New Forms of Work:
Skills demand and supply in the changing world of work

Prof Hoosen Rasool

May 2021

EXECUTIVE SUMMARY

Part 1: Orientation

The aim of this research study is to profile the South African labour market over a decade to determine which jobs and skills will be impacted by labour market shifts and what policy measures will maximise the benefits and minimise the negative effects of labour market transitions. Those who lose their jobs in this transition may be least equipped to take advantage of new opportunities. Current skills might not match future jobs and newly acquired skills can quickly become obsolete. In this sense, the purpose of this investigation is to gather comparable evidence and policy options adopted in South Africa for a better-informed policy design.

Part 2: Profile of the South African Labour Market

For 2020, Statistics South Africa (Stats SA) estimates the mid-year population at 59,62 million.[1] About 28,6% of the population is aged younger than 15 years and approximately 9,1% (5,4 million) is 60 years or older. A drastic decline was experienced in 2020, when employment plummeted to 15 024 000 employed persons due to the COVID-19 pandemic and its adverse effects on the economy. Employment declined by 1,326 million between 2019 and 2020. Before COVID-19, the official unemployment rate was 27,6% and expanded unemployment (includes discouraged work-seekers) 38%.[2] In the 4th quarter of 2020, official unemployment rose to 32,5% and expanded unemployment to 43,1%.[3]

Although South Africa is making progress towards achieving gender parity in education, health, economics and politics, much remains to be done. Women are more likely than men to lose their jobs in the downturn. They are also behind their male counterparts in obtaining employment during a recovery.

The youth unemployment problem continues to manifest, despite considerable efforts to get youth into the labour market. There were about 10,3 million young people aged 15–24 years in Q4: 2020, of which 29,8% were not in employment, education or training (NEET) – 2,2 percentage points lower than in Q4: 2019. In this age group, the NEET rate for both males and females decreased by 2,2 percentage points each. The NEET rate for females was higher than that of their male counterparts in both years.

Part 3: Labour Supply and Demand Policies: Building competencies for the jobs of the future

The state is committed to ensuring through its policy, legislative and regulatory instruments that the supply of labour responds to the demand in the labour market. Technology, COVID-19, the economy, climate change, the future of work and occupational change are key drivers of skills supply and demand. Occupations in high demand are drawn from the digital economy, energy, infrastructure development, data science, web development, electrical engineering, toolmaking, crop analysis, agricultural science, and trades.

---

[1] Statistics South Africa (2020) Mid-year population estimates, Statistical release P0302, accessed at: http://www.statssa.gov.za/?page_id=1854&PPN=P0302

[2] Statistics South Africa. Quarterly Labour Force Surveys Q4: 2019.

[3] Statistics South Africa. Quarterly Labour Force Surveys Q4: 2020.

The top 5 skills gaps in the country are management and leadership, computer, technical, communication and customer service. Several countries have implemented reforms to strengthen their national skills system.

Robust training and skills strategies and policies are constructed from several building blocks. These include anticipating future skills needs; participation of social partners; sector approaches; labour market information and employment services; training quality and relevance; gender equality; broad access to training; financing training; and assessing policy performance.[4]

Part 4: Overview and Perspectives for the Future of Work in South Africa

The COVID-19 pandemic, Industry 4.0 and sustainability are reshaping labour markets and have significant implications for the nature of work and life. Some of the major trends include the rise in unemployment, remote working, growth of the gig economy, the demand for performance, role hybridisation, skilling over credentialing, continuous bargaining for trade unions, learnability, skills transfer, focus on sustainability, return of manufacturing and gender inequalities.

There have been three major paradigm shifts in labour markets since the start of the great oil crisis in 1970 to the present COVID-19 pandemic in 2021. These shifts have fundamentally redefined labour markets. The fourth Industrial Revolution (4IR or Industry 4.0) is the major disruptor of the economy and labour market. Technological advancements such as mobile connectivity, artificial intelligence, Big Data, the Internet of Things (IoT), robotics, blockchain, cryptocurrencies, next-generation software, drone technology, wearable devices and machine learning are breaking down the centuries-old edifice on which the traditional insurance model was built. New technologies are creating a massive disruption to jobs and occupations. New jobs and occupations are emerging, and existing jobs and occupations are changing. Technology is a prime mover in changing the nature and content of work. Old skills are becoming obsolete, and new skills gaps are emerging.

Part 5: Recommendations and Conclusion

From the preceding sections, the findings and recommendations are closer collaboration with the DHET, promoting labour market research and intelligence, making employment services efficient, and remodelling the Unemployment Insurance Fund.

The name change from the Department of Labour (DoL) to the Department of Employment and Labour should be followed with a shift in approach from unemployment to an employment orientation. The DEL should be making greater efforts in supporting the unemployed with training, new job search and career counselling. There should be a special focus on supporting the most vulnerable groups in the labour market, namely, youth, women, people with disabilities and rural communities. The research outputs of the DEL should be increased in areas such as job creation, labour relations, unemployment, skills anticipation and matching, distressed industries, occupational health and safety, compensation, discrimination in the workplace, jobs and the fourth industrial revolution, decent work, employment equity, and so on

---

[4] ILO (2010) A Skilled Workforce for Strong, Sustainable and Balanced Growth: A G20 Training Strategy. International Labour Organisation: Geneva.

TABLE OF CONTENTS

LIST OF EXHIBITS

ABBREVIATIONS

DBE	Department of Basic Education
DHET	Department of Higher Education and Training
4IR	4th industrial revolution or Industry 4.0
ILO	International Labour Organisation
INSETA	Insurance Sector Education and Training Authority
NEET	Not in employment, education, or training
NQF	National Qualifications Framework
PSET	Post-School Education and Training
NSDP	National Skills Development Plan
QES	Quarterly Employment Survey
QLFS	Quarterly Labour Force Survey
SA	South Africa
SETA	Sector Education and Training Authority
STATSSA	Statistics South Africa
TVET	Technical vocational education and training

DEFINITIONS

Absorption rate
The absorption rate (employment-to-population ratio) measures the proportion of the working-age population that is employed.

Capital input
Capital input (K_t) is the net stock of investment in fixed assets such as investments in residential and non-residential building, excluding land, infrastructure, machinery and equipment. It is the sum of net capital stock in the previous year and gross fixed investment less provision for depreciation.

Capital labour ratio
Capital labour ratio, or capital deepening, measures the amount of capital available to each worker or per person engaged. It is the ratio of capital input to labour input where positive capital labour ration indicates that a production process uses more capital input relative to labour input. More formally, Capital labour ratio is: $$Capital\ labour\ ratio_t = \frac{C_t}{L_t} = \frac{Capital\ input_t}{Labour\ input_t}$$

Capital productivity
Capital productivity is the amount of output produced per unit of capital input. It measures how productively capital is used to generate output and hence, it reflects the capital intensity of the production process. An increase in capital productivity means that a unit of capital produced more output than in the previous year or that the same amount of output is produced by less capital input. More formally, Capital productivity is: $$Capital\ productivity_t = \frac{Y_t}{K_t} = \frac{Real\ output_t}{Capital\ input_t}$$

Compensation per employee
Compensation per employee is total Compensation of employees (C_t), measured as the remuneration of employees where total compensation includes employer contributions for wages and salaries, including bonuses, overtime payments, social security as well as private and welfare funds, per employee. Compensation per employee is: $$Compensation\ per\ employee_t = \frac{C_t}{L_t} = \frac{Compensation\ of\ employee_t}{Labour\ input_t}$$

Educational Level
The highest level of education completed. The school system is from grades R to 12 (Matric). The are 10 levels of the National Qualifications Framework with level 10 equivalent to a Doctorate.

Employment
Persons employed in market production activities are those (aged 15-64 years) who, during the reference week even if it was for only one hour, did any of the following: a) Worked for a wage, salary, commission or payment in kind (including paid domestic work).   b) Ran any kind of business, big or small, on their own or with one or more partners.   c) Helped without being paid in a business run by another household member. Persons helping unpaid in such businesses who were temporarily absent in the reference week are not considered as employed, they are routed eventually to questions about: job search activities; their desire to work; and their availability to work - to determine whether they are unemployed or inactive.

d) Were temporarily absent from their jobs or businesses to which they would definitely return. They could have been absent in the reference week but definitely returning to their job if the reason given for their absence was any of the following: ill-health, vacation leave, caring for family or others; maternity or paternity leave, other family/community obligations; strike/stay-away/lockout; problems with transport; bad weather; study or training leave; unrest; temporarily laid off; other reasons. However, there are two groups of individuals that may have been temporarily absent from their jobs in the reference week who are not considered as being employed as follows:

   i) Persons who were absent from work in the reference week because of seasonal factors.

   ii) Persons who were absent from work in the reference week because they had a new job or business to start at a definite date in the future.

Informal sector

The informal sector has the following two components:

- Employees working in establishments that employ fewer than five employees, who do not deduct income tax from their salaries/wages.
- Employers, own-account workers and persons helping unpaid in their household business who are not registered for either income tax or value-added tax.

Labour force

The labour force consists of all working-age individuals who are either employed or unemployed. Since there are two definitions of unemployment, there are two definitions of the labour force. The narrow labour force consists of the employed and the narrowly defined unemployed; the expanded labour force consists of the employed and the broadly defined unemployed.

Labour input

Labour input (L_t) is the total number of persons engaged, that is employers and employees, in any type of economic activity also known as employment. The total number of persons engaged, or workers, is used to measure labour input in the absence of the total number of hours worked or hours paid.

Labour productivity

Labour productivity is the amount of output produced per person engaged. It measures how productively labour is used to generate output hence an increase in labour productivity means that a worker produced more output than in the previous year or that the same amount of output is produced by fewer workers. More formally, Labour productivity is:

$$Labour\ productivity_t = \frac{Y_t}{L_t} = \frac{Real\ output_t}{Labour\ input_t}$$

Multifactor productivity

Multifactor productivity, also known as total factor productivity, is the amount of output produced by combining labour input and capital input. It measures productive efficiency due to the contribution of factors such as advances in knowledge, improvements in management and production techniques. Hence, the increase in multifactor productivity means that an improvement in productive efficiency produced more output than in the previous year while still using the same number of inputs. More formally, Multifactor productivity is:

where W_{Kt} is Capital input share to Real output and W_{Lt} is Labour input share to Real output.

$$Multifactor\ productivity_t = \frac{Y_t}{W_{Kt} \times C_t + W_{Lt} \times L_t} = \frac{Real\ output_t}{W_{Kt} \times Capital\ input_t + W_{Lt} \times Labour\ input_t}$$

NEET

The **South African definition of the youth** refers to persons aged **15–34 years**.
NEET refers to not in employment, education or training. The **NEET rate** is the proportion of youth aged 15–24 years who are not in education, employment or training.

Participation Rate

The labour force participation rate is a measure of the proportion of a country's working-age population that engages actively in the labour market, either by working or looking for work.

Population Group

A group with common characteristics (in terms of descent and history), particularly in relation to how they were (or would have been) classified before the 1994 elections. The following are the dominant population: black African, coloured, Indian or Asian, white

Real output

Real output (Y_t) is real value added and measures the value of goods or services produced in a specific time period, for instance, a year. Real value added is the value of output less the value of intermediate consumption and measures of the contribution to GDP made by an individual producer, industry or sector. It is GDP plus all subsidies on products less all taxes on products and hence it is the balancing item of the national accounts' production account. Value-added based productivity measures reflect an industry's capacity to contribute to economy wide income and final demand.

Skills demand

Skills demand refers to the human resources (in this instance, people) and competencies that employers require, at prevailing wage rates, to meet their operational needs at a given point in time. In this sense, the demand for skills derives from the demand for the goods and services produced by employers. Skills demand therefore reflects the skills that public and private sector employers need in order to meet their objectives. Skills demand can also be thought of as skills needs.

Skills imbalances

Skills imbalances arise when the skills demanded by employers and the skills supplied by individuals in the labour market are not aligned. Types of imbalances include skills shortages, skills surpluses, skills gaps, and skills mismatches.

Skills supply

Skills supply consists of the skills – as represented by any appropriate conceptualisation of skills – possessed by individuals who are either working (the employed) or willing, able, and available to work (the unemployed). In other words, skills supply consists of the skills possessed by the labour force. Skills supply is influenced by various factors, including individuals' decisions to participate in the labour force, to learn new skills, and to migrate. In this context, it is important to understand the pipeline of skills acquisition: the various components of the education and training system and how they facilitate the acquisition of new skills, qualifications, and competences. A full picture of skills supply must therefore include a consideration of both the skills of the current labour force and those of the future labour force (which includes those individuals currently

acquiring skills but not yet in the labour force). It may also include a consideration of the effect on skills supply of changes in labour force participation and migration.

Skills gap

A skills gap refers to a situation in which a worker lacks a particular skill required for a job.

Skills mismatch

A skills mismatch may occur when the skills supplied by an individual do not match demand exactly but are sufficiently close for employers to hire the worker. Skills mismatches can refer either to the inadequacy of a worker's skills relative to the requirements of a job (e.g., having a lower level of qualification than that required for the job or being trained in a field of study other than that generally required for the job) or to a situation in which a worker's skills exceed the requirements of a job (e.g., having a higher level of qualification than that required for the job). A skills mismatch can take one of three forms: a skills gap, a qualification mismatch, or a field-of-study mismatch.

Unemployment

There are two definitions of unemployment used to describe forms of unemployment: the official definition and the expanded definition of unemployment.

Unemployed persons according to the ***Official definition*** are those (aged 15–64 years) who:

    a) Were not employed in the reference week; **and**
    b) Actively looked for work or tried to start a business in the four weeks preceding the survey interview; **and**
    c) Were available for work, i.e. would have been able to start work or a business in the reference week; **or**
    d) Had not actively looked for work in the past four weeks, but had a job or business to start at a definite date in the future and were available.

Unemployed persons according to the ***Expanded definition*** are those (aged 15–64 years) who:

    a) Were not employed in the reference week; **and**
    b) Were available to work but did not look for work either because they are discouraged from looking for work (see definition of discouraged work-seeker) or did not look for work for other reasons other than discouragement.

Unit labour cost

Unit labour cost is measured as total Compensation of employees per unit of output and reflects the cost of labour or how much workers are paid to produce a unit of output. It indicates how much output an economy receives relative to the wages it pays; hence, it is regarded an important indicator of international price competitiveness. Unit labour cost is:

$$Unit\ labour\ cost_t = \frac{C_t}{Y_t} = \frac{Compensation\ of\ employees_t}{Labour\ input_t}$$

SECTION 1: ORIENTATION

1.1 INTRODUCTION

Labour markets across the world are undergoing a tectonic paradigm shift. These changes are driven by global megatrends such as the Industry 4.0, digitalisation, climate change, COVID-19, migration and demographic transitions, which are profoundly altering the nature of work and life. Changes to the size, type, task content, skill intensities of work, and work organisation are changing existing occupations and creating new industries and occupations.

These forces of change offer significant challenges and opportunities for workers. It is apparent that the traditional labour market and social policies which served workers well for decades are not adapted to navigate the new world of work. Therefore, it is important to consider how these transformations in the world of work may give rise to different modes of work production, business activities and labour relations, and how the jobs lost due to automation will be rebalanced by the emergence of new work opportunities. All these factors reinforce the need for continuous adaptation of policies, governance models, labour law, labour relationships, and social protection systems.

The onset of the COVID-19 pandemic and ensuing lockdown has effectively accelerated work and workplace changes. It has culled old industries and work practices and accelerated the growth of newer industries. The pandemic is changing how people work, study and live. The type, scale and description of jobs are changing. The way people train and learn is changing. The way business is conducted is also changing. It is feared that the young generation will suffer the greatest consequences of education and training disruptions, loss of income, and job destruction.

Owing to Industry 4.0, some jobs are becoming obsolete. The global workforce is under the constant threat of retrenchments. Workers require continual training to adapt to new technological advancements or fit into new job profiles. The focus has shifted from "long-term employment" to "long-term employability".

South Africa is not immune to these global megatrends. The COVID-19 crisis has accelerated business closures and retrenchments with over 2.2 million jobs lost since March 2020. The unemployment rate is sitting at historically high levels. The pandemic has also exposed the country's vulnerabilities in emergency relief, public health, education, social welfare, local government, housing, and water provision.

On the positive side, technological innovation is creating new industries, jobs and occupations. For instance, the invention of the micro-computer led to the creation of the information technology industry which changes all other industries. Technology is counterbalancing sunset industries mass retrenchments. McKinsey estimates that up to 3.3 million jobs could be displaced by automation, digitisation and machine learning, but that South Africa has the ability to create 4.5 million new jobs.

1.2 AIM AND PURPOSE

The aim of this research study is to profile the South African labour market over a decade to determine which jobs and skills will be impacted by labour market shifts and what policy measures will maximise the benefits and minimise the negative effects of labour market transitions. Those who lose their jobs in this transition may be least equipped to take advantage of new opportunities. Current skills might not match future jobs and newly acquired skills can quickly become obsolete. In this sense, the purpose of this investigation is to gather comparable evidence and policy options adopted in South Africa for a better-informed policy design.

1.3 OBJECTIVES

The following objectives will be addressed:

- Establish trends in labour supply and demand in South Africa.
- Identify key economic sectors undergoing growth.
- Outline jobs and occupations experiencing growth and decline.
- Discuss emerging labour relations.
- Determine top-up skills that are most in demand and their implications for educational and training institutions, curricula and for the design of learning and training approaches.
- Analyse skills mismatches in the labour market.
- Identify groups that are most vulnerable in the changing world of work.
- Examine policies that countries are implementing to match labour supply and demand, and how can they be further developed and adapted for South Africa.

1.4 KEY RESEARCH QUESTIONS

From the above, the following research questions will be addressed:

- What are the key trends in labour supply and demand in South Africa? What are the key growth sectors? What types of jobs and employment relations are emerging?
- What skills are most in demand or in decline? What implications may this have for educational and training institutions, curricula and for the design of learning and training approaches?
- Is there any skills mismatch?
- What groups are most vulnerable in the context of a changing world of work?
- What policies have countries been implementing in order to match labour supply and demand, and how can they be further developed and adapted?

SECTION 2: POPULATION

2.1 POPULATION STRUCTURE

Population characteristics: The estimates cover all the residents of South Africa at the 2020 mid-year point and are based on the latest available information. Estimates may change as new data become available.

Exhibit 1: Mid-Year Point SA Population (2020)
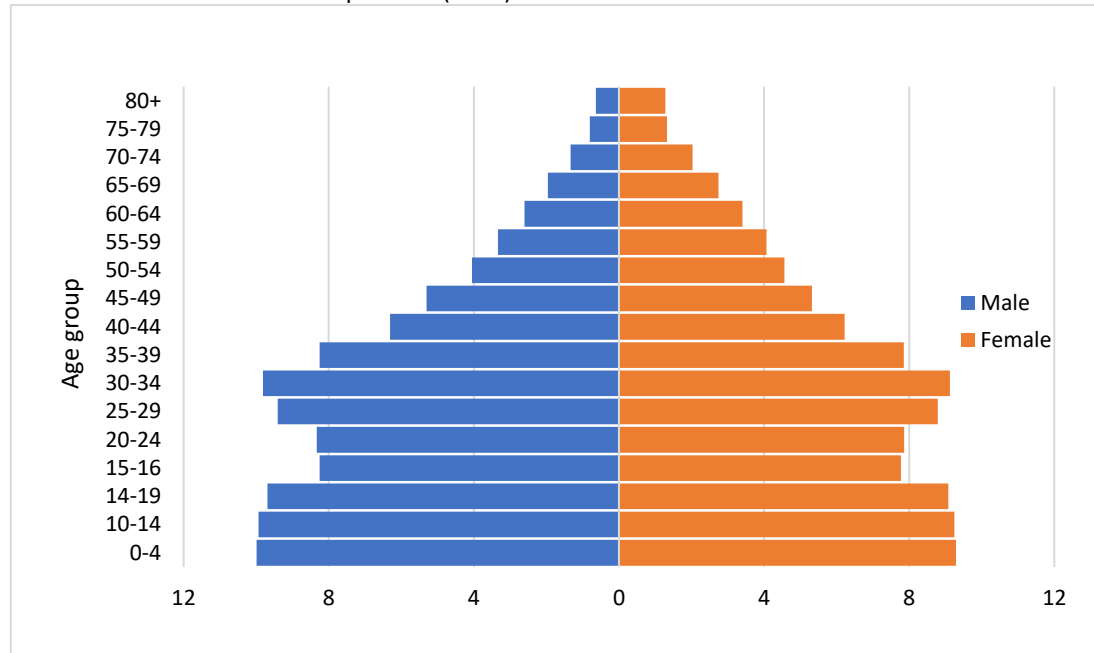
Source: Statistics South Africa mid-year population estimates

For 2020, Statistics South Africa (Stats SA) estimates the mid-year population at 59,62 million.[5] Approximately 51,1% (approximately 30,5 million) of the population is female. Gauteng still comprises the largest share of the South African population, with approximately 15,5 million people (26,0%) living in this province. KwaZulu-Natal is the province with the second largest population, with an estimated 11,5 million people (19,3%) living in this province. With a population of approximately 1,29 million people (2,2%), Northern Cape remains the province with the smallest share of the South African population.

About 28,6% of the population is aged younger than 15 years and approximately 9,1% (5,4 million) is 60 years or older. Of those younger than 15 years of age, the majority reside in KwaZulu-Natal (21,8%) and Gauteng (21,4%). Of the elderly (those aged 60 years and older), the highest percentage 24,1% (1,31 million) reside in Gauteng. The proportion of elderly persons aged 60 and older is increasing over time.

---

[5] Statistics South Africa (2020) Mid-year population estimates, Statistical release P0302, accessed at: http://www.statssa.gov.za/?page_id=1854&PPN=P0302

Migration is an important demographic process, as it shapes the age structure and distribution of the provincial population. For the period 2016–2021, Gauteng and Western Cape are estimated to experience the largest inflow of migrants of approximately 1 553 162 and 468 568.

Life expectancy at birth for 2020 is estimated at 62,5 years for males and 68,5 years for females. The infant mortality rate for 2020 is estimated at 23,6 per 1 000 live births. The estimated overall HIV prevalence rate is approximately 13,0% among the South African population. The total number of people living with HIV (PLWHIV) is estimated at approximately 7,8 million in 2020. For adults aged 15–49 years, an estimated 18,7% of the population is HIV positive.

Population group and gender: The exhibit shows the mid-year population estimates by population group and sex.

Exhibit 2: Population by race and gender mid-year (2020)

Population group	Male		Female		Total	
	Number	% of total male population	Number	% of total female population	Number	% of total population
Black African	23 519 474	80,7	24 634 253	80,8	48 153 727	80,8
Coloured	2 555 204	8,8	2 692 536	8,8	5 247 740	8,8
Indian/Asian	787 662	2,7	753 451	2,5	1 541 113	2,6
White	2 266 535	7,8	2 413 235	7,9	4 679 770	7,8
Total	**29 128 875**	**100**	**30 493 475**	**100**	**59 622 350**	**100**

Source: Statistics South Africa mid-year population estimates

The mid-year population is estimated at 59,6 million. The black African population is in the majority (48,2 million) and constitutes approximately 81,0% of the total South African population. The white population is estimated at 4,7 million, the coloured population at 5,2 million and the Indian/Asian population at 1,5 million. Fifty-one percent (30,5 million) of the population is female.

SECTION 3: EDUCATION

3.1 BASIC EDUCATION

Learners, educators and school sector: The table shows the number of learners, educators and schools in the ordinary school sector by province in 2019.

Exhibit 3: Learners, educators and school sector in provinces (2019)

Province	Public			Independent		
	Learners	Educators	Schools	Learners	Educators	Schools
Eastern Cape	1 770 289	60 462	5 205	73 525	3 811	225
Free State	697 334	22 978	1 085	18 746	1 049	71
Gauteng	2 151 095	70 344	2 071	296 282	17 384	742
KwaZulu-Natal	2 784 917	93 648	5 821	59 847	3 915	215
Limpopo	1 687 376	50 916	3 773	66 443	3 103	158
Mpumalanga	1 067 583	35 316	1 679	27 358	1 663	116
Northern Cape	293 315	10185	546	5 573	468	37
North West	829 336	26 564	1 451	23 253	1 448	85
Western Cape	1 127 510	36 588	1 445	61 416	5 015	273
South Africa	**12 408 755**	**407 001**	**23 076**	**632 443**	**37 856**	**1 922**

Source: Department of Basic Education

- There were totals of 13 041 198 learners in the schooling system, 444 857 educators and 24 998 schools.
- In percentage terms, the learners comprise the following in the provinces: Eastern Cape (14,1%), Free State (5,5%), Gauteng (18,8%), KwaZulu-Natal (21,8%), Limpopo (13,4%), Mpumalanga (8,4%), Northern Cape (2,3%), North West (6,5%), Western Cape (9,1%).
- The highest and lowest percentages of learners, educators and schools in the ordinary (public) school sector occurred in KwaZulu-Natal and the Northern Cape.
- Majority of independent schools were situated in Gauteng (742) followed by the Western Cape with 273 schools.

Learners in the school sector: The exhibit shows the number of learners in the ordinary school sector between 2017 and 2019.

Exhibit 4: Learners in the school sector (2019)
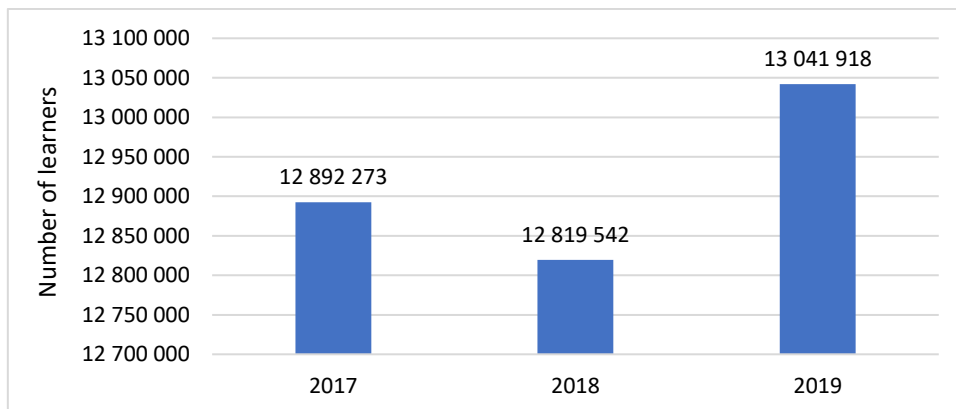
Source: Department of Basic Education

- From the figures it can be deduced that, from 2017 to 2019, the number of learners increased by 1,2% (149 645).

Distribution of learners by school phase: Percentage distribution of learners by school phase in 2019.

Exhibit 5: Distribution of learners by school phase
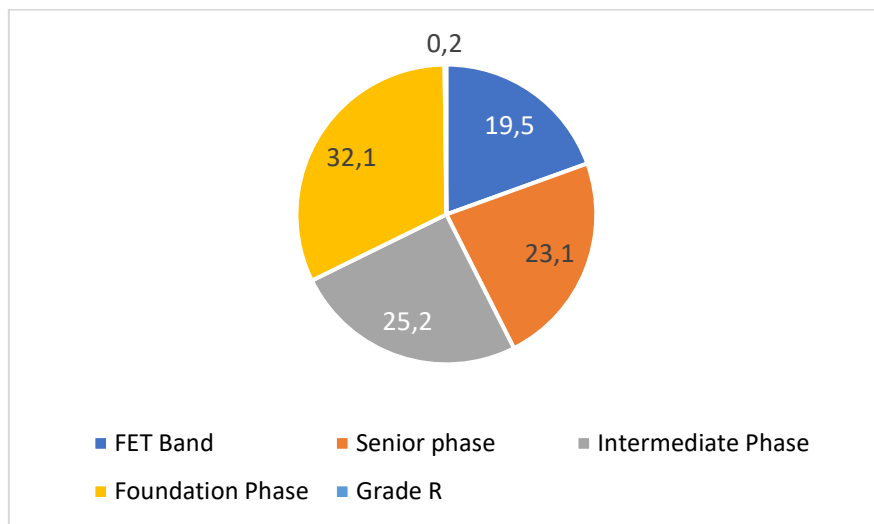
Source: Department of Basic Education

- The highest proportion of learners in ordinary schools nationally was located in the foundation phase (32,1%) followed by the intermediate phase and the senior phase with 25,2% and 23,1% respectively.
- Grade R constituted the smallest percentage (0,2%) of learners in the school phase.

