Intsimbi NTI Programme –

Parliamentary Portfolio Committee on Trade and Industry Presentation

the dti
Department:
Trade and Industry
REPUBLIC OF SOUTH AFRICA

intsimbi
NATIONAL TOOLING INITIATIVE

tasa
TOOLMAKING ASSOCIATION
OF SOUTH AFRICA

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ABBREVIATIONS

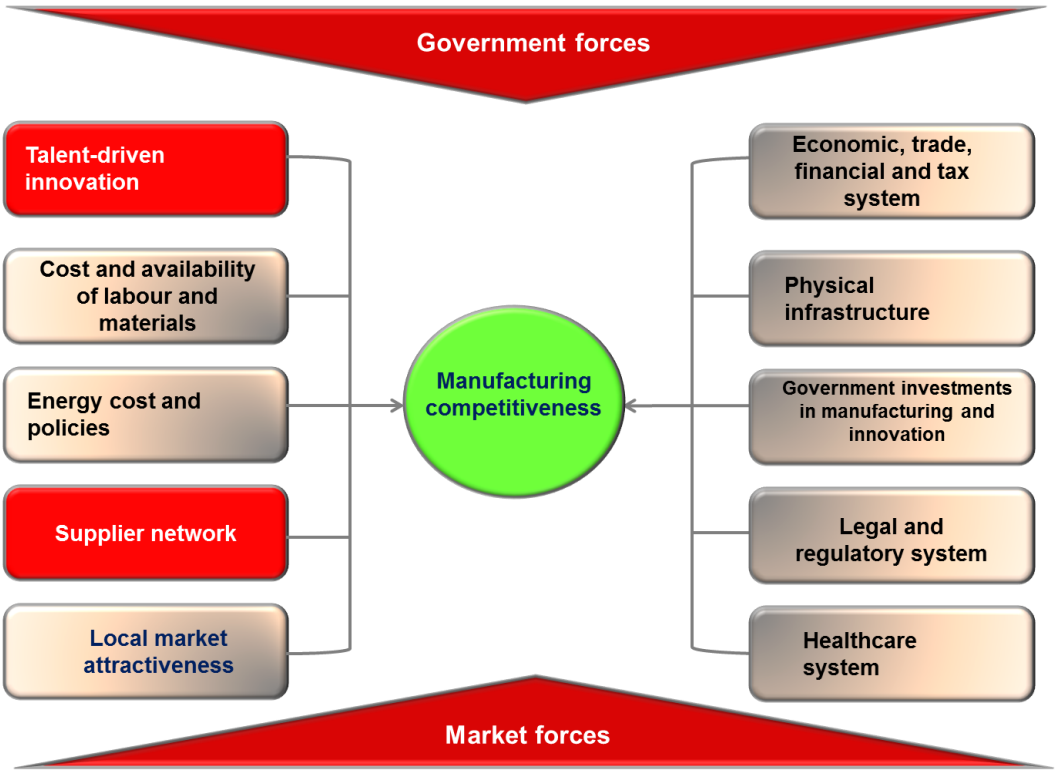
Abbreviation/Acronym	Definition
ANSI	American National Standards Institute
BBBEE	Broad Based Black Economic Empowerment
DTI	Department of Trade and Industry
FMCG	Fast Moving Consumer Goods
GDP	Gross Domestic Product
GMCI	Global Manufacturing Competitiveness Index
IPAP	Industrial Policy Action Plan
MACC	Mobilisation Alignment, Capacity Building and Cooperation Programme
merSETA	Manufacturing, Engineering and Related Services Sector Education and Training Authority
NAMB	National Artisan Moderating Body
NDP	National Development Plan
NECSA	Nuclear Energy Corporation of South Africa
NIMS	National Institute for Metalworking Skills
NTI	National Tooling Initiative
NTIP	National Tooling Initiative Programs
OEM	Original Equipment Manufacturer
OJT	On-the-job Training
QCTO	Quality Council for Trades and Occupations
R&D	Research and Development
ROI	Return on Investment
RTI	Regional Tooling Initiative
SA	South Africa
SAQA	South African Qualifications Authority
SIP	Strategic Infrastructure Project
SIP	Strategic Investment Programmes
SMME	Small, Medium and Micro Enterprises
SOE	State-owned Enterprises
TASA	Toolmaking Association of South Africa
TCOE	Tooling Centre of Excellence
TDM	Tool, Die and Mouldmaking
the dti	The Department of Trade and Industry
TLMA	Tshwane Leadership and Management Academy
TUT	Tshwane University of Technology
TVET	Technical and Vocational Education and Training
USA	United States of America
UT	University of Technology

1. CHALLENGES FACING THE SA ECONOMY AND THE ROLE OF MANUFACTURING

The National Development Plan aims to eliminate poverty and reduce inequality by 2030. Three priorities stand out as part of this plan: **raising employment** through faster economic growth, **improving** quality of education, skills development and innovation, as well as **capacity building** by the state to play a developmental and transformative role in the South African (SA) economy.

