



MERSETA - Metal Chamber Research Project



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List of Acronyms and abbreviations

ATR	Annual Training Report
DHET	Department of Higher Education and Training
FET	Further Education and Training
MEIBC	Metal Engineering Industry Bargaining Council
MERSETA	Manufacturing, Engineering and Related Services Sector Education and Training Authority
NAMB	National Artisan Moderation Body
NPO	Not for Profit
OFO	Organising Framework for Occupations
MISA	Metal Institute of Southern Africa
RPL	Recognition of Prior Learning
SAIF	South African Institute of Foundrymen
SEIFSA	Steel and Engineering Industry Federation of South Africa
SDL	Skills Development Levy
SETA	Sectoral Education and Training Authority
SHER	Safety, Health, Environment Risk
SIC	Standard Industrial Classification
SIPs	Strategic Integrated Projects
SME	Small and Micro Enterprise
SMME	Small, Medium and Micro Enterprise
SSP	Sector Skills Plan
WSP	Workplace Skills Plan

Table of Contents

Chapter 1: Introduction	5
Chapter 2: Research design and Methodology	7
Chapter 3: Findings from a preliminary analysis of available datasets.....	21
Chapter 4: Findings from the Survey.....	22
Chapter 5: Findings from the Regional Workshops	50
Chapter: 6 Key National Policies relevant to development in the manufacturing sector .	54
Chapter 7: Status of qualifications and learning programmes in the metal and engineering sector.....	59
Chapter 8: Current state of affairs for Metals and Engineering Production and Capacity Utilisation	64
Chapter 9: Apprenticeships from an International perspective	72
Chapter 10: The significance of Occupational Health and Safety to Skills Shortage	77
Chapter 11 The State of Industrial Relations in the Metal Sector.....	80
Chapter 12: Concluding Comments and Recommendations.....	85
Annexure A- Survey Questionnaires.....	922
Annexure B: References and Sources	104
Annexure C: Findings and Recommendations.....	107
Annexure D: Research topic for the Metal Chamber of the merSETA	110

Chapter 1: Introduction

This research project was commissioned by the Metal Chamber of the Manufacturing, Engineering and Related Services Sector Education and Training Authority (MERSETA).

This research process began in September 2012. The overall aim of the research has been to gather quantitative and qualitative data from stakeholders regarding the demand for skills in the Metal industry in order to enable the MerSETA to guide key stakeholders in terms of prioritisation of skills, demand driven provision training and development as well as to inform the MerSETA's Sector Skills Plan (SSP) and ensure alignment with national needs.

1.1 Background to the project

The MerSETA allocated funding to the Metal Chamber for a research project on the demand of skills in the Metal sector. The Metal Chamber contracted SEIFSA, the Steel Engineering Industry Federation of South Africa, to project manage the research project and who in turn contracted a researcher to conduct the research project who was an independent consultant with extensive experience in education, training and skills development research however this agreement was terminated for a number of reasons and the work was completed by the Steel and Engineering Industries Federation of South Africa (SEIFSA).

1.2 Purpose of the research

In order to adequately express the needs of the industry in terms of supply and demand of (as this topic can be construed in many ways), a more narrative description was required.

The research required focus on determining the actual need of the industry in terms of vacancies or missing skills and not be based on a Workplace Skills Plans (WSPs) which does not accurately capture this need. The WSP focuses on training that will be undertaken by companies for their current staff compliment and thus does not reflect the needs of their vacancies current or future. The vacancies or jobs that are hard to fill are currently deemed as the *skills in demand*.

Firstly the research needed to quantify the number of vacancies or jobs not filled across the metal and engineering sector, then extrapolating this against the aging workforce to determine the real demand need over a period of time and also to determine training time required to develop learners to address the aging workforce.

i.e.	Engineer	6 years
	Technician	4.5 years
	Artisan	3 years
	Production employee	1 year etc.

Once this information was obtained, the next step was to then determine the number of people currently practising in specific disciplines or “trades” (i.e. there may be 20 000 qualified artisans, however maybe only 12 000 are practising their trade as others may have moved on to higher level positions or into different sectors).

Thirdly the delta (difference) needed to be ascertained between the number of practising skilled people and the demand of skills needed, assuming this will lead to the real required training or developmental need and according to volumes per discipline grouped, will automatically provide an ideal Sector Skills Plan (SSP) based on a real demand of skills needed and not conjecture.

Lastly, a forecasting dimension is needed in the industry: what does the future hold for the Metal industry in South Africa. This is an area that could be considered for research going forward.

Various iterations of the Sector Skills Plan (SSP) have attempted to address the issue of demand and supply of skills, however a sustainable solution has not as yet been found.

In the light of the research problem stated above, empirical and quantitative research was required to address and balance the demand and supply of skills needed in the metal and engineering sector. The purpose of the current project was therefore:

To develop an understanding of the skills needs in the Metal and Engineering sector, the factors impacting on future training needs, key drivers of changes with reference to growth in the sector and national priorities (i.e.– strategic integrated projects and other relevant large scale development projects which would reinvigorate the metal and manufacturing sector)

It is hoped that the findings and recommendations of the research project will also help to inform future empirical research priorities for the Metal Chamber.

Chapter 2: Research design and Methodology

2.1 Introduction

This chapter provides an overview of the research design and methodology that was used for the Metal Chamber research project.

2.2 Research design

The approach adopted by the Counter Part Group (CPG) team for selecting an appropriate research design was to recommend that cognisance be made of the following factors that influence the world of work as well as the demand side of skills needed to provide a more realistic research output reflecting the real skills demanded.

- Vacancies in industry
- Time to fill vacancies in industry (reflects the hard to fill jobs or scarce skills)
- Determine the critical skills in industry based on a set of criteria that reflects the criticality of the job or position in industry
- Projection of skills development time required to develop a learner
- Large infrastructure development projects in place or being planned – in what manner will these projects determine future skill needs?
- Green or brown field developments currently being considered by industry or government
- Changing trends in technology – requires a different skills set. (higher skilled)
- The green factor, carbon foot print considerations will change the world of work and thus skills required
- Determine the number of practising individuals (not registered individuals with professional bodies as most people do not register)
- Establish a compulsory registration body for practising artisans under NAMB

The empirical research needed to be done first as mentioned above, followed by the integration of the data sets and other empirical evidence in order to provide a realistic manner of representing the Sector Skills Plan (SSP).

A high level literature review was also undertaken in order to avoid reinventing the wheel and to ensure that all interested parties had a common understanding of the problem statement. It was intended that the outcomes of the research would also feed into the 2013/2014 MerSETA SSP relevant to the Metal sector. In the interests of

transparency a full list of literature reviewed and data accessed was maintained and updated. These documents are detailed in the Annexure section of this report.

An eight stage process was envisaged with stages four to six running concurrently:

1. Project Set-up
2. Input for 2012 Sector Skills Plan
3. Stakeholder Mobilisation
4. Data Gather – very large employers
5. Data gathering – Medium to large employers
6. Data Gathering – small and micro enterprises
7. Workshops
8. Final Report

Smaller working groups were used, consisting of members of the Metal Chamber (labour as well as employer organisations) to assist in the process.

All contributing members were requested to complete a questionnaire with the resulting information or data sets available for further processing, similar to the Workplace Skills Plan (WSP) and Annual Training Report (ATR) requirements. This was to ensure a solid research output which provides a realistic SSP for the MERSETA and could become the blueprint for determining the national need (demand) as well as a more scientific approach to determine the supply which is currently conjecture (speculation).

The decision as to what types of data would be required for the research study was directly informed by the project's purpose. The first step was to identify what information would be required in order to be able to analyse (i) 'by company size and number of employees'; (ii) 'skills demanded and (iii) 'skills priorities and possible growth scenarios'. The research team worked closely with the CPG members during the research project.

Table 1: Identifying the data required to determine the size and shape of the industry

RANGE	Number of Companies			Number of Employees			Average number of Employees		
	SEIFSA	MERSETA	MEIBC	SEIFSA	MERSETA	MEIBC	SEIFSA	MERSETA	MEIBC
0-10	387	216	3853	2400	1003	18641	6	5	5
11-24	510	175	1960	8613	2597	31895	17	15	16
25-49	493	198	1104	17587	7277	38457	36	37	35

Metal Chamber Research Project 2013							Final Report		
50-99	362	169	627	25436	11986	43754	70	71	70
100-249	302	199	402	47475	31873	62433	157	160	155
250-499	102	86	109	36194	30096	37194	355	350	341
500-999	38	35	48	25525	24026	32522	672	686	678
>1000	30	26	23	62303	55289	41851	2077	2127	1820
Total	2224	1104	8126	225533	164147	306747	3390	3451	3120

The table above provide an analysis of how the sector looks across the different organisations representing employers, employees or both in the industry. The table indicates the size of employers, number of employees and average in the Metal and Engineering sector as per the data gleaned from SEIFSA, MerSETA and the Metal and Engineering Industry Bargaining Council (MEIBC).

An anecdotal analysis of the above existing datasets enabled the sorting and selection of companies to participate in the project through the collection of new, empirical data using an online survey and regional workshops. Datasets were also created by the SEIFSA economics division in order to determine and analyse data such as age, demand of labour and future scenarios related to growth in the sector.

This serves to highlight that MerSETA must be cognisant of the fact that Metal companies also exist in the other sectors i.e. construction. This does have implications including the fact that it could affect the collection of statistics for the Sector Skills Plan (SSP); and/ or it could mean a loss of skills to other sectors, or the reverse.

The benefit of collecting information from a variety of sources is that it enables triangulation. As a general principle, 'triangulation' (a research technique which advocates the sourcing and cross-checking of information from multiple sources) is strongly recommended, as it enhances the validity. As mentioned earlier, a mixed methods research design was selected for this study. In quantitative research, validity 'refers to whether one can draw meaningful and useful inferences from scores on particular instruments' (in this case, the survey) and in qualitative research (in this case, the regional workshops), validity strategies 'are procedures [...] that qualitative researchers use to demonstrate the accuracy of their findings and convince readers of this accuracy' (Creswell, 2009). Chapter 3 outlines the difficulties the project had in triangulating the findings from the three data sources.

A summary of the data sources, together with the methods for data collection and analysis follows in Table 2. Metal Chamber Research Project

Table 2: Summary of proposed data sources, data collection and data analysis methods

Research objective	Data sources	Methods for data collection & analysis
To identify what is currently known about the metals industry in South Africa as well as an understanding of international trends.	Existing literature	Desktop review of available documentation on the metal and engineering industry in S.A. and international developments
To collect new empirical data on the size and shape of the metal industry in South Africa.	Companies within MerSETA, MEIBC and SEIFSA	Online survey: to be administered using Survey Monkey
To collect rich qualitative data from the industry. Where applicable, to collect information as well	Nominated and/ or self-selected participants from companies in KZN, Gauteng and Cape Province	Regional workshops: a participative method for collecting rich, qualitative data directly from participants in a face-to-face setting

2.4 Stakeholder Workshops

The main objective of the regional workshops was to collect sufficient qualitative data.

The CPG suggested three regional workshops be held in Johannesburg, Cape Town and Durban. The workshop programme and a briefing note were circulated to the attendees who were asked to participate and share their expertise.

This part of the research was seen as being critical to the success and not just to focus on Gauteng which would have skewed the findings.

The purpose of Stakeholder workshops were also used to raise awareness and ensure key stakeholder identity as well as preselect useful sources of information from participating employers. The workshop objectives were to identify data and issues to be surveyed. Discuss preliminary identification of likely key issues and establish communication channels for the success of the project.

Workshops were held in Cape Town, Johannesburg and Durban as follows:

- Cape Town 16 October 2012 – 10 People attended
- Johannesburg 1 November 2012 – 4 People attended
- Durban 6 November 2012 - 7 People attended

Unfortunately the attendance was poor once SEIFSA and MerSETA attendees were excluded from the attendance totals. Following these workshops a further three one-on-one meetings were held with Association representatives from the South African Engineers and Founders Association, the Gauteng Tooling Initiative and the Tool Making Association in order to ensure an adequate stakeholder engagement process.

Cape Town - 16 October 2012

The workshop was attended by ten delegates. The absence of large companies was addressed during the large company interviews.

Priority trades identified were: Rigging, Welding, Boiler making, Fitting and Turning, Millwright, Tool making, CNC Machining and Diesel Mechanics.

Discussions centered on important Provincial Economic Initiatives and recommendations were made to open channels of communication in order to allow for sharing of information especially with the *Provincial Skills Development Forum's Metals and Engineering cluster*.

It was noted that there is a lot of cross use of skills between metals and mining, chemical and construction industries. One aspect that is different to most other parts of the country is the exposure to Oil and Gas and the high standards required in that industry.

It was concluded that artisan development was key to the sustainability of the industry, even in periods of relatively uncertain demand.