Trends in International Mathematics and Science: The Trends in International Mathematics and Science Study (TIMSS) is an international assessment of fourth and eighth grade students' knowledge of mathematics and science in which countries participate globally. The TIMSS assessment serves as a medium for participating countries to assess their students' educational achievement in comparison with other nations globally. The assessment was first performed in 1995, and at four-year intervals thereafter, i.e. 1999, 2003, 2007, 2011, 2015 and 2019.

The scores achieved by the students are used to rank countries in terms of their Mathematics and Science performance. In the case of selected countries, instead of grades four and eight, grades five and nine learners are assessed.

The following benchmark categories used by TIMSS are as follows:

Low level	400 – 475 points
Intermediate level	475 – 550 points
High level	550 – 625 points
Advanced level	625+ points

Exhibit 6: TIMMS average scale scores & rankings (2015)

Mathematics		Science	
1. Singapore	621	1. Singapore	597
2. Rep. of Korea	606	2. Japan	571
3. Chinese Taipei	599	3. Chinese Taipei	569
4. Hong Kong SAR	594	4. Rep. of Korea	556
5. Japan	586	5. Slovenia	551
18. Australia	505	18. Norway (Grade 9)	509
19. Sweden	501	19. Israel	507
TIMSS Scale Centrepoint Score = 500			
20. Italy; Malta	494	20. Italy	499
21. New Zealand	493	21. Turkey	493
22. Malaysia	465	22. Malta	481
35. Botswana (Grade 9)	391	35. Saudi Arabia	396
36. Jordan	386	36. Morocco	393
37. Morocco	384	37. Botswana (Grade 9)	392
38. South Africa (Grade 9)	372	38. Egypt	371
39. Saudi Arabia	368	39. South Africa (Grade 9)	358

Source: Reddy et al. 2016; Mullis et al. 2019; Note: SAR = Special Administrative Region

Exhibit 7: TIMSS average scale scores & rankings (2019)

Mathematics		Science	
1. Singapore	616	1. Singapore	608
2. Chinese Taipei	612	2. Chinese Taipei	574
3. Rep. of Korea	607	3. Japan	570
4. Japan	594	4. Rep. of Korea	561
5. Hong Kong SAR	578	5. Russian Federation	543
18. Portugal	500	18. Italy	500
TIMSS Scale Centrepoint Score = 500			
19. Italy	497	19. New Zealand	499
20. Turkey	496	20. Norway (Grade 9)	495
21. Kazakhstan	488	21. France	489
22. France	483	22. Bahrain	486
35. Oman	411	35. Saudi Arabia	431
36. Kuwait	403	36. Morocco	394
37. Saudi Arabia	394	37. Egypt	389
38. South Africa (Grade 9)	389	38. Lebanon	377
39. Morocco	388	39. South Africa (Grade 9)	370

Source: Reddy et al. 2016; Mullis et al. 2019; Note: SAR = Special Administrative Region

- The tables provide a profile of the top 5, middle 5 and bottom 5 countries in terms of performance in the TIMSS assessments.
- In both 2015 & 2019, 39 countries participated in the TIMSS assessments for Mathematics and Science.
- In 2015, South Africa (SA) ranked 38th for Mathematics, with a score of 372.
- A score of 358 was achieved for Science in 2015, placing SA in the last (39th) rank.
- In 2019, SA yet again ranked 38th for Mathematics, with a score of 389.
- A score of 370 was achieved for Science in 2019, placing SA in the last (39th) rank yet again.
- Notably, there was no change in SA's ranking in both subject areas for both years. However, there were minor improvements in the Mathematics score of 17 points and in the Science score of 12 points between 2015 and 2019.
- Although SA's performance in the TIMSS assessments is poor in comparison with other countries, it should be noted that the nation is a developing one. Students in SA face a variety of challenges which are not experienced to the same degree, if at all, by other better-performing nations.
- Some of the challenges affecting SA's students are: (a) lack of access to resources such as textbooks, internet connections and computers; (b) lack of access to necessities such as running water and flushing toilets; (c) parents without secondary education; (d) lack of conducive learning space; and (e) some students do not speak the test language at home. (HSRC 2020)
- Other challenges include income deficiencies in the household, poverty, malnutrition, and lack of access to transport.

Exhibit 8: Grade 9 achievement in SA

Year	Mathematics	Science
	Average scale score	Average scale score
2003	285	268
2011	352	332
2015	372	358
2019	389	370

Source: HSRC 2020

- Although SA's rankings and scores in the TIMSS assessments are poor, the table shows the improvement in the scores since 2003 for Mathematics and Science.
- There has been an increase of 104 in the Mathematics score between 2003 and 2019, and an increase of 102 in Science.

National Senior Certificate pass rate: The exhibit illustrates the pass rate in the annual National Senior Certificate (NSC) examinations for grade 12 learners which is the final grade in the school system.

Exhibit 9: NSC pass rate (2017-2020)
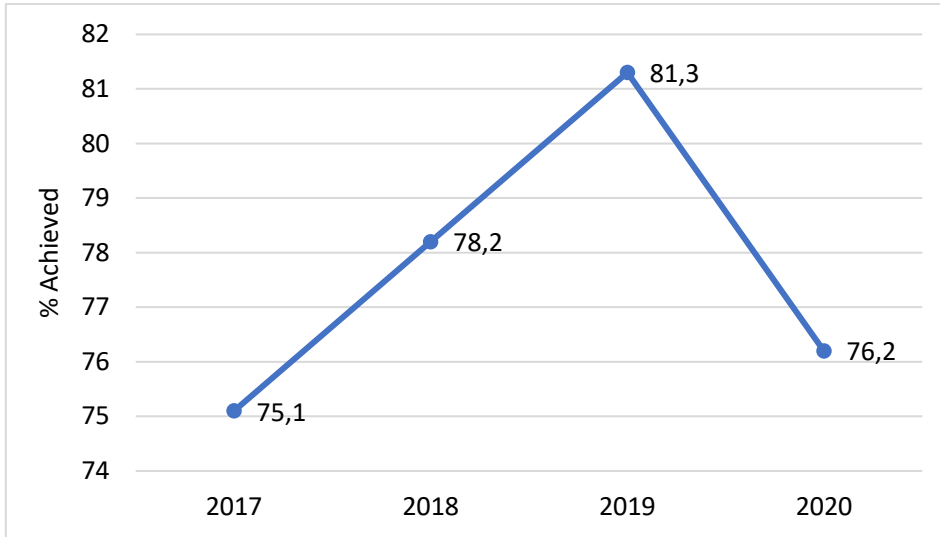
Source: Department of Basic Education

- There was a steady increase in the pass rates between 2017 and 2019 from 75,1% to 81,3%, respectively.
- Between 2019 and 2020, there was a steep drop to 76,2% in the number of matriculants. This is most likely owing to the COVID-19 pandemic which disrupted schooling as a result of the nationwide lockdown in SA. Learners were forced to continue their curricula remotely as schools were shut down during this period.

Exhibit 10: NSC candidates' performance in gateway subjects
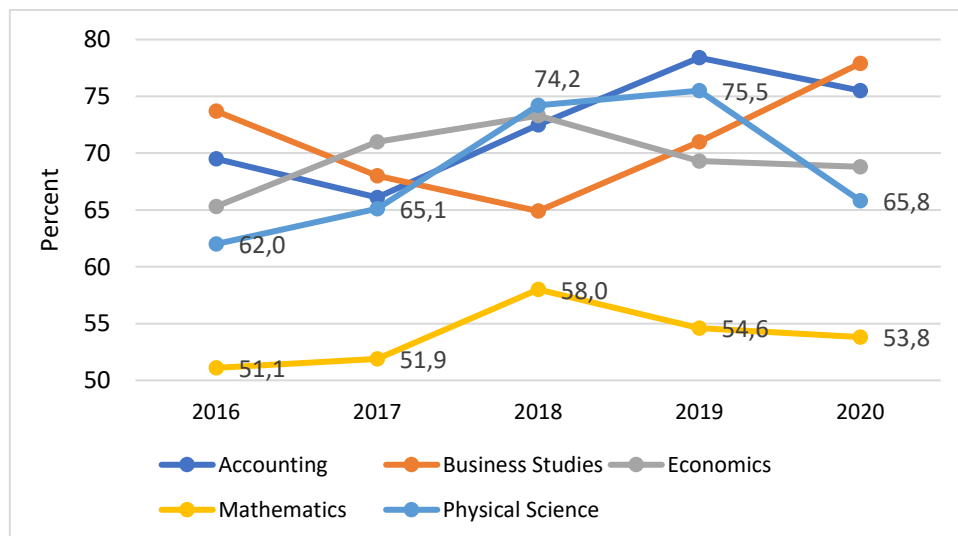
Source: Department of Basic Education

- The exhibit shows the performance of Grade 12 (matric) learners in their achievement of 30% or higher in selected critical or gateway subjects in the 2020 NSC examinations between 2016 and 2020.
- The subjects are described as 'critical' or 'gateway' subjects, as they form some of the major prerequisites for admission to several qualifications at higher education institutions (HEIs).
- Performance in Mathematics is far weaker than in other subjects, but shows a minor improvement from 2016 to 2020 of 2,7%.
- Performance in Business Studies showed the greatest improvement between 2016 and 2020, with an increase of 4,2% by 2020.
- Performance in Accounting was the greatest in 2019, with 78,4% of learners achieving 30% or higher, but declined to 75,5% in 2020.
- Performance in Economics was at its best in 2018 at 73,3%, but quickly declined to 68,8% by 2020.
- It is crucial for performance in Mathematics to improve drastically, as this gateway subject serves as a prerequisite to numerous qualifications at HEI level. The poor achievement in this subject area is a concern in terms of the quality of education that may be received post-secondary school, as well as in terms of the HEI admission options available to matriculants.
- Poor performance in the gateway subjects' limits matriculants in their choice of qualification admission at HEI level.

Exhibit 11: Bachelor achievement in NSC examinations
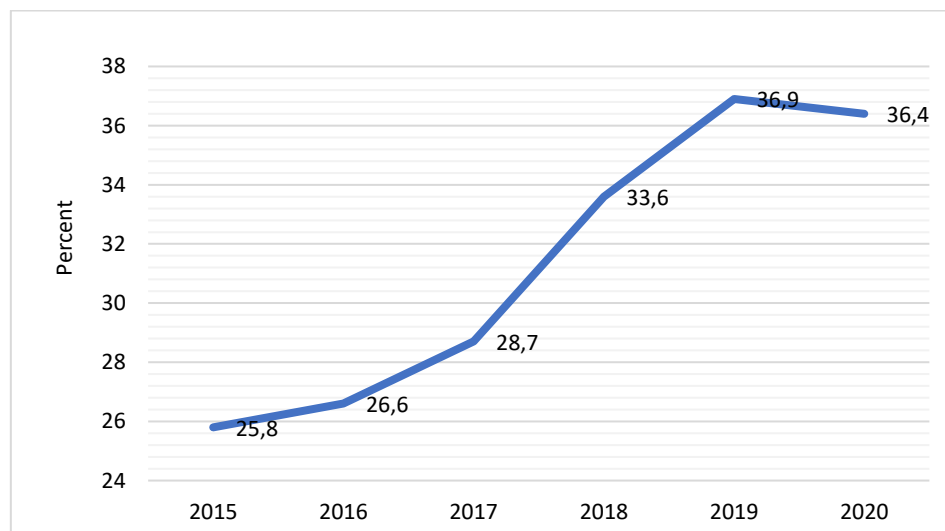
Source: Department of Basic Education

- Learners who achieve *Bachelor* passes in the NSC examination qualify for admission to Bachelor's level studies at a tertiary institution (Department of Basic Education 2020).

- The number of Bachelor passes obtained increased significantly between 2015 and 2019 by 11,1% from 25,8%, but declined slightly to 36,4% by 2020. The Bachelor achievement rate is not yet high enough and requires great improvement.
- The fewer Bachelor passes obtained during the NSC examinations, the fewer potential enrolments into higher-level qualifications and programmes at HEI level. One of the implications is that there will be low supply for Managerial and Professional level employment.

3.2 POST-SCHOOL EDUCATION AND TRAINING

The post-school system is understood as comprising all education and training provision for those who have completed school, those who did not complete their schooling, and those who never attended school.

It consists of the following institutions, which fall under the purview of the DHET:

- 23 public universities (with two more being established in 2014).
- 50 public technical and vocational education and training (TVET) colleges (formerly known as further education and training [FET] colleges).
- Private post-school institutions and private higher education institutions.
- SETAs and the National Skills Fund (NSF).
- Regulatory bodies responsible for qualifications and quality assurance systems.
- Institutions are operated by provincial governments and municipalities to train their own personnel.

National Qualifications Framework (NQF): South Africa has an NQF consisting of 10 levels:

NQF Sub-Framework/ Quality Council	NQF Level	NQF Sub-Framework and Qualification Type		NQF Sub-Framework/ Quality Council
Higher Education Qualifications Sub-Framework (HEQSF)/ Council on Higher Education (CHE)	10	Doctoral Degree Doctoral Degree (Professional)		Occupational Qualifications Sub-Framework (OQSF)/ Quality Council for Trades and Occupations (QCTO)
	9	Master's Degree Master's Degree (Professional)		
	8	Bachelor Honors Degree Post Graduate Diploma Bachelor's Degree	Specialised Occupational Diploma	
	7	Bachelor's Degree Advanced Diploma	Advanced Occupational Diploma	
	6	Diploma Advanced Certificate	Occupational Diploma Advanced Occupational Certificate	
	5	Higher Certificate	Higher Occupational Certificate	
General and Further Education and Training Qualifications Sub-Framework (GFETQSF)/ Umalusi	4	National Certificate*	National Occupational Certificate	
	3	Intermediate Certificate	Intermediate Occupational Certificate	
	2	Elementary Certificate	Elementary Occupational Certificate	
	1	General Certificate*	General Occupational Certificate	

- The QCTOSF is responsible for occupational qualifications (shaded in grey) that stack up from NQF level 1 to 10.
- The GFETQSF is responsible for general and further education and training qualifications that straddle from NQF level 1 to 4.
- The HEQCSF covers higher education qualifications from NQF level 5 to 10.

National Certificate (Vocational) and NATED enrolments: The exhibit shows NC(V) and NATED enrolments by programmes.

Exhibit 12: Public TVET sector enrolments (2010-2018)
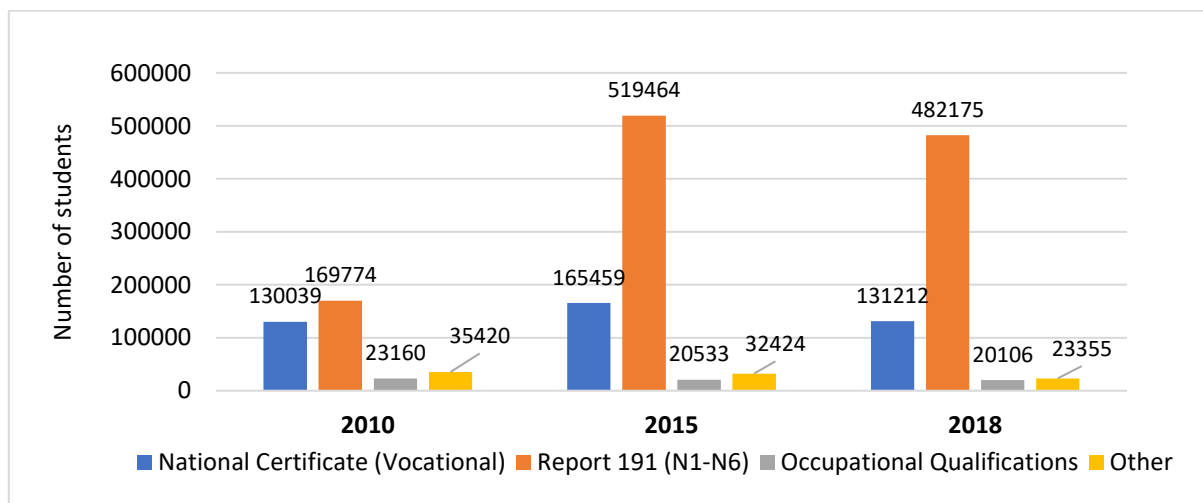
Source: Statistics on Post-School Education and Training in South Africa: 2018

- Total enrolment in TVET colleges reached 657 133 in 2018 (including 285 Pre-Vocational Learning Programme enrolments), reflecting a 12,3% (80 747) decline when compared with 2017.
- Major decreases were recorded for NC(V) from 165 459 in 2015 to 131 212 in 2018. This is a decrease of 34 249 or 26,1%.
- Interestingly, there was a sharp increase in the National Technical Education (NATED) Report 191 between 2010 and 2015 with a slight decline in 2018.
- The NC(V), which is a new qualification, has not gained growth momentum between 2010 and 2018.
- These disparities in enrolment between the NATED Report 191 and NC(V) appear to be attributed to a lack of confidence of employers in the latter qualification.
- Occupational qualifications are relatively new and have yet to increase enrolments.
- A decrease of 427 was recorded for Occupational Qualifications between 2015 and 2018.

National Certificate (Vocational) and NATED: The NC(V) and NATED completion rates are indicative of the performance of the public TVET sector.

Exhibit 13: Public TVET completion rates (2011-2018)

Year	NC(V) Level 4	Report 190/1 N3	Report 190/1 N6
2011	42,8	47,0	61,3
2012	39,3	37,5	33,2
2013	37,1	39,8	35,7
2014	34,5	47,9	42,3
2015	40,0	58,7	59,4
2016	41,7	65,8	66,1
2017	42,9	76,8	96,1
2018	53,9	83,2	87,1

Source: Statistics on PSET, 2018

- The NC(V) completion rates hover between 34,5% and 53,9%, which is regarded as low.
- The Report 190/1 N3 completion rates are between 37,5% and 83,2%, while Report 190/1 N6 is between 33,2% and 96,1%.
- Generally, completion rates are poor to modest, except for Report 190/1 N3 and N6 in 2017 and 2018.

Higher education institution (HEIs) enrolments: The enrolment at HEIs between 2010 and 2018 is given.

Exhibit 14: HEIs enrolments (2010-2018)
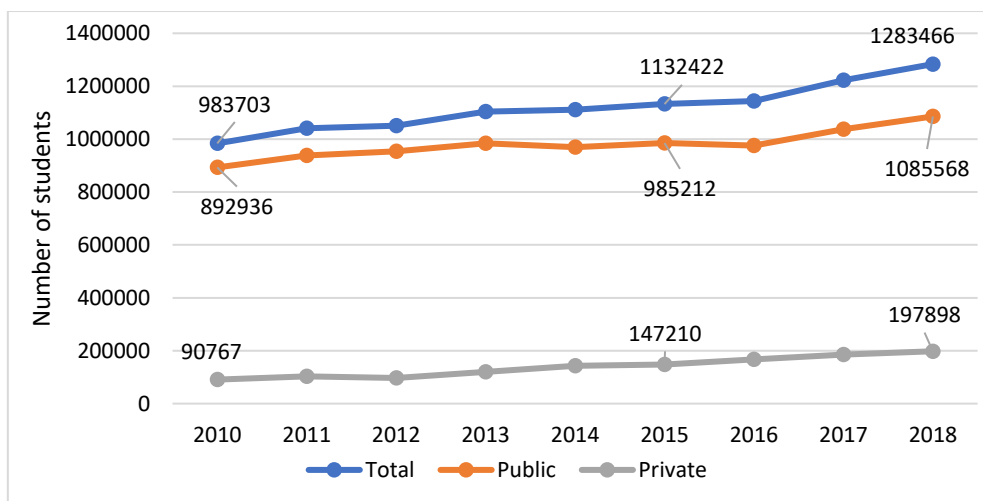
Source: Statistics on PSET, 2018

- Total student enrolment in HEIs grew by 23,4% between 2010 and 2018.
- Public HEI enrolments increased by 17,7%, while private HEI enrolment grew by 54,1%.
- The lack of place in public HEIs and student unrest have contributed to the rapid growth of private HEIs between 2010 and 2018.
- Public HEIs make up 84,6% of the sector, while private HEIs comprise 15,4%.

Enrolments by major field of study: The number of enrolments by major field of study is given.

Exhibit 15: Number of students enrolled in public HEIS by major field of study (2010-2018)

	Science, Engineering and Technology	Business & Management	Education	Other Humanities
2010	251 334	278 843	145 413	217 336
2015	294 935	273 828	170 550	245 899
2018	320 671	283 194	214 151	267 553

Source: Statistics on PSET, 2018

- There was an increase in the Science, Engineering and Technology (STEM) enrolments by 69 337 (26,1%) between 2010 and 2018.
- Business and management increased by 4 351 (1,5%).
- Education increased by 68 738 (32%).
- Other humanities increased by 50 217 (18,8%).

Graduates by major field of study: The number of graduates by major field of study is given.

Exhibit 16: Number of students enrolled in public HEIS by major field of study (2010-2018)

	Science, Engineering and Technology	Business & Management	Education	Other Humanities
2010	42 760	41 657	37 892	31 016
2015	58 090	53 863	36 654	42 917
2018	65 211	60 458	50 651	50 868

Source: Statistics on PSET, 2018

- There was an increase in the STEM graduates by 22 451 (34,4%) between 2010 and 2018.
- Business and management increased by 18 801 (31%).
- Education increased by 12 759 (25,2%).
- Other humanities increased by 19 852 (39%).

Graduate rates: The graduate rates for university qualifications in 2018 are given.

Exhibit 17: Graduate rates (2018)
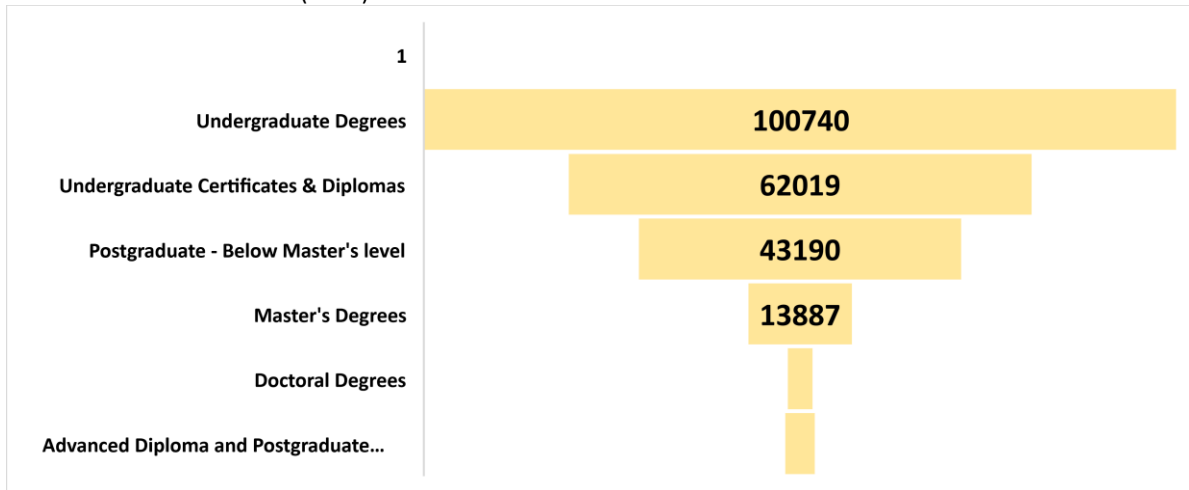
Source: Statistics on PSET, 2018

- Approximately 100 740 students graduated with undergraduate degrees in 2018.
- The figure for doctoral degrees is 3 344 and advanced diploma and postgraduate certificates are 4008.

SECTION 4: LABOUR MARKET PROFILE

4.1 EMPLOYMENT

Total employment: The exhibit tracks employment in South Africa from 2009-2020.

Exhibit 18: Employment (2009-2020)
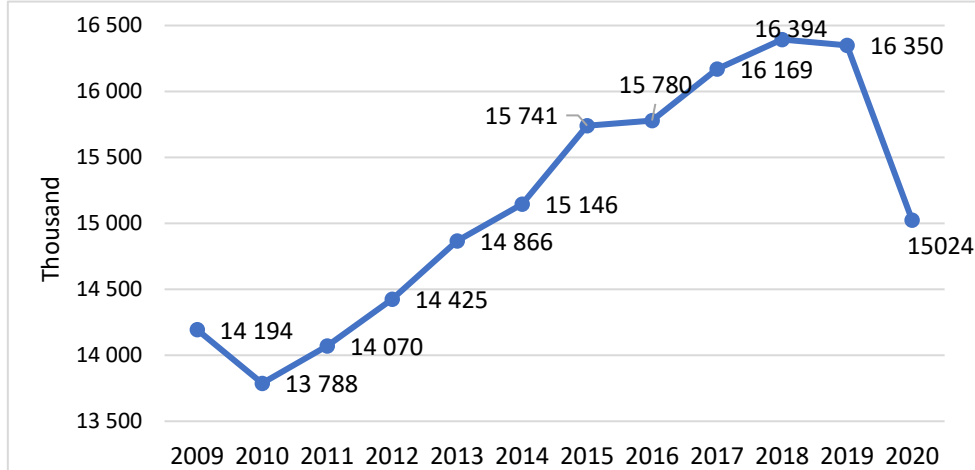
Source: Stats SA 2009; 2020a; 2020c

- Employment was low in 2009 (14,194 million) and 2010 (13,788 million) which is due to the fall-out of the global recession in 2008-2009.
- There was a steady increase in employment between 2010 (13,788 million) and 2018 (16,394 million). The number then declined slightly from 16 394 000 in 2018 to 16 350 000 in 2019.
- A drastic decline was experienced in 2020, when employment plummeted to 15 024 000 employed persons due to the COVID-19 pandemic and its adverse effects on the economy. Employment declined by 1,326 million between 2019 and 2020.

Employment by gender: The exhibit depicts employment by gender between 2010 and 2020.

Exhibit 19: Employment by gender (2010-2020)
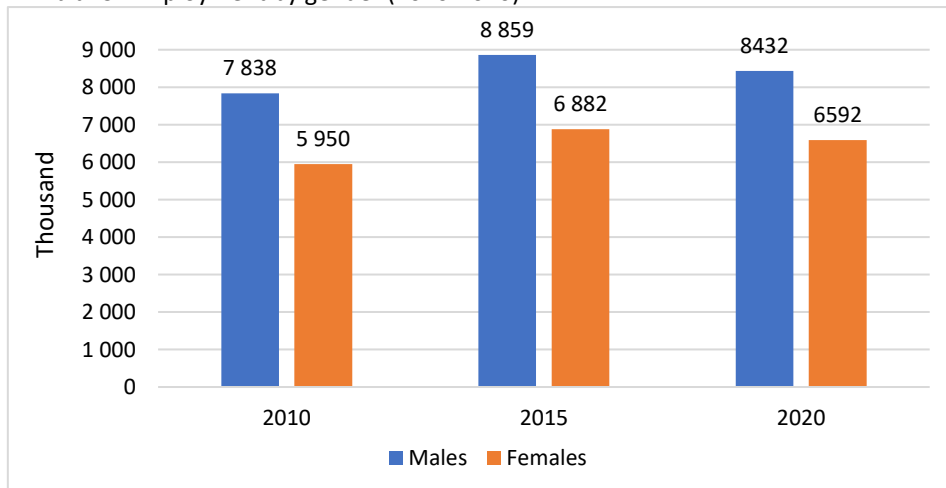
Source: Stats SA 2010; 2020a; 2020c

- The number of employed males (8,859 million) and females (6,882 million) in 2015 both increased from 2010, before decreasing in 2020 to 8 432 000 and 6 592 000 by 2020.
- Employment for males declined by 427 000 compared to females which declined by 290 000.

