N		
					Work integrated Learning	4	Y		
					Work integrated Learning	5	Y		
MICT SETA	2021/22	2019-251203	Developer Programmer	-ICT Developer -ICT Programmer -Applications Developer	Bursary (diploma)	6	Y	306	250
					Bursary (degree)	7	Y		
					Internship	6	N		
					Internship	7	N		
					MCSD Certification	5	N		
MICT SETA	2021/22	2019-133102	ICT Project Manager	-ICT / IT / Computer Service Manager -ICT / IT / Computer Marketing Executive -ICT / IT / Computer Support Manager -Hardware Development Manager -ICT Project Director -ICT / IT / Computer Operations Manager	Bursary (degree)	7	Y	174	150
					Bursary (degree)	8	Y		
					Bursary (degree)	9	Y		
					PRINCE2 Certification	6	N		
					PRINCE2 Certification	7	N		
MICT SETA	2021/22	2019-243403	ICT Sales Representative	-Computer Consultant -Computer Software Support Consultant -Computer Systems Consultant	Bursary (national certificate)	5	Y	78	65
					Short Programme	5	N		
					Internship	8	N		

The occupations identified in the SPO List are key cogs of the4IR. A link can be made between the SPO occupations above and 4IR change drivers. The Sector's most sought after occupation, Software Developer, is the bedrock of 4IR and the change drivers. Software developers are required in *Artificial Intelligence (AI), Cloud Computing, Internet of Things (IoT)* and, working closely with Data Scientists, *Big Data* (Rodriguez, 2018). Business Analysts are the link between all the occupations and 4IR as they interpret the changing requirements of organisations. With the growth of *Cloud Computing*, the Sector's most prevalent 4IR technology (MICT SETA SSP Survey, 2020), and data moving to the "cloud", especially in a time of COVID-19 and remote working, information needs to be secured. ICT Security Specialists are thus important as *Cybersecurity* spans all the change drivers and spectrum of 4IR. More information is being processed than ever before and cybersecurity finds increasing importance in protecting users and their information.

But 4IR does not only relate to ICT, Sub-sectors such as Film & Electronic Media are also called to the fore by occupations such as Multimedia Specialist and their importance in *Virtual and Augmented Reality* and 4D animation. To sell 4IR to consumers, ICT Sales Representative with strong product and technical knowledge will be involved across the entire spectrum of 4IR. But "there is no 4IR without *5G*" (Carew, 2019), the telecommunications Sub-sector will thus have increasing input in this regard (see Table 9), as well as network and systems occupations such as Computer Network and Systems Engineer. With between 25% and 31% of MICT companies developing products in AI, Cloud Computing (used by 66% of companies in the Sector), Big Data, 5G and IoT (MICT SETA SSP Survey, 2020), ICT Project Managers are required to deliver the projects and make benefiting from 4IR an achievable reality.

3.6 Conclusion

This chapter examined the extent and nature of demand for skilled labour in the MICT Sector and explored the types and extent of training available to the Sector. While it may be difficult to gauge the extent of the impact of COVID-19, given that the country is still in the midst of the pandemic, it is undeniable that skills development has been affected, as noted by the World Bank, "Skills development programs have been greatly affected by the COVID-19 crisis. The challenges faced by formal TVET and short-term skills training for out-of-school youth and current workers are unprecedented" (World Bank, 2020). The MICT Sector has been under cost-saving measures since the COVID-19 pandemic and subsequent lockdown, and that has in turn increased demands on employees to be multi-skilled across a number of technologies, with convergence adding to that trend. So, while there are employment opportunities in the Sector, these tend to be for high-skilled professionals. Informants in the ICT Sub-sector reported that with the shortage of skilled developers (especially in scarce coding languages such as Python or Java), there is fierce competition for talent amongst employers, and this raises salaries to levels many companies cannot afford. This is further compounded by the financial challenges presented by the COVID-19 pandemic.

Matching demand for skilled people with supply is difficult in a Sector that is changing so quickly. Long-term predictions on occupations with hard to fill vacancies are not that reliable on the shifting sands of technology, and as a result there has been a call to speed up accreditation processes and recognise vendor programmes on the NQF. Similarly, short, highly varied online courses that cater to specific employer requirements have become especially useful during the pandemic and lockdown. To this effect, employers urge speedy recognition of online learning on the NQF or at least a mechanism for such programmes to be funded more.

Regarding enrolments in MICT qualifications, Universities and Universities of Technology are the main sources of highly qualified MICT graduates and, according to stakeholders in the Sector, the main supply of internship candidates. Despite historical bias towards private colleges, the placement of public TVET graduates is gradually increasing across the MICT Sub-sectors.

Chapter 4: SETA Partnerships

4.1 Introduction

Chapter 3 explored the extent and nature of demand for skilled labour, the skills gaps that exist and the training available in the MICT Sector. This section explores partnerships within the MICT SETA and responds to the mandate of the Skills Development Act of 1998, which encourages SETAs, as agents of skills development, to establish partnerships with both the public and private Sectors. This is further supported by the NSDP Outcomes, which seek to ensure that South Africa has adequate, appropriate and high-quality skills that contribute towards economic growth, employment creation and social development. The MICT SETA views partnerships as critical mechanisms to safeguard the delivery of the skills development mandate. These partnerships are thus intended to promote and sustain interaction between industry and training institutions to ensure that curricula reflect the changing needs of a dynamic industry. This chapter presents both new and existing partnerships in the SETA.

4.2 An Analysis of Existing SETA Partnerships

The MICT SETA has entered into partnerships with various institutions to advance Sector development and growth. These partnerships are structured into the following typologies:

- Partnerships with TVET colleges
- Partnerships with Universities
- Partnerships for Special Projects
- Partnerships with Industry Vendors
- Partnerships with SMMEs
- Partnerships with Research Institutions

The table below illustrates existing partnerships with TVETs, and programmes supported by the MICT SETA. It is to be noted that in implementing these partnerships, companies that are affected by the COVID-19 pandemic will be prioritised with regard to addressing the emerging skills needs.