There were concerns about basic education and technical schools, especially impacting on student capability, discipline, initiative and motivation. FET and other tertiary entities were showing some improvement. The cutting back by companies in view of tough economic times was impacting on long term Human Resources and Skills Development planning and implementation.

A special focus report on the work being done in skills development by the Western Cape Department of Economic Development and Tourism who attended the workshop was requested.

Johannesburg workshop - 1 November 2012

Despite extensive promotion of the workshops via the Associations federated to SEIFSA, the marketing and awareness did not provide the expected turnout for this session. As a result more attention was given to this region by gathering additional questionnaires and conducting interviews.

The workshop was attended by representatives of the Institute of Foundrymen, two large employers and the Constructional Engineers Association.

Priority skills were grouped into basic manufacturing (Toolmakers, CNC machinists, Welders (with an emphasis on coded welders), Boiler Makers, Fitters), Maintenance (Millwrights, Fitters and Electricians) and semi-skilled (Machine Setters, Programmers, Process Controllers and Operators)

Comments regarding the quality of graduates from training providers were similar but there was a clear emphasis on challenges presented by the lack of mathematical skills and technical understanding.

The influence of some key role players outside of the metal sector was identified including Sasol, Eskom and Transnet. Where foreign skills are imported for projects due to shortages it highlighted that must be a requirement that such skills are also

Durban workshop - 6 November 2012

Despite last minute cancellations, the workshop was more successful than in other regions. Representatives included a variety of industry representatives and Kwazulu Natal Engineering Industries Association (KZNEIA). Some of these had multiple representatives which facilitated getting different perspectives across the business value chain including input from Human Resources, Skills Development, and Production Management- specialists.

Priority skills identified were Boiler makers, Fitters, Toolmakers, Electricians, Millwright, Welders, Technical Electronics as well as Maintenance, Production, Operations, Costing and Project management. Additional experience such as in the case of coded welders remains a very real concern.

Concerns were raised that not enough time was provided for gaining practical experience especially under the Accelerated Artisan Training Program (AATP). This is an area that requires further investigation and analysis.

There were stronger concerns about basic education however the role of technical schools in KZN were commended. There remains a consistent concern regarding the ability of students to interact in the business environment and the challenge regarding the lack of problem solving skills was common across all workshops. Bridging courses are helping to a degree however such programmes are intermittent and uncoordinated.

It was noted that there is the possibility that these challenges will be mitigated with the introduction of the Foundational Learning Competence (FLC) which provides competence in communication and numeracy and the ability to learn whilst working. Technology and business processes are becoming far more complex and there are increasing demands from a limited pool of skills which industry is trying to source from. The quality of skills was more often the more important need than the number of skilled people available.

There is still the perception that metal and engineering sectors are not attractive career choices for prospective students. In line with the overarching goals of the policy document on post school educational and training, it is anticipated that the sector could increase its attractiveness through improved career and vocational guidance.

There were concerns that Recognition of Prior Learning (RPL) is not always properly managed and that the assessment process appears to be more lenient in order to help meet targets. The new Policy and Criteria documentation on RPL provides a detailed analysis and framework for these concerns to be curbed. It is anticipated that the national policy on Artisan RPL will also be more responsive to this area of skills development and training.

Additional interviews, returned questionnaires

Additional meetings were held with identified stakeholders in view of the poor response to the workshops, especially in Johannesburg, Gauteng.

These findings highlighted the following challenges:

- lack of entrepreneurial skills and problem solving,
- the limited role of the State Owned Companies in terms of artisan training
- the poor quality of the FET colleges which extensive recapitalisation in order to be responsive to labour market needs
- the need for lecturers and teachers to be better connected to business as well as the need for Tool, Die and Moulding skills which take time to be learnt and are difficult to fast track.

The project was support by sponsorship was from two industry players namely Transman and Adcorp for back office support and to allow the small and medium questionnaires to be administered and analysed separately.

A page was set up on MerSETA website to publicise the research and allow interested stakeholders to register, A letter of support was written by Dr. Raymond Patel the CEO of MerSETA and this was used as a reference at the workshops and face-to face interviews.

MerSETA held an *Inter Chamber workshop* where updates were provided on all the projects being conducted in each of the five chambers. The workshop was held on 30 October 2012 and Guy Harris provided a presentation on the Metal Chamber project.

2.5 The Counter Part Group

During the project, five Counter Part Group (CPG) meetings were held monitor progress and provide directions and guidance in terms of project decision making requirements.

The members consisted of members from the Metal Chamber Committee:

- SEIFSA - Nazrene Mannie (and Chairperson of the Metal Chamber)
- Employers represented by Willy Matthiae, Terence Harrison and Andre Gouws.
- Trade Unions represented by Blackie Swart (Solidarity) and Malebo Mogopodi (Numsa)
- MerSETA representatives – Prof Salim Akoojee and Joseph Peele
- The Department of Trade and Industry (Dti) represented by Mariane Tsoeu

2.6 Piloting the questionnaire

The online survey was piloted from 17-18 May 2013 and the questionnaires were refined further on the basis of the feedback that was received, both in terms of content and user-friendliness. Participants in the pilot were also asked to monitor how long it took to fill in the questionnaire. The average response time was 15-22 minutes, provided the respondent had the relevant demographical information to hand (number of employees etc.).

2.7 Distributing the questionnaire

Survey Monkey was used to target very small, small and medium enterprises (SMME) and large employers. Through this software package the research team were able to develop a simple yet effective survey. At every step of the development process, the software presented relevant options which could be used to address specific objectives.

Instead of being confronted with an onerous and many pages in the questionnaire, respondents were presented with a much shorter, more user-friendly version that was directly relevant to their particular company and the sectors skills needs.

An email was sent to employers via Constant Contact with a covering note explaining the survey and the project. The email also addressed the issue of confidentiality, stating that the only people who would have access to the database of information collected during the survey would be the researchers. Further, the data would only be used for the purposes of the Metal Chamber Research Project and any published data would be aggregated and summarised with no names of individuals or companies being mentioned at any stage.

SEIFSA assisted by sending the above email and link to Survey Monkey to targeted potential respondents through their member associations for onward distribution.

The URL link to the online survey was emailed to all identified organisations on the

mailing database. It was also posted on both the MerSETA and SEIFSA websites. Several communiqués were drafted and SEIFSA mounted an extensive publicity campaign to heighten member awareness, both of the project and the survey.

Transman Pty Ltd and Adcorp assisted with telephonic interviews and tracked the number of surveys completed online.

The survey went live in June 2013. The closing date was extended due to insufficient participation. The survey was eventually closed on 16 July 2013. The number of responses reported ranged per organisation category and overall response rate was not good perhaps because the research was requested at the same time as mandatory grant submissions were due at MerSETA 30 June 2013.

A total of 483 surveys were distributed. 125 did not reach the recipients for a variety of reasons. Therefore the final sample used as the research sample was 59 which equates to 12%. As a general rule, a 10% response rate is the minimum required from a survey in order for the data to be worthwhile. The initial target was 20%. Based on the preliminary estimates:

The table below provides a high level overview of the survey distribution and responses

Size	Email sent	Returned	Completed
1-50	201	29	17
51-999	262	96	30
>1000	20	4	12

Targets were also set for the number of completed questionnaires to be achieved per province, in order to secure a “provincial” picture of the size and shape of the industry. The table below shows the geographic spread figures per province, assuming a 10 % and a 20 % response.

Size	Gauteng	KZN	Western Cape	Eastern Cape	Other	Total
1-50	3	5	5	1	3	17
51-999	13	8	9	0		30
>1000	8	2	1	1		12
Total	25	15	15	2	3	59

The validity is provided in that both the above indicate a low response but 12% is still above the norm.

Not all stakeholders may have been identified and / or feel adequately consulted. Despite attempts to mobilise stakeholders through key influencers, media awareness and workshops in the three major geographic regions (Johannesburg, Cape Town, and Durban) it is inevitable that some were missed. It was originally hoped to have workshops in Ekurhuleni, Tshwane, Port Elizabeth, East London and a second one in Johannesburg but time and budget constraints meant they had to be foregone.

2.8 Analysing the questionnaire

A data cleaning exercise was undertaken to remove any duplications or blank submissions. Survey Monkey then allowed a further detailed analysis of responses especially where correlations were of interest. These findings are presented in Chapter 4.

Table 2: Factors impacting on the future of the Metal and Engineering industry, key drivers for change and skills priorities

Factors impacting on the future and key drivers for change	<ul style="list-style-type: none"> ● Current strengths ● Current weaknesses ● Future opportunities ● Possible future threats ● Key drivers for change in the future
Possible growth scenarios, skills priorities and training	<ul style="list-style-type: none"> ● Possible growth scenarios ● Impact of all the above on skills needs and training and related strategies in the Metal industry ● Attracting and retaining talent ● Optimising skills development pipelines and career development processes

The research team made the decision, however, as a “value add” and to enable the triangulating of data, to undertake a preliminary analysis of two sets of data that were provided by MerSETA’s Sector Skills Plan (SSP) 2011/2016 for the Metal Chamber (merSETA, 2012) and a Contact List of member companies belonging to Associations federated to SEIFSA (2013). The detailed findings are reported on in Chapter 3.

2.9 Questionnaire Design

At the outset, the research team realised that an innovative solution would be needed to deal with what could potentially be a very long and detailed questionnaire, requiring a high level of sophistication in terms of design and administration.

It would have to be capable of collecting not only demographical information, but also information specific to the skills demand needs applicable per company. This exercise became the core component of the questionnaire.

Due to the nature of business within the sector, the number of permutations was likely to be significant. It was clear to the research team that the risk of respondent fatigue was very real and mostly due to the timing coinciding with the Mandatory Grant submissions.

Given the considerable advances in online technology that have taken place over the past few years, and the cumbersome, environmentally unfriendly and time-intensive nature of administering hard copy postal surveys, the decision was made to purchase a one-year licence for an online survey software solution, called *Survey Monkey*. This company is recognised in the research community as one of the world leaders in online surveys. The table below summarises the features that attracted the research team to this particular solution.

Table 5: Features offered by Survey Monkey required for the design, distribution, data collection and data analysis of the Metal Chamber survey

Stage	Feature
Creation of online survey	<ul style="list-style-type: none"> • Easy-to-use and intuitive tool for survey creation with a number of types of questions • Unlimited capacity for questions and answers • Automatic management of “Other, please specify” • Possibility of making the display of certain questions conditional on an earlier response • Possibility of making certain questions mandatory
Distribution of Survey	<ul style="list-style-type: none"> • Direct access through URLij

Stage	Feature
Data collection	<ul style="list-style-type: none"> • Real-time access of respondents to an online spreadsheet • Ability of survey administrator to monitor response rate • Data cleaning: possibility of correcting/ modifying/ deleting answers if needed • Visualization of answers in form mode • Summary of answers • Ability to filter results
Data analysis	<ul style="list-style-type: none"> • Capacity to generate a one-way analysis of all questions • Capacity to generate one-way tables • Capacity to generate cross-tabulation tables • Listing of verbatim results as required • Ability to conduct further statistical tests, as required • Calculation of mean, percentage, frequency, sum as required • Possibility of filtering results • Downloadable in Excel format

Summarised from <http://www.surveymonkey.com>

The research team realised that there was likely to be a considerable learning curve in using the new technology for designing an online survey. The starting point was therefore to draft the questionnaire in hard copy format. The research team worked closely with the Counter Part Group, during this stage. The design process was iterative, with improvements and enhancements being incorporated into the instrument after each draft.

The questionnaire was structured so that the level of analysis moved from organisational level to a sectorial level. The three targeted versions of the questionnaires were used as the starting point for the online instrument. At that point, Guy Harris conducted the regional workshops using the same targeted methodology and developed the online survey instrument, working closely with the Counter Part Group.

The overall finding was that the Survey Monkey software package enabled the research team to develop three simple yet powerful surveys targeted at specific sized organisations over a regional spread. At every step of the development process, the software presented relevant options which could be used to address specific objectives.

A few examples follow:

- The flexibility and sophistication of the Survey Monkey software package facilitated the filtering out of those questions not applicable to a particular respondent.
- The ‘Jumps’ design facility automatically and seamlessly allowed a respondent to skip a question that was irrelevant to their particular context. Some questions could be made mandatory, i.e. the respondent could not move on until it was answered. This was particularly important for questions that were core to the aims of the project.

At a practical level, the above meant that instead of being confronted with an onerous and very lengthy questionnaire, respondents were presented with a much shorter, more user-friendly version that was directly relevant to their particular company.

2.10 Data cleaning

A data cleaning exercise was undertaken to remove the repetitions. Thereafter, using Survey Monkey, one-way tables were generated for each question, as well as cross-tabulation tables in cases where particular correlations were of interest. The findings are presented in Chapter 4.