Employment by population group: The exhibit shows employment by population group between 2010 and 2020.

Exhibit 20: Employment by population group (2010-2020)
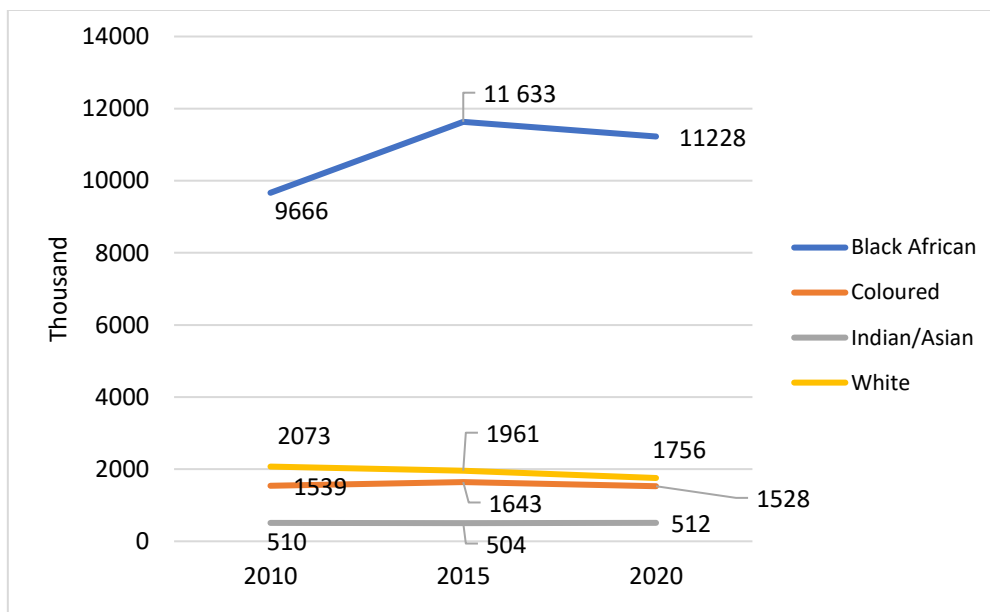
Source: Stats SA 2010; 2020a; 2020c

- There is a high number of black Africans in employment as this group is the majority in the population.
- The number of employed persons increased amongst black Africans and Coloureds between 2010 and 2015 by 1 967 000 and 104 000.
- However, the Indian/Asian and White groups suffered a marginal decrease of 6 000 and 112 000 respectively between 2010 and 2015.
- By 2020 employment losses were suffered in all of the population groups, except with respect to the Indian/Asian group which experienced growth of 8 000 jobs. The largest loss in employment occurred in the black African group (405 000), followed by the White group (205 000) and lastly the Coloured group (115 000).

Employment by educational attainment: The exhibit shows employment by educational attainment between 2010 and 2020.

Exhibit 21: Employment by educational attainment (2020)
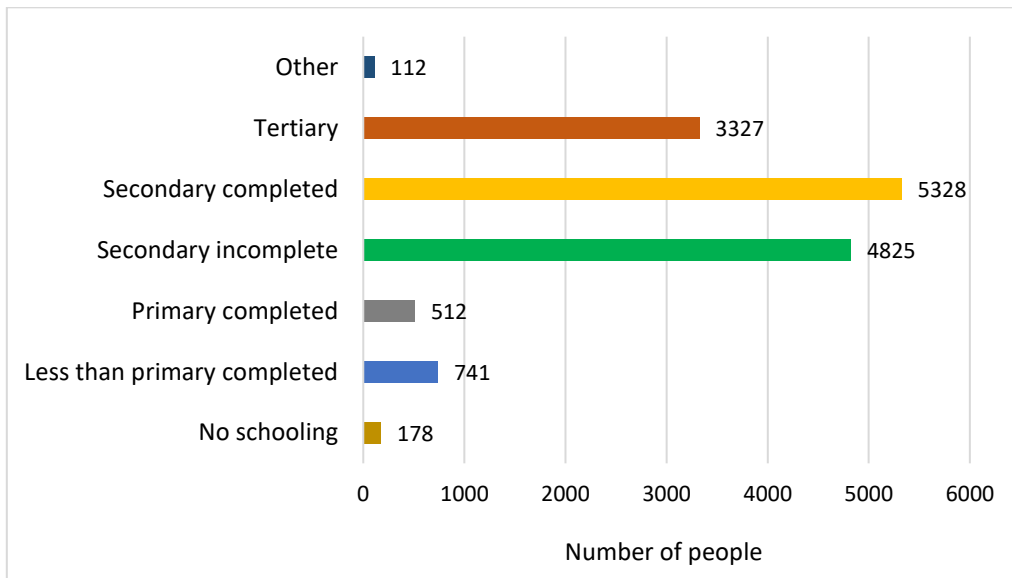
Source: Stats SA 2020c

- Most South Africans have either completed secondary schooling (5,328 000) or exited secondary schooling (4,825 000) without Matric.
- There are about 3,327 000 people with tertiary qualifications.
- The numbers of people with no schooling, primary completed and primary incomplete are low relative to those who have entered and completed secondary schooling and tertiary education, thus indicating a high take-up of formal schooling.

Occupational employment profile: The occupational profile of the labour force is given.

Exhibit 22: Occupational employment profile (2010-2020)
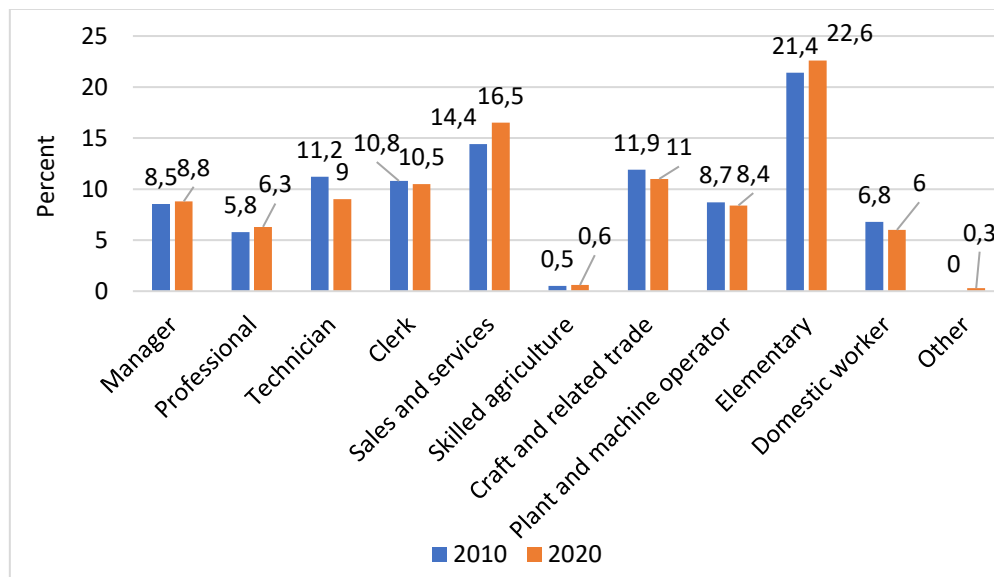
Source: Stats SA 2020c

- Between 2010 and 2020 the profile of the labour force per occupation has not shown any significant change. It implies that the labour force has not upgraded to higher segments or high value-added occupational categories. For example, the share of managers in the labour force increased by 0,3%, professionals 0,5% and technicians decreased by 2,2% over a decade.
- It also signals that the economy is not upgrading to higher value-added industries, where higher skills intensities are required.
- It is indicative of poor performance of the economy.

Change in employment distribution by occupation: The exhibit shows change in employment distribution by occupation between 2010 and 2020.

Exhibit 23: Change in employment distribution by occupation (2010-2020)
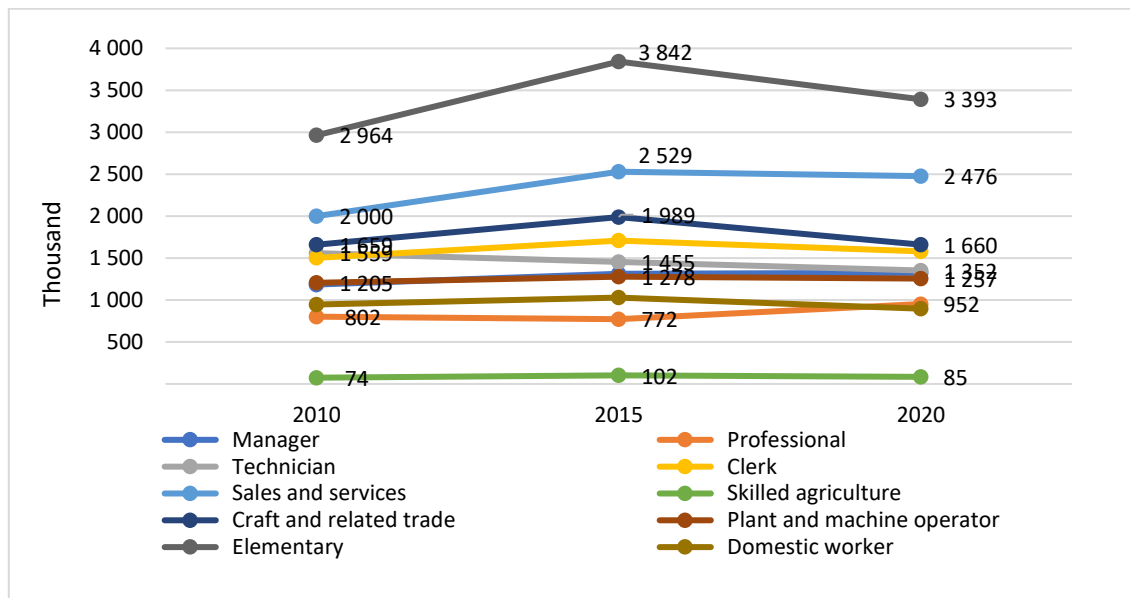
Source: Stats SA 2020c

- While there was a general increase between 2010 and 2015 in the number of persons employed across the occupational groups, there was a decrease of 31 000 in professionals. Professionals from 802 000 in 2010 to 772 000 in 2015.
- There is also a decrease of 104 000 in the number of technicians employed from 1,559 000 to 1, 455 000 between 2010 and 2015.
- The Craft and related trade and Elementary categories experienced the greatest depreciations with staggering losses of 329 000 and 449 000 respectively, between 2015 and 2020.
- Between 2015 and 2020 there was a decrease in the number of persons employed across the occupational groups, except in the categories of Manager and Professional. These groups experienced growth, with an increase of 10 000 in Managers from 1,314 000 and a significant increase of 181 000 in professionals from 772 000 in 2015.
- The increase in the number of managers and professionals employed signals a demand for more highly-qualified people in the labour force. This could also possibly be due to

the lockdown working conditions as a result of the COVID-19 pandemic and the need for more people in authoritative positions to delegate duties during remote working conditions.

Exhibit 24: Percentage change in employment by occupation (2008-2020)

Occupation	2008	2020	Change	%
Manager	1 166	1 324	+158	+11,9
Professional	807	952	+145	+15,2
Technician	1 615	1 352	-263	-19,5
Clerk	1 523	1 579	+56	+3,5
Sales and services	1 828	2 476	+648	+26,2
Skilled agriculture	115	85	-30	-35
Craft and related trade	2 034	1 660	-374	-22,5
Plant and machine operator	1 313	1 257	-56	-4,5
Elementary	3 269	3 393	+124	+3,6
Domestic worker	1 097	897	-200	-22,3

Source: Stats SA 2008; 2020c

- There was a significant decrease in the Domestic worker (-22,3%), Craft and related trade (-22,5%); Skilled Agriculture (-35%); Technician (-19,5%); and Plant and machine operator (-4,5%) categories, while Elementary (+3,6%) and Clerks (+3,5%) showed small increases in employment.
- There was strong employment growth in Manager (+11,9%), Professional (15,2%) and Sales and services (26,2%).
- The change in employment is indicative of skills-biased technological change (SBTC) with losses in unskilled and semi-skilled occupations and growth in middle to high skilled occupations.
- With increasing automation, technicians are at risk of replacement by machines.
- Job losses in Elementary, Craft and related trade, Plant and machine operator and Technician categories can also be assigned to a shrinking manufacturing sector and deindustrialisation of the economy, which has been a trend since the early 1990s with the lowering of World Trade Organisation (WTO) tariff barriers for imports and exports.

Change in employment by industry: The exhibit below indicates the change in employment by industry. It is evident that changes in employment volumes from 2008, 2014 and 2020 appear static or marginally improved for private households, trade, utilities and agriculture. Employment growth is lacking. There is a considerable decrease in manufacturing employment from 2, 111 000 to 1, 706 000 which is a manifestation of de-industrialisation. There was growth in transport, finance and mining.

Exhibit 25: Change in employment by industry (2008-2020)
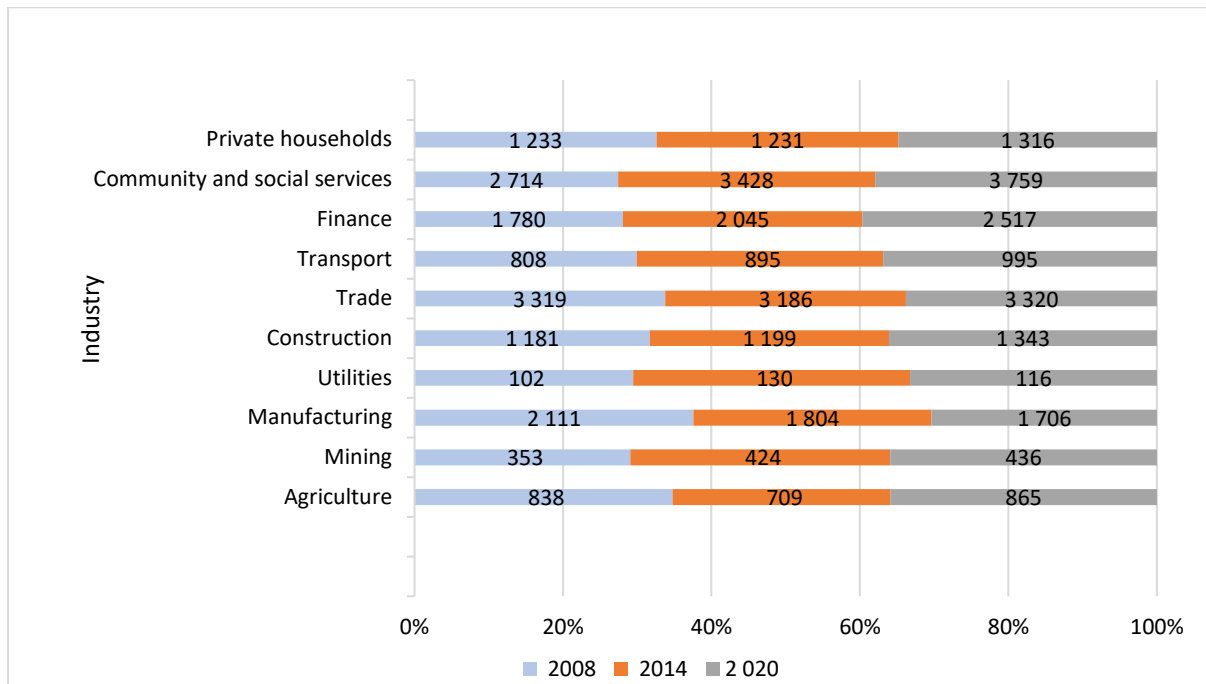
Source: Stats SA 2008; 2014; Stats SA 2020 (Q1)

Change by occupational skills: Changes in the share of employment for low, semi and skilled are negligible. It is indicative of poor economic growth and a lack of economic upgrading.

Exhibit 26: Employment in skilled, semi and low-skilled occupation (2014-2019)
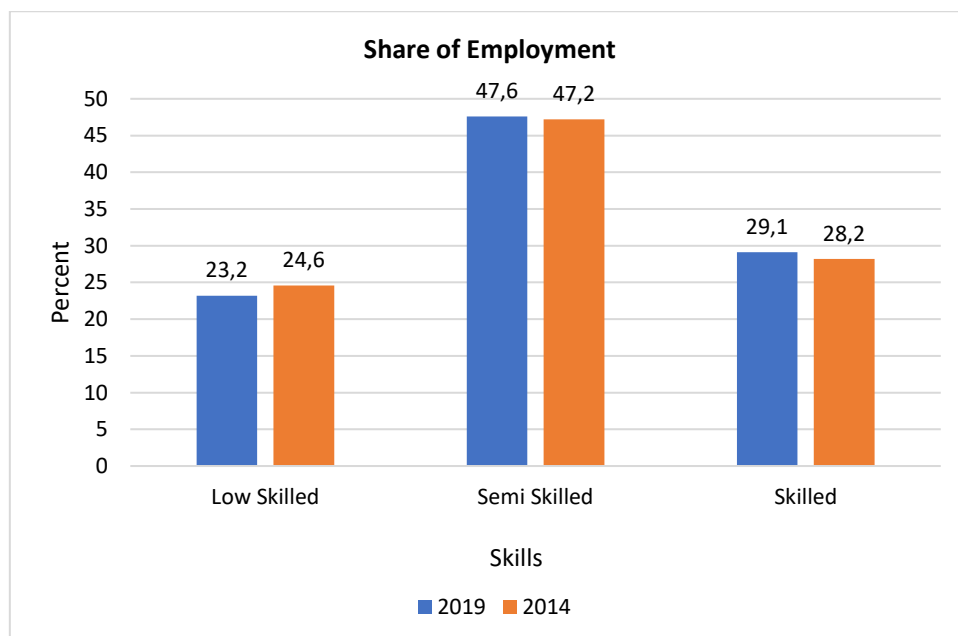
Source: Stats SA 2008; 2014

Absorption rate: Exhibits 10, 11, 12 and 13 provide information of the labour market absorption rate by age, gender and educational attainment.

Exhibit 27: Percentage absorption rate by age (2010-2020)
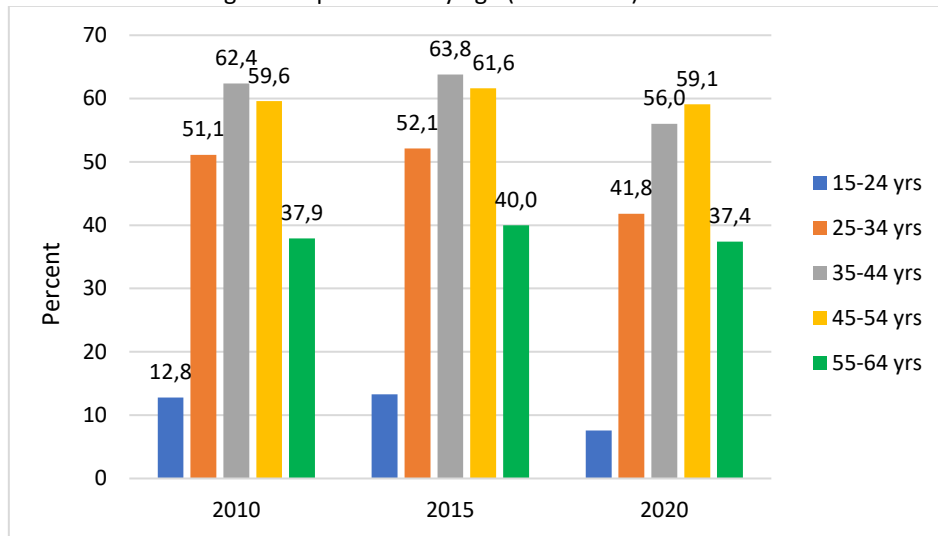
Source: Stats SA 2010; 2015; Stats SA 2020a; Stats SA 2020c

- Between 2010 and 2015 there was only a slight increase in the rate of absorption of individuals into the labour force in each of the age groups ranging from 0,5 to 2,1%.
- By 2020, there were decreases in the absorption rates across all the age groups, ranging from 2,5 to 10,3%; the greatest decrease being in the 25-34 years group.
- Absorption rates are relatively higher for people in the 35 to 54 years categories than in the 15 to 34 years.
- It is evident of the vulnerability of youth in the labour force and the high youth unemployment numbers.

Absorption rate by gender: The exhibit shows absorption rate by gender.

Exhibit 28: Percentage absorption rate by gender (2010-2020)
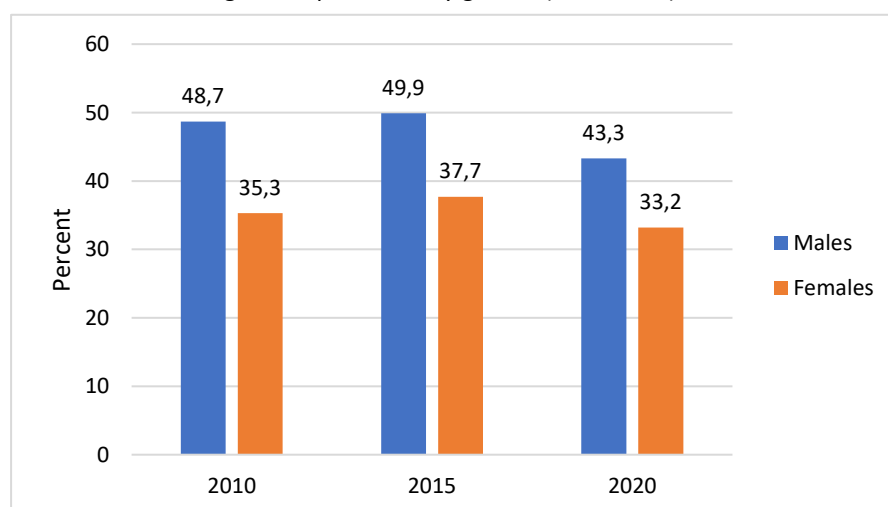
Source: Stats SA 2010; Stats SA 2020a; Stats SA 2020c

- The rate of absorption into the labour force increased for both males and females by 1,2% and 2,4% respectively from 2010 to 2015.
- Between 2015 and 2020, the rate of absorption decreased for both males and females by 6,6% and 4,5% respectively.
- For the intervals 2010, 2015 and 2020 the absorption rates for males were 48,7, 49,9 and 43,3% respectively; while for females the absorption rates were 35,3, 37,7 and 33,2% respectively.
- These figures are indicative of a gender gap in the labour market.

Absorption rate by population group: The exhibit shows absorption rate by population.

Exhibit 29: Percentage absorption rate by population group (2020-2018)
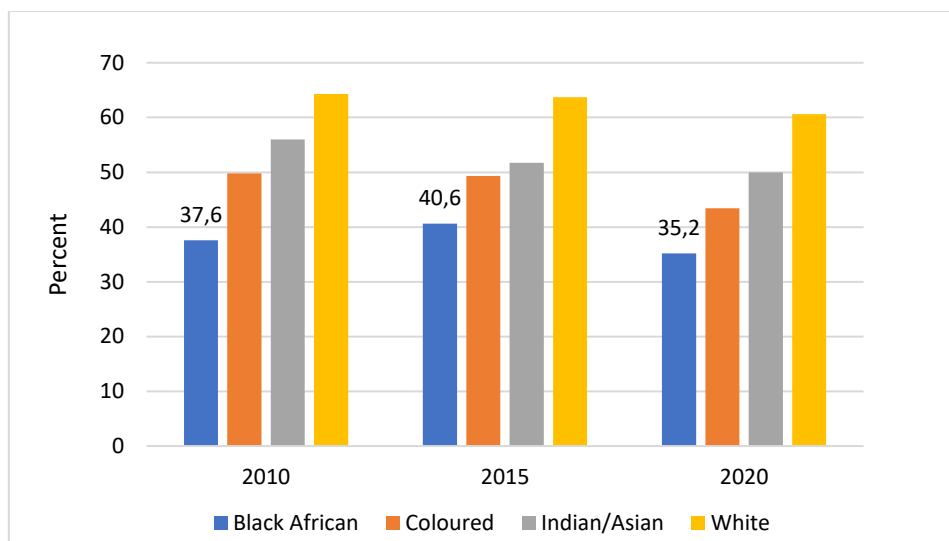
Source: Stats SA 2015; Stats SA 2020a; Stats SA 2020c

- At each of the intervals (2010, 2015 and 2020), the absorption rate of Whites was the highest, followed by Indians/Asians, then Coloureds and black Africans.
- There was a decrease in the rate of people employed in all population groups by 2015, except that of black Africans, which experienced a 3,0% growth.
- In 2020, there was a decline in the rate across all population groups ranging from 1,7% to 5,9%; the greatest decline was seen with Coloureds.

Absorption rate by educational attainment: The exhibit shows absorption rate by population.

Exhibit 30: Percentage absorption rate by educational attainment (2010-2020)
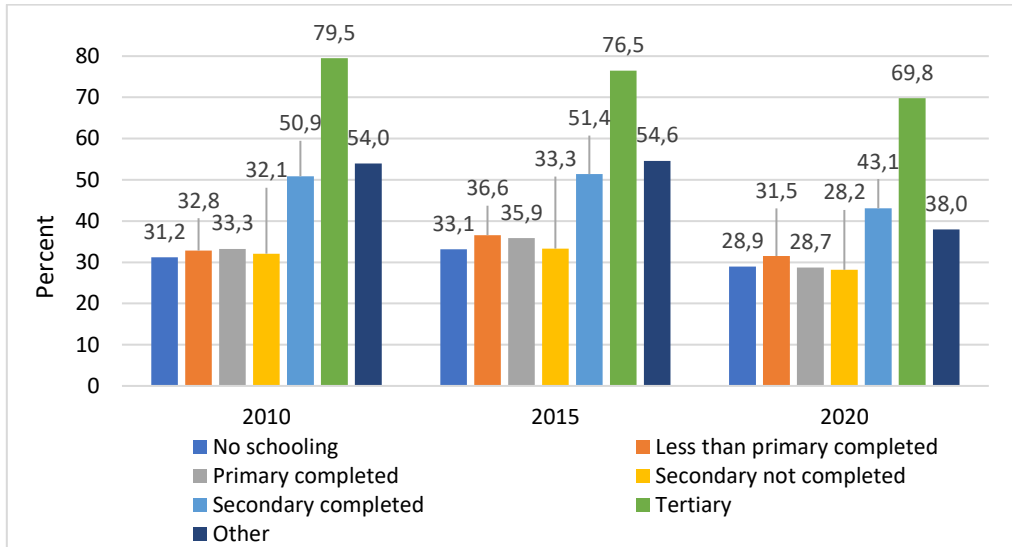
Source: Stats SA 2015; Stats SA 2020a; Stats SA 2020c; own calculations

- Between 2010 and 2015, there were increases in the absorption rates across all the educational attainment groups, except in the tertiary group which experienced a 3,0% decline.
- By 2020, there was a decline experienced in each of the groups, ranging from 4,2% in the no schooling group to 16,6% decline in the 'other' category.

Occupational projections: Occupations are projected at 1%, 3% and 5% growth up to 2025. The extent of growth will depend on the performance of the economy.

Exhibit 31: Occupational projections to 2025 (2015-2020)

Occupation	2010	2015	2020	2025 forecast		
				1%	3%	5%
Manager	1 184	1 314	1 324	1 338	1 364	1 391
Professional	802	772	952	962	981	1 000
Technician	1 559	1 455	1 352	1 366	1 393	1 420
Clerk	1 502	1 708	1 579	1 594	1 626	1 658
Sales and services	2 000	2 529	2 476	2 501	2 550	2 600
Skilled agriculture	74	102	85	86	88	89
Craft and related trade	1 659	1 989	1 660	1 677	1 710	1 743
Plant and machine operator	1 205	1 278	1 257	1 270	1 295	1 320
Elementary	2 964	3 842	3 393	3 427	3 495	3 563
Domestic worker	947	1 029	897	906	923	941
Other			47	48	49	50

Source: Stats SA 2015; Stats SA 2020a; Stats SA 2020c; own calculations

▪ The occupational forecast is the following:

o Managers: at 1% growth 1,338 000, at 3% it will be 1,364 000, and at 5% it will be 1,391 000.
o Professionals: at 1% growth 962 000, at 3% it will be 981 000, and at 5% it will be 1,000 000.
o Technicians: at 1% growth 1,366 000, at 3% it will be 1,393 000, and at 5% it will be 1,420 000.
o Clerks: at 1% growth 1,594 000, at 3% it will be 1,626 000, and at 5% it will be 1,658 000.
o Sales and service workers: at 1% growth 2,501 000, at 3% it will be 2,550 000, and at 5% it will be 2,600 000.
o Skilled agricultural workers: at 1% growth 86 000, at 3% it will be 88 000, and at 5% it will be 89 000.
o Craft and related trade workers at 1% growth 1,677 000, at 3% it will be 1,710 000, and at 5% it will be 1 743 000.
o Plant and machine operators: at 1% growth 1,270 000, at 3% it will be 1,295 000, and at 5% it will be 1,320 000.
o Elementary workers: at 1% growth 3,427 000, at 3% it will be 3,495 000, and at 5% it will be 3 563 000.
o Domestic workers: at 1% growth 906 000, at 3% it will be 923 000, and at 5% it will be 941 000.