Table 15: Partnership with TVET Colleges

Name of TVET	Nature of Partnership	Term and Duration	Objectives of Partnership	Value of Partnership
Elangeni TVET College	Learnership	Jan 2020 –Mar 2021	The purpose of these partnerships is to ensure that there is equitable participation of people from different backgrounds. They are about being responsive to the low to middle level skills demands of the Sector, serving as one of the many mechanisms in which education and training can become more responsive to employers, learners and the overall socio-economic needs of the country.	The value lies with addressing broad Sectoral low to middle level skills issues that stimulate opportunities for job creation and poverty reduction. They contribute to the transformational gender in terms of prioritisation of race, gender, disability and geographical location.
Flavius Mareka TVET College	Learnership	Jan 2020 –Mar 2021		
Maluti TVET College	Learnership	Jan 2020 –Mar 2021		
Coastal KZN TVET	Learnership	Jan 2020 –Mar 2021		
Coastal KZN TVET	Learnership	Jan 2020 –Mar 2021		
Coastal KZN TVET	Learnership	Jan 2020 –Mar 2021		
South Cape TVET College	Learnership	Jan 2020 –Mar 2021		
Umfolozi TVET College	Learnership	Jan 2020 –Mar 2021		
Umfolozi TVET College	Learnership	Jan 2020 –Mar 2021		
Umfolozi TVET College	Learnership	Jan 2020 –Mar 2021		
South West Gauteng TVET College	Skills Programme	Jan 2020 –Mar 2021	This partnership aims to provide students with the opportunity to apply their learning from academic studies to relevant experiences and reciprocate learning back to their studies.	The value lies in developing professional identity of students, enhance their employability through partnerships between employers and TVETs.
Coastal KZN TVET	Work Integrated Learning	Jan 2020 –Mar 2021		
Buffalo City TVET College	Work Integrated learning	Jan 2020 –Mar 2021		
King Hintsa TVET College	Work Integrated learning	Jan 2020 –Mar 2021		
Northlink TVET College	Work Integrated learning	Jan 2020 –Mar 2021		
King Sabata Dalindyebo TVET College	Work Integrated learning	Jan 2020 –Mar 2021		

Source: MICT SETA Commitment Registers, 2019/20, 2020/21

The partnerships outlined above mainly support Work Integrated Learning placements, but also provide for other workplace-based learning opportunities, such as learnerships and internships. Furthermore, they respond to the NSDP Outcome 2: Linking education and workplace. The reality is that TVETs are not well placed to identify the opportunities for partnership formation. Furthermore, they may lack the resources or skills needed to facilitate the development of partnerships. As a result, the MICT SETA plays a key role in proactively initiating these partnerships which in turn accelerates the realisation of the White Paper for Post-School Education and Training goal which states that TVETs need to enrol 700,000 to 2.5 million students by 2030. Similarly, University partnerships, as outlined below, provide parallel opportunities.

Table 16: Partnership with Universities

Name of University	Nature of Partnership	Term and Duration	Objectives of Partnership	Value of Partnership
Nelson Mandela Metropolitan University	Bursary	Jan – Dec 2020	The objective of the partnerships with universities is to ensure that support is offered to learners from disadvantaged communities to afford them the same opportunities as their counterparts from affluent backgrounds, while at the same time exposing them to occupations and high level skills that meet the labour market needs.	These partnerships improve the supply of skilled people in the Sector and afford learners from previously disadvantaged backgrounds opportunities to acquire high level skills critical to industry development and growth, thus creating employment for those graduates.
University of Johannesburg	Bursary	Jan – Dec 2020		
Walter Sisulu University	Bursary	Jan – Dec 2020		
Cape Peninsula University of Technology	Bursary	Jan – Dec 2020		
Mangosuthu University of Technology	Bursary	Jan – Dec 2020		
North West University	Bursary	Jan – Dec 2020		
Rhodes University	Bursary	Jan – Dec 2020		
University of Cape Town	Bursary	Jan – Dec 2020		
University of Pretoria	Bursary	Jan – Dec 2020		
University of Free State	Bursary	Jan – Dec 2020		
University of Venda	Bursary	Jan – Dec 2020		
Durban University of Technology	Skills Programmes	Apr – Nov 2020	This partnership aims to equip graduates with the necessary ICT skills to navigate a digital career. Focusing on programmes such as python, java and software development.	The value lies in addressing skills development and job creation within the information and communications technology (ICT) Sector, equipping the youth with relevant skills and making them attractive to prospective employers.

Source: MICT SETA Commitment Registers, 2019/20, 2020/21

The table above confirms that forging mutually beneficial ties with institutions contribute towards addressing industry occupational shortages and skills gaps. While bursaries have been the main partnering mechanism, key developmental and transformational imperatives remain at the heart of the abovementioned partnerships. Learners from previously disadvantaged backgrounds become better positioned to acquire high-level skills in programmes such as Honours, Masters and PHDs, which enables them to compete with those from more affluent backgrounds.

4.2.1 Partnerships for Special Priorities

The table below highlights some of the Special Projects Partnerships which are aimed at maximising the provision of job opportunities and the transformational agenda.

Table 17: Special Project Partnerships

Industry Vendor	Nature of Partnership	Term and Duration	Objectives of Partnership	Value of Partnership
Department of Communications & Digital Technologies (DCDT)	Short and Skills Programmes – Cybersecurity – Data Science – Drone Piloting – Digital Media – 3D printing Software Development	Jan 2020 - Mar 2021	This partnership is aimed at provision of new technology and innovation skillsets, particularly in relation to 4IR, while at the same time exposing beneficiaries to job opportunities within and beyond the MICT Sector. It is about ensuring that beneficiaries gather innovative skills to compete globally. Through this partnership, the SETA supported 1000 learners for Short Programmes and Skills Programmes some of whom are already	This partnership better prepares beneficiaries for 4IR, effectively propelling them into innovation environments and exposing them to employment opportunities at both national and international levels.

Industry Vendor	Nature of Partnership	Term and Duration	Objectives of Partnership	Value of Partnership
			in employment while others are still in training.	
Unemployment Insurance Fund (UIF)	Labour activation programme through the implementation of Learnership Programmes	Jan 2020 - Mar 2021	This partnership is aimed at prioritising employment and business opportunities, skilling and re-skilling unemployed youth. It is about combating long-term unemployment and poverty reduction. Through this partnership, 3249 learners are trained in various learnership programmes and 4,648 in Skills Programmes.	This partnership will boost skills, create jobs and enable entrepreneurship for unemployed youth. It recognises meaningful benefits for the youth, particularly those from poverty-stricken areas, and goes a long way in addressing unemployment, skills development and stimulates economic growth in the country.
	Labour activation programme through the implementation of Skills Programmes	Jan 2020 - Mar 2021		

Source: MICT SETA Commitment Registers, 2019/20, 2020/21

It is evident from the table above that special project partnerships are of critical importance. It is for this reason that the MICT SETA continues to implement such projects, as it promotes meaningful employment and rapid growth. The table below depicts the MICT SETA partnerships with SMMEs. Similar to special projects, SMME partnerships serve as potential catalysts for employment and sustainable growth.