The value of the survey component of the research is that a reasonably representative cross-section of companies in terms of size and region was achieved.

The data provides a fascinating “snapshot” of 59 companies and some intriguing data on trends and patterns, which ought to be tested through further empirical research.

Chapter 3: Findings from a preliminary analysis of available datasets

3.1 Introduction

The sample dataset consisted of 59 companies and contained information relating to these companies, including geographic location and employee data including occupational information, race, gender and age.

The research team made use of the expertise of SEIFSA's Economist and Junior Economist asking them to cross-check the data sets at a later stage in the report-writing process which revealed a confirmed validity in the information obtained.

Approaches were made to MEIBC and Numsa to provide information on employees/members by company to allow correlation. The MEIBC list totals over 300,000 employees. It is likely that the SEIFSA figures exclude many small companies and the reconciliation of data is important in establishing the population to be surveyed.

3.2 Findings from the MerSETA Dataset

MerSETA supplied the researchers with a dataset summarising the size and regional location of companies on their database. This was cross checked against the 2012/13 – 2016/2017 Sector Skills Plan data. The listing of companies provided by merSETA indicated 165,000 employees.

The MerSETA data showed 44, 000 companies are registered for skills development and only 12,500 pay the skills development levy. This indicates a huge amount that would evidence as being small and micro enterprises (SME) across all 5 chambers. The Metals Chamber is the largest chamber contributing approximately 60% in SDL.

3.3 Findings from the MEIBC Dataset

The MEIBC acknowledged that it had experience difficulty in extracting the data of out of their database because it had not really been intended for extracting this type of information.

The dataset provided information on company size (based on the number of employees) and age but could not determine the geographic location. The dataset created difficulties in that it could not be cross checked against regional information. Therefore the information proved to be too limited to triangulate the survey data. The

dataset does, however enable some very limited and broad comparisons in relation to the survey data.

3.4 Findings from the SEIFSA Dataset

SEIFSA was commended on the extraction of data from their database because it had provided comprehensive information including size, employee numbers and regional spread.

The SEIFSA numbers provided indicated 220,000 employees. Based on this analysis, SEIFSA was able to provide a list of thirty employers with more than 1000 employees.

3.5 Concluding comments

There were clear discrepancies and differences in the databases. The discrepancies were reduced, however amongst larger companies as the larger the company, the more likely it is to submit a workplace skills plan (WSP), annual training report (ATR) and PIVOTAL plan to claim the Mandatory and discretionary grant allocations. As the size decreases, the likelihood of alignment decreases. It should also be noted that each of the institutions collect data for different reasons and therefore one cannot expect exact correlations to exist across the various strata.

It is interesting to note that the MerSETA data is the low end and the MEIBC at the high end. The research team continued on the assumption that the MEIBC data is correct as that is based on levies that all companies have to pay so that data is likely to be the most comprehensive.

It was useful to triangulate some of the data in the survey to obtain an indication of the representivity of the companies that participated in the survey and to continuously validate the data that was submitted.

However, reference is made to the datasets to support some of the survey data.

Chapter 4: Findings from the Survey

This chapter presents the findings from the online survey, which was conducted using Survey Monkey. The methodology that was used is described in Chapter 2. Section 1 covers the organisational profile of the participating companies and Section 2 discusses their employee profile. As noted in the methodology chapter, the final sample consisted of 59 companies, whilst is a really good sample it is not a

statistically representative sample and the findings cannot be generalised to the total population. It does provide us with an overview and more insights into the skills needs and demands of these companies, however, together with the diversity of size and coverage that they represent. Some of the issues and trends identified through the survey are indicative of patterns in the broader population, but this can only be confirmed through detailed empirical research.

In Chapter 5, the survey data will be triangulated with other sources of data (from the regional workshops, the available literature and an analysis of datasets) to cross check the findings.

4.1 Section 1: Organisational Profile

4.1.1 Provincial distribution

The findings indicated that the majority of participating companies are situated in three provinces, the largest namely Gauteng (41%) followed by the Western Cape (25%) and KwaZulu- Natal (25%), Eastern Cape (3%), Mpumalanga, North West Province and Free State (combined at 5%). This finding was not entirely unexpected.

4.1.2 Years in business of participating companies

The results indicated that as would be expected, the majority of participating companies have been in business longer than 50 years (42%), followed by 21-50 and 11-20 combined (25%) businesses less than ten years old are a minority (7%). The total combined percentage indicates that the majority of some of the participating companies are older businesses.

Only one company fell into the 3-5 year category. This could mean that the timeframe from establishment to reaching the three year milestone is a particularly critical one, or that companies in this category do not have time for surveys. It is a well-known fact that these organisations would be particularly vulnerable to market volatility caused by the knock-on effects of the global recession, for example; and to other factors such as insufficiently regulated imports.

Overall, 97% of the companies participating in the survey have been in business for more than 5 years. This suggests that the survey data comes from companies that are reasonably mature, with business processes that are well established. Further inferences and conclusions based on the data collected in the survey should therefore have a higher degree of credibility.

4.1.3 Expansion plans or changes in business of participating companies

The results indicated a clear 50/50% split between a yes and no response from the medium and very large companies participating. This is indicative of a mixed outlook on expansion plans/changes to business.

Participating companies were provided with space to provide comments below the yes/no answered. These further explanations about expansions plans and changes to business indicated a number of useful insights. Whilst on the one hand the expansion plans and changes in business can lead to creating jobs it does also create skills shortages.

It appears that training to fill a company's own needs comes first or training towards company required competencies. Some of the responses indicated that it was better to recruit qualified personnel with the required skills rather than spend time and money on training current employees.

From the additional responses provided it becomes clear that expansion of a business or changes definitely highlight skills shortages. With regards to expansion this would require some additional skills training in regards to new technology and machinery. Again this could be twofold in that by applying new technology we expect to reduce our reliance on a dwindling pool of skills. Yet with the impact of the Green economy more and more technology is needed to reduce carbon footprints.

Contrary to the above point it was also indicated that there would not be a high percentage increase on skill shortages. Companies are currently busy with a recruitment drive to ensure that individuals are trained for the next three years and could form the basis for further growth.

The need for qualified artisans was stressed. It was noted that downsizing based on existing facilities for cost reasons, mature product, low cost imports and scrap exports are all reasons for concern and this in turn affects the skills pool.

Companies that intend to increase production in the next few years as well as to grow the business stressed that a shortage of technical skills would negate this planned growth. Despite this concern, very few companies were willing to quantify the number of new jobs that could potentially be created not would they provide a numerical analysis of the of skills required.

Productivity and (global) continuous improvement drives equates to fewer more highly skilled people. However, this will change with closing loss making labour intensive and

electricity intensive; focus on energy recovery and greater self-sufficiency. This suggests that growth will accentuate shortages.

Expanding to service more of Africa is now a focus area and this training has already started. Technology changes as a result of upgrades may require increasingly better qualified people to operate the automated equipment. Overall this finding indicates contradictory information and further empirical research would be needed to clarify the actual position in the sector.

4.1.6 Major constraints to expanding the business

For the major constraints to expanding business section of the questionnaire, and a list of constraints were provided participants were asked to rate with regards to Major constraints to expanding the business and primary constraints to expansion

Owner capital and finance	5	8	1	14	10%
Debt finance for business	1	4		5	3%
Finance for customers	3	3	2	8	6%
Market demand inadequate	5	17	5	27	19%
Market price too tight	7	10	4	21	15%
Supply availability or cost	6	7	1	14	10%
Regulation/cost of doing business	8	10	9	27	19%
Skills availability	5	14	3	22	15%
Other	3	1	2	6	4%

The results indicate that skills availability is ranked as the third factor with market and regulation being the primary constraints to capacity. The area marked other detailed *labour regulations and restrictions, import competition, lack of profit, cash flow and capacity*

4.1.7 Key risks the company faces

The key risks facing a company followed the major constraints to expanding business section of the questionnaire, and a list of keys risks were provided for participants to rank. The table below provides the Keys risks and the rankings.

Erratic demand	13	5	18	16%
Unreliable supply chain	6	3	9	8%
Loss of key skills	11	7	18	16%
Loss of major market	11	1	12	11%
Foreign competitor disrupting market	7	7	14	13%
Increased local competition	7	3	10	9%
Large customer abusing powerful position	6	1	7	6%
Government policy or regulation difficulties	15	4	19	17%
Other	2	2	4	4%

The results indicate that in this instance 19% of participating companies felt strongly that *Government policy and legislation difficulties* are perceived as a hindrance and a major constraint. This was followed by an identical ranking for erratic demand and a loss of key skills at 16%. This supported the major constraints to expanding the business.

Only 4% identified the area marked *other* and provided the following as other: *employee productivity, unaffordable wages, skills for expansion, cost/productivity vice.*

4.1.8 Key cause of the skills constraint companies face

This question provides insights to the perceived quality of training offered by training providers and a list of keys constraints were provided for participants to rank.

Quality of Secondary Education	10	10	11	31	20%
Quality of FET Colleges	2	7	8	17	11%
Quality of learner and apprentice artisan graduates	5	11	1	17	11%
Quality of University of Technology (UoT) graduates	2	3	3	8	5%
Quality of University graduates	0	3	2	5	3%
Learners lacking practical work experience	6	13	5	24	15%
Employee motivation/work readiness	9	14	4	27	17%
Employment regulations	8	11	2	21	14%
Other	3	2	0	5	3%

Out of the total of 155 results 20% of participating companies indicated that the quality secondary education was a constraint followed by 17 % ranked **Employee motivation/work readiness** as skills constraints.

Other was ranked at 3% and identified the following *rural location, lack organisations to provide training, worldwide shortage in metallurgists, graduate without experience and salary expectations..*

Whilst the DHET, and bodies responsible for quality must continue working together to improve and ensure that the quality of training and skills development this will take time to implement. Vocational and Career guidance should be used as mechanisms to assist with this perceived cause of skills constraints. This means that the DHET, industry bodies and business need to work more closely with the Department of Basic Education.

4.1.9 Improving the quality of graduates from basic education

Participating companies were asked: *‘What could be done to improve the quality of graduates from basic school?’* A space was provided for constraints and the respondents had to provide details under the proposed actions column.

Constraint	Proposed action:
The schooling system within which 80% of schools are dysfunctional Unqualified teachers. Wastage in terms of drop-outs Declining standards	Revise curriculum to be more relevant to school leavers Up skill teachers Build new teacher training colleges Improved school management
Poor results; despite having “passed” graduates do have basic maths and literacy capabilities Students lack proper comprehension Lack career guidance	Extra learning programmes, bridging courses; teachers upgraded and revised evaluation systems. Need more class time and place involvement in visiting skills, partnerships.
Lack of early childhood development, poor maths and science results	Government to introduce strong early Childhood development Centres to manage children development from an early age stage. Resources to support long term goals
Maths, Science and English, Educators not skilled.	Teacher training to be improved at source, basic understanding of concepts required and regular and up-skilling
Few pupils passing mathematics, few pupils doing science	Reintroduction of standard grade maths rather than maths literacy Introduce engineering science
Mathematics Teachers no adequately qualified	Focus area Teacher training
Mathematics and Sciences Quality of facilities	More corporate investment (more coordinated CSI spend) Sponsorship and involvement from employers Better use of resources
Not enough students choosing maths and science	Greater awareness of opportunities and implications of literacy choice, Teaching in the foundation phase to improve, improve maths teachers
Maths and Science and Technical as well as level of competence, standards are far too low, too afraid to fail.	Upping the standards, teacher development, more comprehension less rote

It is worth noting that Maths, Science, and Teachers are listed above on both the constraints and proposed actions.

4.1.10 Improving the quality of graduates from technical schools

Participating companies were asked: 'What could be done to improve the quality of graduates from technical schools?' A space was provided for constraints and the respondents had to provide details under the proposed actions column.

Constraint	Proposed action:
The system. Unqualified teachers. Wastage Lack of equipment	Revise curriculum. Up skill teachers training colleges Better Management
Poor results; despite having "passed" fail basic maths and literacy. Lack proper comprehension Lack career guidance Educators lack practical experience workshops don't have current equipment	Extra learning programmes, bridging courses; upgrade and revised evaluation systems. Need more class time and place involvement in visiting skills, partnerships. Give educators factory exposure. Business and supplier support and better use of department funding.
Few technical schools in most areas	The Government should revisit the current strategy and put emphasis on technical skills.
Not sure of their future, quality of courses	Allow them to do N courses, Align with FET college curricula
Improved maths and science	Establish roaming track laboratory
Few pupils passing mathematics, few pupils doing science	Standard grade maths rather than maths literacy Bring in engineering science and reduce compacting
Quality of graduates, teachers not adequately qualified.	Focus on real understanding Not rote learning. Teacher training
Poor mathematics results, too many do maths literacy	Teach upgrade Greater awareness of impact
Pass requirements are too low	Upping the standard
Testing soon shows graduates not really understand	Teach development, more comprehension less rote learning not just chase the results stats.