Exhibit 32: Occupational projections to 2025 at 1%, 3% and 5%
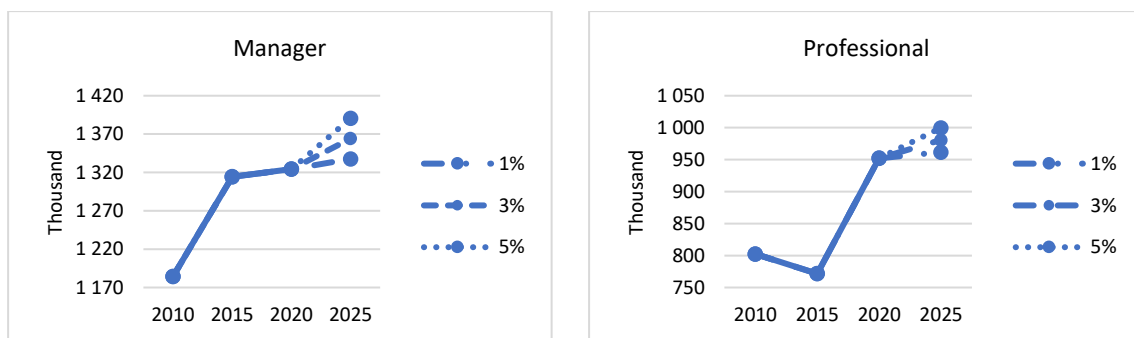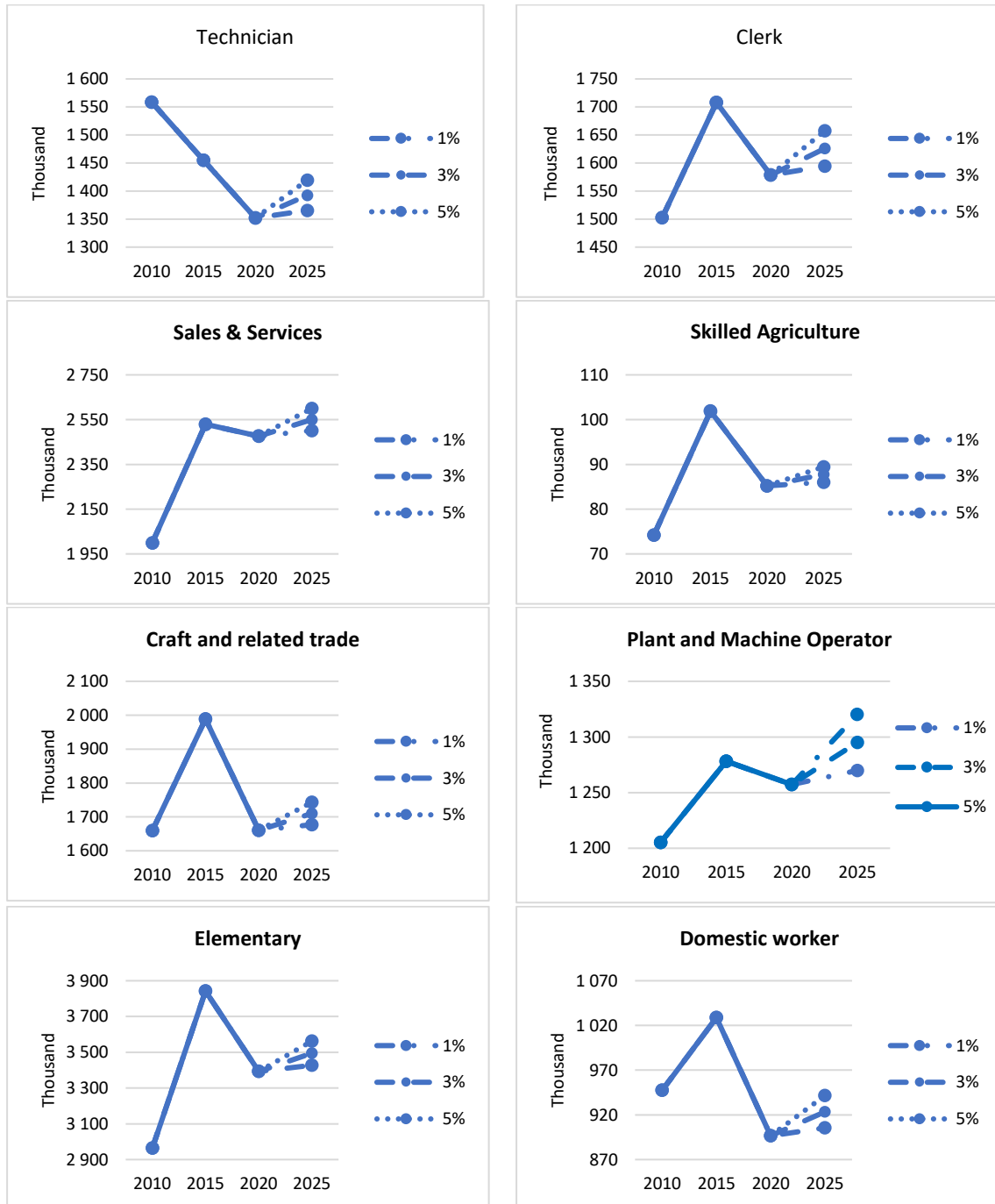
Source: Stats SA 2015; Stats SA 2020a; Stats SA 2020c; own calculations

4.2 UNEMPLOYMENT

Since 1990, South Africa has seen some level of economic growth, buoyed by macroeconomic reforms, an improved business environment, and commodity price hikes. But this growth has not translated into productive jobs. It is a major problem for a country with a booming youth population. In recent years, the labour market has been struggling to create jobs. Although the unemployment crisis predates COVID-19, the pandemic has exacerbated the unemployment problem.

The scale of economic and social destruction of the coronavirus is unprecedented. The COVID-19 pandemic is robustly reshaping the way we live, socialise and work. It is leading to business foreclosures, unemployment, hardships, and suffering. The most affected are the poorest of the poor, the marginalised and hard-to-reach communities. Women, who bear the burden of managing the household are slipping through the social safety net. The pandemic has exacerbated the youth unemployment problem and disrupted education and training for millions of workers and youth.

Moreover, the rapid evolution of robotics, 3-D printing (or additive manufacturing technology), artificial intelligence, and the "Internet-of-Things"—known as the Fourth Industrial Revolution (4IR)—are projected to fundamentally disrupt manufacturing technology, with significant implications for the future and nature of jobs. The downside of disruption could be significant job losses owing to workers being replaced by technology and machines, as well as changes to the nature and location of work. Countries need to ensure people have the skills they need to minimize these future impacts—and help drive transformation in the process. On the other hand, it could be argued that the 4IR offers new opportunities to create jobs through modernised agriculture and export-led manufacturing, as well as modernised services, tourism and the creative industries.

Exhibit 33: Percentage unemployment in South Africa (2008-2020)
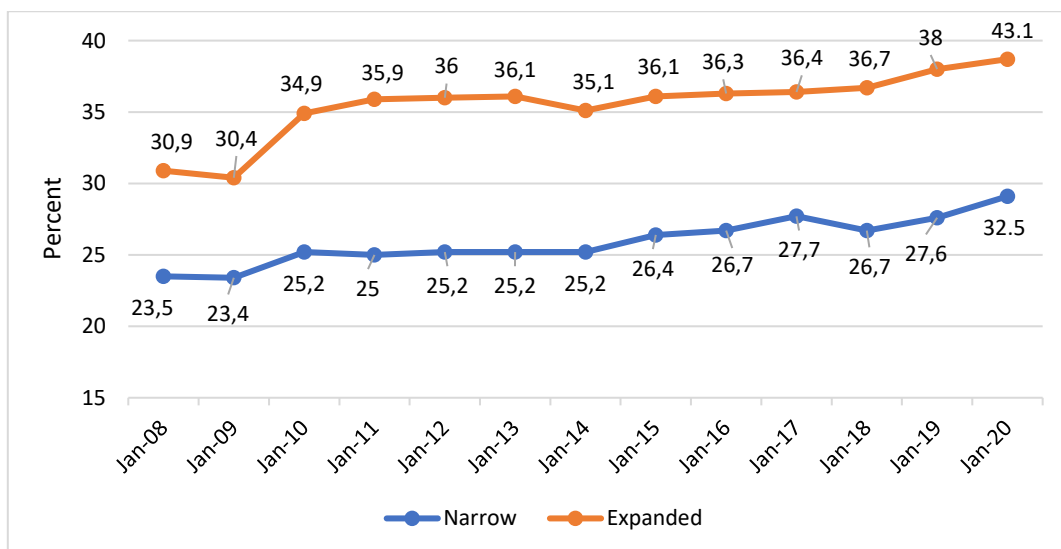
Source: Stats SA QLFS 2008-2020

- From 2008, unemployment in SA was on the rise. This has been accelerated by the COVID-19 pandemic.
- Before COVID-19, the official unemployment rate was 27,6% and expanded unemployment (includes discouraged work-seekers) 38%.[6] In the 4th quarter of 2020, official unemployment rose to 32,5% and expanded unemployment to 43,1%.[7]

---

[6] Statistics South Africa. Quarterly Labour Force Surveys Q4: 2019.
[7] Statistics South Africa. Quarterly Labour Force Surveys Q4: 2020.

- The working-age population increased by 143 000 or 0,4% in the 4th quarter of 2020, compared to the 3rd quarter of 2020. Compared to the 4th quarter of 2019, the working-age population increased by 583 000 or 1,5%.

- The number of employed persons increased by 333 000 to 15 million in the 4th quarter of 2020, and the number of unemployed persons also increased by 701 000 to 7,2 million compared to the 3rd quarter of 2020, resulting in an increase of 1 million (up by 4,9%) in the number of people in the labour force.

- The number of discouraged work-seekers increased by 234 000 (up by 8,7%), and the number of people who were not economically active for reasons other than discouragement decreased by 1,1 million between the two quarters, resulting in a net decrease of 890 000 in the not economically active population.[8]

- From the 7,2 million unemployed persons in the 4th quarter of 2020, as many as 52,3% had education levels below matric, followed by those with matric at 37,9%. Only 1,8% of unemployed persons were graduates, while 7,5% had other tertiary qualifications as their highest level of education.[9]

- Although South Africa is making progress towards achieving gender parity in education, health, economics and politics, much remains to be done. Women are more likely than men to lose their jobs in the downturn. They are also behind their male counterparts in obtaining employment during a recovery. The youth unemployment problem continues to manifest, despite considerable efforts to get youth into the labour market.

Unemployment by age: The exhibit shows unemployment by age.

Exhibit 34: Percentage unemployment by age (2015-2020)
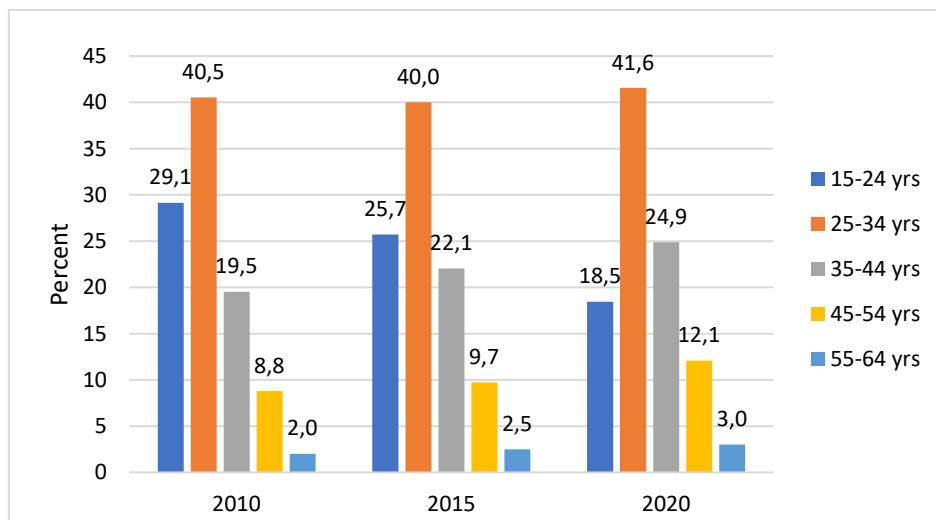
Source: Stats SA 2015; Stats SA 2020a; Stats SA 2020c; own calculations

- The percentage of unemployed persons decreased from 2010 to 2015 in the 15-24 years and 25-34 years age groups by 3,4 and 0,5% respectively. However, it increased in the remaining age groups ranging from 0,5 to 2,5%.

---

[8] Ibid.
[9] Ibid.

- By 2020 the percentage of unemployed persons increased across all the age groups ranging from 0,5 to 2,8%, except in the 15-24 years category which experienced a 7,3% decrease. This is largely due to the COVID-19 pandemic and the ensuing nationwide lockdown which resulted in a massive loss of jobs in SA.
- With the exception of 15 to 24 years, unemployment has increased for all other groups. It is consistent to weak economic growth.
- Since 2010, the issue of youth unemployment has worsened.

Unemployment rate by gender: The exhibit shows the unemployment rate by gender.

Exhibit 35: Percentage unemployment rate by gender (2015-2020)
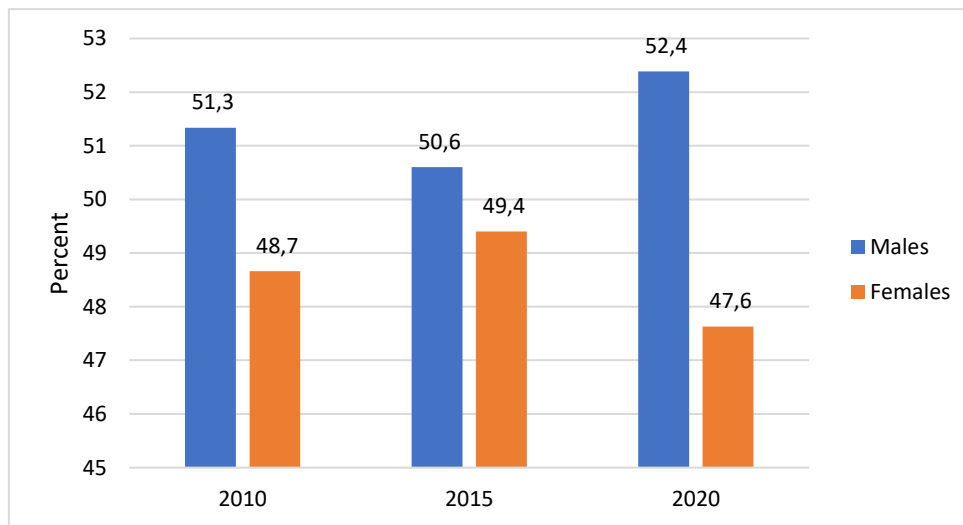
Source: Stats SA 2015; Stats SA 2020a; Stats SA 2020c; own calculations

- In the case of males, the unemployment rate decreased between 2010 and 2015 from 51,3 to 50,6%, before increasing to 52,4% by 2020.
- In the case of females, the unemployment rate increased between 2010 and 2015 from 48,7 to 49,4%, before decreasing to 47,6% by 2020.

Unemployment rate by population group: The exhibit shows the unemployment rate by population group.

Exhibit 36: Percentage unemployment rate by population group (2020-2020)

Group	2010	2015	2020	Change	%
Black African	3948	4634	6468	2520	39,0
Coloured	438	492	527	89	16,9
Indian/Asian	48	76	68	20	29,4
White	130	142	170	40	23,5

Source: Stats SA 2015; Stats SA 2020a; Stats SA 2020c; own calculations

- Between 2010 and 2020, unemployment increased for black Africans by 39%; Coloureds by 16,9%; Indianss/Asian by 29,4%; and Whites by 23,5%.

▪ These increases show that labour market performance for all population groups is high, especially for black Africans.

Unemployment rate by educational attainment: The exhibit shows the unemployment rate by educational attainment.

Exhibit 37: Percentage unemployment rate by educational attainment (2020)
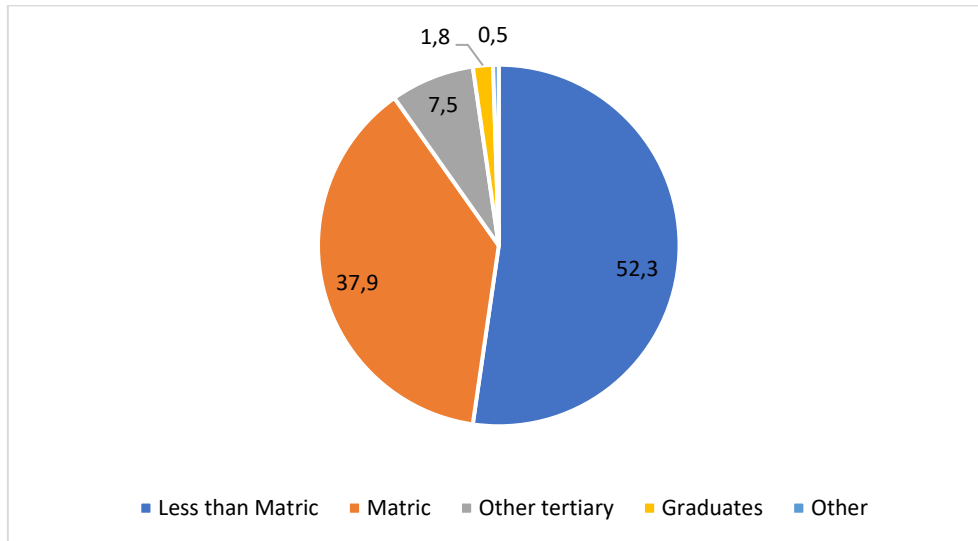
Source: Stats SA QLFS Q4 2020

▪ There were 7,2 million unemployed persons in the fourth quarter of 2020. As many as 52,3% had education levels below matric, followed by those with matric at 37,9%. Only 1,8% of unemployed persons were graduates, while 7,5% had tertiary qualifications as their highest level of education.

Unemployment rate by province: The exhibit shows the unemployment rate by province.

Exhibit 38: percentage unemployment rate by province (2020)
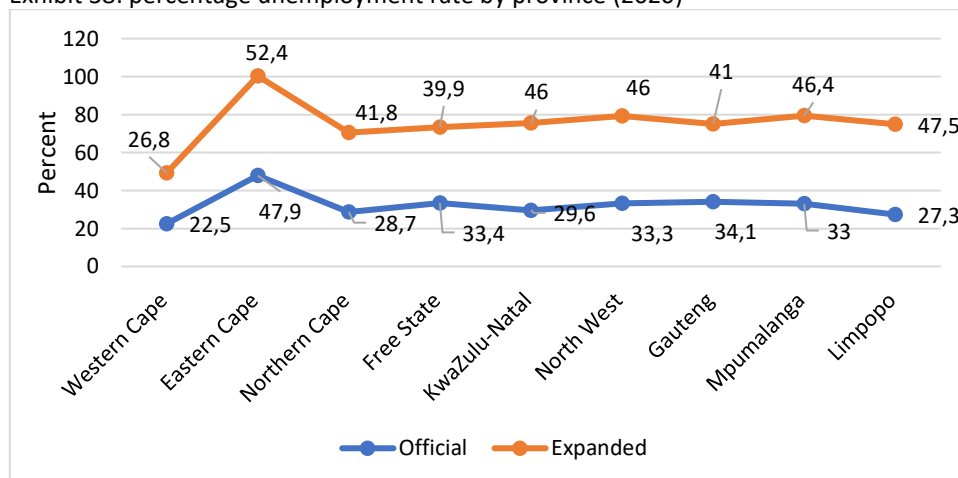
Source: Stats SA QLFS Q4 2020

- The official unemployment rate hovers between 22,5% (Western Cape) and 47,9% (Eastern Cape).
- The expanded unemployment rate is in excess of 39% in 8 out of the 9 provinces.
- Unemployment in terms of both definitions is high and demonstrates poor performance of the labour market.

4.3 NEET AND VULNERABLE GROUPS

Some young people have been discouraged with the labour market and they are also not building on their skills base through education and training – they are not in employment, education or training (NEET). The NEET rate serves as an important additional labour market indicator for young people.

Total NEETs: The exhibit shows the total number of NEET (15-24 years) between 2014 and 2019.

Exhibit 39: NEET rate for youth aged 15-24 years (2014-2019)
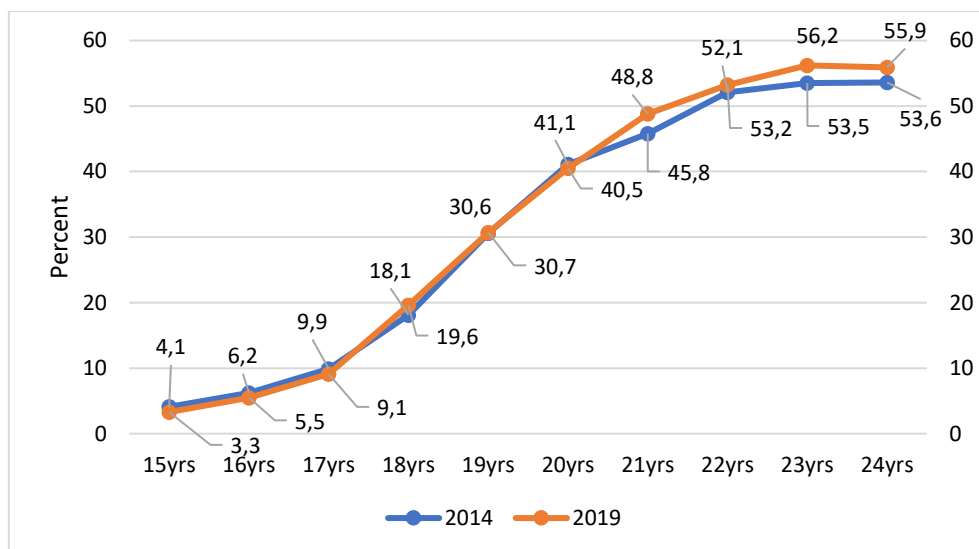
Source: Statistics SA QLFS 2013-2020; DHET 2018a

- The persistently high youth unemployment rate has long been one of the most pressing socio-economic problems in South Africa. Some of the young work-seekers are not well educated and do not possess sufficient skills and previous work experience demanded by employers in the labour market.
- The economy demands skilled and experienced work-seekers, which makes it difficult and lessens the chances for young people to find employment, which ultimately results in some losing hope of ever finding a job (thereby becoming discouraged work-seekers).
- Some of these young people have disengaged with the labour market and they are also not building on their skills base through education and training – they are not in employment, education or training (NEET).

- Youth unemployment needs urgent and coordinated responses to address it. Above all, a comprehensive strategy for youth employment, as part of a broader focus on expanding employment in South Africa, is necessary.

NEET by population group: The NEET (15-34 years) classified by population group is given.

Exhibit 40: Number of NEET by population group (2019)
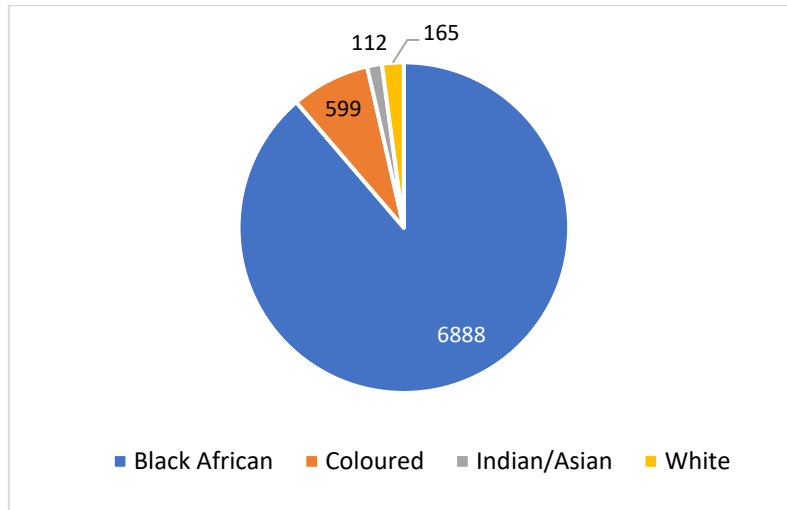
Source: Stats SA QLFS 2019

- There are significant differences in the NEET rate by population group.
- Black African youth constitute 88,7% (6,888 000) of the NEET population.
- The other three population groups collectively make up 11,3% (876 000) of NEETs.

NEET by educational attainment: The NEET (15-24 years) classified by educational attainment is given.

Exhibit 41: Number of NEET by educational attainment (2020)
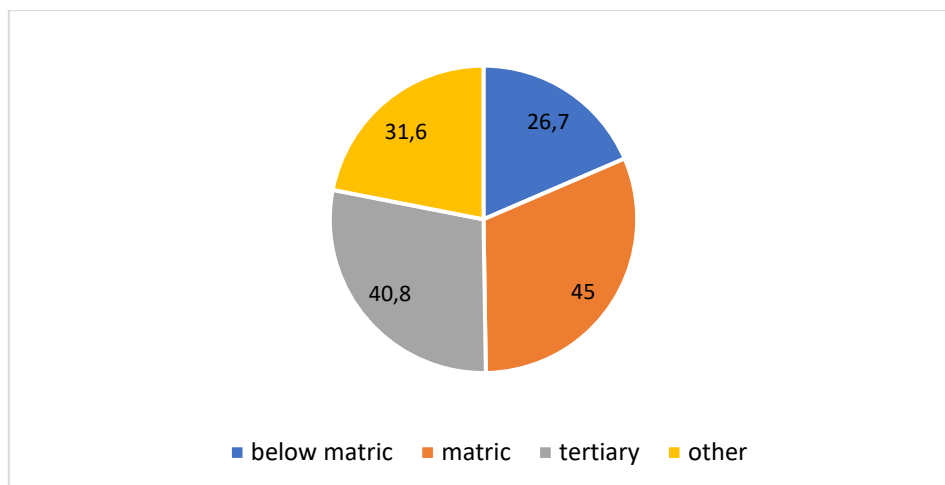
Source: Stats SA QLFS 2020

- Although a higher NEET rate is often associated with lower education levels, Exhibit 41 reflects an interesting picture for South Africa, as the NEET rate among youth with higher levels of education was higher than that of those with a lower level of education.
- The highest NEET rate was recorded among youth who possessed a matric qualification.

4.4 WAGES

Median monthly earnings by industry: The exhibit gives median monthly earnings by industry between 2010 and 2019.

Exhibit 42: Median monthly earnings by industry (2010-2019)

Industry	2010	2019	Change	%
Agriculture	1295	3033	1738	57,3
Mining	5000	9000	4000	44,4
Manufacturing	3250	4333	1083	25,0
Utilities	6000	9000	3000	33,3
Construction	2437	3683	1246	33,9
Trade	2505	3900	1395	35,8
Transport	3500	4333	833	19,2
Finance	3501	4500	999	22,2
Community & Social Services	6000	4500	1500	33,3
Private households	1000	2000	1000	50,0

Source: Stats SA 2015; Stats SA 2020a; Stats SA 2020c

- Agriculture showed the largest increase of 57,3% between 2010 and 2019, keeping in mind it is from a low base.
- Other large increases included mining, utilities, construction, trade, community and social services and private households.