Table 18: Partnerships with SMMEs

SMMEs	Nature of Partnership	Term and Duration	Objectives of Partnership	Value of Partnership
143 SMMEs (please see Annexure A, attached)	Work Integrated Learning, Internships, Learnerships, Skills Programmes, Short Programmes	April 2019 – March 2021	The purpose of these partnerships is to ensure that there is equitable participation of people from different backgrounds. They are about being responsive to the low to middle level skills demands of the Sector, serving as one of the many mechanisms in which education and training can become more responsive to employers, learners and the overall socio-economic needs of the country.	The value lies with addressing broad Sectoral low to middle level skills issues that stimulate opportunities for job creation and poverty reduction. They contribute to the transformational gender in terms of prioritization of race, gender, disability and geographical location.

As illustrated in the table above, SMMEs are well placed as critical foundations for the development of skills and the creation of employment opportunities. SMMEs are responsible for up to 70% of formal employment (Francis, 2019). The table below highlights partnerships with industry vendors for the mapping of vendor programmes back to MICT SETA registered programmes.

Table 19: Partnerships with Industry Vendors to Map Qualifications

Industry Vendor	Nature of Partnership	Term and Duration	Objectives of Partnership	Value of Partnership
QCTO	Occupational qualifications development	April 2012 – December 2023	The objective of the partnership is to develop occupational qualifications.	The value of the partnership lies in the development of occupational qualifications to ensure that the system is more responsive to labour-market skills needs.
CompTIA	Alignment to US	April 2019– November 2020	The objective of the partnership is to develop occupational qualifications.	This partnership is important as it recognizes that there is a need to assist learners in getting their achievements listed on the National Learner Records Database (NLRD).
Microsoft	Alignment to US	February 2019- November 2020		

Source: ETQA, 2019/20

Since the emergence of 4IR, the MICT Sector is witnessing a major shift in the higher education landscape. Thus, the MICT SETA understands that partnering with industry vendors who have high expertise is of paramount importance – furthermore, by partnering with vendors, the MICT SETA has the opportunity to develop meaningful relationships with them. The table below highlights partnerships with research institutions.

Table 20: Partnerships with Research Institutions

Research Institution	Nature of Partnership	Term and Duration	Objectives of Partnership	Value of Partnership
Redflank	Support for the development of the SETA's Sector Skills Plan (SSP).	March - August 2020	The objective is to increase the SETA's research capacity to develop the SSP.	This partnership will help the SETA to have a more nuanced, grounded long-range view on how the MICT Sector is changing.

Source: SSP, 2020/21

Partnerships that are working successfully

Provision of exposure to relevant training and employment opportunities facilitates learners' transition into the labour market. The model that the SETA uses across all partnerships to ensure successful outcomes is based on collaborative efforts between the SETA and the Sector. It begins with the identification of the right partnerships, delineation of the roles and responsibilities for both parties and the maintenance of constant and open communication in order to mitigate potential risks that can impede the achievement of intended objectives. Figure 21 below depicts the SETA partnership model.

Figure 21: SETA Partnership Model

One of the successful partnerships based on this model was the Mzansi Scuba Diving Academy. This was an "Underwater Photography learnership Programme" that recruited and trained candidates from various townships across South Africa, with the aim of enabling beneficiaries to track sardine migration underwater using photography. This is a skill that is not readily available, more especially amongst South African youth from disadvantaged communities. The value of the partnership was that it addressed a gap this gap. This partnership followed the aforementioned process of organisational assessment, partner selection, partnership building and maintenance and evaluation. Another successful partnership that followed this model was with the Department of Communications and Digital Technologies (DCDT), whose aim was to create a pool of skills sets that respond to the emergence of 4IR. The SETA had to assess and select an efficient partner with a proven track record in implementing a project of this magnitude, ensuring partnership stability and sustainability throughout implementation and evaluation of the impacts thereof. As a result, this partnership has been renewed and documented in Figure 21 above.

Partnerships that are not working well

TVET colleges in rural areas are lacking in skilled lecturers, infrastructure and alternative centres of excellence. Thus, TVET colleges may at times lack delivery capacity, which impacts negatively on the timeous implementation of programmes. The challenge with Universities is often an administrative one excessive deliberation on and reviewing of SLAs may result in delays with the implementation of programmes. Partnership challenges with employers are often rooted in employers delegating to training providers who are not able to deliver on the mandate of the SETA.

As a way of mitigating the risks of unsuccessful partnerships, the MICT SETA will ensure that selected employers have the necessary capacity to deliver on SLA requirements - support will be offered through constant programme Monitoring and Evaluation, from inception to completion.

4.3 Planned Partnerships

The following table highlights the SETA's planned partnerships.

Table 21: MICT SETA's Planned Partnerships

Industry Partner	Nature of Partnership	Term and Duration	Objectives of Partnership	Value of Partnership
University of Johannesburg	Professional TVET lecturer development programme on the fourth industrial revolution	June 2020 – March 2021	The aim of the partnership is to upskill lecturers in TVET colleges to align their teaching to elements of the Fourth Industrial Revolution (4IR). The partnership consists of blended online and face to face learning programmes, which also consist of short learning programmes. Core to this partnership are: Basics of Data, Programming and Applications, Big data analytics and applications, Virtual Reality (VR), Digital Advertising and Internet of Things (IoT).	The value of this partnership promises to bring increased access to occupationally directed programmes, increased and improved workplace capacity in TVET colleges to produce relevantly skilled graduates and increased support of SMEs within the MICT Sector.
South African College Principal Organisation	Candidacy programmes Bursary programmes	September 2020 –August 2021	This partnership caters for learning opportunities and developmental needs of TVET lecturers to successfully acquire the competency level in fields that lead to professional registration within the MICT Sector.	This partnership has the value to redress past social separation and its effects. It is about enabling those eligible to register and upgrade to a professional status within the MICT Sector. This will also increase and improve workplace capacity in TVET colleges to produce relevantly skilled graduates
KZN Film Commission	Mentorship and learnership programmes	September 2020 –August 2021	The aim of this partnership is to advantage young emerging film makers and producers within closed business environments, enable them to learn from more experienced professionals where networking and personal links are very strong, also neutralize gender bias. This will be supplemented by Learnership programmes that will run for 12 months, where qualifying learners will be trained on the production of films and television programmes.	This partnership has the value to equip learners with the necessary skills that can enable them to compete or evolve further at a national, regional or international level.
Gauteng Department of E-Government	Internship Programmes	September 2020 –August 2021	The aim of this partnership is to expose young emerging professionals, especially from disadvantaged backgrounds to workplace experience. It is about helping them gain skills that can be applied to future jobs.	The value of this partnership lies in enhancing skills development, knowledge and experience, with the potential to reduce high rate of unemployment within the ICT environment by making unemployed graduates employable.