The above data indicates a distinct trend *improve technical schools through facilities*. If this data constitutes a trend, this situation could have implications for the provider system.

4.1.11 improving the quality of graduates from FET colleges

Participating companies were asked: *'What could be done to improve the quality of graduates from FET colleges?'* A space was provided for constraints and the respondents had to provide details under the proposed actions column.

Constraints	Proposed actions
The system Unqualified lecturers Wastage, lack of equipment	Revise curriculum reintroduce teacher training colleges Better management
Lack proper comprehension Educators lack practical experience don't have current equipment Lack of career guidance Workshops	Teacher upgrade and revised evaluation systems Give Educators factory exposure Business and supplier support and better use of departmental funding Need more class time and work place involvement in visiting skills, partnerships
Lack of qualified managers	The FET should be managed by professionally qualified people who understand the content and the vision of FET's.
An extension of school via NCV, Poor lecturers	Focus on NCT courses and adult focus Upskill
Improve Maths / Science background	FET Sector needs to appoint knowledgeable lecturers
Teaching for exam rather than for understanding; Lack of graduates from Technical High School	More practical work, teacher needs training, Promote technical jobs to overcome stigma
Quality of graduates, Teachers not adequately qualified have the paper	Focus on real understanding not rote learning, Teacher training, Practical testing, suppliers and companies help
not the real understanding	More involvement from business, More understanding of why not just the how
Not enough NCV graduates	Promote
Quality could be improved	Improve quality of Lecturers
Low level of skills, especially welding, not core specific – too generic	Up the standards and involve business will they listen or just chase the numbers

The general thread from the above is the focus of improving FETs through management. This view is reinforced by the findings from regional workshops. Another

observation is that FET's seem to have some capacity as part of their operations but their supply does not meet business's demand.

4.1.12 Improving the quality of graduates from Universities of Technology (UoT)?

Participating companies were asked: *'What could be done to improve the quality of graduates from Universities of Technology?'* A space was provided for constraints and the respondents had to provide details under the proposed actions column.

Constraints	Proposed actions
Application of learning to practical experience Basic literacy and numeracy	More on site learning Business bridging
Student lack of exposure to industry Lecturer lack of exposure to Industry	Proposal to start P1 and P2 earlier between first and second year Partnering with industry
Lack of alignment between UT and business	Business should have input in the course content.
Lowering of standards to make numbers, Rapid changes in Programs	Maintain standards and change funding model, Stability
Practical experience, Outdated equipment	More Technical workshops; Update technology
Quality of Graduates, Lecturers not adequately qualified, have paper but not the real understanding	Focus on real understanding not rote learning, Lecturer training and practical experience, Practical testing
Quality is variable	Uplift the poorer performing universities of technology
Standards are a bit low at some UoTs	Increase entry requirements
Qualifications merge to closely with Universities/Lack of experience	Rank the qualification independently/more focus on practical modules, exposure and experience

The findings from the above indicate that Universities of Technology require upgrading for more consistent quality to be supplied to meet the demand from business.

4.1.12 Improving the quality of graduates from Universities?

Participating companies were asked: *'What could be done to improve the quality of graduates from Universities?'* A space was provided for constraints and the

respondents had to provide details under the proposed actions column.

Constraints	Proposed actions
Application of learning to practical experience Maths skills	More on site learning More emphasis on the need for mathematical skills
Lack of alignment between University and business	Business should have input in the course content.
Business understanding; Work readiness, soft skills	Include business understanding in curriculum
Quality is vary variable	Uplift the poorer performing universities
Qualifications merge too closely with University of Technology curricula	Lack of experience - more so than UT`s / More focus on practical modules

The findings above imply a much closer synergy between Universities and business is needed to ensure Universities provide what business needs.

4.2 Demand of skills needed in the Metal and Engineering

The key findings with regard to the demand of skills of the 59 participating companies, specifically in relation to their organisations needs are highlighted below. The sample is too small to make firm generalisations to the overall population, therefore what follows represents a 'snapshot' of the 59 participating companies and the trends and patterns that have been found. Some may well be found in the general population, but this would need to be tested by further empirical research and access to an accurate WSP dataset.

The next section of the questionnaire provided companies with questions related to skills demands that had been identified for the Metal industry on the basis of extensive previous research. Companies were asked to indicate the most important aspects related to their businesses.

4.2.1. What are the key non-technical skills gaps?

Entrepreneurial Skills	1	2	3	4%
Problem Solving Skills	18	10	28	34%
Continuous Improvement Skills	17	4	21	25%
Basic English Literacy	12	3	15	18%
Basic Numeracy	10	4	14	17%
Other	1	1	2	2%

Problem solving ranked highest with 34% followed by continuous improvement with 25% perceived as key non-technical skills gaps. Work attitude and production orientation were provided next to the area marked “Other”.

4.2.2. What are the top sources of skilled employees?

In house learnerships and apprenticeships	18	11	29	39%
Universities and Universities of Technology graduates	8	7	15	20%
Rely on Skills development by large Metal employers	10	2	12	16%
Rely on Skills development by other Metal employers	12	3	15	18%
Immigration	0	0	0	0%
Only hire people with 5 Years experience	7	0	7	9%
Other	6	3	9	12%

In house learnerships and apprenticeships ranked highest with 39% followed by **Universities and Universities of Technology graduates** with 20% are perceived as key top sources of skilled employees. *In-house development, Department of Labour database employee relatives and career portals* were provided next to the area marked *Other*.

The following question ***Do you think more use should be made of technical schools?*** was answered with a resounding 100% yes.

4.2.3. Which has the greatest impact on metal skills demand?

Technology	11	11	10%
Economic growth	6	6	5%
Government industrial policies	2	2	2%
Government industrial policies	6	6	5%
Employee attitude and motivation	6	6	5%
Demand in rest of Africa	6	6	5%
Government regulation	5	5	5%
Demand from other sectors	8	8	7%
Infrastructure roll out	8	8	7%
Green Industries	2	2	2%
Other	1	1	1%

This set of data represents the complexity of the current metal and engineering environment. Organisations have a greater requirement on implementing the above factors and this requires different sets of skills especially new approaches to technology, infrastructure roll out and demand from other sectors.

Whilst emerging *Green Industries* are ranked very low it will have a huge impact on skills demand going forward. It suggests that the *Green Economy Accord* which has been signed by government, labour and business has not reached all organisations in the metal and engineering sector in terms of strategic planning and this is an area for emerging growth going forward.

4.2.4. How will technology impact on the demand for skills, supply of skills and mix of skills required?

The next qualitative section posed the question “*How will technology impact on the demand for skills, supply of skills and mix of skills required?*”

Participants were then asked to explain how it would impact, what specific skills will have increased demand and how attrition of lower skilled jobs will be dealt with.

The following recommendations were provided in the responses:

Recommendation 1: *Technology will expand the market for products and increase the skills needs as changing technologies will place greater demand for higher skill levels across the board.*

Recommendation 2: *Technology should facilitate the supply of skills, Change the level of skill required, inverted triangle.*

Recommendation 3: *The demand of welders (coded) is getting critical. In the construction industry advance welding is vital.*

Recommendation 4: *Advances in electronics, hydraulics, diesel mechanics will impact on various trades and possibly remove the level of low-skilled workers in the industry*

Recommendation 5: *The opportunity is created partnerships with technology providers for the establishment of technology hubs.*

Recommendation 6: *An opportunity exists in the foundry sector as foundrys have undergone rapid developments and big changes in operating practice. It is critical that the melter and moulder trades respond to this rapid development.*

Recommendation 7: *There is a need to review the skills value chain across industry and processes in order to understand the impact of technology.*

4.2.5. Beyond compliance requirements, what kind of upskilling is being done?

What follows below indicates a huge amount of upskilling is being done in the metal and engineering sector. Responses included *Adult Education and Training (AET), Learnerships, apprenticeships, 100% study loan for business related (loan cancelled if pass) Bursary schemes for children of employees, use sandwich (learn, release, learn, release) to make it more effective. Ensure competent before employing as artisan (qualified and competent preferred by business vs. qualified but not competent). Individual development based on comprehensive succession planning systems Accelerate technology skills updates.*

The following trades require skills refinement and increased training

- *A-class welders,*
- *Pipe fitters*
- *Riggers*
- *Boilermakers*
- *Crane, tractor, counter-balance operators, riggers assistants, general workers and cleaners.*
- *Identification and development of talented individuals in supervisory (white collar) positions*

- *Supervisory, managerial, six sigma, product specific training, Soft skills, Adult Education and Training (AET), Product specific training*
- *Not at present but looking at providing learnerships in conjunction with clients*
- *Recognition of Prior Learning (RPL) and advancing from low skill areas*
- *Mainly production, learnership and supervisory programs as well as management development programs*
- *Job related skills, learner ship for supervisors is very successful, will be cascaded to operators and specific skills such as PLC`s*
- *For own requirements- welders, coded welders, in house quality, and own inventory system*

4.2.6. Does your company complete a workplace skills plan (WSP)?

The overwhelming responses below indicate that 97% of the participants do complete the workplace skills plan to MerSETA. Small businesses were not asked this questions as the majority of SMEs who employee less than and turnover is less than R500 000.00 are exempt from the Mandatory Grant submission process.

The recommendations from participants are detailed below for the questions ***How could the WSP process be improved?***

Recommendation 1: *Less government red tape, more recognition of internal training and safe after hours training facilities in rural areas.*

Recommendation 2: *By having a more stable demand for our product we could ensure less changes in staffing structures, therefore long term training.*

Recommendation 3: *Programmes could be accommodated and by making it simpler to complete.*

Recommendation 4: *Capacitate the management to be able to do training needs analysis.*

Recommendation 5: *More training facilities to be implemented by government!*

Recommendation 6: *Through buy in by more staff.*

Recommendation 7: *It is more about the SETA to finalise the discretionary grants at least a year before the intended year of grant so that adequate planning can be done*

Recommendation 8: *Implementation.*

Recommendation 9: *Look at more training applicable per industry*

Recommendation 10: *Balanced i.e. to match the business plans as well the industry skills gaps.*

Recommendation 11: *Recognition for company specific training provided in-house (because there is no training facility available for the skills we require)*

Recommendation 12: *Make it more user-friendly.*

Recommendation 13: *We need assistance with training curriculum. The skills plan is being completed more to satisfy MerSETA rather than to satisfy the company's training requirements.*

Recommendation 14: *WSP and ATR's to be less complicated less paperwork, e.g. apprentices, more efficient personnel at Setas*

Recommendation 15: *More efficient and be able to train according MerSETA's scarce skills and NDS 111 strategy*

Recommendation 16: *Needs to move from a bureaucratic system, with reduction in mandatory grant will probably see decline, it is just on paper and not verified in terms of quality of training, too quantitative not qualitative enough, focus more on primary sector needs.*

Recommendation 17 *Simplify – it is overly complex (suburb and age) and is the information used and what for. From SETA side's simplification of the system*

Recommendation 18: *Needs to include measures to try and keep to the plan. Needs to be more business needs driven. How to factor in variation in the economy.*

Recommendation 19: *Management level and link to development plans based on need to do not want to do, more automated and many systems changes, SAP aligned to OFO codes*

Recommendation 20: *The implemented systems and processes are delivering to expectation -However, the rules of completion is revised almost every year i.e. OFO codes etc. this takes long to get the rules in place which changed from the previous year and load on the system.*

Recommendation 21: *Services SETA is not as good as MerSETA and always changing – new systems annually (even Labdex v1 is very different to Labdex v2) and user unfriendly.*

Recommendation 22: *Less bureaucratic, system is slow, difficult to import data.*

Recommendation 23: *Involvement of internal business partners (internal customer) in discussing their needs more practical rather than ivory tower administrative.*

Recommendation 24: *Make it easier, is the level of detail really needed and used as a very large administrative burden.*

Recommendation 25: *Difficult to meet generic codes for unique people, all training should be covered; core skills that are specific should be recognised, too rigid*

4.2.7. Are you aware of any specific skills initiatives in your Province?

The findings from the above question posed indicate that there are mainly no provincial skills initiatives that participants are aware of in their provinces as 70% answered *no*. The 30% that answered *yes* are companies based in the Western Cape Province.

Only the very large sized participants provided information. The medium sized company participants confused provincial with merSETA grants:

What are they	How well are they being implemented	How could they be improved
Western Cape – Yes, welding, oil and gas provincial	Very successful	
Foundrymen patternmaking, moulding and melting by (SAIF) South African Institute of Foundrymen supported by the National Skills Fund (NSF)	Very well	To early to say
Provincial skills Development project learners for people with a disability	Not yet started, too slow	
Welder initiative by ECED	Not training to requirements of industry,	Higher standards program meets advanced manufacturing

4.2.8. Indicate categories in which you expect to see skills shortages i.e. positions which you expect to have difficulty in filling which will impact on your competitiveness/ability to do business:

The finding below indicates that shortages are mainly in the *Skilled* and *Technicians* band with a 20% followed by Engineers at 16%.