First World and developing economies have shifted their core focus to manufacturing as the key driver for future economic growth, and likewise through the Industrial Policy Action Plan (IPAP) of ***the dti***, SA is joining the shift towards more local and export manufacturing. Competitiveness will be a key hurdle for the SA Manufacturing industry to overcome in support of this strategy.

The most important drivers of Manufacturing Competitiveness can be outlined as follows:



Graphic 1: Most important drivers of Manufacturing Competitiveness

According to the 2013 Global Manufacturing Competitiveness Index (GMCI), SA is ranked the **24th** most competitive manufacturing economy globally.

The **top ten** competitive nations are listed below:

	Current Competitiveness	
	Rank Country	Index score
		10 - High
1	China	10.00
2	Germany	7.98
3	United States of America	7.84
4	India	7.65
5	South Korea	7.59
6	Taiwan	7.57
7	Canada	7.24
8	Brazil	7.13
9	Singapore	6.64
10	Japan	6.60
24	South Africa	4.92

	Competitiveness in 5 years	
	Rank Country	Index score
		10 - High
1	China	10.00
2	India	8.49
3	Brazil	7.89
4	Germany	7.82
5	United States of America	7.69
6	South Korea	7.63
7	Taiwan	7.18
8	Canada	6.99
9	Singapore	6.64
10	Vietnam	6.50
25	South Africa	4.77

Graphic 2: Top ten competitive nations

Much of manufacturing in the world centres on higher value-added activities that require highly skilled workers, unique knowledge on the part of innovators and a sophisticated infrastructure. Globally more than 5 per cent of manufacturing jobs remain unfilled due to the ever-increasing **skills gap**.

Government, business, labour and academic leaders must rethink and retool the nation's business environment as globalisation will diminish the low-cost advantages offered in emerging economies, making it possible for SA to play an increasing role in the global manufacturing supply chain.

The Tool, Die and Mould (TDM) manufacturing sector is recognised globally as a key sub-sector of manufacturing that enables competitive manufacturing.

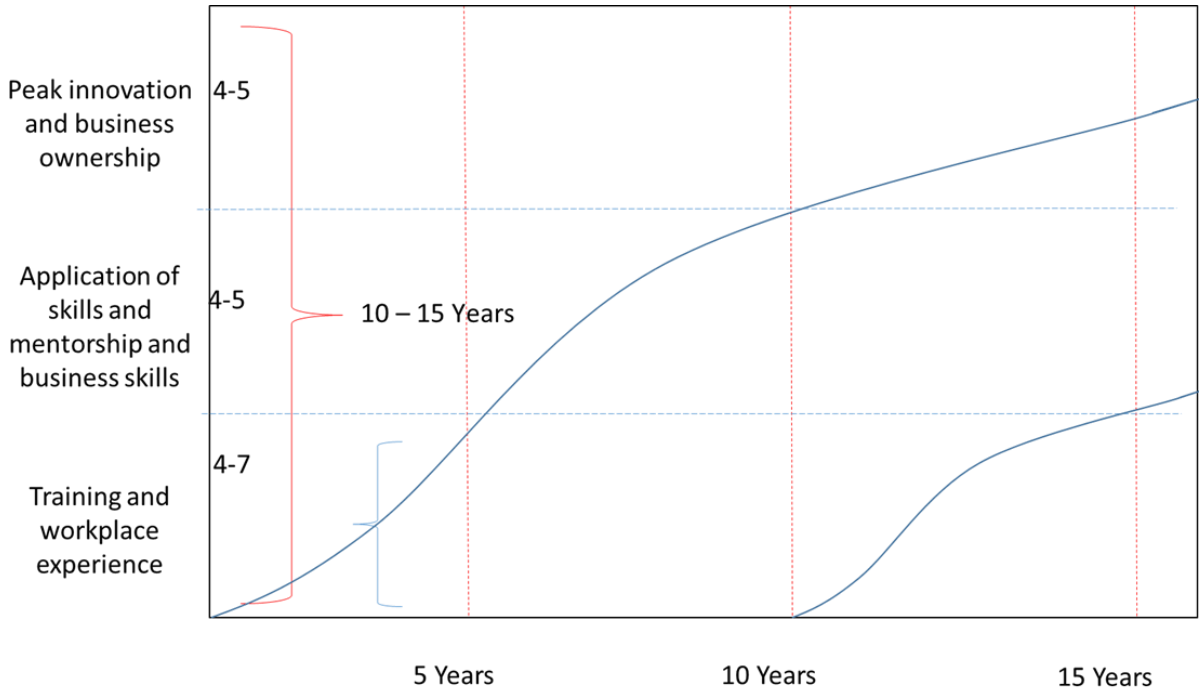
The South African manufacturing sector's contribution towards GDP has since 2004 decreased from 22% to almost 11% mainly due to a decrease in global competitiveness. The main contributors to this decrease are the increasing skills gap, lack of innovation capacity, technology stagnation, lack of recapitalisation and the local markets' lack of access to comparative manufacturing volumes (demand).