Source: MICT SETA Commitment Registers, 2019/20, 2020/21

Developing relevant and high-quality skills and competencies is the foundation upon which the MICT SETA bases its partnerships on. These planned partnerships respond directly to the gaps that exist in the Sector and serve as responsive mechanisms to 4IR.

4.4 Conclusion

The partnerships highlighted above are essential for the successful advancement of skills development. The SETA understands that these partnerships should be undertaken with the NDP Vision 2030 in mind. Through these partnerships, the SETA will continue to build capacity, ensuring efficient and effective implementation. Transformational imperatives will continue to be a priority – this includes race, gender and people with disabilities. Through these partnerships, the SETA will continue to increase the participation of previously disadvantaged people, especially in rural areas. The partnerships highlighted above show that the MICT SETA is a reflective organisation which has learnt to prioritise quantifiable public goals and stakeholder engagement, thus ensuring transparency and long-term planning.

Chapter 5: SETA Monitoring and Evaluation

5.1 Introduction

Chapter 4 discussed the implementation of learning programmes through partnerships, the basis upon which this chapter is built. It is vital for SETAs to be able to show tangible results and visible improvements in the implementation of learning programmes. This requires SETAs to continuously review the design and relevance of their programmes, processes and implementation strategies in order to achieve meaningful impact. Monitoring and Evaluation (M&E) is therefore of crucial importance. This chapter will reflect on MICT SETA's approach to M&E, with a focus on the three core divisions: Sector Skills Planning (SSP), Learning Programmes (LPD) and Education and Training Quality Assurance (ETQA). Moreover, it reflects on the previous financial year's strategic priorities and examines the extent to which those priorities were addressed. This chapter also identifies the mechanisms that are in place to address priorities that were not achieved in the previous financial year.

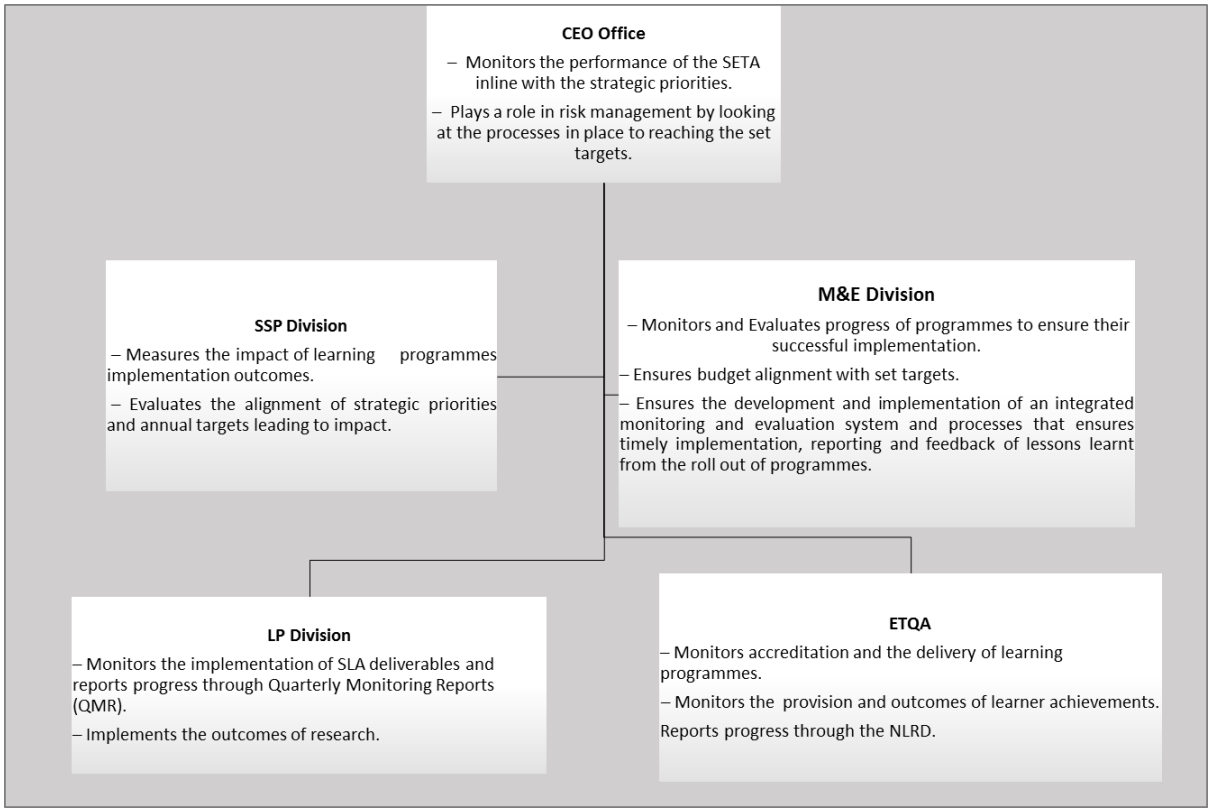
5.2 Sector Skills Planning Reflections

5.2.1 SETA's Approach to Monitoring and Evaluation

For the MICT SETA, monitoring involves a routine process of collecting data to provide information against set targets, it is a systematic assessment of performance against activities, programmes and projects. The MICT SETA employs monitoring to track progress on programme implementation to ensure consistent achievements of agreed upon deliverables. It provides early indications of progress, achievements, and challenges in programmes' implementation (Frankel & Gage, 2007) (Gage & Dunn, 2009). On the other hand, the MICT SETA uses evaluation to measure the outputs, outcomes and impact of programmes and projects. It is considered to be a systematic and objective concept that focuses on the success of predetermined objectives, examining the results chain (inputs, activities, outputs, outcomes, and impacts), processes, contextual factors and causality in order to understand achievements or the lack thereof. It provides information that is credible and useful, enabling the incorporation of lessons learned into the decision-making process (Frankel & Gage, 2007) (Gage & Dunn, 2009).

The MICT SETA uses the Risk Management Strategy across all its core and support functions to monitor and evaluate the implementation of its strategic objectives. The monitoring part is realised through the implementation of research outcomes, Service Level Agreements (SLA) deliverables, and overall quality assurance on delivery of learning programmes. The evaluation part is realised through measuring the impact of learning programmes' implementation outcomes. The SETA has recently established a distinct M&E division to ensure a more systematic and objective approach towards the attainment of strategic objectives and the assessment of their impact thereof. The figure below is a depiction of the SETA's approach to M&E.