Administration/HR/Finance	2	0	2	2%
Engineers	2	6	18	16%
Logistics/ inventory	1	1	2	2%
Management	4	1	5	5%
Project management	4	2	6	5%
Sales/marketing	3	0	3	3%
Service/customer Liaison	0	1	1	1%
Technicians	17	5	22	20%
Other non- manufacturing	0	0	0	0%
Project management (manufacturing)	4	0	4	4%
Supervisors (manufacturing)	4	2	6	5%
Skilled	15	7	22	20%
Unskilled	0	0	0	0%
Other-manufacturing	9	2	11	10%

4.2.9: What are the main reasons for these expected skills shortages?

The main reason for expected shortages as deduced from the compile responses below is lack of suitable candidates.

Labour turnover	9	3	12	22%
Lead time to fill positions	7	3	10	18%
Lack of suitable candidates	16	4	20	36%
New technology	5	1	6	11%
Other	3	4	7	13%

Reasons provided under *other* were ageing workforce/ retirees, availability of graduates, lack of technical skills, unique areas, time to get right person, attracting good people to non-metro areas.

4.2.9: Indicate the trades or occupations in which you expect to see shortages:

The findings below are based on the respondents and not the reasons for shortages and suggest *Boilermaker* (11%) followed by *Fitter and Turner* (9%) are the Trades and Occupations with the most shortages.

Air-conditioning/Refrigeration Mechanic	0	0	0	0%
Armature winder	2		2	2%
Blacksmith	0	0	0	0%
Boiler Maker	7	4	11	11%
Diesel Fitter	1	0	1	1%
Diesel Mechanic	2	2	4	4%
Electrician	5	3	8	8%
Electrical Equipment Mechanic	1	0	1	1%
Fitter and Turner	6	3	9	9%
Fitter-Welder	2	2	4	4%
Forklift Mechanic	1	0	1	1%
Instrument Mechanician	2	0	2	2%
Heavy Equipment Mechanic	1	1	2	2%
Lift Mechanic	1	0	1	1%
Mechanical Fitter	1	1	2	2%
Melter	1	2	3	3%
Metal Fabricator	2	0	2	2%
Metal Machinist	0	1	1	1%
Millwright	5	3	8	8%
Moulder	3	1	4	4%
Patternmaker	2	1	3	3%
Pipe Fitter	2	1	3	3%
Railway Track Master	0	0	0	0%
Refractory Mason	1	2	3	3%
Refrigeration Mechanic	0	0	0	0%
Rigger	2	4	6	6%
Scale Fitter	0	0	0	0%
Sheet Metal Worker	0	0	0	0%
Structural Plater	0	0	1	1%
Telecommunications Technician	0	0	0	0%
Tractor Mechanic	0	0	0	0%
Toolmaker	2	0	2	2%

Vehicle Painter	0	0	0	0%
Welder	3	3	6	6%
Other	2	4	6	6%

4.2.10: Main reason for expected shortages is lack of suitable candidates

The findings below are based on the *lack of suitable candidates* which is ranked the highest at 44% which is more than 26% higher than labour turnover.

Labour turnover	6	3	9	18%
Lead time to fill positions	4	3	7	14%
Lack of suitable candidates	16	6	22	44%
New technology	3	5	8	16%
Other (please specify)	2	2	4	8%

Other was populated with *Ageing workforce / retirees, schooling system. Local labour is too expensive. Welding in the oil and gas industry requires specific skills that are more specialised than what is available in the welding apprenticeship although not as broad as required for a red seal. Our business specifically needs both double coded welders and pipe fitters for oil and gas.*

4.2.11. What can be done to make the industry more attractive to students and new entrants?

Below are the recommendations from participants. In general these are good ideas to promote industry as employer of choice.

Recommendation 1: *Cleaner and safer environment, more workplace exposure at schools and FET colleges, understand earnings potential of skilled artisans, more exposure to children in families that do not have an artisan in the family.*

Recommendation 2: *Exposure to industry while students still at school, partnering with schools in the area and /or with relevant subject focus engineering shows, exhibitions and competitions selection based on student desires, competency rather just what is available, getting students to study where there is demand.*

Recommendation 3: *Emphasis on the pride of the trade. Strong technical foundation is needed from school level. Expose students even at primary level to manufacturing.*

Recommendation 4: *Benefits of skills acquisition, more positive visibility and perceptions of the industry, emphasise the good potential rewards and it is not difficult*

Recommendation 5: *Marketing and career guidance for the trade professions, educators must understand the job markets, companies must talk with schools and access must be made easier, TV program on hard skills, good adverts and role models, promoted by department of labour with support of education environments.*

Recommendation 6: *By implementing career guidance at school level. Hosting open days to explain the various trades to students interested in becoming artisans. More focus on Mathematics and science subjects on school level and colleges to be more affordable for individuals to be able to obtain the relevant subjects required for allowance in an apprenticeship.*

Recommendation 7: *Marketing, make youngsters aware of benefits and earnings potential, more marketing of skills and forward demand, artisans are a great life. Career guidance, make needs and aptitudes better known, get understanding of career paths and opportunities, better use of expos.*

Recommendation 8: *Children reluctant to work with hands, yet it is area of greatest need, need to sell the idea that trades are a good career and jobs are easier to obtain in trade areas, work career expos, especially at high school as that is where decisions are made, by university it is too late. Attract ladies through emphasizing need for precision.*

Recommendation 9: *Understand earning potential, that it is a decent job with good prospects*

Recommendation 10: *Need Bursaries, road shows, if targeted, lack of other job opportunities makes our careers attractive graduate recruitment program at university level, MerSETA had promised to finance but not granted, Grade 4 welder is a short career path, what after at that level - need grading flexibility - if to apprentice take a cut.*

4.2.12: What are the key skills constraints for the business?

The table below details the finding with regards to the participants understanding of key skills constraints for their businesses.

What are the key skills constraints for the business?	How do you plan to overcome these skills constraints?
Low literacy Ageing workforce Melters, process controllers and roll turners	AET Bring in young people Poach from others
Contract bidding and sales Continuous Improvement –people and process (rather than plant and systems) SAP implementation skills Regulatory environment Skills funding to encourage business to do more to support technical training. Availability of technical skills in key areas. Budget constraints	Under investigation Use of Cross Functional Teams Plan to overcome Lobby via SEIFSA and other interest groups for relaxation of labour laws. Lobby DHET and MerSETA via SEIFSA and other interest groups. Work in conjunction with FET to support initiatives aimed at developing technical skills, e.g. Company and DHET partnership to improve a pool of technical skills in the area. Memorandum of Understanding (MoU) signed. Recruitment and selection underway
Leadership skills Technical skills given rapid advances	University level quality training and courses Ways to provide training faster via technology base
Funding Entry level of Maths and Science Knowledge of careers Welders, Pipe Fitters and Riggers	Single funding model, especially beyond own need Improved basic education Career guidance, not decided by what course still has course vacancy Import expatriates and implement transfer of skills
Mechanics Millwrights Boilermakers	Improving the pipeline, improve quality and remuneration
Quality of applicants, especially once tested	Promote on the job training, advanced training/retraining by major companies
Specific skill sets	Keep the pipeline full Bursaries
Technical Production	internal development programmes

What are the key skills constraints for the business?	How do you plan to overcome these skills constraints?
Quality of matriculates Lack work experience Attractiveness of area	Business involvement Work exposure during studies, P1 and P2 opportunities assimilate quicker Promote advantages of area, employ spouses, develop local people
Coded welder, quality, inventory, assemblers, systems Training costs and funding for apprenticeship that are beyond basic competencies, in line with company needs Government regulation around EE and EEAP in the specific region - competent applicants not always meet EE and EEAP requirements	Internal training More pressure on merSETA and NSF to co-fund Lobby for change
Basic education and logic, problem solving	On the job training, certain training courses related to job
The shortage of armature winders in South Africa is a serious threat to direct investment and job creation and the industry. It must be revitalised. As most armature winders are SMEs, the biggest challenge is finding the correct labour, skill and finance for the capital investment that is required for development. Our challenges are in respect of qualified armature winders, the challenge in acquiring the required skills, are major with reference to the: - Cost implications of scarce skills - Sustainability in respect to cost for scarce skills (the increase in acquiring these skills) - Importance of skills development for long term sustainability of the entire armature winding industry in South Africa	“A joint venture between our business and merSETA enabled our company to source from the Labour Department’s data base and from our local communities where poverty, hunger and crime is a way of life as there is not many job opportunities available. This is one of the company’s initiatives which will enable us to play a leading role in developing critical and scarce skills, not only for our company, but for all armature winders in South Africa”. In this strategy to provide a supportive education system, there is particular emphasis on providing access to learning opportunities for post-school learners, specifically work-integrated learning opportunities. The principles are detailed in the Annexures
Metallurgist	Training and development
Welders, and first line supervision	Through in house training and mentorships
Quality Welders and Boilermakers	Internal Training and Quality Management

What are the key skills constraints for the business?	How do you plan to overcome these skills constraints?
Toolmakers	By joining forces with other companies to up-skill the workforce.
Artisan and engineers	source talent by giving bursaries to students and give apprenticeship
Machining, fitting and Turning, Wire Cutting, Designing.	Training has been taking place onsite and this is a huge company as it cuts into the production time!
Cost of training and production down-time	Increased in house training
Machine operators, CNC operators, Welders, Supervisors, Managers	Outsource work, in-house training
Welders and fitters and turners	Internal training initiatives
finding qualified people	look at doing more learnerships and moulding the learners
succession planning of product / machine skills	workforce profiling and risk assessments
Welding skills and maths skills	Want to send 2 guys for their trade test
Laziness, lack of commitment, lack of growth potential in individuals and unrealistic salary levels	Utilise fixed period contracts to determine the actual potential of employees before committing to long term employment.
There is a shortage of technically qualified skilled employees	By recruiting more apprentices
Qualified welders artisans	More apprentice intakes
Technical training	Train more artisans and professionals

What are the key skills constraints for the business?	How do you plan to overcome these skills constraints?
Armature Winding artisans	We are training outside of MerSETA regulations.
Numeracy and literacy amongst school leavers	We source directly from colleges

4.2.13 How could the importation of skills, especially for very large projects, be reduced?

The responses that follow were provided by the respondents. It appears the general view is that *better planning to reduce need to import skills*.

- *By improving quality of artisans trained in South Africa (qualitative not quantitative).*
- *Upskilling SA workforce timeously by getting understanding of demand and demand drivers.*
- *Innovative incentive schemes and retention strategies for artisans will reduce need for importation of skills.*
- *Up-skill local people timeously to competitive standards, projecting the changes in advance and quality of skills learnt*
- *Only once own people are upskilled, depends on degree of local content.*
- *Expatriate artisans have much more experience than the SA craft in certain niche areas like P 91 welding. The current skills transfer initiative on Projects are addressing this shortfall and simultaneously transfer of skills are taking place.*
- *Proper (accredited) training facilities to be in operation well before a major project starts, this will enable the skilled labour who could be recruited locally be prepared and supply the demands. This will also allow new recruits (Novices) to be trained up to fill lower positions but have the basic foundation laid to be up-skilled as per need.*
- *Government regulation and tightening up of work permits*
- *Planning ahead and localization where practical, especially where specific high skilled people are not required.*
- *Forward planning, sending South Africans for overseas training, preparation for skills.*
- *Lack of experience for major projects, but maybe too easy and need to reassess whether actually need to import.*

- *Long term planning could substantially reduce demand as it is the easy way out - match requirements and competency and decent salaries could reduce importation substantially, as a parastatal they should be thinking wider and longer and for good of society.*

4.2.13. Is it possible to improve skills transfer in such situations, if so how?

Indeed from the recommendations provided in answer to this question *better planning can improve skills transfer*

Recommendation 1: *Developmental approach for fellow employees working alongside, start with engineers who can continue operator training (business bridging teach5, test5, practice5) when overseas people leave.*

Recommendation 2: *Use people with knowledge of the skills and the applicable process areas. Harness South Africa's ingenuity.*

Recommendation 3: *Deployment of locals in key areas of projects and documenting their involvement in such projects could assist in building local skill sets and replicating the same in similar projects locally.*

Recommendation 4: *Already do well, need desire from both overseas and local employees for it to be effective.*

Recommendation 5: *Contractual obligation to transfer skills (what and by when otherwise falls by the wayside), send South Africans overseas.*

Recommendation 6: *Building skills in the wider community, not just in specific trades.*

Recommendation 7: *Closer management and monitoring of transfer of skills.*

4.2.18 Do you have any other comments about Skills Demand in the Metals Sector?

This question was answered mainly by the small and medium organisations as very large had answered more open-ended questions above.