The business ownership and the existing innovation capacity within the manufacturing and tooling sectors lies with an aging population grouping with an average age of 58 years and older.

1.1 Increase in skills gap

The development path of a career in manufacturing typically entails the following cycles over a period of 15 – 20 years:

- Formal Education/studies and on-the-job training
- Application of Skills, Mentorship and Business Skills Development
- Peak innovation capacity and business ownership (Transfer to next generation)



Graphic 3: Development Cycle – Manufacturing Skills

1.1.1 Manufacturing and TDM Sector Growth and Transformation Barriers

A key international trend in the manufacturing and TDM Sector is a marked increase in lower profitability and lower return on investment. Typically in the automotive and FMCG (Fast Moving Consumer Goods) the profitability has sunk below 10% for component manufacturing and as low as 3-6% for Tool Die and Mould Manufacturing Sector.

The automotive and FMCG Sectors drive annual cost reduction in spite of labour and raw material price increases. Component and TDM Sector suppliers are thus forced to invest in research, development, and new technology investment to achieve these reductions.

Internationally companies reinvest up to 30% of their annual returns in Research & Development (R&D) and Technology, which then requires new skills to optimise these investments.

Due to this low profitability, low ROI and continuous need for improved advanced skills and experience very low BBBEE investment and new business creation results. Furthermore financial institutions are very reluctant to facilitate investment in the manufacturing and TDM Sectors as a result of the risk profile realising from the above.

New solutions have to be found to finance sector growth and transformation investment.

1.1.2 Formal Education/studies and on-the-job training

The South African Educational environment for advance manufacturing and TDM skills have declined in output and pipeline capacity with outdated curriculum, inadequate teaching capacity, outdated technology, declining investment and failure to attract talent. The ongoing weakening results and output of Mathematics and Science candidates from the schooling system further exacerbates the growing problem. Qualification rates from outdated qualifications are alarmingly low (4-15%).

1.1.3 Application of Skills, Mentorship and Business Skills Development

Due to weak relationships between industry and the educational system as well as incorrectly structured training programmes very little workplace based training takes place to enable learners to acquire the necessary industry experience to be successfully employed in the advanced manufacturing and TDM sectors.

Entrepreneurs thus get very little opportunity to develop knowledge and experience of the operational and financial performance environment of these sectors causing a high rate of new business failure and failure to access funding for new venture creation.

1.1.4 Peak innovation capacity and business ownership (transfer to next generation)

Peak innovation capacity of newly skilled entrance to the advanced manufacturing and TDM sectors, can take between 7 -10 years to develop thus indicating that substantial time will be required to replace the lost innovation capacity of the sectors as a result of inadequate stocking of the pipeline over the last 30 years.

1.2 Lack of Innovation capacity

The aging workforce of the advanced manufacturing and TDM sectors (estimated to be around average age of 58) currently responsible for South Africa's output in these sectors are no longer innovation drivers. It subsequently needs to mentor a new, younger generation of highly skilled innovation drivers to take over their positions as the new business owners and entrepreneurs within the SA manufacturing economy.

1.3 Technology stagnation

In both the educational and business environment technology stagnation and lack of coordinated research and development, support has led to decline in competitiveness in the above-mentioned sectors.

1.4 Recapitalisation

Due to the distressed nature (decline of manufacturing and TDM sector competitiveness) of manufacturing in South Africa, financial institutions including the IDC, are very reluctant to make investment available to small business entrepreneurs wanting to enter these sectors.

2. CREATION OF A SOLUTION FOR THE SOUTH AFRICAN MANUFACTUIRNG INDUSTRY THROUGH A TDM SECTOR PILOT IMPLEMENTATION

2.1 The Programmes

The Intsimbi National Tooling Initiative (NTI) Programme, is a national (South African), multi-stakeholder initiative that was established under the auspices of the Department of Trade and Industry(***the dti***) and the Toolmaking Association of South Africa (TASA) to implement a turnaround strategy for the distressed tooling industry. The initiative is enabling government and industry to cooperate on the large-scale interventions required to rehabilitate the South African Tool, Die and Mould Making (TDM) sector for the benefit of the SA manufacturing sector.