Figure 22: MICT SETA's Approach to Monitoring and Evaluation



The **CEO's Office** plays an oversight monitoring role, which goes hand in hand with the principles of risk management. This means that it monitors the organisation against its priority targets by looking at internal and external risks that may delay the organisation in reaching targets. The governance role played by this office is premised on the understanding that without proper risk management, the MICT SETA will not be able to achieve its goals for the future. There is thus an interrelationship between all the divisions, with the SSP division working closely with the CEO's office to define measurable strategic outcomes for the SETA.

The **SSP Division** measures the impact of learning programmes implementation outcomes. This is done through the annual Tracer and Impact (medium to long-term) studies. In addition, the division ensures the alignment of the three strategic Documents: Sector Skills Plan, Strategic Plan, and Annual Performance Plan.

The **M&E Division,** has been recently established, it will ensure a more systematic and objective approach towards the attainment of strategic objectives and the assessment of their impact thereof, will play the role of evaluating programmes at regular intervals to ensure their successful implementation, and will report on lessons learnt from the rollout of the programmes.

The **LP Division** implements the outcomes of research (Sectoral Priority Occupations List). It monitors the implementation of deliverables and tracks progress against targets outlined in the Service Level Agreement through Quarterly Monitoring Reports (QMR) submitted quarterly to DHET.

The **ETQA Division** monitors the provision and the outcomes of learner achievements, culminating in certification. Other Monitoring functions performed by the ETQA include: Monitoring of accreditation, the delivery of learning programmes, learning outcomes of learner achievements, verification processes and reporting through the NLRD.

5.2.2 Monitoring and Evaluation Data to Support Research and Planning

M&E data is important in evidence-based decision-making, and for providing accountability to stakeholders. The following table demonstrates the data used by the three core divisions and the CEO's office:

Table 22: Data Used by Three Core Divisions

Division	Monitoring and Evaluation Data
CEO's Office	• Divisional Management Committee (MANCO) reports • Risk Management Quarterly reports
Sector Skills Planning	• Workplace Skills Planning/Annual Training Reports (WSPs/ATRs)Learning Programmes Impact Study reports
M&E Division	• Quarterly Monitoring Reports (QMR), Fact file reports • Divisional Management Committee (MANCO) reports • Learning Programmes Impact Study reports
Learning Programmes Division	• Quarterly Monitoring Reports (QMR) • Learner Placement reports • Site Vetting Reports
Education, Training and Quality Assurance Division	• Quality Assurance on delivery of learning outcomes • Accreditation/Re-accreditation reports

The monitoring data that is submitted to the CEO's office by the 3 core divisions is used for strategic planning and adjustment where risks are identified. The data is used to identify risks, so that strategies may be conceived and executed to guard against these risks. Through data submitted, management identifies and prioritises critical risks that may have an adverse impact on the SETA.

Most of the Monitoring data from the LPD and ETQA divisions is submitted to the SSP division for evaluation and reporting. The LPD submits QMR reports to the SSP division to undertake Tracer and Impact studies, and the ETQA data is used in research documents such as the SSP - an example of this data is the NLRD data. These studies help the SETA to determine if the programmes implemented are producing the intended results. Learning from past implementations, the SETA prepares mitigation strategies for future implementation. Moreover, ETQA monitors the relevance of qualifications and works with the Quality Council for Trades & Occupations (QCTO) in this regard. This exercise of reporting complements the QMR produced by the LPD, as it allows the SETA to distinguish which qualifications are relevant, thus informing the SETA's funding priorities for qualifications.

5.2.3 Extent to Which Previous Strategic Priorities Were Addressed

In the previous financial year, the MICT SETA had six strategic priority areas. The table below highlights the status of implementation of these strategic priority areas:

Table 23: Status of Implementation of Strategic Priority Areas for 2019

Strategic Priority	Status of Implementation
Priority 1: Enablement of the Fourth Industrial Revolution (4IR)	This priority action responded to NSDP outcomes 1 and 2 and relates to the role the MICT Sector plays in the development of technologies and products related to 4IR. In response to the change brought about by 4IR, the SETA partnered with the University of Johannesburg to upskill lecturers in TVET colleges to align their programmes to 4IR. The partnership consisted of blended online and face to face short learning programmes. Core to this partnership was delivery on; Basics of Data, Programming and Applications, Big data analytics and applications, Virtual Reality (VR) and Digital advertising. Furthermore, the SETA partnered with Deviare and the Department of Communications & Digital Technologies (DCDT) in providing Short and Skill programmes in cybersecurity, data science, drone piloting, digital media, 3D printing and software development. Though, some of

Strategic Priority	Status of Implementation
	the aforementioned programmes are completed and beneficiaries already in workplaces, some are still in progress.
Priority 2: Improved access to and take-up of training for priority skills	This priority action responded to NSDP outcomes 1 and 2 and was aimed at ensuring access to and delivery of priority skills. The SETA collaborated with industry and ensured implementation of set targets through the allocation of discretionary grants. Furthermore, the SETA ensured delivery of learning programmes in accordance with the Service Level Agreements. Programmes that were prioritised addressed Sectoral occupational shortages and skills gaps that were 4IR focused. Special attention was given to programmes such as Work Integrated Learning and Internship programmes were prioritised as they provided effective bridges into employment. Furthermore, the SETA supported enrolments on short and targeted programmes that focused on addressing specific and immediate skills gaps to stimulate direct employment.
Priority 3: Expand skills development to rural areas	This priority action responded to NSDP outcome 8, which is aimed at increasing access to occupationally directed programmes for rural and previously disadvantaged communities (including townships). The SETA provided career and vocational guidance to rural communities and collaborated with TVETs and industry in implementing programmes, some of which were 4IR focused. Furthermore, the SETA assisted aspirant skills development providers to attain accreditation and deliver on MICT SETA programmes.
Priority 4: Inclusivity through technology skills development	This priority action responded to NSDP outcomes 1 and 2 and was aimed at provision of skills development programmes that address transformational targets for women learners, learners with disabilities and rural learners. Thus far, the SETA partnered with Deaf Empowerment Firm (Pty) Ltd (DEF) to empower the deaf youth through the coding learnership and skills programmes. Furthermore, the SETA supported skills development providers to successfully develop e-learning platforms as delivery platforms by ensuring that the content that they placed on the platforms were fittingly aligned to the qualification outcomes and broader NQF principles so that learners are certified on completion and records submitted NLRD.
Priority 5: SMME Support, particularly with regard to 4IR	This priority action responded to NSDP outcome 6, which is aimed at providing support to SMMEs. Previously, the SETA always ensured that SMMEs were supported through the allocation of discretionary grants to implement learning programmes that address occupational shortages and skills gaps. For this reporting period, the SETA had 309 agreements with SMMEs to implement various learning programmes and this collaboration has been quite beneficial for both parties.
Priority 6: Cross-Sectoral partnerships and projects in the delivery of learning interventions	This priority action responded to NSDP outcome 5 with the aim of partnering with strategic role players in the implementation of cross-Sectoral programmes. For this reporting period, the SETA partnered with Mzansi Scuba Diving Academy to implement the Underwater Photography programme which was related to both the MICT and transport Sectors. This was a great and beneficial programme as learners who completed went into immediate employment.