- *The process for taking on and qualifying apprentices is - too complicated - changes too often – unpredictable, how many mandatory grants will be available. This stops a lot of small companies to engage in the process.*

- *If the quality of education at school level improved certainly from a communication i.e. English, Arithmetic, (ABET) and computers leading to tertiary education including on the job training without the expectation of high wages, skills levels will improve.*
- *Bring back Artisan training as not everyone is university material. Couple this with more competitive materials locally produced and import restrictions on cheap Chinese imports will improve the manufacturing sector.*
- *Labour, generally, is over-priced, under productive and businesses will automate or downsize to remain competitive.*
- *Manufacturing in the metal industry is highly competitive .We are desperately short of skills.*

4.3. Concluding comments

The survey data from the participating companies, when seen as a whole, rather than as individual components, suggests the following:

- Although the sample size was relatively small it does correspond to to a large extent the diversity of the sector;
- By far the majority of the companies (97%) have been in business for more than 5 years, suggesting a level of stability and maturity in their processes and that the data they provide should have a good level of accuracy;
- Managing quality is a significant concern to industry and companies
- The approach of using questions to draw specific insights about skills demand has yielded rich information about the range of company activity, the networks required, the balance between having the capability and outsourcing.

MerSETA is therefore the SETA with responsibility for most of the companies in the Metal Chamber (based on the sample). However, from such a small sample, it is evident that Metal companies also exist in the other sectors, i.e. Services and Construction. This does have implications: for example it could affect the collection of statistics for the Sector Skills Plans (SSPs); it could mean a loss of skills to other sectors, or the reverse.

The survey data from the participating companies, when seen as a whole, rather than as individual components, suggests the following:

- Mainly older and more established businesses in the industry.
- There is a mixed outlook on expansion plans and foreseeable changes to business will increase skills shortages

- Skills are only the third factor as market and regulation are listed as being the primary constraints to expansion.
- Regulations are a key risk to the sector
- Secondary education and motivation as well as work readiness are causes of skills constraints. The education profile of the industry has changed somewhat from the 1990s and early 2000s, where the owners or general managers of many companies were trained artisans, many of whom started their careers in the late 1960s and 1970s. This generation has retired and a new, more formally educated and younger generation of managers now seems to be at the helm.
- Improvements needed in basic education.
- Improvements to technical schools through facilities
- Upgrading for more consistent quality from Universities
- Problem solving and continuous improvement are key non technical skills gaps
- In-house and graduates are becoming top sources of skills
- Making more use of technical high schools
- Technology and demand from other sectors impacts demand and is variable
- A huge amount of upskilling is being done. The rationale for upskilling is to redress poor education and global competitiveness
- Better planning to reduce need to import skills and improve skills transfer.

The combination of factors points to the emergence a different education and training climate, as well as a different management climate. Many of these trends will be evident in the following chapter dealing with the regional networks.

Chapter 5: Findings from the Regional Workshops

5.1 Introduction

As stated in the methodology section (Chapter 2) the regional workshops took on a very different outlook from what had been expected and generated some very interesting, new data. This data suggests that the Metal Chamber and MerSETA will have to revisit many of their underlying assumptions and consider alternative approaches to skills development in this sector.

5.2. Workshop themes

Common themes emerged at all the workshops. The chapter preceding following have been selected in terms of factors impacting on the future of the Metal industry.

5.2.1 Weaknesses and threats

Macro environment

- Cheap imports, skewed trade protection
- High input costs
- Regulatory and compliance pressure and the high cost of compliance
- Poor image of the industry

Industry-internal issues

- A lack of vision and innovation
- A lack of a culture of sharing and collaboration
- The challenge and cost of shifting from old to new manufacturing technologies
- Changes required to respond to “green” issues and concerns

A shortage of skills

- Difficulties in attracting and retaining skills, emigration, a lack of career guidance (development and progression opportunities)
- A lack of good foundational knowledge and skills (poor basic education); a lack of well-trained employees; a negative culture and a poor work ethic
- An inflexible grant system and slow payments; perceived sudden changes to the grant system; a grant system that is perhaps not always appropriate to Metal industry needs, e.g. emphasising artisan development

5.3.1 Strengths and Opportunities

Current capabilities

- Current industry experience and expertise (however a caution that this is an ageing population despite South Africa's overall youthful population)
- Some world-class companies (or close to being so)
- New technology enabling improved or lower cost solutions
- Some companies have developed IT-based manufacturing systems
- Quality of local products is reasonably good in comparison with the quality of many imports

Improvement programmes

- Government and other incentives and grants
- Cluster initiatives, e.g. Regional forums
- Technology partnerships with overseas companies

New products and markets

- New technology enabling new solutions, new products and new markets
- Economic downturn is creating changes in demand and requires agile responses
- Green solutions involving a greater volume of green skills
- Expanding services into Africa as a new market for current products

Networking, collaboration and idea sharing

- Creating regional forums hosted by employers
- Social media to create discussion platforms
- Sharing ideas with other Metal companies
- Technology partnerships

Refocusing training

- Training for apprentices, technician and engineers
- Training staff for the long-term not just compliance

- Trade shows and Career guidance expositions.

Notable thread:

Behind all the discussions was an articulated action theory. This action theory can be summarised as follows:

IF the Metal industry is going to thrive, THEN companies will have to change the way they do business and become more efficient and economically sustainable

IF Metal companies have to change how they do business, THEN management will have to learn new approaches to enable and support this.

IF management applies these new approaches, THEN all employees involved, including management, will require a different set of skills

IF companies want to acquire these new sets of skills, THEN they will need a new kinds of training interventions to meet these needs.

IF companies engage in training, THEN the training should support company strategic objectives through initiatives to innovate, improve and transform

5.4. Impact on skills development

The impact, in turn, of the key drivers on skills development would be as follows:

- A shift from the short-course paradigm to an extended training period for new entrants in apprentice-style programmes
- Change the current training paradigm to encourage knowledge transfer outside of formal courses and a just-in-time focus
- The development of a coherent strategy and approach to attracting talent

There were intensive discussions regarding the current training paradigm. On the one hand the current providers were providing a useful service and, in general, the companies attending the workshops made considerable use of their services. On the other hand there was a strong feeling that current content and delivery mechanisms were inadequate. Participants felt that the industry needed to:

- Apply some out-of-the-box thinking to training
- Adapt approaches to training to enabling and supporting learners and

- Consider social media and e and m-learning and other delivery mechanisms
- Become more flexible
- Redefine content and add general skills that add greater value to company processes, i.e. implementing quality, Tool box talks, housekeeping, energy awareness, and soft skills such as team work; consider integrating these into the technical training
- Shift emphasis from low- to medium- and high-level skills

Shift from formal to informal training: Equally important was the fact that more attention and effort should be given to on-the-job training and a broad exposure to the full production process for all employed in the organisation including non-production staff. There should also be a greater emphasis on improving knowledge transfer from course to workplace. This was the responsibility of employers but they would need guidance on providing more coaching and mentoring on the shop floor. One of the options was to use newly retired people.

Attracting talent: The industry needs a national strategy and process for attracting talent but there also had to be local support for such a process. The strategy must make the industry more attractive to school leavers and graduate students before they left the institutions. This should also be supported by involving interested students in company visits, follow up sessions and even mentoring.

Chapter: 6 Key National Policies relevant to development in the manufacturing sector

6.1 Introduction

This chapter provides insight into two national policies namely the National Development Plan (NDP) and the Industrial Policy Action Plan (IPAP) that can and will influence the world of work as direct outputs will be Large infrastructure development projects in place or being planned – and talks to the demand side to provide understanding with regards to future demand of Skills Development needs in our industry:

6.2 National Development Plan (NDP)

The National Development Plan has been endorsed as the official road map and cornerstone for growth in South Africa. Owing to the growing importance and role of the NDP in the country, most, if not all, policy proposals from government departments have been released with a heavy emphasis on contributing to the long term vision envisaged by the NDP.

The plan is an extensive proposal commissioned by the Presidency and tasked to the National Planning Commission, which is an advisory body consisting of a 26 experts from civil to private societies, chosen for their expertise in key areas to develop a growth plan for South Africa.

The NDP, does not focus purely on economic interventions but covers everything from promoting the health of our nation, **to transforming education**, to improving the functioning of the state and business. The NDP proposes that transforming the economy and creating sustainable expansion for job creation means that the rate of economic growth needs to exceed 5% per year on average (NDP-Pg39).

Economic history and theory postulate that one of the most successful drivers of economic growth for any country lies in raising aggregate demand through increasing National government spending. Amongst many others, the NDP defines one of the strategic roles of the National government as being one that boosts local demand and grows the economy through massive infrastructure programmes.

The success of large infrastructure spending vis ‘a’ vis economic growth can be attributed to the fact that the large projects require the utilisation of local production capacity, the training of local skills to be used and employed in the infrastructure

projects. Furthermore, long term economic, socio-economic and social equity benefits are derived from long term infrastructure investment. These benefits include and are not limited to;

- Promoting balanced economic development
- Unlocking economic opportunities
- Promoting mineral extraction and beneficiation
- Promoting job creation
- Helping integrate human settlements and economic development

Operating under the auspices of the NDP is the Presidential Infrastructure Coordinating Committee (PICC) together with its supporting management structures. The committee's task is to oversee, integrate and coordinate the long term infrastructure build. It currently sits with projects in consideration to the value of R3.6 trillion to be built over the longer term. Table 1 below, gives the public infrastructure projects pipeline. Many of the projects are still in planning phase and subject to assessment and alignment to the national development priorities. As such the priorities set out by the NDP, will dictate the project selection that best meets the growth and development objectives of the country.

Table 1

R billion	Project stage								Total	Per-cent of total
	Con-cept	Pre-feasi-bility	Feasi-bility	Finan-cing	Detailed design	Tender	Con-struction	Ongoing pro-grammes ¹		
Water	–	–	20	47	22	7	15	20	131	3.6
Transport	383	–	130	19	52	88	25	126	823	22.9
Electricity	300	53	550	–	98	464	385	152	2 002	55.7
Liquid fuels	–	3	209	8	–	–	23	–	243	6.8
Education	12	–	–	68	–	–	18	34	133	3.6
Health	–	–	50	29	–	–	–	37	116	3.2
Telecommunication	12	–	–	0	4	16	3	–	36	1.0
Human settlement	–	–	–	84	–	–	26	–	110	3.2
Total	707	56	958	256	176	575	496	368	3 592	
<i>% total expenditure</i>	<i>19.7%</i>	<i>1.6%</i>	<i>26.7%</i>	<i>7.1%</i>	<i>4.9%</i>	<i>16.0%</i>	<i>13.8%</i>	<i>10.2%</i>	<i>100.0%</i>	

As a start, the 2013 budget has allocated R827 billion to be spent on infrastructure over the next 3 years. This initial trench, will focus on schools, hospitals, clinics, dams, water and electricity distribution, sanitation schemes, building more court rooms and prisons and improving bus, commuter rail and road links. Table 2 below, gives a detailed breakdown of the budget allocation of the R827 billion rand to be spent in medium term expenditure framework.

Table 2

	2011/12	2012/13	2013/14	2014/15	2015/16	MTEF Total
R million	Outcome	Budget	Medium-term estimates			
National departments	6 599	10 802	11 225	14 046	14 329	39 600
Provincial departments	43 449	43 762	46 202	49 385	52 098	147 685
Local government	33 239	38 489	46 940	50 506	53 161	150 607
Extra-budgetary institutions ¹	15 418	15 697	21 493	21 909	23 176	66 578
<i>of which:</i>						
<i>SANRAL non-toll building programme</i>	8 296	9 667	10 206	10 433	10 960	31 599
Public-private partnerships ²	10 710	17 955	7 145	4 504	13 713	25 362
General government	109 415	126 705	133 005	140 350	156 477	429 832
Eskom investment programme	58 815	76 141	72 107	68 016	64 934	205 057
Transnet investment programme	21 821	31 183	37 320	38 815	48 026	124 161
SANRAL ³	5 683	2 012	1 785	1 620	2 669	6 074
Central Energy Fund	1 209	5 226	3 719	2 061	398	6 178
Trans-Caledon Tunnel Authority	1 191	1 659	1 230	3 068	1 871	6 169
Rand Water	1 514	1 352	2 108	1 966	1 820	5 894
Other state-owned companies	8 638	11 627	11 537	15 184	16 992	43 713
State-owned companies⁴	98 871	129 200	129 806	130 730	136 710	397 246
Total	208 286	255 905	262 811	271 080	293 187	827 078

The Presidential Infrastructure Coordinating Committee has compiled an infrastructure book that contains more than 645 infrastructure projects across the country. The projects have been categorised into a total of 18 Special Integrated Projects (SIPs).