Two major programmes have been identified and defined to drive the rehabilitation objectives of the TDM sector. They are:

- TDM Skills Development Programme; and
- Enterprise Development Programme focusing on Small, Medium and Micro Enterprises (SMME) competitiveness improvement, BBBEE structuring, cluster and export development activities.

Stakeholders participate in and contribute to these programmes on both regional and national levels through formalised legal structures and forums. Although the main performance objectives of the Intsimbi NTI programme remain the same for each period, the detailed outcomes are different for each period as new pilot projects are mobilised within each performance area.

2.2 The TDM Powered Skills Development Programme

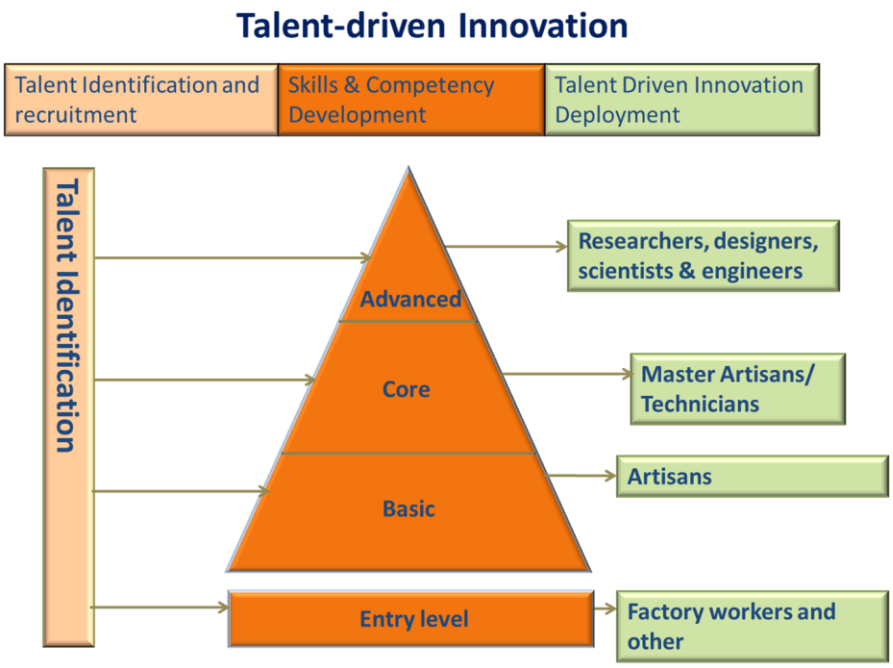
2.2.1 Eradication of the skills gap

No sector creates more economic value or supports more additional jobs than manufacturing. This is reflected in the multiplier effect, and it underscores why a strong and healthy economy requires a vibrant and growing manufacturing sector.

The creation of a Talent-driven innovation system as a priority intervention towards sector competitiveness forms the core of the TDM sector's pilot intervention to eradicate the skills gap.

The core elements of a talent-driven innovation system are (summarised in the graphic below):

- Talent Identification and Recruitment
- Skills and Competency Development
- Talent Driven Innovation Deployment



Graphic 4: Talent-driven Innovation Model

2.2.1.1 Talent Identification and Recruitment

Talent identification and recruitment forms the cornerstone of a Talent-driven innovation system.

Most leaders today recognise that competitive advantage in the knowledge economy is determined and driven by human capital. People are the only asset that innovates, and innovation is the only path to sustained breakthrough performance.

In order to enable the manufacturing and tooling sector to improve their innovation engine it is imperative that the right talent must be recruited, trained and employed.

The Talent Identification/sourcing system includes the following:

- Career Guidance
- Marketing
- Recruitment
- Assessment and Profiling
- Placement into Skills Development System