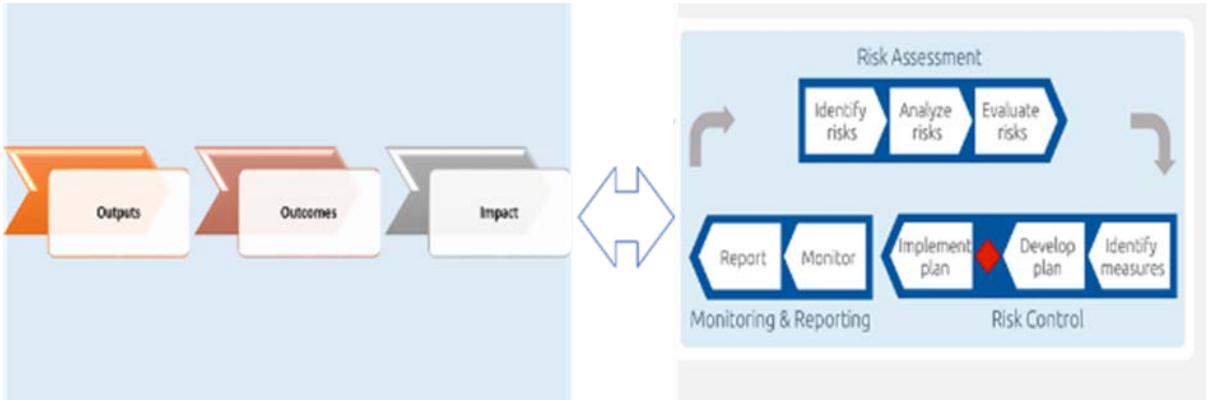
It is evident from the table above that the SETA committed itself to the implementation of its key strategic priority areas. The MICT SETA ensured that the above mentioned key strategic priorities interphase with its key strategic outcomes, ensuring that all these priority areas were integrated with performance indicators, measuring and reporting on their achievement. The SETA will continue to focus on strategic priority areas through partnerships with critical interest groups to ensure that occupational shortages and skills gaps are addressed, and their impact measured for continuous improvement.

5.3 Plan of Action

5.3.1 Mechanisms That Need to be Placed to Address Key Strategic Priority Areas

M&E is important for organisations such as the MICT SETA to assess programmes and projects. The structure of the M&E Division, which is currently being established, will comprise of a Research, Monitoring and Evaluation Manager, a Monitoring and Evaluation Advisor, and a Monitoring and Evaluation Administrator. This will allow the SETA to recognize where strategic changes should be made. This will be complemented by the Risk-Informed Monitoring and Evaluation Plan as seen below in figure 23.

Figure 23:Risk Informed Monitoring and Evaluation Plan



The above plan is a depiction of how the MICT SETA monitors its performance against set targets. Monitoring is an integral part of the risk management decision making processes, meaning that every step of the risk management process may be related to the Monitoring. The monitoring element from the core divisions, specifically the LPD and ETQA will be assessed from an input, process/activities and up to an output level. Moreover, risk management will be key in monitoring and reporting. The SSP and M&E division will assess the data submitted at both the outcome and impact level, this will be the level where evaluation will be implemented.

5.3.2 Measures to Ensure Current Priorities are achieved

M&E, and Strategic Management should not be viewed as two separate functions, as they are both concerned with supporting fundamental decisions and actions which shape and guide the organisation. The SETA will establish innovative and strategic partnerships with public institutions, centres of specialisation, SMMEs and industry at large for maximum impact on Sectoral growth and sustainability. Key Priority Areas will be aligned to the APP, which could translate into an SLA between the MICT SETA and DHET. Moreover, the SETA will ensure that there are up to date and fit for purpose programmes which respond to skills development needs at hand, with a special focus on 4IR.

5.4 Conclusion

This chapter highlighted the SETA's approach to M&E, and demonstrated how data in relation to the concept is applied - this was useful in understanding how decisions are made, and to establish whether the existing M&E function contributes to decision making. The chapter highlighted the work of the various divisions in leveraging M&E to improve delivery of learning interventions. It was noted that the monitoring function is complemented by the risk management element. The SETA is confident that a dedicated M&E function, intertwined with risk management will strengthen the SETA's ability to detect threats and opportunities for improvement, and respond appropriately with higher degrees of flexibility.

Chapter 6: Strategic Skills Priority Actions

6.1 Introduction

Although there has been widespread transformation of the Sector's labour market, in particular the nature of skills demanded, there is some ambiguity about the extent to which these are fundamental shifts in the sectoral structure of the economy, and what the response from the training and education perspective should be. This section summarises the key findings that have emerged from the 2020/21 SSP, which in turn point to the strategic objectives of the MICT SETA and its stakeholders over the next period. This chapter is informed by the 5 preceding chapters, which are in turn informed by consultations and literature review. The recommended priority actions were drafted with strategic input from MICT SETA senior management and policy directives such as the NSDP.

6.2 Key Skills Findings from Previous Chapters

In Chapter 1 it was outlined that the MICT Sector is made up of 28 829 employers, the vast majority of which are small businesses. This will have an impact on training opportunities. Although there are fewer large and medium sized employers, resulting in limited large-scale learnership and internship programmes, smaller companies are perceived to be intensive incubators and mentors for entrants in the Sector.

In general, as all the Sub-sectors experienced growth, the MICT Sector has experienced growth over the 2019/20 period. However, this is expected to take a downturn as the year progresses and the impact of the COVID-19 pandemic becomes clearer. Gauteng, Western Cape, and KwaZulu Natal account for almost 90% of all employees in the Sector. Employment has steadily increased over the past three years and Information Technology continues to be the largest Sub-sector.

Chapter 2 illustrated that the MICT Sector is dynamic and in constant technological flux. Thirteen 4IR technologies were studied as drivers of change in the Sector, with Artificial Intelligence (AI), Cloud Computing, Big Data, 5G and the Internet of Things (IoT) coming up strongly as the biggest change drivers in the Sector. From the drivers of change, the challenges and implications for skills development, with a focus on change brought about by the fourth industrial revolution (4IR), were identified. South Africa still lags behind in terms of adopting 4IR technologies and a major contributor to this is the lack of appropriate qualifications in 4IR related fields. Thus, 4IR introduces new opportunities for training and as new hardware and software products appear on the market, these need to be accompanied with the upgrading of courses.