4.5 PRODUCTIVITY

Contributions of main economic sectors to real output: The contributions of main economic sectors to real output between 2015 and 2019 is given.

Exhibit 43: Contributions of main economic sectors to real output (2015-2019)

Indicator	2015	2016	2017	2018	2019
Agriculture, forestry and fishing	2,6	2,3	2,7	2,6	2,4
Mining and quarrying	8,4	8,0	8,3	8,1	7,9
Primary sector	**11,0**	**10,3**	**11,0**	**10,7**	**10,3**
Manufacturing	13,7	13,7	13,5	13,5	13,4
Electricity, gas and water	2,4	2,3	2,3	2,3	2,3
Construction	3,9	3,9	3,8	3,8	3,6
Secondary sector	**20,0**	**20,0**	**19,6**	**19,6**	**19,3**
Wholesale, retail and accommodation	15,2	15,4	15,1	15,1	15,1
Transport, storage and communication	9,4	9,5	9,5	9,6	9,5
Finance, real estate and business services	21,7	22,0	22,2	22,4	22,9
Tertiary sector	**46,4**	**46,9**	**46,8**	**47,0**	**47,4**
Real output (Productivity SA)	77,3	77,2	77,4	77,3	77,0
General government services	16,8	16,8	16,6	16,7	17,0
Community and personal services	5,9	6,0	5,9	6,0	6,0
Other Sectors	22,7	22,8	22,6	22,7	23,0
Real output (Stats SA)	100,0	100,0	100,0	100,0	100,0

Source: Productivity SA 2020

- The share of the Primary and Secondary sectors to Real output decreased slightly in 2019, while the share of the Tertiary sector to Real output realised a moderate increase in the same period.
- The Tertiary sector remained the most important sector in terms of the contribution to Real output followed by the Secondary sector, while the Primary sector continued to be the least important contributor to Real output.
- The contribution of the Primary sector to Real output decreased to 10,3% in 2019 from 10,7% in 2018.
- The decrease in the contribution of the Primary sector to Real output in 2019 was due to both Agriculture, forestry and fishing which decreased to 2,4% in 2019 from 2,6% in 2018, as well as Mining and quarrying which decreased to 7,9% in 2019 from 8,1% in 2018.
- The contribution of the Secondary sector to Real output decreased to 19,3% in 2019 from 19,6% in 2018.
- The contribution of Manufacturing to the Real output of the Secondary sector decreased to 13,4% in 2019 from 13,5% in 2018, while the contribution of Construction decreased to 3,6% in 2019 from 3,8% in 2018.
- The contribution of Electricity, gas and water to the Real output of the Secondary sector remained unchanged at 2,3% in 2019 from 2,3% in 2018.
- The contribution of the Tertiary sector to Real output increased further to 47,4% in 2019 from 47,0% in 2018. The contribution of Wholesale, retail and accommodation to Real output remained unchanged at 15,1% in 2019 from 15,1% in 2018.
- The contribution to Real output of Transport, storage and communication decreased slightly to 9,5% in 2019 from 9,6% in 2018, while the contribution of Finance, real

estate and business services to Real output increased further to 22,9% in 2019 from 22,4% in 2018.

- The share of General government services to Real output increased further to 17,0% in 2019 from 16,7% in 2018, while that of Community and personal services remained unchanged at 6,0% in 2019 from 6,0% in 2018.

Growth of main economic sectors to real output: The contributions of main economic sectors to real output between 2015 and 2019 is given.

Exhibit 44: Contributions of main economic sectors to real output (2015-2019)

Indicator	2015	2016	2017	2018	2019
Agriculture, forestry and fishing	-5.9	-10.1	21.1	-4.8	-6.9
Mining and quarrying	3.3	-3.9	4.2	-1.7	-1.9
Primary sector	**1.0**	**-5.4**	**8.0**	**-2.5**	**-3.1**
Manufacturing	-0.4	0.8	-0.2	1.0	-0.8
Electricity, gas and water	-1.9	-2.1	0.6	0.9	-2.0
Construction	1.8	1.2	-0.6	-1.2	-3.3
Secondary sector	**-0.2**	**0.5**	**-0.2**	**0.5**	**-1.4**
Wholesale, retail and accommodation	2.1	1.7	-0.3	0.6	0.0
Transport, storage and communication	1.4	1.1	1.4	1.6	-0.4
Finance, real estate and business services	2.1	1.9	2.1	1.8	2.3
Tertiary sector	**1.9**	**1.7**	**1.2**	**1.4**	**1.0**
Real output (Productivity SA)	1.2	0.4	1.7	0.6	-0.2
General government services	0.8	0.6	0.3	1.3	1.7
Community and personal services	0.9	1.8	1.3	1.0	1.0
Other Sectors	0.8	0.9	0.6	1.2	1.5
Real output (Stats SA)	1.1	0.5	1.5	0.7	0.2

Source: Productivity SA 2020

- Real output growth, including General government services, as well as Community and personal services, decelerated to 0,2% in 2019 from 0,7% in 2018.
- Real output growth decelerated from 0,6% in 2018 to -0,2% in 2019. General government services also decelerated from 1,3% in 2018 to 1,7% in 2019. Community and personal services remained unchanged at 1,0% between 2018 and 2019.
- The Real output growth of the Primary, Secondary and Tertiary sectors all declined in 2019.
- Real output growth of the Primary sector declined to -3,1% in 2019 from -2,5% in 2018. Real output of Mining and quarrying, as well as Agriculture, forestry and fishing declined sharply with both industries realising two successive years of negative growth in 2018 and 2019, following strong positive growth in 2017.
- Real output growth of the Secondary sector declined to -1,4% in 2019 from 0,5% in 2018. Manufacturing, Electricity, gas and water, as well as Construction recorded negative growth in 2019. Construction, in particular, realised 3 successive years of decline in growth since 2017.
- Manufacturing declined to -0,8% in 2019 from 1,0% in 2018. Electricity, gas and water declined to -2,0% in 2019 from 0,9% in 2018, while Construction declined further to -3,3% in 2019 from -1,2% in 2018.

- Real output of the Tertiary sector decelerated to 1,0% in 2019 from 1,4% in 2018. Wholesale, retail and accommodation recorded no growth between 2019 and 2018.
- Transport, storage and communication realised a decline in growth between 2019 and 2018 while Finance, real estate and business services registered an increase in growth in the same period.
- Wholesale, retail and accommodation showed no change having a value of 0,0% in 2019, down from 0,6% in 2018. Transport, storage and communication declined to -0,4% in 2019 from 1,6% in 2018. Finance, real estate and business services increased to 2,3% in 2019 from 1,8% in 2018.
- Real output of General government services increased to 1,7% in 2019 from 1,3% in 2018, while that of Community and personal services remained unchanged at 1,0% in 2019 from 1,0% in 2018.

Productivity indicators: The contributions of main economic sectors to real output between 2015 and 2019 is given.

Exhibit 45: Contributions of main economic sectors to real output (2015-2019)

Indicator	2015	2016	2017	2018	2019
Real output	1,2	0,4	1,7	0,6	-0,2
Capital input	0,2	-3,3	1,0	-0,7	0,2
Labour input	5,1	2,7	1,3	1,9	-0,1
Capital labour ratio	-4,6	-5,9	-0,3	-2,5	0,3
Compensation per employee	-1,5	-0,9	0,6	-3,4	0,0
Unit labour cost	2,3	1,4	0,2	-2,2	0,1
Capital productivity	1,0	3,8	0,7	1,3	-0,4
Labour productivity	-3,6	-2,3	0,4	-1,2	-0,1
Multifactor productivity	-0,8	-2,7	1,7	-0,6	0,0

Source: Productivity SA 2020

- Real output declined to -0,2% in 2019 from 0,6% in 2018. The decline in 2019 followed 4 years of successive positive growth in the indicator since 2015.
- Strong positive growth in the indicator was realised in 2017.
- Capital input increased to 0,2% in 2019 from -0,7% in 2018.
- The indicator realised volatile growth between 2015 and 2018 where it recorded negative growth in 2016 and 2018.
- Consequently, Capital productivity declined to -0,4% in 2019 from 1,3% in 2018. The decline in 2019 followed 4 years of successive positive growth in the indicator since 2015.
- Labour input declined slightly to -0,1% in 2019 from 1,9% in 2018. The decline in 2019 also followed 4 years of successive positive growth in the indicator since 2015. As a result, Labour productivity declined mildly to -0,1% in 2019 from -1,2% in 2018.
- The indicator generally recorded negative growth between 2015 and 2019 save for the positive growth in 2017.
- Multifactor productivity recorded no growth at 0,0% in 2019 from -0,6% in 2018. The indicator previously realised a decline in growth between 2015 and 2018 save for the positive growth in 2017.

- Capital labour ratio increased to 0,3% in 2019 from -2,5% in 2018. The positive growth registered in 2019 followed 4 years of successive negative growth in the indicator since 2015.
- Compensation per employee recorded no growth at 0,0% in 2019 from -3,4% in 2018. The indicator previously recorded negative growth between 2015 and 2018 save for the positive growth in 2017.
- Unit labour cost increased slightly to 0,1% in 2019 from -2,2% in 2018. The indicator recorded positive growth between 2015 and 2018.

4.6 INFORMAL SECTOR

South Africa has a small informal sector compared to other developing countries. Unemployment in South Africa is involuntary, and informal work is preferred. South Africa's high involuntary unemployment and small informal sector are attributed to an underperforming formal sector and barriers-to-entry in the informal sector.

While the informal sector in South Africa is small and survivalist in nature, it serves as an important avenue for entry into employment for those who would otherwise be unemployed.

The informal sector makes an important contribution to employment in provinces such as Limpopo, Mpumalanga, KwaZulu-Natal and Eastern Cape. People employed in the informal sector have lower levels of education and are thus less likely to be employed in skilled occupations relative to those employed in the formal sector.

Trade dominates informal sector employment, while entitlement to benefits such as pension, medical aid and paid leave for those working in this sector is lower relative to the formal sector.

In terms of the informal sector's contribution to employment, out of the 16,4 million employed persons, the informal sector employed about 3,0 million; this is 18,2% of the total employed population in 2019. While improving educational outcomes remains crucial to reducing unemployment, providing work experience (formal or informal) holds the key to lowering unemployment in the short run.

Informal (non-agricultural) sector employment: The data for informal sector employment is given.

Exhibit 46: Informal sector employment (2009-2020)
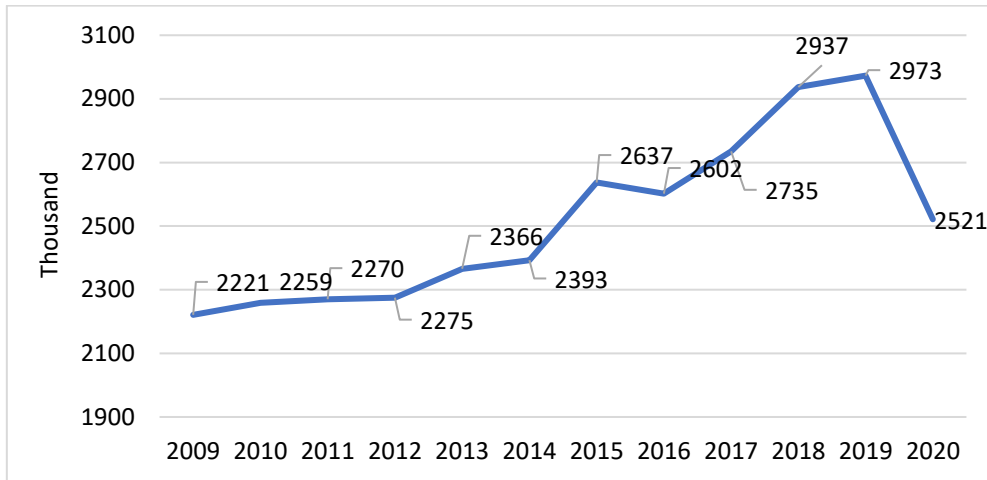
Source: Labour Market Dynamics 2014 & 2019; QLFS Trends (Oct-Dec 2020)

▪ Over the period 2009 to 2013 informal sector employment increased by 145 000 jobs.
▪ Between 2019 and 2020, 452 000 jobs were lost in the informal sector showing that the COVID-19 pandemic and lockdown extracted a heavy toll on informal sector workers who effectively lost their incomes.
▪ From 2009 to 2020 the informal sector has shown weak growth. As an entry point into the formal sector, the outlook for this sector appears bleak.

Exhibit 47: Informal sector employment by gender (2009-2020)
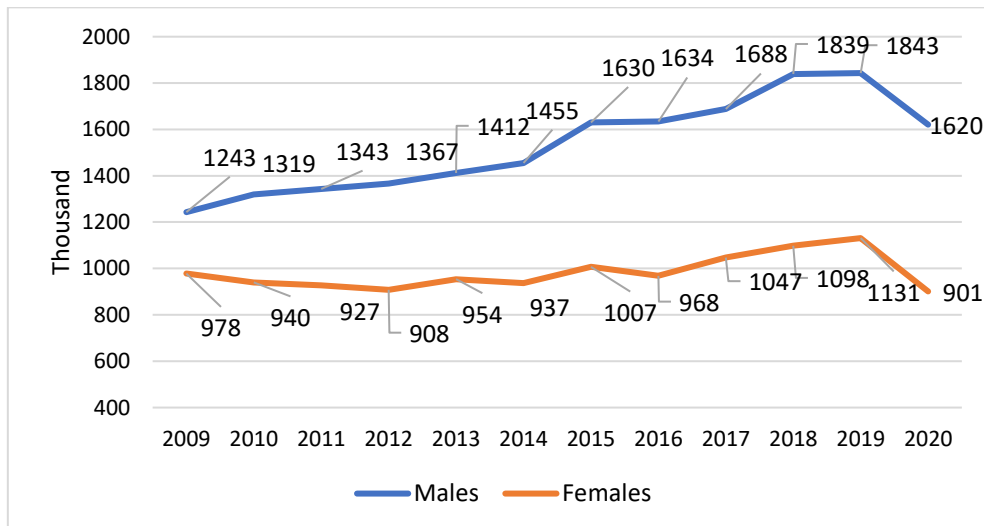
Source: Labour Market Dynamics 2014 & 2019; QLFS Trends (Oct-Dec 2020)

▪ Over the period 2014–2020, the formal sector accounted for a larger share of employment amongst men relative to women.
▪ The largest informal employment shares were recorded in 2019 for both men (1,843 million) and women (1,131 million).

- Informal sector employment for men later declined by 223 000 jobs in 2020 and for women by 230 000 jobs.

Exhibit 48: Informal sector employment by industry (2020)
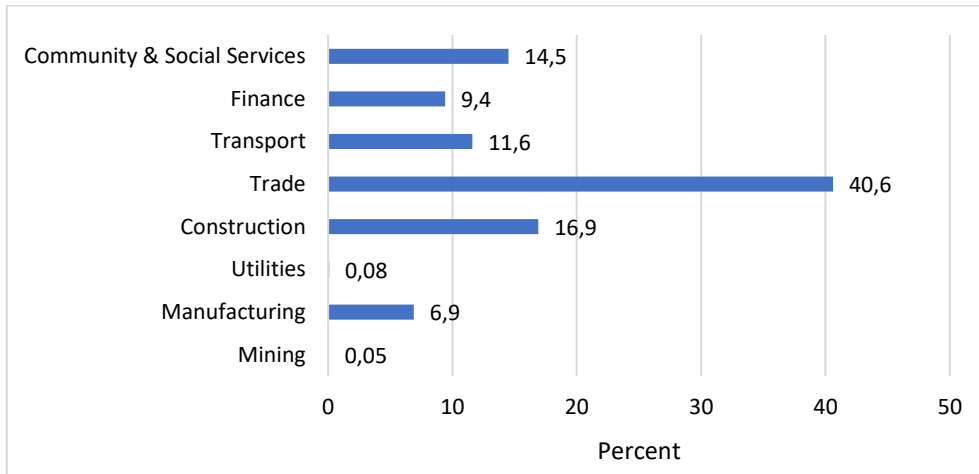
Source: QLFS Trends (Oct-Dec 2020)

- Over 40% of informal workers are employed in trade, followed by 16,9% in construction, 14,5% in community and social services and 11,6% in transport.
- Generally, these sectors are prone to high levels of casualisation.

SECTION 5: SKILLS MATCHING AND ANTICIPATION

5.1 LABOUR SUPPLY-DEMAND EQUILIBRIUM

The state is committed to ensuring through its policy, legislative and regulatory instruments that the supply of labour responds to the demand in the labour market. An illustration of the labour supply and demand equilibrium is given below:[10]

Exhibit 49: Labour supply-demand equilibrium
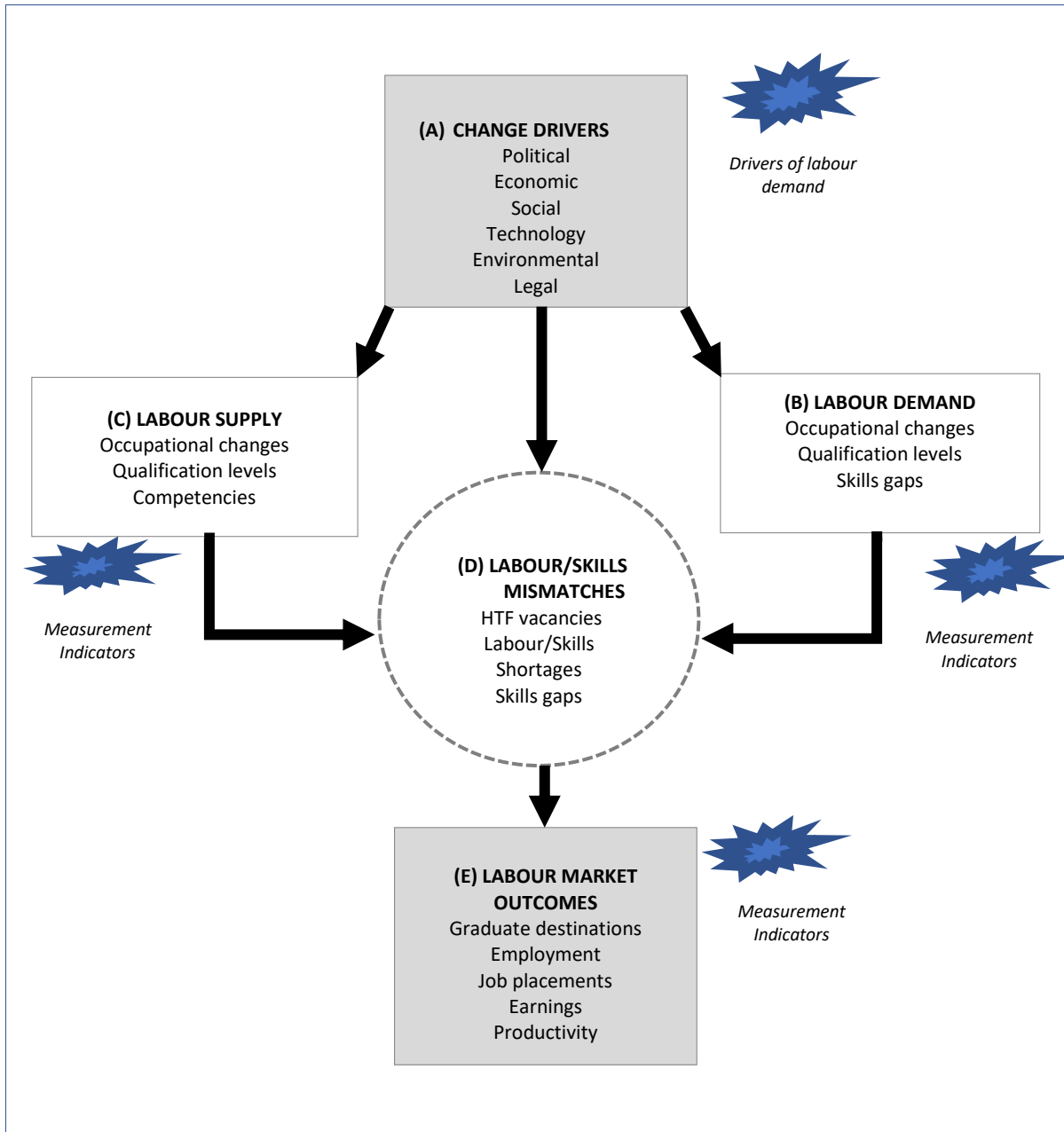
Source: World Bank (2008)

---

[10] Fasih, T (2008) Linking education policy to labor market outcomes. The World Bank: Washington.

(A) **Change drivers –** There are political, economic, social, technological, environmental and legal change contextual change drivers influencing labour supply and demand in the labour force. These change drivers can have positive or negative labour market outcomes for workers and may lead to increasing or decreasing mismatches in the labour market.

(B) **Labour demand** - Labour demand is defined as the amount of labour that employers seek to hire during a given period at a particular wage rate. The demand for labour as a factor of production is a derived demand, in that labour is demanded not for its own sake but its contribution to the production of goods and services.

(C) **Labour supply** - The supply of labour is defined as the amount of labour, measured in person-hours, offered for hire during a given period. People engaged in or seeking paid employment make up the labour force or the supply of workers.

(D) **Labour/Skills mismatches** – Labour/skills mismatch is a discrepancy between the labour /skills that is/are sought by employers (demand) and the labour/skills that is/are possessed by individuals (supply). If the education and training system does not provide the labour/skills demanded in the labour market by the employer, or the economy does not create jobs that correspond to the skills of individuals, it leads to labour/skills mismatches – an imbalance between skills demand and supply. Skills mismatches take many forms:

Vertical mismatch - where individuals are over-or under-qualified or skilled for a job.
Horizontal mismatch - where firms are not able to attract the right skills or where there is a genuine lack of adequately skilled people (skill gaps, skill shortages, horizontal mismatch) or individuals have skills that have become obsolete (skill obsolescence).

(E) **Labour market outcomes** – Labour market outcomes encompass several aspects of the labour market, such as the transition from education to work, the employment status, productivity and earnings. These are positive outcomes. Unemployment and retrenchment are examples of negative labour outcomes.

5.2 DRIVERS OF SKILLS CHANGE

The following are the key factors that are driving change in labour markets:
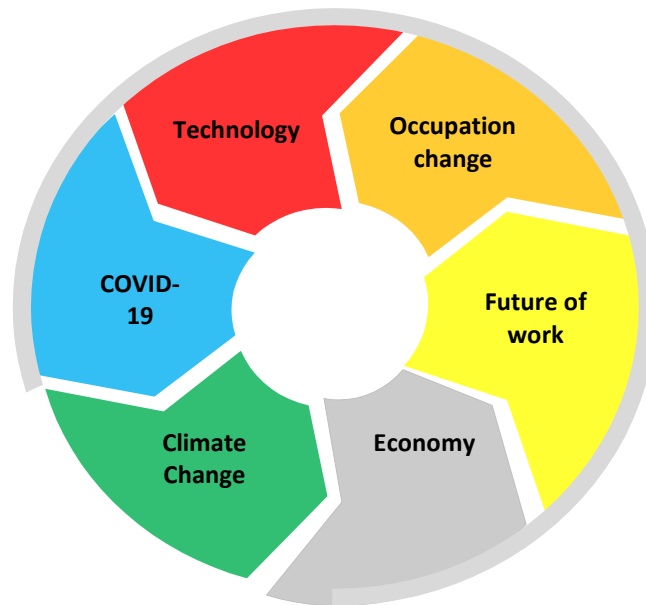
TECHNOLOGY

- New technologies and 4IR are changing the world of work.
- The 4IR is pivoted by cyber-physical systems, "The Internet of Things" (IoT), automation, digital transformation, robotics, artificial intelligence (AI) and big data.
- Technological advancements require upskilling and reskilling of the workforce. In some instances, workers are deskilled and tasks are automated.
- There are new and emerging occupations, skills and industries requiring new skill sets and creating new jobs.
- On-the-job training and workplace-based training are effective as practical skills are often the best obtainable skills in this manner. Other learning forms, such as micro-credentialling also need attention.
- There is an increasing demand for the application of AI and automation in all sectors to improve the efficiency and speed with which work is done and production demands are met.

CLIMATE CHANGE

- Climate change is having a devastating impact on the globe. In SA, changing weather patterns have affected rainfall patterns leading to water shortages.
- Water scarcity hinders economic activities. It also affects peoples' livelihoods.
- There is a shift to green energy solutions to mitigate the effects of climate change.
- Green skills should be developed across all economic sectors. Skill sets should be broadened and sector-specific experience should be acquired through practical training offered through internships and learnerships.

- The gap between educational programmes and industry requirements should be bridged through training on green industry regulations, applications, technologies and innovations.

COVID-19 PANDEMIC

- The COVID-19 pandemic has affected every aspect of human life.
- Borders were closed, travel restricted, and imports and exports adversely affected.
- Unemployment levels have increased due to mass retrenchments, and many businesses have shut down.
- Remote working is the new norm, with organisations and firms forced to operate remotely. Some have decided not to return to pre-COVID-19 working conditions.
- Less funds are available for training interventions due to more unforeseen expenses and reallocations.
- New health and safety measures have necessitated distance learning or e-learning.
- Firms are forced to reprioritise training activities and make trade-offs, as more needs to be achieved but with less funds.
- New and innovative methods of learning, such as micro-credentialling and online learning are coming into prominence.

ECONOMY

- The COVID-19 pandemic has had an astoundingly adverse effect on the South African economy, which was already in a recession for a number of years pre-COVID-19.
- Unemployment rates stood at 30,1% pre-COVID-19, and have climbed steadily since.
- Other developments afflicting the South African economy are corruption, high fuel and transport prices, lack of business growth, high costs of doing business, high food inflation, restrictions on doing business, high costs of data, monopolies, and poor governance of state-owned entities and local municipalities.
- There are reduced business activities which translate to a reduction in recruiting and retraining.
- Workers require upskilling to equip them to multi-task in an economy where retrenchments are on the rise and workers must adapt to performing more tasks.

OCCUPATIONAL CHANGE

- 4IR is transforming the nature of work, jobs and occupations.
- Occupations are changing in four ways: upskilling (where there are skills gaps), deskilling (where workers are over-skilled), out (workers being replaced due to automation) and apart (upskilling and deskilling in different areas of the same job).

- Previously, a flexible labour supply was associated with low-skilled workers. Today, organisations are opting to hire freelance workers.
- While some individuals undergo 'job transitions' where they move from one role to another within the same occupation or job cluster, other individuals undergo 'job pivots' where they change their occupations entirely.
- Employers need to consider the implementation of upskilling and reskilling programmes to educate and retain their workforces and ensure a smooth transition into a technologically advanced 4IR.

FUTURE OF WORK

- The future of work is being shaped by the 4IR, automation, digitisation and even the COVID-19 pandemic.
- Automation is creeping into the world of work in various ways. People are being replaced by machines.
- Although jobs will be lost in such instances, there are also opportunities emerging with the need for reskilling and upskilling of the workforce.
- Technologies such as robotics and digitisation have the potential to reduce human error, increase efficiency, improve the safety of processes and reduce costs in production.
- Digitisation can improve service delivery through customer experience.
- If SA seizes the opportunities being created by technology efficiently, and can use this to leverage productivity and innovation, significant economic growth can be driven.
- The novel Coronavirus has also significantly impacted the world of work, effecting changes in organisational structures, reliance on technology to perform tasks, remote working conditions, social distancing measures and business operational innovations.

5.3 SKILLS MISMATCHES

This section compares mismatch indicators for South Africa with two countries with a similar socio-economic profile (based on data availability) and the OECD. The three indicators calculated by the OECD are field-of-study mismatch, underqualification, and overqualification. The analysis also presents a profile of the employed by field of study in 2013 and 2019, in order to consider field-of-study mismatches in particular over time.