Graphic 5: The Talent Identification/sourcing system

2.2.1.2 Skills and Competency Development

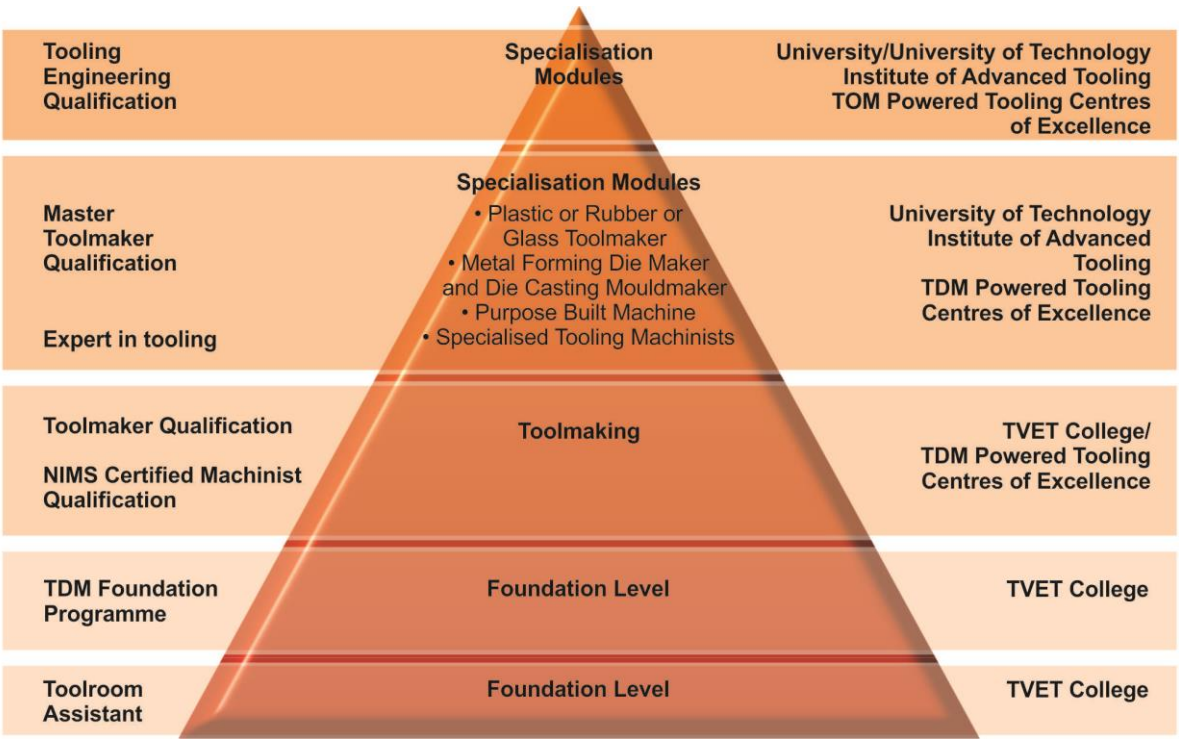
The skills and competency development is based on the establishment of a new competency-based Apprenticeship System, developed by industry in collaboration with international partners and local skills development stakeholders, such as QCTO, NAMB, merSETA, etc. aligned with industry needs and standards to provide a complete integrated solution.

This is based on the following guiding principles:

- International standards and certification;
- Sector specific competency
- Articulation and career pathing
- Modularity, flexibility and cross sectorial application

This seeks to incubate a solution that can be formalised within and transferred to the South African skills system.
This has been done through the implementation of a pilot project named the ***TDM Powered Programme*** with the following objectives:

- Development of a support system to provide students with continuous personal and social support as well as the development of their own career paths;
- Development of regional structures and capacity to enable continuous industry involvement and participation in the provision of workplace experience for students;
- Development of a foundation programme, inclusive of remedial work in the areas of Mathematics, Science, Occupational English, Computer Skills and Life Skills to improve the students chance of success during the toolmaker training programme;
- Develop a South African registered new Toolmaker trade qualification that complies with the local industries' requirements, benchmarked against international standards;
- Develop a South African registered new Master Toolmaker qualification that complies with the local industries requirements, benchmarked against international standards which articulates with the toolmaker qualification;
- Develop and registered new Engineering in Tooling qualification that complies to the local industries requirements, benchmarked against international standards which articulates with the master toolmaker and mechanical/industrial engineering qualifications;
- Create learning content and materials as well as a supply chain for the provision of all materials to the training programmes;
- Create the required system capacity, capability and infrastructure to train students against this new qualifications requirements; and



Graphic 6: The TDM Powered Programme Structure

The Qualifications

The TDM Powered Programme has been designed in a modular way to allow students the flexibility to enter and exit at different stages of the programme. The competency-based nature of the programme provides students with the opportunity to complete the various modules when they reach the competency levels to do so.

The qualifications are made up of the following modules:
- Knowledge module (applied and trade theory),
- Practical skills module (work pieces and online examinations) and
- Work experience module (on-the-job training).

The following qualifications can be obtained via the TDM Powered Programme:

- Toolroom Assistant registered with the merSETA (SP 0627/11-17);
- Foundation Programme certified by the industry body (TASA);
- NIMS Certified Machinist accredited by the National Institute for Metalworking Skills (NIMS), based in the USA (NIMS is accredited by the American National Standards Institute (ANSI) as a developer of American National Standards) ;
- Occupational Certificate: Toolmaker registered with the South African Qualifications Authority (SAQA ID: 91796);
- Occupational Certificate: Master Toolmaker (application lodged with QCTO for registration by SAQA is in progress) inclusive of the Expert in Tooling certified by WBA;
- Masters in Tooling Engineering (qualification development in progress).