Current economic growth in the Sector is arguably driven by a consumer market with an appetite for imported electronics, particularly cell phones. This may increase demand for skilled labour in sales and marketing. At the same time, investing in high-end skills in research and development could activate a new economy in this regard.

In Chapter 3 it was highlighted that skills gaps include business etiquette, certified skills (e.g. CompTIA A+), financial management, communication, leadership, and Python, amongst others. The most hard-to-fill-vacancy is Software Developer, followed by Computer Network and Systems Engineer. Completing the sectoral priority occupations list is ICT Sales Representative.

Enrolments and completions in MICT qualifications decreased in 2019, however, the qualification Information Technology: Technical Support (NQF 4) drew the most enrolments. The SETA is working on developing a number of up-to-date qualifications, including those that speak to 4IR related occupations.

There continues to be a high demand for vendor programmes and online courses. These include both short courses that have high price tags and longer, more generalised, courses that can be accessed through TVET colleges and HEIs. The MICT SETA has begun a process of mapping vendor programmes against NQF levels.

In Chapter 4, the various partnerships that MICT SETA has entered into with professional, academic and government partners were discussed. These include partnerships to provide learning programmes and increase research capacity and access to learning programmes.

Chapter 5 explored the SETA's M&E approach and articulated the functions of the various divisions of the SETA in M&E. Although all three core divisions play, to some extent, a monitoring function, the SSP division consolidates the three divisions and conducts evaluations as well. M&E is also intrinsically linked to Risk Management as handled by the Office of the CEO. A plan of action was also presented on how the SETA intends to achieve its priorities.

6.3 Recommended Priority Actions

The following sets out the proposed broad skills development objectives for the Sector. These areas are intended to include efforts made broadly by MICT Sector stakeholders.

Table 24: Recommended Priority Actions

Outcome/Priority Area	Description
1. Credible labour market information that accurately identifies occupations in high demand.	The MICT SETA will ensure that the labour market information signalling the demand and supply of skills is thoroughly triangulated in order to improve the trustworthiness of data used for skills planning purposes. Such systematic and in-depth research will be achieved through collaboration with industry bodies, universities and acclaimed research institutions. Of equal importance will be the management and dissemination of research outcomes on occupations in high demand and incremental building of career guidance in partnership with industry and various learning institutions through a number of platforms, with online distribution being the main platform. The targeted audience will be unemployed learners and those already in employment seeking to progress to identified occupational shortages and skills gaps to ensure meaningful and sustainable employment.
2. Enablement of the Fourth Industrial Revolution (4IR).	The MICT Sector key skills change drivers articulated in Chapter 2 are all centred on 4IR technologies. In response to the change brought about by 4IR, the SETA will provide support to enable the Sector to play a key role in the development of technologies and products related to 4IR. This will be achieved through support by the SETA for the development of the skills required to research, develop and commercialise 4IR technologies and products. In recognising and planning for occupations that are on the National List of Occupations in High Demand-and linked to 4IR-this priority action fulfils NSDP outcome 1, which calls for the identification and increase in the production of occupations in demand (examples of which include Cloud Architects in the Cloud Computing space and AI Specialists in the Artificial Intelligence space), and outcome 2, which speaks to linking education and the workplace. The impact of COVID-19 in relation to the enablement of 4IR cannot be ignored therefore, in implementing 4IR priority programmes, companies that have been, and will be impacted by COVID-19 are also accounted for in SETA strategies. This is seen through its inclusion in the SETA's 2020/21 Strategic Plan and Annual Performance Plan – going forward, COVID-19 considerations will be integral to the planning process for the SETA.
3. Increased access to, and delivery on occupationally directed priority programmes that link education and the workplace.	The SETA will set realistic targets in collaboration with industry, ensure implementation through the allocation of discretionary grants and monitor delivery of Service Level Agreement deliverables as a way of addressing sectoral occupational shortages and skills gaps. This will prioritise the development of skills that enable 4IR occupations and specialisations such as network and systems engineering and cybersecurity specialists. The COVID-19 phenomenon has been taken into consideration with regard to the SETA's strategic planning and has been acknowledged as a catalyst for the necessary 4IR related skills development. One of the key strategies the SETA will employ is the

Outcome/Priority Area	Description
	expansion of opportunities for Work Integrated Learning and Internship programmes as they provide effective bridges into employment and the general world of work. Furthermore, the SETA will support uptakes on short and targeted programmes focused on addressing specific and immediate skills gaps that stimulate direct employment and sustainable growth. The SETA needs to look into funding more professional qualifications as part of learnerships and skills programmes as they afford learners a greater chance of employability, such programmes include CISCO and CompTIA A+ which are linked to Technical Support and Systems Support programmes. Addressing NSDP outcome 8, learning pathways need to be communicated with learners in schools, colleges and universities as well as those already employed in the Sector who wish to seek entry to occupations that present other opportunities for employment in the Sector. This will be done through the publication of the MICT SETA career guide as well as through partnerships with industry stakeholders. Online platforms and tools will be utilised to expand on this. Improved access and awareness of MICT Sector programmes in previously disadvantaged areas will also be a focus for the SETA, speaking to NSDP outcomes 1 and 2.
4. Support growth of the public college system through sectoral partnerships in the delivery of learning interventions.	The SETA will identify TVETs with the potential for meaningful collaboration and enter into partnerships with them. These partnerships will recognise some of the TVETs as Centres of Specialisation, linking them with industry and ensuring that programmes offered are aligned to identified skills gaps for ease of learner placement on programmes such as WIL. Furthermore, the SETA will award bursaries to college lecturers and training opportunities on curriculum related studies to college managers for their continuous development and for them to be adept with industry technological advancements. The SETA will establish offices in some TVET colleges to ensure accessibility and reach, ensuring that those TVETs are duly accredited to offer the SETA's high-demand occupational qualifications. In all this, the development of skills that enable 4IR occupations and specialisations will be the main focus. All these initiatives will ensure gradual growth of the public college system, eventually ensuring that TVETs become fit for purpose skills development providers and institutions of choice.
5. Increased and focused skills development for rural and marginalised communities to ensure inclusivity through technology skills development.	The MICT SETA's rural strategy, linked to NSDP outcome 8, is aimed at increasing access to occupationally directed programmes for rural and previously disadvantaged communities (including townships). The MICT SETA strategy aims to respond to the President's Youth Employment Service, which is known as the "YES initiative". It aims to address the most pressing socio-economic challenges in the country, particularly around poverty and unemployment among the youth. There are currently more males (58%) employed in the MICT Sector than females (42%). This gap is slowly closing, and the SETA will continue encouraging transformation in the Sector by placing focus on providing increased funding and skills development opportunities to African and female learners. This priority intends to scope the skills development needs and priorities of rural communities, provide career and vocational guidance, support government in addressing e-governance issues and assist aspirant training providers to attain accreditation and deliver MICT SETA programmes. The SETA will thus collaborate with developmental organisations such as USAASA and industry in initiating and implementing focused Rural Development Projects on an annual basis.