Field-of-study mismatch: The OECD's field-of-study mismatch indicator shows the proportion of individuals who studied in one field but work in another field. For example, an individual who majored in history but works as a statistician would be considered a mismatched individual. The exhibit shows the field-of-study mismatch indicator for South Africa and a number of other countries.

Exhibit 50: Field-of-study mismatch (2016)
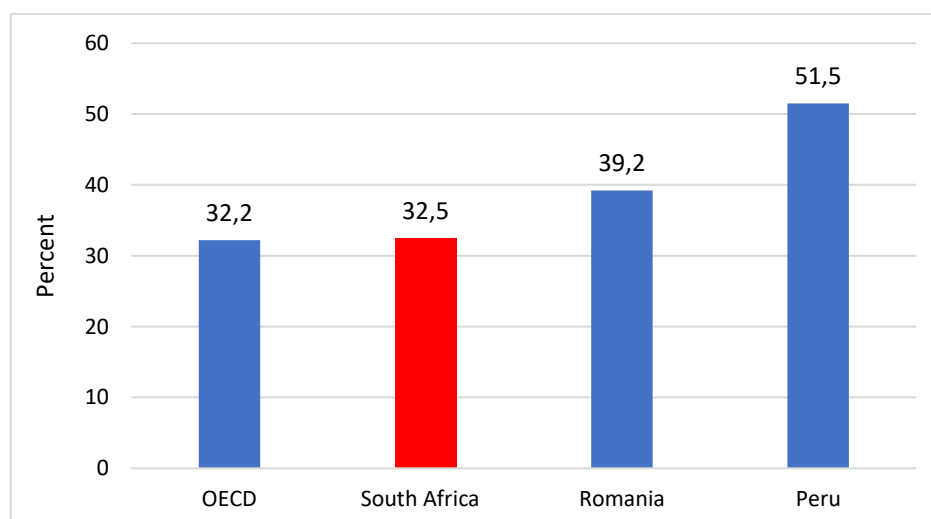
Source: OECD Skills for Jobs Database (2019)

- South Africa's field-of-study mismatch (32,5%) is similar to the average for OECD countries.
- It is, however, lower than for Romania and Peru (39,2% and 51,5%). Therefore, the indicators suggest that, in terms of field-of-study mismatch, South Africa is aligned to high income countries.
- Despite this favourable comparison, it must still be emphasised that South Africa's figure suggests that nearly a third of people work in a field for which they did not study.

Qualification mismatch: The OECD also provides an indicator of qualification mismatch. As part of this calculation, the modal qualification for each occupation for each country at a particular time was first computed. This figure was then used to determine whether an individual was under- or overqualified: an individual working in an occupation who had an educational attainment level below (or above) that of the mode, would be considered under-

(or over-) qualified. The incidence of under- and overqualification calculated by the OECD for 2016 is shown.

Exhibit 51: Qualification mismatch (2016)
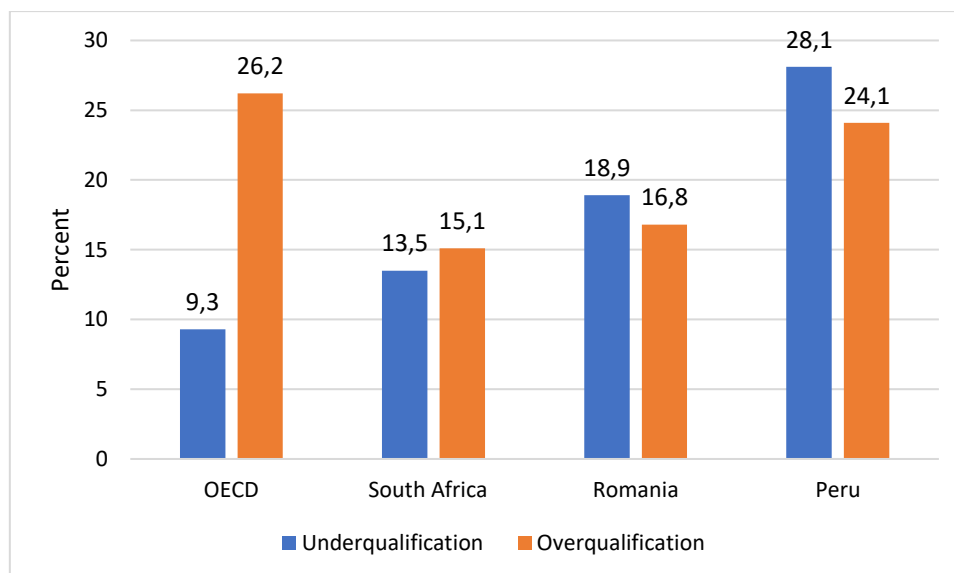
Source: OECD Skills for Jobs Database (2019)

- In South Africa, 13,5% of the employed in 2016 were underqualified, while 15,1% were determined to be overqualified. This is indicative of a considerable qualification mismatch in the South African economy. Compared to the OECD, South Africa has a far higher proportion of underqualified individuals.
- South Africa also has a higher proportion of overqualified individuals than some OECD countries. However, South Africa has a similar proportion of overqualified individuals to Romania.

5.4 OCCUPATIONS IN HIGH DEMAND
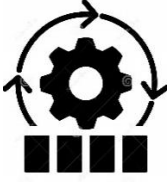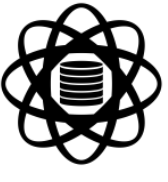
OIHD List: The Department of Higher Education and Training publishes a *List of Occupations in High Demand*. It helps the post-school education and training sector plan to train people to enter the labour market with the requisite skills. The DHET identifies occupations that will best suit the National Development Plan (NDP), the New Growth Path (NGP), and the Industrial Policy Action Plan (IPAP), as well as other major strategies of the government. This helps the department identify ways to make the tertiary education system and post-school education more responsive to the needs of the economy.

The primary purpose of the list of OIHD is to inform planning in the PSET sector by:

- Signalling the need for the development of new qualifications.
- Acting as a signpost for enrolment planning.
- Informing career guidance for learners and work-seekers.

An occupation is considered to be in high demand if it is innovative, it has shown signs of employment growth and the demand for the occupation is higher than the supply of skilled individuals entering the market.

The 2020 list contains 345 occupations that are crucial for the National Economic Reconstruction and Recovery Plan (2020). This years' list includes high demand skills and occupations like:

Digital economy	Energy	Infrastructure development	Data science	Web development
Electrical Engineering	Toolmaking	Crop analysis	Agricultural science	Trade

A comparison of the OIHD List 2018 and 2020 consists of 345 occupations.

Exhibit 52: OIHD list (2018-2020)

Source: OIHD List 2018/2020

- In terms of major occupational categories, professionals (2018-40/2020-42), technicians (2018-30/2020-27), and skilled agricultural and related trade workers (2018-23/2020-27) dominate the list.

5.5 SKILLS GAPS

The DHET produces a Qualitative Interview Report on Skills Development. The information is gathered by 21 SETAs and consolidated by the DHET. The 2020 report covered 123 of the 156 sub-sectors in the country. Approximately, 1 252 industry experts were interviewed.

The top 5 skills gaps identified by SETAs are the following:

Exhibit 53: Top 5 skills gaps (2020)

Source: SETA interviews (2020)

Interviewees identified the following occupational clusters in high demand:

Exhibit 54: Occupational clusters

FINANCE	INFORMATION TECHNOLOGY
▪ Accountant ▪ Finance Manager / Chief Financial Officer ▪ Auditor	▪ Software Developer ▪ Data Scientist / Statistician ▪ ICT Manager ▪ ICT Project Manager
ENGINEERING/MANUFACTURING	GENERAL
▪ Manufacturing Operations/ Production Manager ▪ Civil Engineer ▪ Industrial Engineer ▪ Engineering Manager	▪ SHEQ Practitioner ▪ Training Manager ▪ Supply Chain and Distribution Manager ▪ Sales and Marketing Manager ▪ Corporate Services Manager

Source: SETA interviews (2020)

5.6 GLOBAL COMPETITIVENESS INDEX

The Global Competitiveness Report is a yearly report published by the World Economic Forum. Since 2004, the Global Competitiveness Report ranks countries based on the Global Competitiveness Index which integrates the macroeconomic and the micro/business aspects of competitiveness into a single index. The report "assesses the ability of countries to provide high levels of prosperity to their citizens". This in turn depends on how productively a country uses available resources.

These 12 pillars of competitiveness are: Institutional environment; Infrastructure; Macroeconomic environment; Health and primary education; Higher education and training; Good market efficiency; Labour market efficiency; Financial market development; Technology readiness; Market size; Business sophistication and Innovation.

South Africa's performance: SA's performance on the Global Competitiveness Index (GCI) is given.

Exhibit 55: South Africa overall GCI ranking (2009-2018)
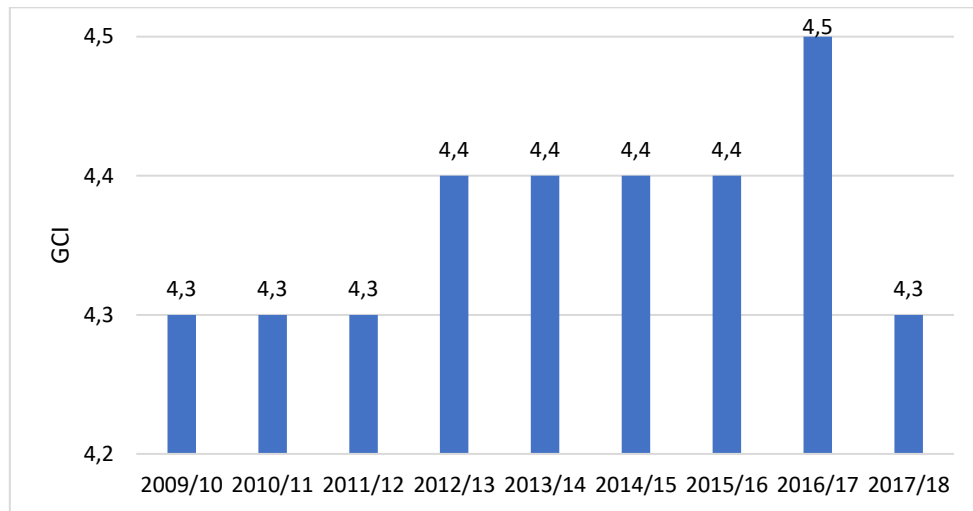
Source: Global Competitiveness Index (GCI)

- Countries are ranked on a scale of 1 to 7 with 7 being the best score.
- SA's ranking since 2009/10 is consistently poor and ranges between 4,3 and 4,5.
- Faced with sluggish economic growth and in the midst of the global COVID-19 pandemic, South Africa has hit its lowest global competitiveness ranking according to the latest World Competitiveness Yearbook (WCY) compiled by Switzerland based Institute of Management Development (IMD).
- According to the 2020 WCY, South Africa fell by three notches to be ranked 59 out of 63 countries rated by the IMD. The IMD's WCY is an annual report that ranks the competitiveness of 63 selected countries and is recognised internationally as the leading survey of competitiveness between nations.
- The country recorded a reasonably good level of global competitiveness between 2000 and 2006 averaging below 40 of the 63 countries - the best being 37 in 2001 and 2005, respectively. South Africa's performance has been on a downward trend since 2007.
- According to the IMD's 2020 WCY, the drop in South Africa's global competitiveness ranking was underpinned by the following factors:
  o Deteriorating headline and youth unemployment
  o Rising public debt levels amid a shrinking fiscal space
  o Lack of decisive plans to revive the struggling economy
  o Ongoing electricity supply problems and rolling blackouts
  o Sluggish legal process to address corruption in state owned enterprises
  o High rates of unemployment, poverty and inequality.
- Some concerns are the following:
  o Economic performance - dropped to 61 in 2020 from 59 in 2019.
  o Government efficiency - dropped to 54 in 2020 from 50 in 2019.
  o Business efficiency - dropped to 56 in 2020 from 44 in 2019.
  o Infrastructure - dropped to 61 in 2020 from 60 in 2019.

SECTON 6: LABOUR SUPPLY AND DEMAND POLICIES: BUILDING COMPETENCIES FOR THE JOBS OF THE FUTURE

6.1 POLICY ENVIRONMENT

South Africa has a robust policy environment to address labour supply and demand. Several national policies are intended to match labour supply and demand.

NATIONAL DEVELOPMENT PLAN 2030 (NDP)
The National Development Plan 2030 has identified the following 9 key areas to achieve a development approach that is sustainable and inclusive: ▪ Creating jobs and livelihoods ▪ Expanding infrastructure ▪ Transitioning to a low-carbon economy ▪ Transforming urban and rural spaces ▪ Improving education and training ▪ Providing quality healthcare ▪ Building a capable state ▪ Fighting corruption and enhancing accountability ▪ Transforming society and uniting the nation It is imperative to reduce the regulatory burden on small businesses and facilitate access to the labour market by young, unskilled work seekers (National Planning Commission, 2012).

HUMAN RESOURCE DEVELOPMENT STRATEGY FOR SOUTH AFRICA 2010-2030
Strategic priorities of the above strategy that impact skills planning initiatives include: **Strategic Priority 4:** To ensure that all new entrants to the labour market have access to employment-focused education and training opportunities. **Strategic Priority 7:** To ensure that education and training outcomes are equitable in terms of race, gender, disability and geographic location.

WHITE PAPER FOR POST-SCHOOL EDUCATION AND TRAINING (2013)
▪ Set out strategies to improve the capacity of post-school education and training system to meet SA's needs. ▪ It is a vision for an integrated system of post-school education and training, with all institutions playing their role as parts of a coherent but differentiated whole. These institutions include the colleges and universities whose main purpose is the direct provision of education and training and, in the case of universities, the conduct of research. They also include institutions that support the education and training process, such as the Sector Education and Training Authorities, the National Skills Fund and the advisory, regulatory and quality assurance bodies such as the South African Qualifications Authority (SAQA) and the Quality Councils.

- The White Paper also recognises the importance of partnerships between educational institutions and employers. Most students are preparing for careers in the labour market, and practical experience in the world of work is an invaluable part of their training. Even those students who do not find jobs in the formal labour market will benefit from practical work experience as they seek alternative ways of earning sustainable livelihoods. Employers must be drawn closer to the education and training process; they are among its major beneficiaries and must contribute to its success.

NATIONAL SKILLS DEVELOPMENT PLAN (NSDP)

- The NSDP derives from the broader plan of government, namely the National Development Plan (NDP), which aims to put in place the framework whereby we 'build the capabilities of our citizens to make our future work'. The NDP notes that "several challenges require attention, including a critical shortage of skills, a complex intergovernmental system, high levels of corruption, weak lines of accountability, inadequate legislative oversight and a long history of blurring the lines between party and state.
- The outcomes of the NSDP are to:
    o Identify and increase production of occupations in high demand
    o Link education and the workplace
    o Improve the level of skills in the South African workforce
    o Increase access to occupationally directed programmes
    o Support the growth of the public college institutional type as a key provider of skills required for socio-economic development
    o Technical and Vocational Education and Training Colleges
    o Community Education and Training Colleges
    o Skills development support for entrepreneurship and cooperative development
    o Encourage and support worker-initiated training
    o Support career development services

ECONOMIC RECONSTRUCTION AND RECOVERY PLAN (ERRP) 2020

The ERRP is a government response to the recovery of the South African economy from the COVID-19 pandemic. It is aimed at initiating equitable and inclusive growth. A key enabler of the plan is skills development.

- Skills development is imperative not only in driving reconstruction and recovery for the economy, but also to sustain it.
- The COVID-19 pandemic has adversely impacted the world of work. Remote work is growing in significance and prevalence, and the use of technology has become central to all economic sectors. The pandemic has also highlighted the frailties of the labour market.
- Due to the distinguishing problem of skills mismatch in the local labour market, should the use of technology increase, many semi- and unskilled workers will fall behind. Resultantly, there are opportunities arising for reskilling and retraining workers.

- Additionally, there is a need to develop a skills base for the economy, industries and future jobs.
- Workplace and industry training will be supported to assist the drive to build and strengthen the required skills base.
- SETA skills training will be focused on addressing the impact of COVID-19. The ERRP requires human capital, thus the youth need significant investment to reach their full potential as drivers of economic growth. Programmes to introduce youth into workplace-based learning in various sectors of the economy will be implemented.
- Infrastructure projects should contribute towards the creation of new skilled artisans, drawn mainly from the vulnerable groups, i.e. women and young people, to support the creation of a sustained skills supply.
- Vulnerable groups, i.e. the youth, women and persons with disabilities, will be afforded tools and training to enable them to access online learning and economic opportunities. Coupled with this, the skills strategy will be re-orientated and aligned to be more demand-led and responsive to the changing nature of work.
- Women and girls will be upskilled to reverse the deterioration of the gender division of labour.
- There is a shift towards a green economy. An important intervention is the pursuit of green industrialisation and a green future which not only target the persistent challenges of inequality, poverty and unemployment but also offer a sustainable solution to climate vulnerability and driving economic competitiveness. The ERRP will include a significant green component that will aid the creation of new green jobs, industries and firms.

NATIONAL DIGITAL AND FUTURE SKILLS STRATEGY

- The national strategy strength lies in the diversity of skills produced, giving the country the ability to adjust and adapt to local and global skills demand cycles.
- To build digital skills awareness, where the success of any digital skills strategy relies upon high-profile engagement to ensure the development of digital skills, is on the national agenda.
- There is a need for mechanisms to nurture digital skills development (DSD) at ECD, schooling and post-school education and training levels.
- An interdependent strategic initiative must be to provide access to the necessary infrastructure that facilitates DSD and ensures this is operational, secure and sustainable.
- The DFSS identifies and assesses the digital skills gap in South Africa, ascertains objectives and strategy elements for the achievement of digital literacy and skills development, and develops an institutional approach to address the disconnect supply-side (through schools, universities and TVET colleges) and demand-side (workplaces and communities) digital skills disconnect.
- Key areas for the development of digital skills in both business and government are additive manufacturing, cloud computing, apps development, biotechnology, robotics, data analytics, and basic computer user skills.

- The Media, Information and Communication Technologies (MICT) SETA should develop digital skills planning which must focus on skills development for low-skilled workers.
- There is a need for incorporating digital competencies in job descriptions and suggesting the need for continuous online learning, indicated by the DSD required for around 2,1 million civil servants. Cybersecurity skills are a priority agenda item for national skills development for SA to protect, detect and respond to cyber threats.
- A digital skills research programme will be established by the DCDT to monitor and evaluate DSD initiatives.
- The SETAs are encouraged by Government to include appropriate DSD within training programmes and internships.

6.2 BEST PRACTICES OF OTHER COUNTRIES

Several countries have implemented reforms to strengthen their national skills systems. Robust training and skills strategies and policies are constructed from several building blocks. These include anticipating future skills needs; participation of social partners; sector approaches; labour market information and employment services; training quality and relevance; gender equality; broad access to training; financing training; and assessing policy performance.[11]

STRENGTHENED NATIONAL SKILLS SYSTEM

Anticipating Future Skills — Participation of Social Partners — Sector — LM Info/Employment Services — Training Quality and Relevance — Gender Equality — Financing Training — Broad Access To Training — Assessing Policy

PILLARS OF A NATIONAL SKILLS SYSTEM

---
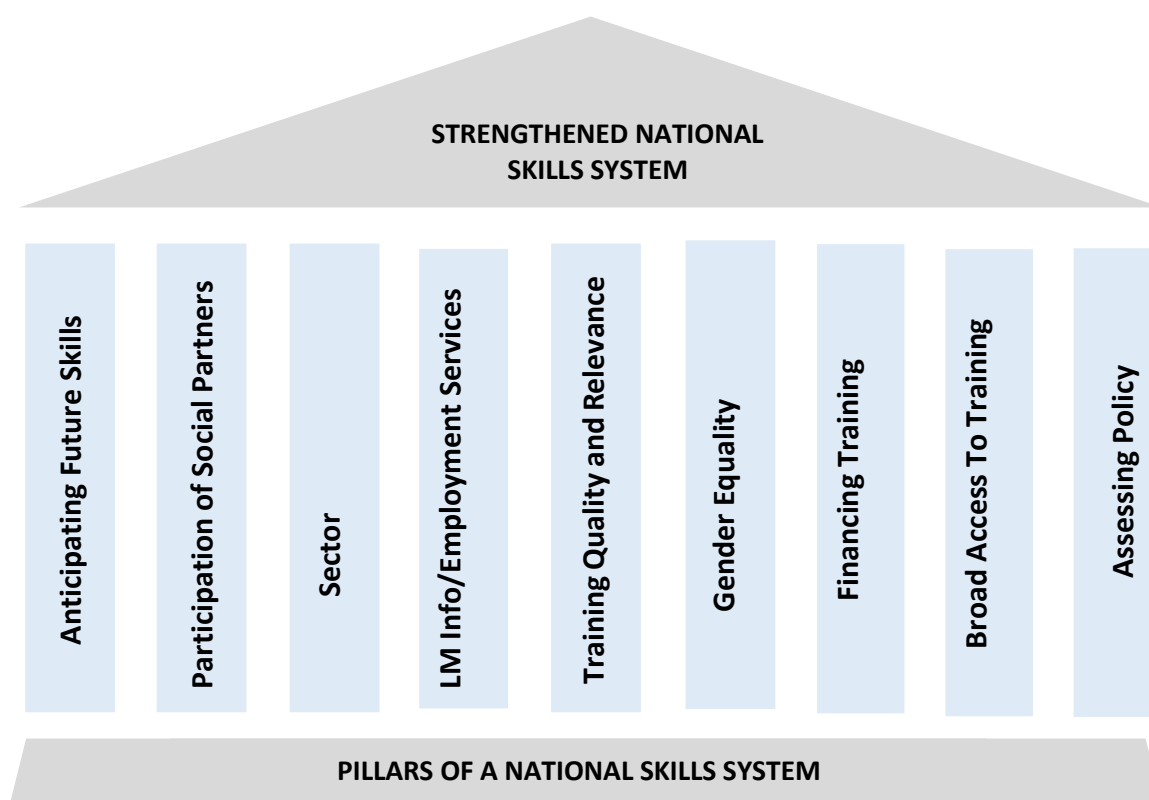
[11] ILO (2010) A Skilled Workforce for Strong, Sustainable and Balanced Growth: A G20 Training Strategy. International Labour Organisation: Geneva.

Anticipating skills needs and stimulating growth

Ireland's Expert Group on Future Skill Needs (EGFSN) analyses future skills needs and develops proposals for how to meet them, through a broad membership including business representatives, educationalists, trade unionists and policy-makers. The breadth of participation enables EGFSN to identify changing occupational profiles within sectors and changes in demand for various occupations. EGFSN identified the key elements to be included in a generic skills portfolio for the future: basic or fundamental skills (literacy, numeracy, ICT); people-related skills (e.g. communication, team-working); and conceptual/thinking skills (collecting and organising information, problem-solving, planning and organising, learning to learn, innovation and creative skills). They provide advice on how to improve jobseekers' awareness of sectors where there is demand for skills and of the qualifications required.

Source: ILO (2010)

Social dialogue for skills developments

In **Germany**, continuing training concerns all partners at the enterprise level and is a subject for collective bargaining. Work councils have legally defined participation rights on vocational training schemes, for example in implementing training schemes at the enterprise level, especially when measures taken by employers necessitate skills upgrading, and in consulting, concerning workers' participation in external training centres. The well-known dual system of education in Germany, combining classroom and workplace learning, involves extensive participation by companies.

Source: ILO (2010)

Skills development in the Netherlands: sectors and social partners

Vocational education in the Netherlands is a shared priority of government, enterprises and workers. The popularity and effectiveness of the Dutch system of vocational education may be attributed in part to the important role played by the social partners in initial training and lifelong learning, both of which are organized largely by the industrial sector. There are 17 national expert centres for vocational education and business, financed by the Government and organised by sector, e.g. for construction, health care, engineering professions, administrative professions, logistics and transport, and agriculture. The boards of these centres are made up of educators, employers and trade unionists. The centres' tasks typically include advising the Government on the qualification structure and competence profiles for the sector, training company trainers and monitoring changes in skills demand.

Source: ILO (2010)

Labour market information and employment services

In **Canada**, Human Resources and Skills Development Canada (HRSDC) helps students, workers and employers to anticipate the skills that will be needed in the future. CanLearn is an online post-secondary education resource that provides information about education and training opportunities, tools to assess how well those opportunities match individuals' aspirations, and information on financing education and lifelong learning. The Youth Employment Strategy helps at-risk

youth, post-secondary students and graduates acquire the skills and work experience necessary to increase their success in the labour market. To help employers retain their skilled workers during economic downturns, Canada's Work-Sharing programme provides employment insurance benefits to supplement regular wages for workers on short working weeks.

Source: ILO (2010)

Improving skills development systems

In **Spain**, the Government seeks to bring the numbers of students in vocational training closer to the average in other European countries, reduce school drop-out rates and prepare workers for new jobs in emerging sectors. Efforts to increase the demand for training include providing education grants to more young people, improving the supply of training by engaging enterprises and linking training more closely to their needs, and raising social perceptions of vocational training. These and other steps comprise the Government's "road map" towards more rapid reform and increased graduation rates.

Source: ILO (2010)

Broad access to training

Learning Agreements in the **United Kingdom** aims to raise participation in education and training of 16–17-year-olds without a lower secondary qualification. They comprise two elements:

▪ The Learning Agreement itself: a negotiated, personalized agreement focusing primarily on the learning and support needs of the young person. The agreement also seeks the engagement and support of employers in helping to re-engage their young employees with learning.

▪ Financial incentives to encourage employees to take up the Learning Agreement offer. A range of these incentives is being tested, including for example, completion bonuses.

The Learning Agreement model aims to reach all 16–17-year-olds in the pilot areas who are in jobs but without accredited training. Priority is given to those who do not hold a lower secondary qualification and to those who are working 16 hours a week or more. All of the pilots were required to enter into a contract with Train to Gain – a programme launched nationwide in 2006 providing employers with free skill brokerage services to identify the skills gaps of their workforce and the best provision and funding available to fill them.

Source: ILO (2010)

Gender equality

Training is an important means of pursuing the overall goal of equality of opportunity and treatment for women and men in employment and occupation. Opportunities in the labour market are important means for women to achieve greater equality with men; and the more skilled the female workforce is, the wider women's choices in labour markets will be, and the more likely they are to secure equal treatment. Overcoming the challenges that confront women in gaining access to education and training and in using this training to secure better employment requires the adoption of a life-cycle approach. This includes improving girls' access to basic education; overcoming logistic, economic and cultural barriers to apprenticeships and secondary and vocational training for young women –

especially in non-traditional occupations; taking into account women's home and care responsibilities when scheduling workplace-based learning and entrepreneurship training; and meeting the training needs of women re-entering the labour market and of older women who have not had equal access to opportunities for lifelong learning.

Source: ILO (2010)

Financial incentives for training in Argentina

Argentina uses its tax credit regime to target incentives for SMEs to invest in training their workers. Under this regime, SMEs can finance training projects up to the equivalent of 8 percent of total remuneration. They can also be reimbursed for costs incurred in undertaking skills assessment and certification in addition to actual training – an incentive to boost recognition of skills learned informally or on the job. This feature helps make the programme (begun in 2007) attractive to SMEs, which comprise 70 percent of beneficiaries.

Source: ILO (2010)

Assessing policy performance

Measuring the outcomes of skills development systems is not straightforward. Poor outcomes are more readily spotted in the form of mismatches, shortages and gaps. Good outcomes are easily lumped into other indicators, for example, low unemployment or increased productivity, exports or investment. Nevertheless, measuring the outcomes of skills systems and policies is essential to monitor and improve their effectiveness and relevance. Four key elements of a sound assessment process are:

- quality assurance, based on employers' and trainees' feedback, to capture the labour market outcomes of training: this represents the monitoring of performance that training institutions, students, their families, their prospective employers and taxpayers need most.
- regular and timely labour market information on current demand, broken down by occupation and skills level, including early identification of sectoral trends and of changes in technology and occupations leading to changing skills composition.
- quantitative and qualitative forecasting of future demand for skills.
- channelling of information to training providers, career guidance and employment services to enable them to adapt training provision to changing demand.