In a move that will be welcomed by the private sector, the state indicated that it will need to form strategic partnerships with private firms to co-invest and bring technical expertise to the large public infrastructure projects, if these projects are to be affordable and implementable. In motivation the example of the renewable energy independent power producer programme has been used to highlight the benefits of private public partnership. The project attracted R46.6 billion worth of investment from the private sector in 2012-2013. In addition, treasury has stated that the government is working on a series of reforms to improve regulation and operation of public infrastructure and facilitation of greater private sector participation. This will most surely have a positive effect on skills development and job creation.

6.3 Industrial Policy Action Plan (IPAP)

Where the objective of the NDP is to create a longer term vision for South Africa and strategically deal with systemic and structural issues targeted at 2030. Shorter term policy objectives operating under this vision have been developed in the Industrial Policy Action Plan (IPAP).

The publication of the IPAP is a product of the National Industrial Policy Framework (NIPF). Each successive IPAP publication, published for a rolling 3 year period, seeks

to highlight continuous improvements and up scaling of concrete industrial development interventions, with a 10 year outlook on desired economic outcomes.

The IPAP is framed by and constitutes a key pillar of the National Development Plan. Government interventions set out the by NDP through incorporating IPAP seek to ensure that critical steps in support of restructuring the economy are secured to set it on a more value-adding and labour-intensive growth path (IPAP2012/13-14/15; Pg20).

Metal Fabrication, Capital Equipment and Transport Equipment

IPAP recognises the Metal Fabrication, Capital Equipment and Transport Equipment sectors as being at the centre of economic development. These sectors produce products, applications and services across the entire economy. Furthermore, these sectors form an important component of any industrialisation path and are a key driver of the manufacturing sector's competitiveness. These sectors include infrastructure programmes, construction, general engineering, mining, automotive and packaging.

The industries comprise;

- Basic iron and steel and basic non-ferrous metals (these sub-sectors are not part of the metal fabrication, capital equipment and transport equipment sector, but underpin supply with associated challenges, particularly with regard to pricing);
- Metal products, excluding machinery;
- Machinery and equipment;
- Other transport equipment; and
- Electrical machinery and apparatus

The key to planning lies in fully understanding the constraints facing the sector and where opportunities for that sector lie. Planning then entails developing strategies to fully exploit opportunities, while working around and eliminating constraints.

A number of constraints are explored by the IPAP, and are acknowledged as being the main reasons for inefficiency in the Metal Fabrication, Capital Equipment and Transport Equipment sectors. These include;

- Current procurement practices by State Owned Companies and government departments in relation to large contracts that are not optimal:
 - Lumpy, ad hoc procurement and unrealistic, short delivery times often demanded by State Owned Companies and government departments. These undermine local manufacturing and associated investments. This in turn points to the urgent need for long-term procurement planning; and

- A lack of competitive financing impedes the ability of South African companies – particularly lower-tier suppliers – to compete on an equal footing with foreign companies. Foreign companies often receive highly concessional export financing from their home country's export banks or agencies.
- Inadequate capital investment due to three decades of low demand has led to plants, machinery and equipment not being continuously upgraded or replaced. The import parity pricing of major material inputs such as steel and aluminium remains a major impediment to the further development of these sectors.
- Variable and often out-of-date production and technological capabilities have resulted in the industry losing ground in maintaining local content and being unable to best capture new opportunities offered by both private and public Capital Expenditure programmes.
- There are intense and increasing global cost-competitive pressures, particularly from low-cost imports. This is exacerbated by downward tariff pressures on a number of value-added products. It is therefore imperative to enhance the manufacturing competitiveness of South African suppliers to increase local content and exports. Increased research and development (R&D) levels are key requirements for competitiveness and the development of competencies.

IPAP recognises key areas of opportunity for growing the sector or achieving higher impact as being;

- Boosting the public infrastructure programme presents the single largest opportunity to stimulate the industry. This can be strengthened via a reduction of import leakage of the capital and operational expenditure programmes of State Owned Companies and all spheres of Government;
- Export opportunities exist in relation to infrastructure and mining turnkey projects, especially in the rest of Africa and South America;
- Lack of maturity in South African beneficiation chains presents opportunities to extend value chains through further downstream manufacturing; and
- The new Automotive Production and Development Programme (APDP) offer additional opportunities for metal-component manufacturing.

Chapter 7: Status of qualifications and learning programmes in the metal and engineering sector

7.1 Introduction

The current status of qualifications and learning programmes in the metal and engineering sector is vast. In this chapter detailed explanations are provided that detail the perceived demand of skills training and development with cognisance on workplace occupational directed qualifications for the relevant occupations and trades in our industry.

7.2 Findings

From the detailed research conducted it is evident that a myriad of skills development initiatives supply business, potential learners and school leavers with opportunities to enter and become a part of productive and capable skilled workforce.

Government and national policy to date continuously emphasise that a focus on skill development is needed especially on scarce skills being those skills that directly impact the economy due to unavailability of the skills needed in our industry. Given the upcoming Strategic Integrated Projects (SIPS) and IPAP a pool of skilled and competent workforces (labour market) will be needed to ensure sustainability and an ongoing globally competitive economy for South Africa.

The decision to enter Further Education and Training (FET) or Higher Education and Training (HET) is a multi-stage process involving a series of successive decisions finally resulting in enrolment in either an FET or HET programme clear career and vocational guidance is needed starting in primary schools in order to prepare adequately for the career or vocation being in demand within the labour market.

In the South African context the student choice behaviour study (Cosser with du Toit 2002; Cosser with du Toit and Visser 2004) and the Grade 12 learner pathway study (Cosser 2009a; and 2009b forthcoming) combine a focus on individual student trajectories (particularly useful in understanding the factors that influence students in their decision-making) with a system-level understanding of the flow of students from one year to the next. It appears that career and vocational guidance are not purported or reinforced to enable learners to make informed decisions and this is a critical aspect especially if the extent to which declared intention to enter further or higher education is translated into student enrolment, and ultimately into student graduation and uptake in the South African labour market.

The primary purpose of Further Education and Training (FET) colleges in South Africa is to provide post-school vocational and occupational training, including artisanal training (Department of Education 2008b; DHET 2011, 39). FET colleges are expected to make an important contribution to meeting the demand for intermediate skills and widening post-school participation, particularly for young people who do not proceed to higher education and the NEETs (Not in Employment, Education or Training).

Currently 4.3 million NEETs, some of which have degrees or vocational training but the skills are not needed in the workforce. Perhaps emphasis should be directed at supplying entrepreneurial skills to the young people and the funding mechanism to create sustainable small and micro enterprises which will become the conglomerates of tomorrow.

Findings strongly indicate that FET colleges are accordingly seen as a vital component of the Technical-Vocational Education and Training (TVET) sector. The Medium Term Budget Policy Statement (2009) made expansion of FET colleges a priority and set a NC(V) enrolment target of 20 per cent of youth aged 18-24 who are not attending other educational institutions. The fact that the Department of Higher Education supplied the fifty public FET colleges with funding of R40 billion from the National Skills Fund (NSF) in 2012 for the resourcing and upskilling capacity and infrastructure has not yielded a decrease in NEETs or shorted the skills gap with regards to skills needed.

Prior to the creation of a single Ministry of Higher Education and Training in 2010, the location of colleges in the Education Department and skills development and artisan training in the Department of Labour (DoL) resulted in separate pathways for artisan training in particular with inadequate interfacing of these systems. Public FET colleges have not and are still not seen by business or labour as serving the needs of industry, and industry has not been responsive to the needs of colleges.

Quality challenges in basic education must continuously be addressed in order to supply the high demand for NQF level 4 programmes as these are a response to weaknesses and give way to the need to emphasise a post-school occupational training system or pathway that provides business with the skills it needs.

The findings from the research clearly show over and over that artisan training has emerged as a critical concern not just for industry but that of government. Minister Blade Nzimande has taken a special interest over the last couple of years in driving artisan development and is clearly evident in the mantra: *Make every workplace a training space/place*.

It should be noted that intensive initiatives have started in order to strengthen artisan training, increase the numbers as well as the much needed quality of skilled artisans, particularly in priority/scarce listed trades, through a synergy of strengthening FET colleges, SETAs and business initiatives.

The Skills Development Act of 2008 provides alternative paths to the trade test required to qualify as an artisan:

NC(V) programmes are delivered under the auspices of the Department of Higher Education and Training and quality assured by Umalusi. The programmes integrate theory and practice and provide students with a broad range of knowledge and practical skills within specific industry fields.

NATED / Report 191 programmes are delivered under the auspices of the Department of Higher Education and Training and quality assured by Umalusi. The programmes consist of 18 months theoretical studies at colleges and 18 months relevant practical application in work places. Engineering studies range from N1 – N6 while Business and Utility Studies range from N4 – N6

Learnerships are a means to a NQF registered full qualification and is offered under the auspices of SETAs and quality assured by SETAs.

Skills programmes are based on a cluster of NQF registered unit standards and are offered under the auspices of SETAs and quality assured by SETA ETQAs. Skills programmes can build up to a full qualification.

Of the four routes, only the last one makes specific reference to an '**occupational or vocational qualification**', the previous three make no such reference. This stands in sharp contrast to the traditional route to the trade test (outlined in the Manpower Training Act, 1981 (as amended) where all apprentices were required to complete at least an 'N2' qualification before being permitted to take the trade test.

From the research finding undertaken it clearly shows a 'strong and significant relationship between work experience during studies and subsequent employment'. FET colleges are currently ill-equipped to help students find this experience – and given that this experience is not required by the NC(V), their incentive to do so is weak. However the Skills Development Amendment Act (2008) states that a person who has completed an NC(V) or 'any other learning programme resulting in an occupational or vocational qualification' must complete a period of 'prescribed work experience' before they are entitled to do a trade test (Skills Development Amendment Act, Act 37 of

2008, Section 2D(2)(d)). If learners want to progress to become artisans, work placements are essential.

The Minister of Higher Education and Training has made the development of a policy response to this problem a priority, SETAs are required to address this challenge in the service level agreements. SACPO has proposed that this challenge be addressed by designing a system-wide partnership framework with the SETAs, who have a countrywide network of organisations and grant funding mechanisms to incentivise firms to guarantee a far greater number of workplaces for FET college students and to sponsor more thorough-going oversight of students when so placed.

Suffice that it might just be possible that together these new mechanisms will energise and uplift the partnerships between FET colleges and the world of work in other areas too.

In the face of the demand for higher-level skills in the industry and a national plan to tilt the balance of enrolments towards the sciences, engineering, and technology (SET), growth in annual enrolments in SET programs is lagging behind average annual growth in undergraduate enrolments. There is clearly an “inverted pyramid” in higher education, with enrolments in universities considerably exceeding those in FET colleges. In order to address these challenges our industry needed to determine skills demands for medium and long term needs and ensure that scarce skills are made attractive to the youth and filtered into the career and vocational guidance information distributed.

There appears to be a clear mismatch between the statutory minimum requirements for admission to higher education and the level of academic preparedness needed for succeeding in South Africa’s current higher education programs and this is a clear indicator that basic education and further education need to bridge the invisible divide.

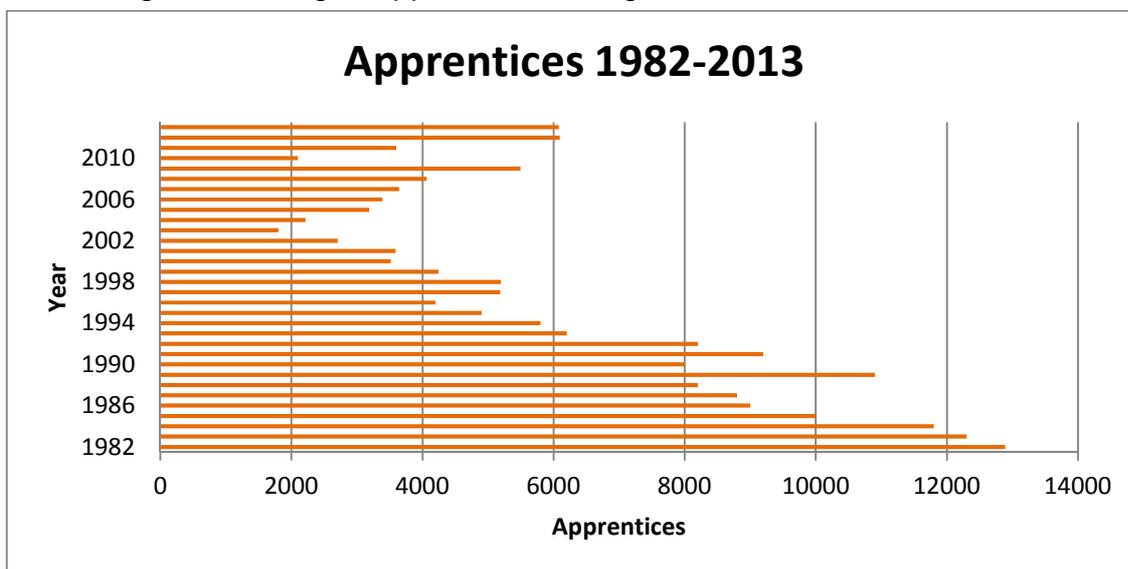
If the current programs of the higher education sector are not proving skills and training responsive or, for the matter, relevant to educational and learning needs of the industry and find ways to improve the quality of schooling over the long term, particularly in science and mathematics.