Outcome/Priority Area	Description
6. Support for SMMEs, Entrepreneurship and community-based organisations, particularly in relation to 4IR cross-sectoral partnerships and projects for sustainable growth.	In developing interventions for SMMEs and community-based organisations, the SETA will make considerations such as: the ability of an SMME to obtain funding for skills development; whether or not it is a levy paying company; the flexibility and accessibility of programmes that recognises the difficulty that small companies have in releasing staff for long periods; the difficulties that small companies have in meeting requirements for learning programmes implementation; and the potential for established larger companies in the Sector to mentor and provide incubator opportunities to smaller less well established businesses. Furthermore, the SETA needs to intentionally formalise partnerships with other SETAs through meaningful engagements in order to synchronise contrasting mindsets and interests. This will assist in reaching common ground for both parties to work together to reach a common outcome and long-term viability for stakeholders. These partnerships are especially important now, during the COVID-19 phenomenon (the impact of which will outlast the pandemic) as SMMEs are in a more vulnerable position attempting to keep up with 4IR trends and technology in order to stay relevant in the current MICT Sector environment. These partnerships will play an imperative role in enabling these SMMEs to sustain their businesses. Addressing NSDP outcome 6, training interventions focused on developing key skills relating to 4IR will be made available to SMMEs and community-based organisations to allow for those active in 4IR or related fields to develop more specialised or adjacent skills. This will help further innovation and commercialisation of 4IR technologies in South Africa, further encouraging local production and gradually increasing exports.
7. Improved quality of education to address programmes in high demand within the MICT Sector.	The focus will be on the identification and development of occupational qualifications through the QCTO for occupations in high demand in consultation with the sector. These include occupations such as software tester, network engineer and ICT security specialist. Furthermore, the SETA will put in place mechanisms to prioritise 4IR related qualifications and increase the number of accredited skills development providers offering occupational qualifications in high demand on an annual basis. Such 4IR occupations which require qualification development are in cloud computing, cybersecurity, artificial intelligence, data science and robotics and automation, amongst others. Where the relevant qualifications and training courses exist, the SETA will encourage enrolment in them, particularly for middle and high-level skills. Where qualifications and courses need to be developed, the SETA will work with industry, relevant academic and research institutions and other critical interest groups to map-out and develop programmes that respond to such new technological imperatives for sustainable growth of the Sector.

6.4 Measures Planned to Support National Strategies and Plans

The MICT SETA works with its various partners to support the achievement of the NDP objectives. Through continued funding of bursaries at research level, the SETA endeavours to propel the Sector's innovation system. The MICT SETA strives to be a reliable skills development partner that promotes growth in requisite skills (this is especially important now with the occurrence of COVID-19 and the catalyst effect it is having on the enablement of 4IR). To the effect of attaining the NDP objectives, the MICT SETA will leverage its partnerships with industry to drive innovative research and offer opportunities to small business, to enable them to play a significant role in the country's manufacturing and technology ecosystem. Equal focus will be channelled towards continued support for SMEs through more focused internships and incubation programmes. The table below shows this effort by the SETA.

Table 25: MICT SETA's Efforts to Support National Strategies and Plans

Planning Priority	*Priority Action*
National Development Plan	The MICT SETA together with stakeholders in the NSI will engage in processes to help commercialise research. The SETA strategic plan emphasises provision of financial and non-financial support to SMMEs, NGOs, NLPEs, CBOs. Partnerships with stakeholders like SEDA to encourage incubation would play a key role in achieving sustainability and growth of small businesses in the Sector.
White Paper on Post Schooling Education and Training	The White paper calls for an integrated post schooling and education system and an efficient skills development system. Many of the targets identified in the White Paper have found expression in the NDP. The MICT SETA will ensure expanded access to TVET and University education through bursaries.
National Skills Development Plan (NSDP)	In the new planning cycle, the MICT SETA responds to the NSDP outcomes by determining and addressing occupations in high demand, strengthening TVETs, CETs and work integrated learning (WIL), increasing the number of workers trained and supported and supporting SMMEs, Cooperatives and rural learners. These outcomes are pursued by the SETA in the Recommended Priority Actions above. In addition, there are efforts to mainstream provision of vendor type as well as SETA accredited programmes, especially at NQF 4 through partnerships with TVET colleges.
Strategic Integrated Projects (SIPs)	There is a need for a skill development package that includes skills programmes for those who will be entrusted with managing the broadband infrastructure. MICT SETA will, through its skills development interventions, endeavor to support the SIPs.
New Growth Path (NGP)	Some of the programmes identified in IPAP find expression through the Strategic Integrated Projects. As stakeholders in the Sector start to engage in these programmes, the MICT SETA's role as a skills development partner will become more pronounced, ensuring that requisite skills are developed.
Industrial Policy Action Plan (IPAP)	Some of the programmes identified in IPAP find expression through the Strategic Integrated Projects. As stakeholders in the Sector start to engage in these programmes, the MICT SETA's role as a skills development partner will become more pronounced, ensuring that requisite skills are developed.
National Integrated ICT Policy White Paper	The MICT SETA seeks to support this planning priority through managing supply-side issues and infrastructure roll-out, including supporting work done in scarce resources such as spectrum and interventions to facilitate open access and rapid deployment of infrastructure. The SETA commits itself to facilitating multi-stakeholder participation in the drive for an inclusive digital economy.

6.5 Conclusion

The MICT SETA will continue to strive towards the continuous improvement of planning and implementation efforts, as well as the constant monitoring of Sector-related changes and developments. Currently, two of the most important Sector-related developments being taken into account by the SETA, is that of COVID-19 and 4IR with regard to its impact on skills development and the stakeholders within the Sector. Therefore, the skills development interventions that the MICT SETA will be implementing provide the most relevant and up-to date learning programmes that afford learners the opportunity to acquire skills that are appropriate to economic and societal needs. The priority actions identified in this plan find expression in the MICT SETA Strategic Plan and Annual Performance Plan and will serve as a guide for the SETA in support of national and sectoral objectives in the best manner possible. Furthermore, the alignment of future strategically oriented SETA plans will also serve to strive towards the achievement of the abovementioned priority actions.

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