Source: ILO (2010)

6.3 SOUTH AFRICA'S SKILLS SYSTEM

South Africa's skills anticipation and matching architecture is illustrated below:

Exhibit 56: Skills anticipation and matching architecture

Occupations in High Demand List *(every 2 years)*	- Signal the need for the development of new qualifications. - Act as a signpost for enrolment planning. - Inform career guidance for learners and work-seekers. - Supports enrolment planning and state funding.
Skills Supply and Demand Report *(every 2 years)*	- Measure's skills imbalances and mismatches. - Improves the effectiveness and efficiency of the skills development system.
Management Information System Databases	Records supply data in the post-school education and training system.
21 Sector Skills Plan *(annually)*	A sector skills development plan that focuses on a sector labour market and economic profile, change drivers, occupational supply and demand, and skills gaps.
Tracer Studies *(Occasional)*	Measures graduate destinations.
Sector Interview Report *(annually)*	Qualitative interviews with industry leaders who have considerable knowledge of their industries and skills development issues.

Priority Occupations List *(annually)*	▪ Identifies occupational shortages in the labour market. ▪ Identifies priority occupations by sector. ▪ Supports enrolment planning and state funding.
Critical Skills List *(every 2 years)*	▪ Identifies scarce occupations in the labour market for eligibility to obtain foreign work permits and for immigration.
Quarterly Labour Market Surveys	▪ A household-based sample survey conducted that collects data on key labour market indicators. ▪ Provides the dataset to develop the occupations in high demand list.
Quarterly Employment Statistics	▪ An enterprise-based sample survey, with data drawn from private non-agricultural businesses such as factories, offices, national and local government entities.
Youth Labour Market Surveys *(Occasional)*	▪ Measure youth (15 to 35 years) in terms of key labour market indicators.
Online Recruitment Index *(Quarterly)*	▪ Monitors the online recruitment in South Africa by examining supply and demand trends by providing a detailed analysis of the relative ratio of supply and demand in the online job market.

SECTION 7: OVERVIEW AND PERSPECTIVES FOR THE FUTURE OF WORK IN SOUTH

7.1 MAJOR LABOUR MARKET TRENDS

The COVID-19 pandemic, Industry 4.0 and sustainability are reshaping labour markets and have significant implications for the nature of work and life. Some of the major trends include the following:

Rise in unemployment: The COVID-19 pandemic is shrinking economies and leading to a surge in job losses. Firms in the hardest hit industries are suffering unrecoverable losses or were forced to liquidate. The most vulnerable workers are unskilled and low skilled workers. Women have been worst affected by job losses.

Remote working is the new norm: Remote working for prolonged times will make people more skilled in remote working. It will also change the behaviour of people and expectations from companies. Homes will start having a home office to qualify for jobs in the future. The digital will replace the physical to connect to remote connections.[12]

Full-time jobs will diminish and the Gig economy will grow: Jobs that do not add value to a business will disappear. Paper pushers, routine task workers and high salaried jobs that do not justify their cost will reduce dramatically. Companies will hire freelancers or Gig workers to get the job done.[13]

Performance will be in demand: Job titles and positions in the hierarchy will melt down and performance will be demanded from each employee. Workers that do not perform to expectation or add value to the bottom line will find job security untenable. The high performers will gain the respect of their peers and shareholders.

Role hybridisation: Workers with hybrid skills will be favoured for their ability to adapt to a changing environment. It will necessitate life-long learning. Workers will need to work more quickly, flexibly and interdependently. Soft skills will be as important as hard skills with technological skills as a must have.

---

[12] Ibid.

[13] COVID- 19 Impact On The Jobs Of Future While governments and citizens are finding ways to come out of this unprecedented catastrophe, experts in SCIKEY are analysing the impact of COVID19 on the future of jobs. ?

Skilling will overtake credentialing: Businesses will hire people who possess the attitude and skills to get the job done. Credentials will matter less for companies. Micro-learning will gain traction as a legitimate form of learning. Quick deskilling, reskilling & up-skilling will enhance the rapid adoption of e-learning tools & platforms.

Continuous bargaining for trade unions: The pandemic brought issues like job security, occupational health and safety, non-discrimination and inclusivity to the forefront. Bargaining will become almost continuous. The collective agreement will be the tool for unions to protect workers, saving jobs and demand benefits.

Women will be disproportionately affected: The health crisis has exposed the vulnerability of women who are low paid workers, self-employed and temporarily employed. COVID-19 has put inequality back in the spotlight. There is an opportunity to develop strategies for responding decisively.

Learnability will be the goal: To stay relevant in the workplace of tomorrow, workers will need to focus on nurturing their learnability and developing soft skills. Learning how to learn will be essential to all job seekers and employees.

Skills transfer will take centre stage: Organisations will shift from hiring the right skills to creating and transferring these skills. Mentorship and career coaching programmes allow more experienced employees to transfer their knowledge and skills to those lesser experienced. Non-formal and informal will gain prominence.

Focus on sustainability: Organisations globally have been looking at sustainable environmental practices because it is good for business. There will be a focus on energy efficiency, decarbonisation, environmental considerations, and green products and services. These will be used as marketing tools.

Return of manufacturing: Manufacturing sectors that are pivotal to healthcare, pharmaceuticals, food security and other essential products will be localised to respond to future pandemics. Small-scale manufacturers will re-emerge and start creating small job opportunities to meet just-in-time demand.

New jobs will be created: Although technology will take away some jobs, new ones are being created. Healthcare, online retail, food production, remote learning, telecommunications, cybersecurity, wellness sector, logistics and technology will get a tremendous boost and create more jobs.
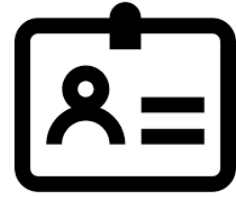
More from the public service: The public will demand more from the public service. A century-old business model of public service organisations will give way to market-oriented organisational forms. Speed, efficiency and flexibility will be the key to success. It will require a new kind of thinking in the public service.

7.2 LABOUR MARKET PARADIGMS

There have been three major paradigm shifts in labour markets since the start of the great oil crisis in 1970 to the present COVID-19 pandemic in 2021. These shifts have fundamentally redefined labour markets.

Exhibit 57: Labour market paradigm shifts

DIMENSIONS	INDUSTRIAL ECONOMY (Up to 1970)	POST-INDUSTRIAL (After 1970 -1990)	DIGITAL/COVID-19 (After 1990)
Economy	Stable and predictable	Less stability and predictability	Unstable and unpredictable
Firms	Large and hierarchical	Smaller, flatter and agile	Online and ubiquitous
College-to-work transitions	Direct college-to-employment	Indirect college-to-employment	Less employment
Occupations	Negligible changes	Moderate changes to occupations	Constantly changing occupations
Career	One to two jobs	Few jobs	Many job changes are the "new" normal
Training	Prescribed and standard	Customised	Individualised
Training Delivery	Face-to-face (F2F)	F2F / Distance	Online / blended
Curriculum	Long-term	Short-term	On-demand
Employment	Formal and typical	Less formal and less typical	Atypical (GIG / freelancing)
Job Security	Strong job security	Less job security	Little to no job security

- Labour markets are unstable, unpredictable and subject to the effects of global contagion. A crisis in one region of the world can spread instantaneously to others.

- Digitisation has enabled firms to be ubiquitous. Low hanging online platforms enable micro-enterprises to compete with multinational giants in any part of the world. Technology is the great equaliser.

- We live in a world where there is less employment for the unskilled and semi-skilled. People in routinised work are replaced by machines. There is no direct route from college to employment, as was the case in the past.

- Occupations are undergoing constant change. It means that workers should be constantly learning.

- Changing jobs frequently is the new normal.

- Technology has enabled learning to be tailored to the needs of the individual.

- COVID-19 has accelerated the transition to online and blended learning.

- The pace of societal change has necessitated that curricula be constantly changing to ensure their relevance.

- The GIG economy and freelancing are on an upward trajectory and atypical employment has become the new typical.

- There is very little job security in modern economies.

7.3 INDUSTRY 4.0

Definition: The fourth Industrial Revolution (4IR or Industry 4.0) is the major disruptor of the economy and labour market. Technological advancements such as mobile connectivity, artificial intelligence, Big Data, the Internet of Things (IoT), robotics, blockchain, cryptocurrencies, next-generation software, drone technology, wearable devices and machine learning are breaking down the centuries-old edifice on which the traditional insurance model was built. New technologies are creating a massive disruption to jobs and occupations. New jobs and occupations are emerging, and existing jobs and occupations are changing. Technology is a prime mover in changing the nature and content of work. Old skills are becoming obsolete, and new skills gaps are emerging. New training programmes are required to equip employees for a changing business world. For example, for students starting a four-year degree, half of what they learn in the first year will be outdated by their third year of study.[14]

Exhibit 58: Elements of the industry 4.0
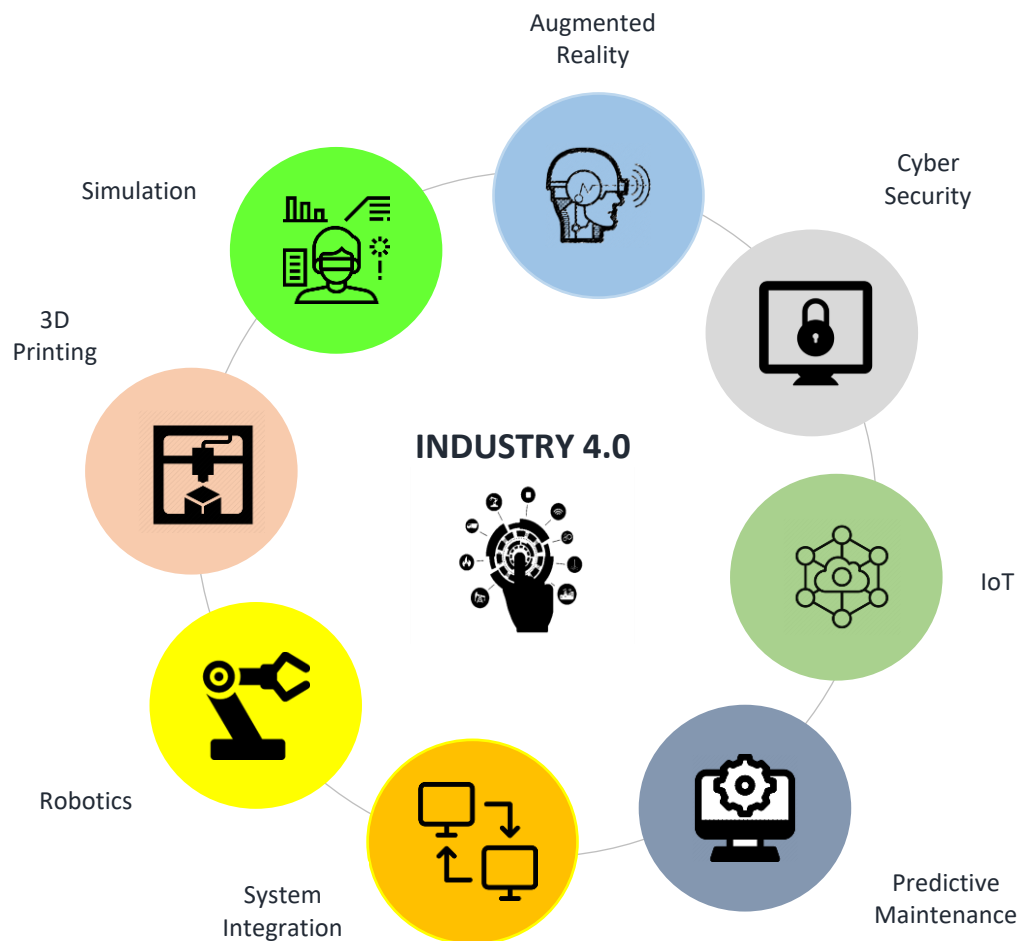
Source: Rasool (2020)[15]

---

[14] Friedman, T (2016) Thank you for being late: an optimist's guide to thriving in an age of acceleration. Farrar, Straus and Giroux: USA.
[15] Rasool, H (2020) Readiness of the metal industry for the 4th industrial revolution. SEIFSA: Johannesburg.

System integration	The process of linking together various IT systems, services or software to enable all of them to work functionally together.
Internet of things	A network of machines and devices that have built-in connectivity, electronics, software or sensors that allow them to share data and improve efficiency.
Predictive maintenance	A technique that uses condition-monitoring tools to track the performance of equipment to detect possible defects and fix them before they fail.
Autonomous robots	Like humans, they can make their own decisions and then act accordingly.
Additive Manufacturing	3D printing as it is known, builds up components from scratch, using only the material needed and minimising waste.
Augmented Reality	A technology that superimposes a computer-generated image on a user's view of the real world.
Simulation	Also called Virtual Reality (VR). The use of computer technology to create a simulated environment.
Cybersecurity	The practise of protecting systems, networks, and programs from digital attacks.

Industrial Revolutions: This 4th industrial revolution, which is defined as the convergence of new technologies, is radically disrupting the insurance sector.

Exhibit 59: 4th Industrial revolution
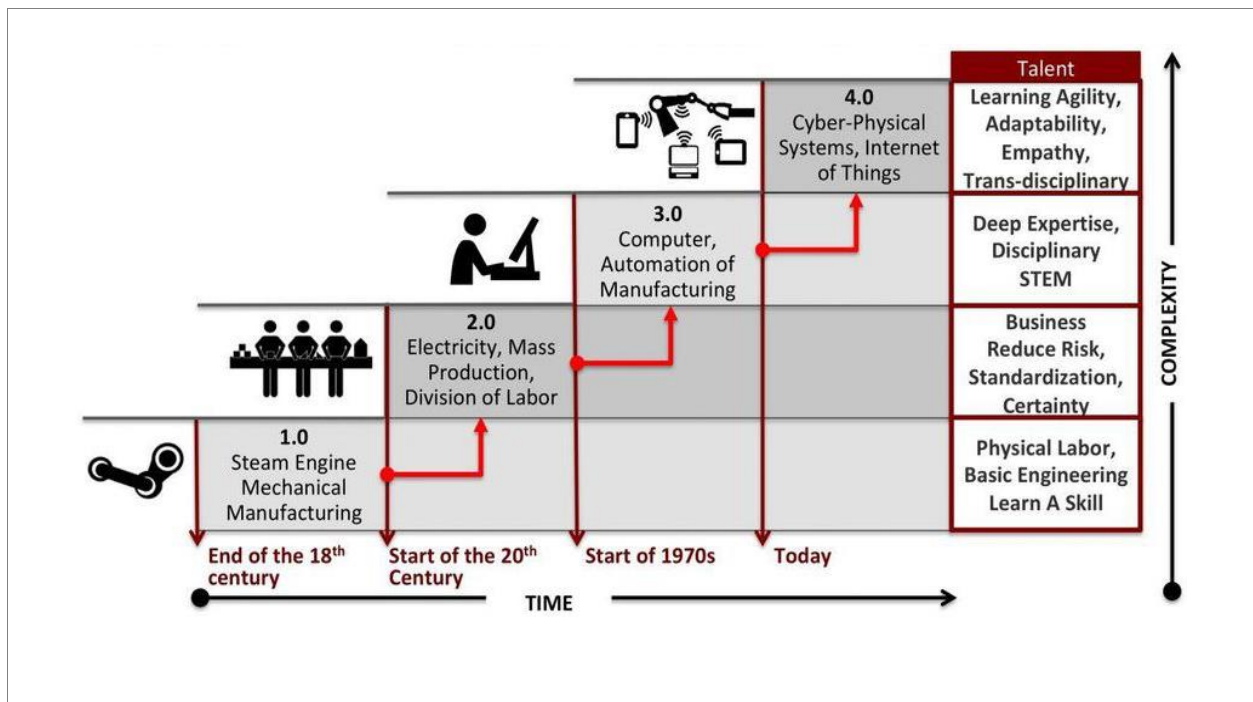
Source: World Economic Forum

The 1st industrial revolution was steam; the 2nd was electrification and mass production, and the 3rd was the advent of computerised technologies and the automation of physical labour such as manufacturing. The 4th industrial revolution is marked by advances in technology but most notably, the automation of cognitive labour. No matter how cognitively intense, anything mentally routine or predictable can and will be achieved by some form of

technology. As a result, we need to think differently about what work humans do and prepare them for that work.[16]

Disruption: There is consensus that the nature of work, jobs and occupations is undergoing rapid change. Traditional job descriptions and occupational profiles do not comport with changes in work settings.

Political, economic, social, technological, environmental and legal (PESTEL) forces drive change in the workplace. These forces influence the content and structure of work, jobs and occupations. They create pressures for organisational restructuring, business re-engineering and change in employment relationships. The content and structure of work, jobs and occupations, in turn, dictate the knowledge and skills requirements of employees.[17]

Exhibit 59: Change drivers
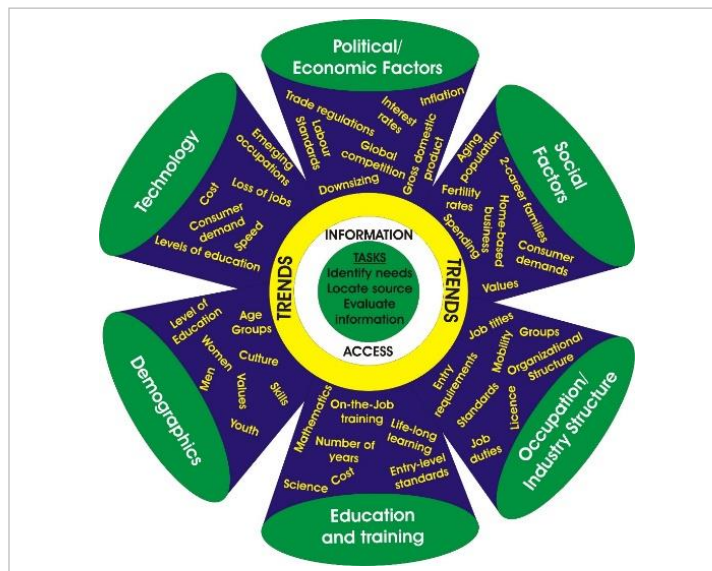
An *Oxford University White Paper* (2013) forecasts that 47% of jobs or occupations could be eliminated by smart technology during the next two decades and a *McKinsey Report (2017)* predicts that 49% of the time spent working could be eliminated by technology. In PWC's *Workforce of the Future (2018),* 37% of respondents were concerned that automation is putting jobs at risk.[18]

Technology is not the only factor that is disrupting jobs and occupations. The heterogeneity of employees, work and the workplace are impacting on jobs and occupations. First, the workforce is becoming diverse concerning gender, race, religious beliefs, culture, class, education and immigrant status. Second, the boundaries between who performs what jobs and the employment outcomes and experiences of individuals working in different occupations are fluid. Third, there are choices about how work is structured, which is interdependent with jobs and occupations. Fourth, there is an interrelationship of changing

---

[16] World Economic Forum. 2020. *Future of jobs*. Geneva: WEF.

[17] Jacobs, RL (2019) *Work Analysis in the Knowledge Economy: documenting what people do in the workplace for human resource development.* Palgrave Macmillan: Illinois.

[18] Iny, D (2018) Leveraged learning; how the disruption of education helps life-long learners and experts with something to teach. Ideapress Publishing: USA.

markets, demographics, technologies and human behaviour. Therefore, it requires an integrated, systematic approach to understanding how the context of work is changing and the implications of these changes.

Exhibit 60: Implications of work
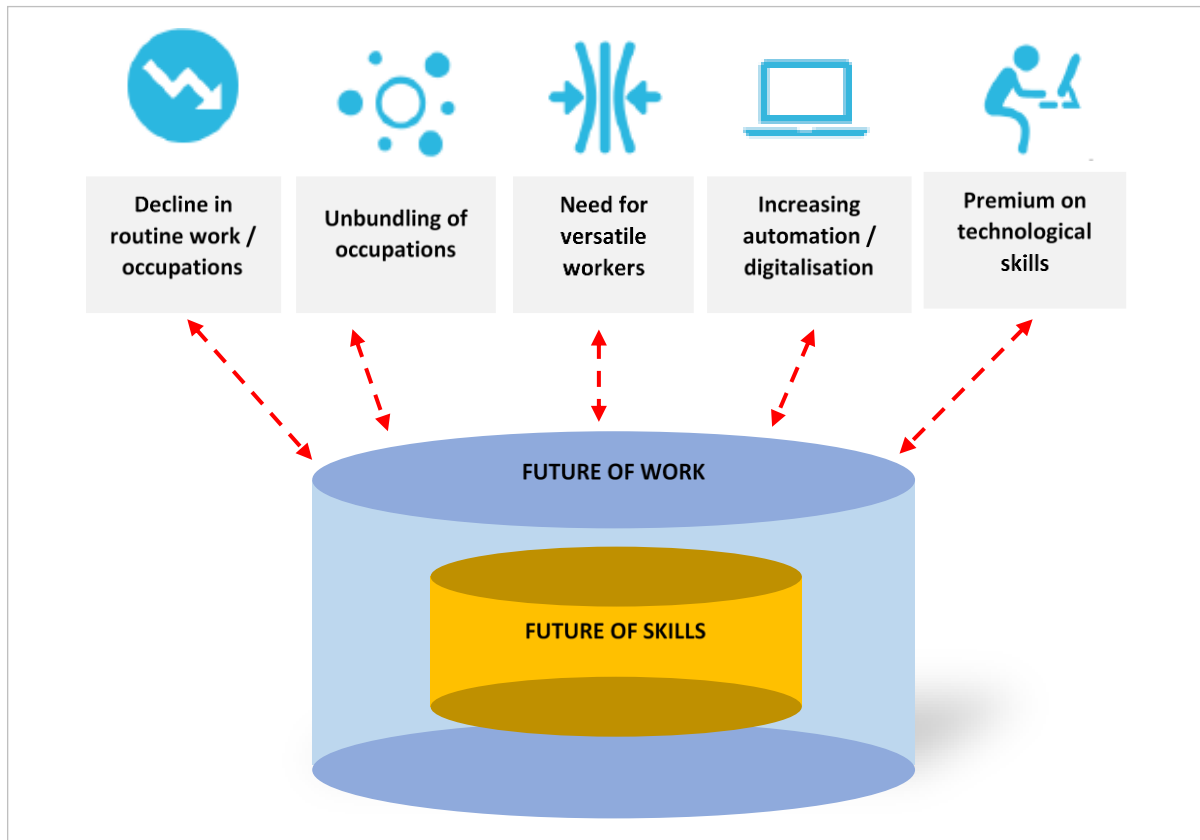
**Occupational Change:** Friedman describes four ways in which jobs and occupations are changing:[19]

---

[19] Friedman, T (2016) Thank you for being late: an optimist's guide to thriving in an age of acceleration. Farrar, Straus and Giroux: USA.

Exhibit 61: Occupational Change
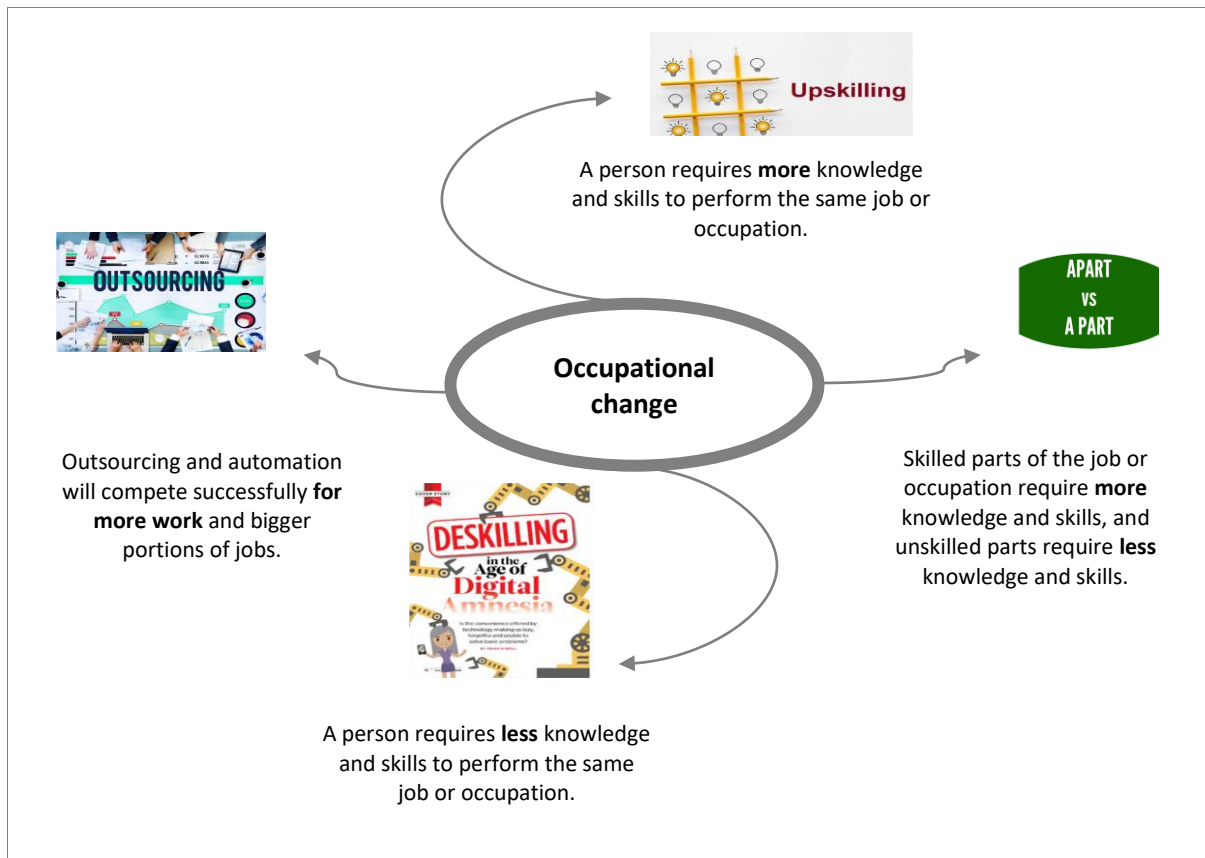
Source: Friedman (2016)

The following elements characterise occupational change:

- A change in a new professional activity.
- Job tasks added to an occupation from a similar or new field.
- A substantial change in the work content related to an occupation.
- The necessity to acquire different competencies to fulfil the job tasks.
- A change in the range and depth of job tasks in an occupation.
- An enlargement of jobs.

Occupational change may occur in an occupation in the same organisation, or by the movement to other organisations in the same occupation. Occupational change may occur in an occupation in the same industry or move to other industries for the same occupation.
The implications of work and occupational change are profound. There is diversity in the structure of work, jobs and occupations. The rise of atypical employment and gig work is a growing trend. There are also more ways of performing tasks. The organisational structure, task differentiation and jobs are blurred.

Narrow routine, task-related jobs are giving way to new occupations. Management layers are being cut out, leading to flatter hierarchies and wider spans of control. Traditional boundaries around jobs, such as the distinction between managerial and production work, white-collar

and blue-collar jobs, the barriers around craftwork, and the narrow job descriptions of production jobs associated with scientific management have blurred.

The employment relationship, defined as the set of mutual obligations and expectations between employer and employee, has weakened. Expectations seem to have moved toward more transient relationships.

Jobs, Occupations and Skills: In the era of Taylorism and scientific management, job descriptions made sense because the value was created by driving efficiency to scale effectively. Standardisation and repetitive tasks thrived. Workers relied on well-earned credentials and built careers on the value they brought to the job. Job descriptions were designed to screen for these credentials and value.

Today, businesses need workers to focus on the non-routine, complex and ambiguous work that requires their uniquely human skills of creativity, communication, collaboration, empathy and judgment. The most valuable workers will be those who create value on the job, relying on an entrepreneurial outlook, a beginner's discovery and an inquiring mind. These workers are best suited to turn insights into new opportunities – a capability we have yet to see put to any job description.