2.2.1.3 Talent-driven Innovation Deployment

The TDM Powered Talent-driven Innovation Deployment includes the following:

- Apprenticeship Rotational Placement System – On-the-job training – which provide students with the opportunity to work in companies where they have the chance to strengthen the skills learned at training institutions;
- Company-Student-College Relationship Building & Management – Regional Tooling Sector sub-structure of the NTI Programme, has build capacity to contiuously source new partner companies for participation in on the job training and actively managers the relationships between individual learners, college staff, mentors, and industry participant.

- Post Qualification Placement – Post Qualification Placement is more successful due to the fact that students have already experience the world of work during their on-the-job training periods at companies.
- Student Tracking & Performance Analysis – students are tracked continuously and performance analisys from companies are evaluated
- Talent Warehouse & Continuous Development – the NTI Programme also seeks to develop the future capacity to manage the migration of workers, learners and teaching capacity through a system of continuous development and placement into new opportunities by continuously following the career paths of every individual employed in this sector.

Graphic 7: Talent Driven Innovation Deployment

2.2.2 Delivery Capacity Building for the TDM Powered Programme

2.2.2.1 Implementation of the TDM Powered Programme

The Programme has been implemented since 2010 at a number of partner training institutions with the support of industry for the workplace experience element.

Schedule

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Foundation Programme												
Development												
Capacity Building												
Implementation												
Accreditation of qualification with merSETA												
DHET partnership to mainstream implementation												
Toolmaker Apprenticeship Programme												
Development												
Capacity Building												
Implementation												
Accreditation of qualification with SAQA												
DHET partnership to mainstream implementation												
Master Toolmaker Programme												
Development												
Capacity Building												
Implementation												
Accreditation of qualification												
DHET partnership to mainstream implementation												
Masters in Tooling Engineering Programme												
Development												
Capacity Building												
Implementation												
Accreditation of qualification												
DHET partnership to mainstream implementation												

Graphic 8: Implementation Schedule of Programme

Capacity and Equipment

	Handskill Equipment	Conventional Machining Equipment	CNC and EDM Machining Equipment	Advanced Machining Equipment	Trade Test Centres	Teaching Capacity	Career Guidance, Recruitment and Assessment	Student Support
Northlink TVET College – Wingfield	X	X	X			X	X	X
College of Cape Town TVET College – Cape Town	X	X				X	X	X
Coega Training Centre – Coega	X	X				X	X	X
Border Training Centre – East London	X	X				X	X	X
Umgungundlovu TVET College	X	X	X			X	X	X
Coastal TVET College – Durban	X	X	X			X	X	X
Ekurhuleni East TVET College - Kwa-Thema	X	X				X	X	X
Nuclear Skills Development Centre at NECSA	X	X	X	X	X	X	X	X
Denel Technical Academy – Kempton Park	X	X	X			X	X	X
Tshwane South TVET College – Tshwane	X	X				X	X	X
Tshwane Leadership and Management Academy – Pretoria West	X	X	X			X	X	X
City of Tshwane Hammanskraal – Faranani	X	X				X	X	X
Lephalale TVET College – Lephalale	X	X				X	X	X
Nkangala TVET College – Nkangala	X	X				X	X	X
ELTC Glencore - Eastern Limb Training Centre – Steelpoort	X	X				X	X	X
Western Cape Tooling Centre of Exellence			X		X	X		X
North West University			X			X		X
Stellenbosch University			X	X				X
Tshwane University of Technology			X	X				X

Graphic 9: Capacity and Equipment at participating training institutions

2.2.2.2 Industry

More than 200 companies have provided students with the necessary on-the-job experience that forms an integral part of the training programme.

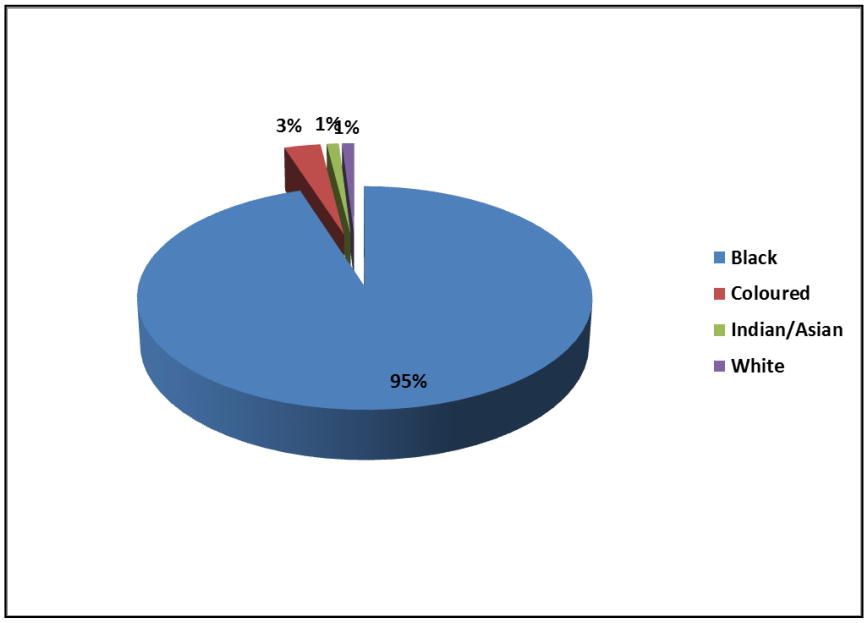
2.2.2.3 Partner Training Institutions

The pilot programme is presented at the following institutions:

- Northlink TVET College – Wingfield
- College of Cape Town TVET College – Cape Town
- Coega Training Centre – Coega
- Border Training Centre – East London
- Umgungundlovu TVET College
- Coastal TVET College – Durban
- Ekurhuleni East TVET College - Kwa-Thema
- Nuclear Skills Development Centre at NECSA
- Denel Technical Academy – Kempton Park
- Tshwane South TVET College – Tshwane
- Tshwane Leadership and Management Academy – Pretoria West
- City of Tshwane Hammanskraal – Faranani
- Lephalale TVET College – Lephalale
- Nkangala TVET College – Nkangala
- ELTC Glencore - Eastern Limb Training Centre – Steelpoort

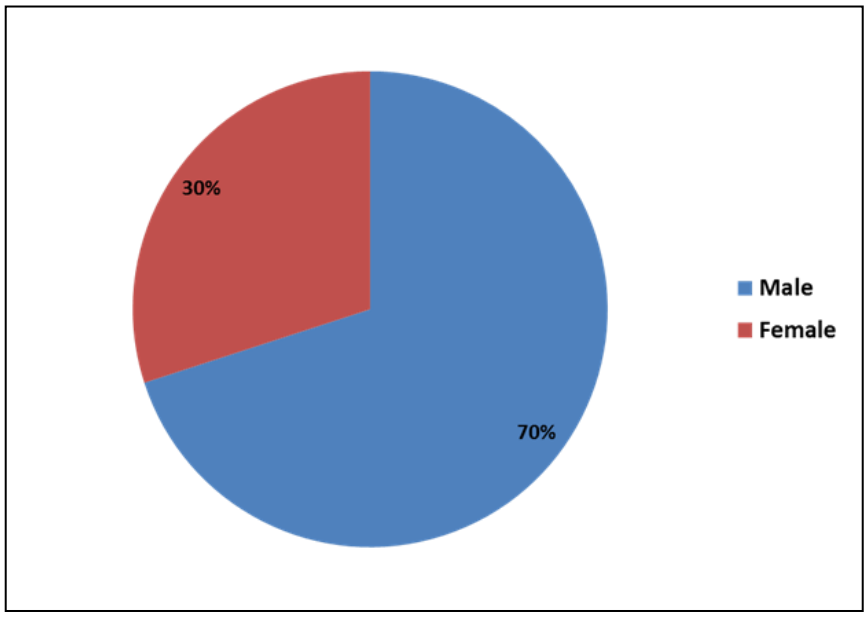
2.2.3 Demographics

2.2.3.1 Population Distribution



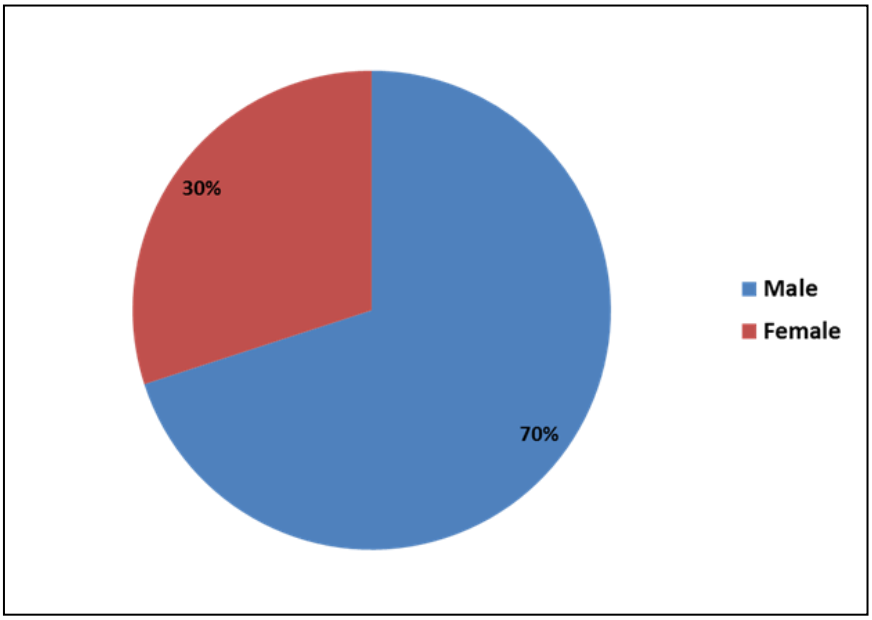
Graphic 10: Population Distribution

2.2.3.2 Gender Distribution



Graphic 11: Gender Distribution

2.2.3.3 Age Distribution



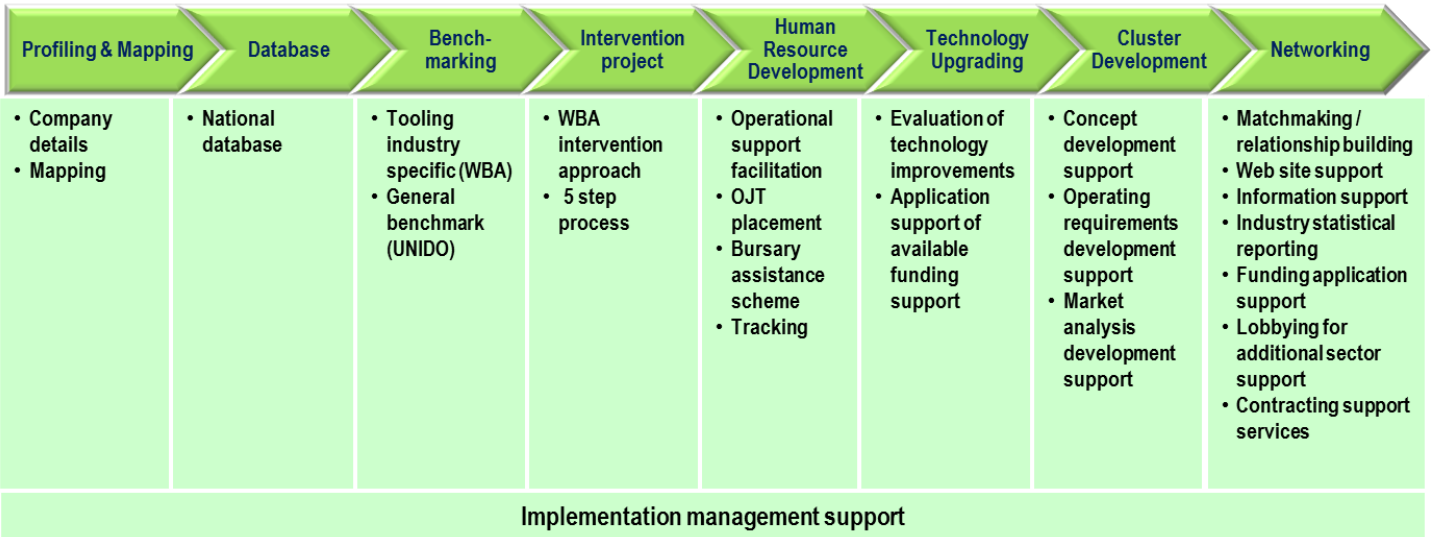
Graphic 12: Age Distribution

2.3 The Enterprise Development Programme

The NTI's enterprise development activities focus on the following:

- Development of the capacity and competitiveness of existing local TDM sector companies;
- Attracting direct foreign investment from top international tooling companies in areas where local technology and skills are unable to meet the demands of industry; and
- Encouraging increased local manufacturing to create jobs.
- Transformation Investment Support into the TDM Sector

The NTI Enterprise Development Programme consists of various activities and support enablers for the Regional Tooling Initiatives (RTIs) and the local tooling industry. The figure below reflects the Enterprise Development value chain and a structure maintained by the Enterprise Development leg of the NTI and the Tooling Association of South Africa (TASA) regional structures, the Regional Tooling Initiatives.



Graphic 13: Enterprise Development Value Chain

Project Growth in Company Participation
Since 2011 more than 67 companies have participated in capacity building projects.

Graphic 14: Project Growth in Company Participation

During the last financial year the following project elements were performed:

- A total of 16 companies were benchmarked nationally in Gauteng and Western Cape via the respective RTIs;
- Intervention projects were launched at three tooling companies and
- Continuous implementation assistance by the NTIP to previously intervened companies.

Transformation Investment Support into the TDM Sector

Over the next five years, the Intsimbi NTI Programme will seek to mobilise investment capacity for newly skilled NTI Programme Entrepreneurs to invest into companies, into companies whose competitiveness and market access has been substantially improved by the Enterprise Development Programme as well as the creation of new TDM Sector companies as a result of business opportunities and market demand arising from localisation projects emanating from the SIP environment and obligations of auto sector Original Equipment Manufacturers (OEMs).