Exhibit 62: Future of work, jobs and occupations
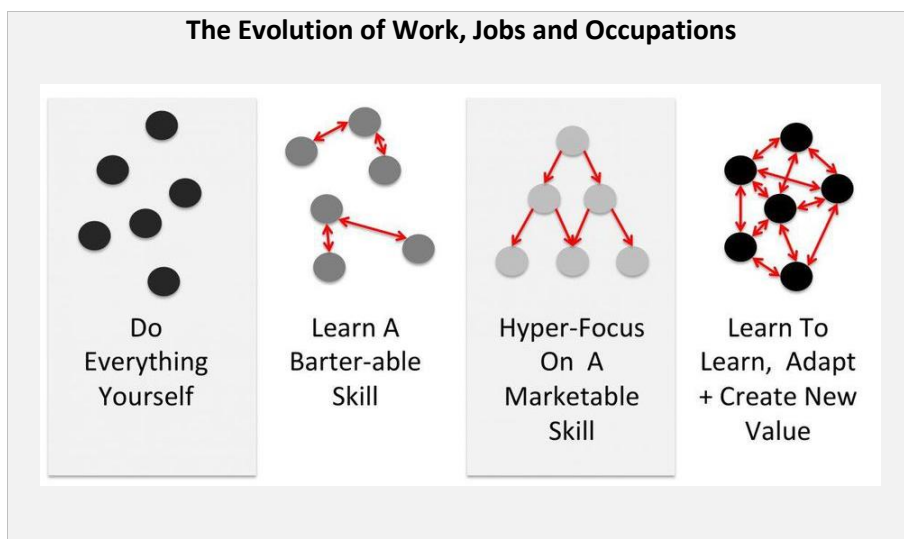
Source: heathermcgowan.com[20]

Evolution of organisational structures: We have moved from hierarchical structures to networking structures. The latter has evolved into interdependent networks working in tandem.

---

[20] Accessed at heathermcgowan.com

Exhibit 63: Organisational structures

How things were   How things "are"   How things work
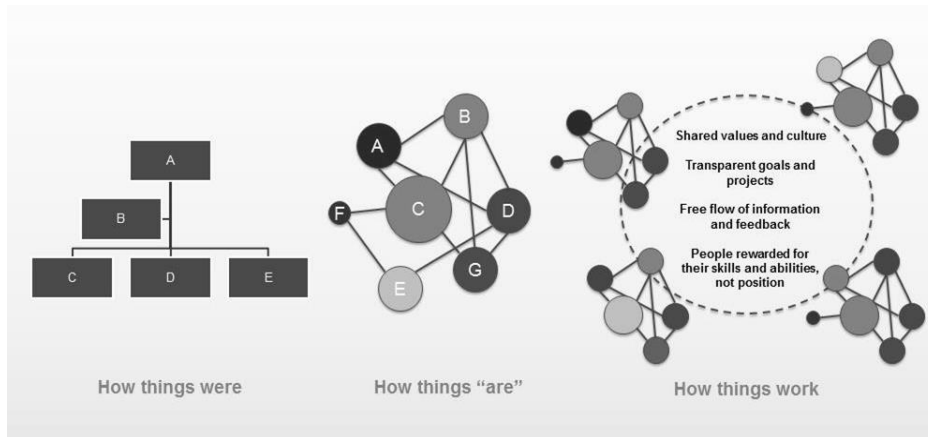
Source: HR Future 2017

The 21st century skills identified by the World economic Forum are the following:

Exhibit 64: 21st century skills
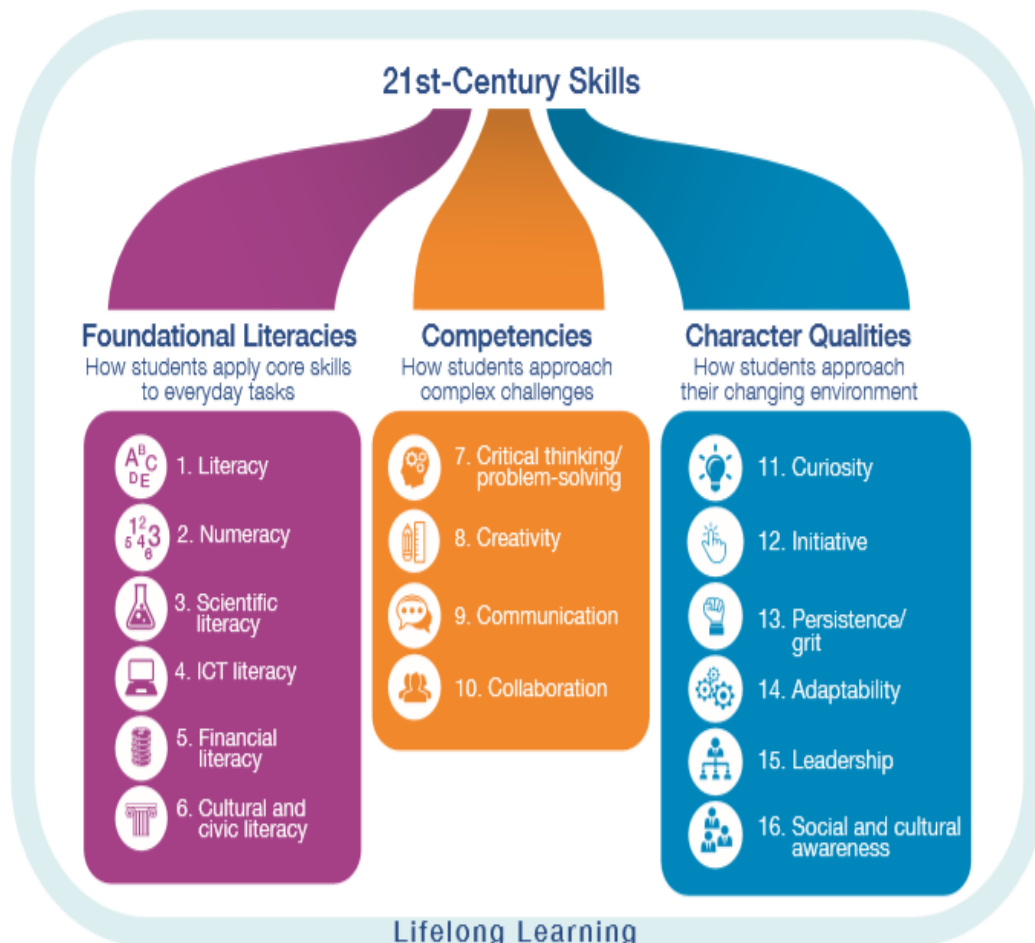
Source: WEF 2016 New Vision for Education

7.4 NEW APPROACHES TO SKILLS DEVELOPMENT

There is a shift toward a skills-based system, where skills are the "core currency of the labour market". Key trends driving change in education, training and skills development are outlined.

Micro-credentialling: Micro-learning based on digital credentialing or micro-credentialling (digital badges and micro-degrees) is mooted as an effective way to rapidly upskill and reskill the whole workforce.

> ***Micro-credentials*** *are mini-qualifications that demonstrate skills, knowledge, and/or experience in a given subject area or capability. Also known as nanodegrees, micro-credentials tend to be narrower in range than traditional qualifications.*

Micro-credentials are like degrees or diplomas, in that they provide public recognition and a way to signal skills held, but they differ in their focus on demonstrated application of one specific "micro" competency in practice. Micro-learning is cost-effective and widely accessible. Firms can purchase annual licenses from service providers to access hundreds of micro-learning courses for workers. Interviewees also pointed out that "blue-collar" workers are disadvantaged from subscribing to digital credentialing because of the nature of their work and that this issue should be resolved so that no one is left behind. Several entities play complementary roles in the process of earning a micro-credential (MC).

Developer	An entity creates an MC by identifying a valued competency; compiling resources to learn about the competency; describing the evidence required to demonstrate the competency; and providing criteria of how evidence will be assessed to earn an MC.
Candidate	An individual in the process of compiling and submitting evidence demonstrating the competency but who has yet to earn the MC.
Assessor	An individual who applies a rubric to evaluate MC evidence submitted by a candidate to determine whether it is sufficiently proficient to earn the MC, and who provides feedback of strength and areas of improvement.
Digital platform	An entity that hosts the digital site where candidates access MC content and submit their evidence, and where assessors evaluate candidate's evidence and provide determinations and feedback.
Issuer	An entity that awards MCs to candidates to successfully meet proficiency criteria.
Earner	A candidate who successfully submits evidence demonstrating a specific competency and obtains an MC.
Recogniser	An entity that formally acknowledges value of, and grants currency to, earned MCs.
Digital credentialing	Also called digital badges, web pages, nano-degrees, micro-degrees, micro-certifications and micro-credentialling.

Exhibit 65: Process to earn a micro-credential

First understand the micro-credentialling system:

WHAT MCs ARE AVAILABLE?
Developers create MCs and make them available online often via a separate digital platform provider

WHAT VALUE DOES AN MC PROVIDE?
Recognisers (e.g. employers) determine the market value that a given MC holds or stack of MCs hold for earners

Engage in the process:

SELECTION
Candidate selects an MC from a digital platform and reviews the evidence required for demonstrating competency and the rubric describing how submitted evidence will be assessed

IMPLEMENTATION
Candidate collects evidence of demonstrating competency in practice. Candidate may review the associated MC resources and engage in other types of professional development to aid their ability to demonstrate competency

FEEDBACK
If the provider does not approve the submission, the candidate receives feedback of how to improve the submission, and is provided the opportunity to resubmit (as many times as necessary)

SUBMISSION
Candidate curates required evidence (e.g. artifacts of learning, practice) and submits through the digital platform

ASSESSMENT
Provider-assigned assessor reviews evidence using the rubric and recommends whether the candidate meets requirements for earning an MC

EARNING
If the provider approves the submission, the candidate earns the MC, and receives some representation of the credential as proof via the digital platform often in the form of a digital badge from the issuer

Source: Tooley (2021)

Blended Learning: Blended learning is likely to be the future.

DEFINITION
Blended learning is an approach to learning that combines face-to-face and online learning experiences. Each complements the other by using its strengths.

BLENDED LEARNING

FACE-TO-FACE TRAINING

VIRTUAL CLASSROOM

WEBINARS

LINKS

SIMULATIONS

ASSESSMENT

ONE-ON-ONE COACHING

METHODS
Some of the methods of blended learning

Self-paced E-Learning

Media, activities, and events

BLENDED LEARNING

Online Collaborative Learning

Face-2-face training

3 CHALLENGES OF BLENDED LEARNING

- We need technology in every classroom and in every student and teacher's hand.
- Students from poor backgrounds without access to free interconnectivity, hardware and know-how of using digital platforms fall out of the learning loop.
- The right learning strategy, sound execution and fool-proof technology are critical to the success of the programme.

Building a skills-based labour market: The strategies for building a skills-based labour market are the following:[21]

LEARNING ECOSYSTEM STRATEGIES

1. Build, adapt and certify foundational skills

- *Traditional foundational skills of today's education ecosystems require updating.*
- *Soft skills and technology-related skills are becoming more prominent.*
- *Basic literacies require complementing with socio-emotional skills (e.g. emotional intelligence), digital fluency, complex problem-solving skills, and inductive and deductive reasoning.*

2. Build, adapt and certify advanced skills

- *Advanced skills can be developed through tertiary education, vocational courses or via the early phases of on-the-job learning.*
- *The above strategy focuses on the use of competency-based models to assess skills as an alternative to traditional assessment methods of skill acquisition based on completed credits. This measures demonstrated proficiency in skills.*

3. Build, adapt and certify skills among the adult work force

- *The problem of labour market inefficiencies is exacerbated by the lack of coordination regarding company reskilling and upskilling efforts, as well as poor public-private coordination.*
- *The challenge of reskilling and upskilling demands a more effective balance between public and private responsibility in terms of financing skilling, as well as greater flexibility to the demands of the labour market and greater comparability of learning content across companies.*

---

[21] Towers Watson, W. and WEF. 2019. *Strategies for the new economy: skills as the currency of the labour market.* Switzerland: WEF.

4. Realise the potential of educational technology and personalized learning

- *Due to the ever-evolving nature of in-demand skills, there is an opportunity for educators and businesses to adapt curricula and learning by introducing updated methods of delivering information.*
- *Educational technology (edtech), which constitutes virtual reality, web-based learning and smart systems powered by AI can be utilised to deliver learning at greater speeds and with varying duration.*

5. Map the skills content of jobs

- *As technology is increasingly used to enhance jobs, the tasks performed by a range of workers in all sectors of the labour market are rapidly evolving and demanding new skillsets.*
- *Since descriptions of the same role vary amongst organisations, better signalling to learners regarding high-value skills and those in demand place learners in a better position to recognise job opportunities in the labour market and to capitalise on those opportunities through effective reskilling.*

6. Design coherent and portable certifications

- *Despite qualifications being central, comparability between the skills acquired and qualifications obtained are not clearly distinguished as a result of a lack of common standards and principles of portability across institutions, relevant bodies and economies.*
- *Defining common standards allows for proficiency and assessment in conjunction with inter-operable skill certification, which allows for the empowerment of individuals by increasing their awareness of the extent and value of their skillset.*

7. Rethink organisation and talent management processes

- *Current talent management processes and policies are predicated on filling roles for a defined job architecture. This model is no longer applicable.*
- *The current labour market demands that firms employ a greater degree of agility and broaden the range of potential skilling trajectories. There requires to be a shift away, toward a talent management system that adapts to evolving work and skills.*

8. Drive momentum around the concept of skills

- *Throughout education and training systems, as well as among employers there exists the requirement to progress beyond the current practice of learning bodies of fact, and instead turn the focus to developing behaviours and skills which apply knowledge to tasks.*
- *The move toward a focus on skills development will enable learners to signal their competencies to the labour market and allow for improved collaboration between educators and employers.*

9. Align skills taxonomies

- *Perpetual differences in the definition and language of skills among stakeholder groups drive a range of inefficiencies and collaboration costs.*
- *The labour market urgently requires to establish skills with cohesion to aid collaboration between employers and educationalists. Common methods of establishing, updating and consolidating skills clustering, nomenclature and definitions must be ascertained to create a more effective marketplace for upskilling and reskilling.*

10. Shape culture, mindsets and mechanisms for lifelong learning (LLL)

- *Defining a culture of LLL will be imperative across education and training systems, businesses and society. Embedding such a change requires investment of time and capital, along with careful design of incentives to adapt for individuals.*
- *Leaders in business and education are pressured to use the tools at their disposal to nurture a mindset of constant development and retooling, encouraging the labour market to remain flexible in response to perpetually evolving business and education needs. To continually update one's skillset and the importance of LLL will steadily become important tools for success.*

SECTION 8: RECOMMENDATIONS AND CONCLUSION

From the preceding sections, the findings and recommendations are the following:

8.1 CLOSER COLLABORATION WITH THE DHET

Findings
Both the DEL and DHET have overlapping mandates which broadly include the development of human resources; the protection of worker rights; decent work; labour market research and intelligence; occupational health and safety; supporting marginalised groups (youth, women, rural communities, and people with disabilities); employment creation; dealing with work-seekers; addressing unemployment; reducing poverty; supporting economic growth and social development; and promoting quality training, among others.

Recommendations
There should be closer collaboration between the DEL and DHET on overlapping objectives and programmes. There are several areas for departmental collaboration. For example, the DHET has a career development services division called KHETHA. The DEL is responsible for public work-seekers registration and support. There should be collaboration. In the area of labour market research, the DHET produces a List of Occupations in High Demand, Priority Skills List. The DEL has a labour market research, policy and planning unit and a labour market information and statistics unit which collects labour market data on unemployment insurance, compensation fund, industrial action, labour laws, wage determination and public employment services. Through collaboration, these vital data sources can be shared with the DHET for skills planning.   - The DEL is storing data on unemployment through the Unemployment Insurance Fund and job vacancies. There should be collaboration in the use of this data for skills planning.   *The collaboration between the two departments should be formalised at various levels in the hierarchy.*   *There should be a pooling of resources for common programmes offered by the two departments, for example, in the training of the unemployed and people in the informal sector.*   *The feasibility study of merging the workplace skills plan/annual training report (DHET), the Employment Equity Report (DEL) and the BBBEE scorecard (DTIC) into a single user-friendly employer submission should be investigated.*   *A feasibility study to create a single platform for career guidance support rendered by the two departments should be investigated.*

8.2 LABOUR MARKET RESEARCH AND INTELLIGENCE

Findings

The DEL has a wealth of data on unemployment insurance, occupational health and safety, compensation, industrial and labour relations, employment equity, public employment services, inspection and enforcement, trade unions, minimum wage, collective bargaining and training needs that would provide considerable insights into improving the efficiency of the labour market.

Recommendations

- *The DEL should develop a labour market research strategy and plan in consultation with the DHET to transform these vital datasets into labour market intelligence.*
- *The outcomes should be the production of regular labour market research reports for policy-makers, planners and other labour market actors.*
- *The research outcomes of the DEL should be integrated with the research outcomes of the DHET to provide a richer source of labour market information and intelligence.*
- *There should be a special focus on mining the wealth of data from the Unemployment Insurance Fund (UIF) to improve the labour market and supply-side diagnostics.*

8.3 EMPLOYMENT SERVICES

Findings

Employment services match job seekers with job opportunities and are thus central to a well-functioning labour market. They are provided with both by the government through their Ministries of Labour and/or by private employment agencies.

Recommendations

- *Closer collaboration between public and private employment services is important because it results in the most positive outcomes for the labour market.*
- *There should be an assessment of public employment services at the DEL labour offices to identify areas in need of strengthening and supporting the development and implementation of technical cooperation projects to enhance employment services.*
- *Provide technical training courses on public employment services, on career counselling to support the transition of youth from school to work, and on guidelines and policies concerning the regulation of private employment agencies.*
- *Assess how PESs could extend core employment services to workers and enterprises in the informal economy to help them in the transition to the formal economy.*
- *Draw lessons from information collected on PESs' labour market programmes in response to the global COVID-19 pandemic.*
- *Disseminate labour market information.*

8.4 UNEMPLOYMENT INSURANCE FUND

Findings
South Africa is bedevilled with an acute chronic unemployment crisis. Before COVID-19, the official unemployment rate was 29.1% and expanded unemployment (includes discouraged work-seekers) 38.7%.[22] In the 4th quarter of 2020, official unemployment rose to 32.5% and expanded unemployment to 43.1%.[23] The COVID-19 crisis has pushed youth unemployment to precedented high levels. Youth aged 15-24 years and 25-34 years recorded the highest unemployment rates of 63.2% and 41.2% respectively. Approximately 3.1 million (29.8%) out of 10.3 million young people aged 15-24 years were not in employment, education or training (NEET).[24] Twice as many women than men lost their jobs since the start of the crisis; male employment was 2% lower than pre-COVID levels in October 2020, female employment was down 8%; women make up 60% of the unemployed, but only 39% of the beneficiaries of the Unemployment Insurance Fund (UIF) and only 37% of the beneficiaries of the social relief of distress grant in October.[25]

Recommendations
The Unemployment Insurance Scheme (UIF) should be remodelled from a focus on unemployment to employment. It should be recast as an Employment Insurance Scheme (EIS).[26]   *The Temporary Employer/Employee Relief Scheme (previously called the Training Layoff Scheme) to support distressed companies and furloughed workers with a stipend and training should be managed solely by the UIF instead of the CCMA as there are too many public entities dealing with this scheme which delays implementation of relief measures.*   *UIF claimants should be offered the support of career counsellors to assist with identifying training needs, job search, new career directions, self-employment and/or re-entry into employment.*

8.5 CONCLUSION

The name change from the Department of Labour (DoL) to the Department of Employment and Labour should be followed with a shift in approach from unemployment to an employment orientation.

The DEL should be making greater efforts in supporting the unemployed with training, new job search and career counselling.

---

[22] Statistics South Africa. Quarterly Labour Force Surveys Q4: 2019.

[23] Statistics South Africa. Quarterly Labour Force Surveys Q4: 2020.

[24] Statistics South Africa. Quarterly Labour Force Surveys Q4: 2020.

[25] Ihsaan Bassiery, I; Budlender, AJ & Zizzamia, AR (2021) National Income Dynamics Study (NIDS) – Coronavirus Rapid Mobile Survey (CRAM) The labour market impacts of COVID-19 in South Africa: An update with NIDS-CRAM Wave 3. Accessed at: https://cramsurvey.org/wp-content/uploads/2021/02/2.-Bassier-I.-Budlender-J.-Zizzamia-R.-2021-The-labour-market-impact-of-COVID-19-.pdf

[26] Rasool, H (2017) Benchmarking Study of Models of Training Lay-off and Retrenchment Mitigation Schemes. SEIFSA/MERSETA.

There should be a special focus on supporting the most vulnerable groups in the labour market, namely, youth, women, people with disabilities and rural communities.

The research outputs of the DEL should be increased in areas such as job creation, labour relations, unemployment, skills anticipation and matching, distressed industries, occupational health and safety, compensation, discrimination in the workplace, jobs and the fourth industrial revolution, decent work, employment equity, and so on.

REFERENCES

COVID- 19 Impact On The Jobs Of Future While governments and citizens are finding ways to come out of this unprecedented catastrophe, experts in SCIKEY are analysing the impact of COVID19 on the future of jobs

Department of Basic Education. 2020. *National Senior Certificate examination report 2020.* Pretoria: Department of Basic Education.

Department of Higher Education and Training. 2017. *Statistics on technical and vocational education and training, community education and training and private colleges examinations in South Africa: 2015*. Pretoria: DHET.

Department of Higher Education and Training. 2018a. *Fact sheet on "NEETs" (persons who are not in employment, education or training)*. Pretoria: DHET.

Department of Higher Education and Training. 2018b. *Statistics on post-school education and training in South Africa: 2016*. Pretoria: DHET.

Department of Higher Education and Training. 2019. *2017 examination data: South African technical and vocational education and training, community education and training and private colleges.* Pretoria: DHET.

Department of Higher Education and Training. 2020. *Statistics on Post-School Education and Training in South Africa: 2018*. Pretoria. DHET.

DHET (2020) SETA interview report on skills development. Department of Higher Education and Training: Pretoria.

DNA Economics. 2020*. The 2020 list of occupations in high demand: a technical report.* Cape Town: Labour Market intelligence research programme.

Eberhard, B., Podio, M., Alonso, A. P., Radovica, E., Avotina, L., Peiseniece, L., Caamaño Sendon, M., Gonzales Lozano, A. and Solé-Pla, J. 2017. Smart work: The transformation of the labour market due to the fourth industrial revolution (I4.0), *International Journal of Business and Economic Sciences Applied Research* (IJBESAR), ISSN 2408-0101, Eastern Macedonia and

Thrace Institute of Technology, Kavala, Vol. 10 (3), p. 47-66. http://dx.doi.org/10.25103/ijbesar.103.03

Fasih, T (2008) Linking education policy to labor market outcomes. The World Bank: Washington.

Friedman, T (2016) Thank you for being late: an optimist's guide to thriving in an age of acceleration. Farrar, Straus and Giroux: USA.

Future of Work: Learning To Manage Uncertainty (linkedin.com). heathermcgowan.com

https://www.fya.org.au/wp-content/uploads/2016/11/The-New-Work-Mindset.pdf

HR Future. 2017. *The_new_organisation_Different_by_Design* [illustration]. Randburg: HR Future. Available from: https://www.hrfuture.net/startegy/organisational -design/what-is-the-new-organisation/ [Accessed 25 April 2021].

HR Future. 2020. *Trends in the labor market 2020 – 2021.* Available from: https://www.hrfuture.net/future-of-work/trending/trends-in-the-labor-market-2020-2021/ [Accessed 21 April 2021].

Human Sciences Research Council. 2020. *TIMSS 2019: highlights of South African grade 5 and 9 results in mathematics and science.* Cape Town: HSRC.

https://www.fya.org.au/wp-content/uploads/2016/11/The-New-Work-Mindset.pdf

Ihsaan Bassiery, I; Budlender, AJ & Zizzamia, AR (2021) National Income Dynamics Study (NIDS) – Coronavirus Rapid Mobile Survey (CRAM) The labour market impacts of COVID-19 in South Africa: An update with NIDS-CRAM Wave 3. Accessed at: https://cramsurvey.org/wp-content/uploads/2021/02/2.-Bassier-I.-Budlender-J.-Zizzamia-R.-2021-The-labour-market-impact-of-COVID-19-.pdf

ILO (2010) A Skilled Workforce for Strong, Sustainable and Balanced Growth: A G20 Training Strategy. International Labour Organisation: Geneva.

International Labour Office. 2010. *A skilled workforce for strong, sustainable and balanced growth: a G20 training strategy*. Geneva: International Labour Office.

International Labour Office and Organisation for Economic Co-operation and Development. 2018. *Global skills trends, training needs and lifelong learning strategies for the future of work.* Geneva: ILO & OECD.

Iny, D (2018) Leveraged learning; how the disruption of education helps life-long learners and experts with something to teach. Ideapress Publishing: USA.

Jacobs, RL (2019) *Work Analysis in the Knowledge Economy: documenting what people do in the workplace for human resource development.* Palgrave Macmillan: Illinois.

Keevy, J., Vally, Z., Paterson, A., Janda, M. and Osman, A. *Learning and 'Building Back Better' An Early Research Response to the Impact of COVID-19 on South Africa's Education System*.

Mullis, I. V. S., Martin, M. O., Foy, P., Kelly, D. L., and Fishbein, B. 2019. *TIMSS 2019 international results in mathematics and science.* TIMSS & PIRLS, Lynch School of Education.

Ovanessoff, A. 2018. *It's learning. Just not as we know it*. Dublin: Accenture.

Productivity SA. 2020. *Productivity statistics October 2020.* Midrand: Productivity SA.

Rasool, H (2017) Benchmarking Study of Models of Training Lay-off and Retrenchment Mitigation Schemes. SEIFSA/MERSETA.

Rasool, H (2020) Readiness of the metal industry for the 4th industrial revolution. SEIFSA: Johannesburg.

Rasool, H. 2021. *South Africa Rapid assessment of reskilling and upskilling needs arising from the effects of the COVID-19 crisis*. Johannesburg: FR Research Services.

Reddy, V., Visser, M., Winnaar, L., Arends, F., Juan, A and Prinsloo, C.H., and Isdale, K. 2016. *TIMSS 2015: Highlights of Mathematics and Science Achievement of Grade 9 South African Learners*. Pretoria: Human Sciences Research Council.

Schleicher, A. 2020. *The impact of COVID-19 on education: insights from 'education at a glance 2020'.* Germany: OECD.
South Africa. 2020. *The South African economic reconstruction and recovery plan.* Available from: https://www,gov.za/sites/default/files/gcis_document/202010/south-african-economic-reconstruction-and-recovery-plan.pdf [Accessed 22 April 2021].

Statistics South Africa. 2015. *Labour market dynamics in South Africa, 2014*. Pretoria: Stats SA.

Statistics South Africa. 2018. *Quarterly labour force survey, quarter 1, 2018*. Pretoria: Stats SA.

Statistics South Africa. Quarterly Labour Force Survey Q4: 2019.

Statistics South Africa. Quarterly Labour Force Survey Q4: 2020

Statistics South Africa. 2020a. *Labour market dynamics in South Africa, 2019*. Pretoria: Stats SA.

Statistics South Africa. 2020b. *Mid-year population estimates, 2020*. Pretoria: Stats SA.
Accessed at: http://www.statssa.gov.za/?page_id=1854&PPN=P0302

Statistics South Africa. 2020c. *QLFS trends 2008-2020Q4*. Electronic dataset. Pretoria: Stats SA. Available from:
http://www.statssa.gov.za/publications/P0211/QLFS%2520Trends%25202008-2020Q4.xlxs [Accessed 22 March 2021].

Towers Watson, W. and WEF. 2019. *Strategies for the new economy: skills as the currency of the labour market.* Switzerland: WEF.

World Economic Forum. 2010. *The global competitiveness report 2010-2011.* Geneva: WEF.

World Economic Forum. 2016. *New vision for education.* Geneva: WEF.

World Economic Forum. 2020a. *Future of jobs*. Geneva: WEF.

World Economic Forum. 2020b. *Jobs of tomorrow.* Geneva: WEF.