This begs the questions are the current policy assumption of a level playing field an obstacle to improving the quality and the quantity of higher education graduates? And does this constrain the higher education system from effectively closing the skills gap?

Curriculum reform, facilitating improvements in teaching and learning, and differentiating the roles of existing higher education institutions are becoming more and more important if we are to improve future system performance.

The current approach to “steering” higher education through funding, formal differentiation and the approvals process for programs and qualifications has had a limited effect on changing overall enrolment rates and the distribution of enrolments across disciplines. The official differentiation of the sector bears little relationship to the actual diversity of higher education institutions.

There are currently 125 listed trades in South Africa and within the Metal and Engineering Sector there are 33 listed apprentice trades. The graph below indicates the waxing and waning of apprentice training from 1982 to 2013.



Interesting to note is the fact that a number of accredited training providers and decentralised trade test centres are listed on the MerSETA website but not enough information could be found to indicate that apprentice trades are being made interesting/exciting or how to go about becoming an artisan, the career path, education needed.

The *South African Qualifications Authority's* (SAQA) website can be used to find unit standards, qualifications and skills programmes. It also details a multitude of registered qualifications under the search system for *Metal Engineering*; however no other information is provided. Links are provided to the *Quality Council for Trades and Occupations* (QCTO) information is limited. The *National Artisan and Moderation Body* (NAMB) has even more limited information.

The *Engineering Council for South Africa* (ECSA) provides detailed information about the professional engineering career and also provides an exciting portal *Engenius* for career and vocational guidance.

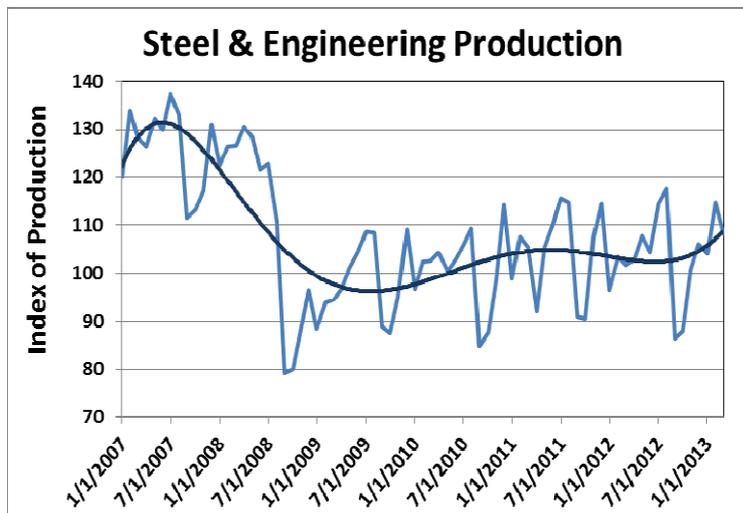
Evidence suggests that these providers, intuitions and para-statal appear too operate with insufficient integration of the holistic needs of the sector as interrelated components of the post-school education and training system.

A robust interface and on-going engagement with employers is also critical.

Chapter 8: Current state of affairs for Metals and Engineering Production and Capacity Utilisation

The latest (**June 2013**) data on **volumes of production and sales** have been published by Statistics South Africa in the beginning of August.

Graph: 1 Steel & Engineering Production



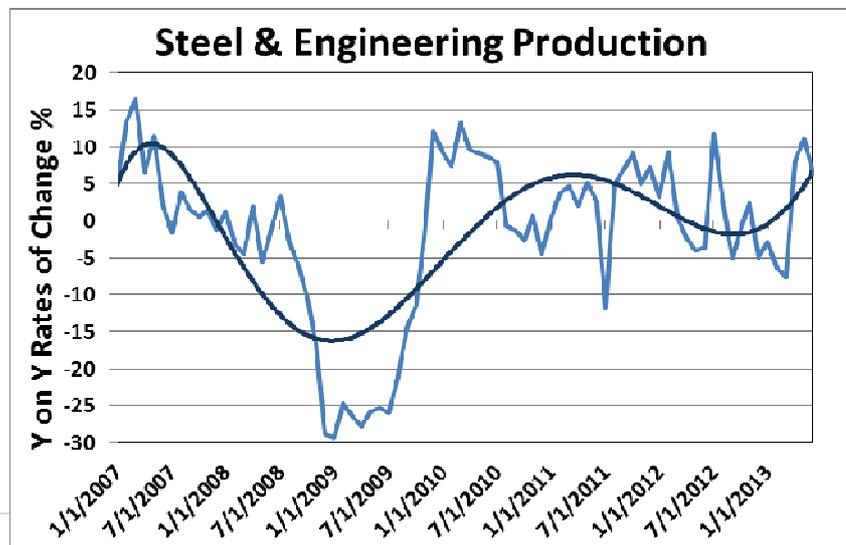
Graph 1 show the production trends for the combined steel and engineering sector. The trend line shows a slowly upward pattern since the low point in 2008, albeit very gradually. The overwhelming characteristic remains the severe volatility with highs and lows often above and below 10% of the average.

The severity of the ‘swings and roundabouts’ are clearly reflected in the year on year

Source: Statistics South Africa

growth rates shown in graph 2 below. Although this is only one way of comparing current levels with those of a year ago, the picture of volatility is reinforced.

Graph 2: Rates of Change in Production



The overall situation can be summarized as follows;

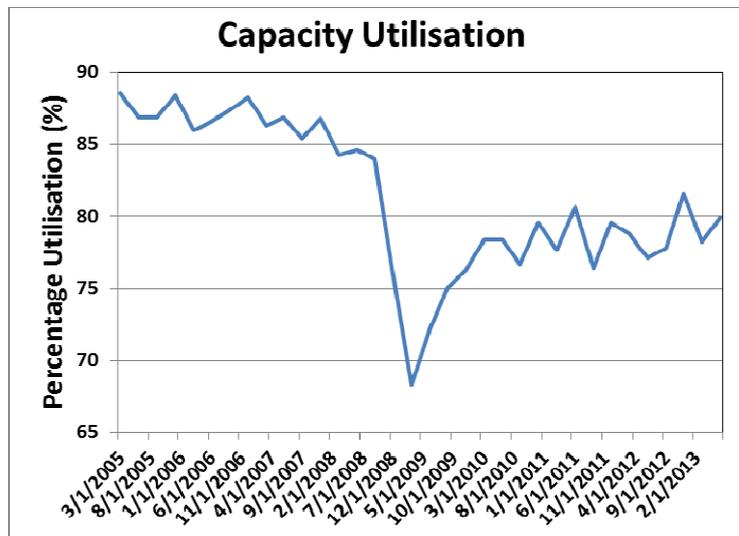
- June compared to May (2013); -2,4%,
- 6 Months of 2013 compared to 6 months of 2012; a decline of 1,2%,
- 12 Months (ending June 2013) on 12 months

(ending June 2012); -0,6%,

- June 2013 on June 2012; growth of 6,4% (year on year comparison) shown in graph 2.

Source: Statistics South Africa

Graph 3: Capacity utilisation in steel & engineering



Graph 3 shows how capacity utilisation in the sector hardly touches 80%, whereas 85% and higher is deemed to be full capacity.

It also shows the profound impact of the international financial crisis and how post crisis utilisation differs from the pre-crisis levels

Source: Statistics South Africa

Growth comparisons for the Steel and Engineering sub sectors; (referring to table 1 below)

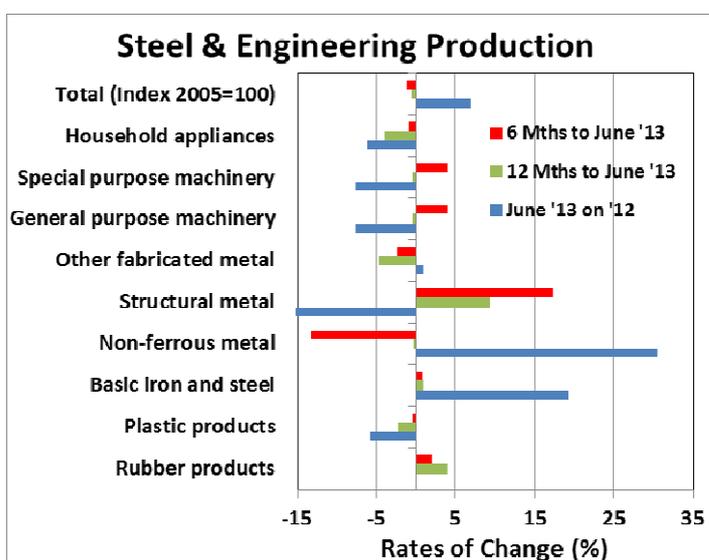
- The **month on month** growth figures for June compared to May this year (column 4) shows contractions for each industry, bar basic iron and steel (+1,7%) which was mainly due to Mittal's Vanderbijlpark works getting back on stream.
- When the **year to date** production (**6 months** of 2013; column 3) is compared to the same 6 months of 2012, the sector contracted by 1,2%. The industries showing the most losses were, non-ferrous metals, fabricated metals and electrical machinery and equipment. The others were static or grew slightly.
- Over **one year**, production in steel and engineering (**12 months** ended in June 2013; column 7) contracted by 0,6%. Rubber (+4,1%), basic iron and steel (+0,9%), and structural metal products (+9,4%) all showed growth, with the other industries static or in decline.
- The **year on year** figures (June 2013 against June 2012; column 8), showed an **6,4%** increase in production, simply because June 2012 was a particularly slow month.

Table 1: Sub sector analysis

Index 2010 = 100	6 Mths		Y on Y	Mth on Mth	12 Months		Y on Y	Y on Y
	Year to date (Jan-June '13)	Prev year to date (Jan-June '12)	6 Mths	(June/May)	Year to June '13	Year to June '12	12 Mths	June 2013 on June 2012
	Index	Index	%	%	Index	Index	%	%
	1	2	3	4	5	6	7	8
Rubber products	120.3	122.9	2.2	-6.4	115.8	121.1	4.6	0.0
Seasonally adjusted	118.7	121.1	2.0	-2.2	115.8	120.5	4.1	0.1
Plastic products	102.6	102.4	-0.2	-6.9	107.7	105.3	-2.3	-5.8
Seasonally adjusted	107.5	107.0	-0.5	-6.1	107.9	105.4	-2.3	-5.8
Basic iron and steel	94.2	94.5	0.2	-9.9	91.7	92.5	0.9	18.0
Seasonally adjusted	92.4	93.2	0.8	1.7	91.6	92.5	0.9	19.3
Non-ferrous metal	107.9	93.6	-13.2	-8.1	102.6	102.5	-0.1	29.7
Seasonally adjusted	110.4	95.8	-13.2	-1.8	103.1	102.8	-0.3	30.5
Structural metal	85.3	100.4	17.7	-3.0	91.3	99.7	9.1	-15.4
Seasonally adjusted	87.4	102.5	17.3	-4.6	91.0	99.6	9.4	-15.2
Other fabricated metal	112.0	109.5	-2.2	-4.9	114.4	108.9	-4.8	1.0
Seasonally adjusted	114.9	112.1	-2.4	-2.8	114.2	108.9	-4.6	0.9
General purpose machinery	100.8	105.2	4.3	-2.4	108.2	107.8	-0.4	-7.5
Seasonally adjusted	106.1	110.3	4.0	-1.8	108.1	107.6	-0.5	-7.7
Special purpose machinery	111.1	109.3	-1.6	-3.5	112.8	111.1	-1.5	8.0
Seasonally adjusted	115.1	113.4	-1.5	-5.3	112.7	111.0	-1.5	8.1
Household appliances	113.2	112.5	-0.5	-4.1	114.6	110.0	-4.0	-6.0
Seasonally adjusted	116.1	115.1	-0.8	-6.8	114.5	110.0	-3.9	-6.2
Total (Index 2005=100)	103.6	102.3	-1.2	-5.8	104.3	103.7	-0.6	6.4
Total (Seas adj)	105.7	104.5	-1.2	-2.4	104.3	103.7	-0.6	7.0

Source: Statistics South Africa

Graph 4: Growth rates for steel & engineering sub industries



Graph 4 shows how drastically these growth comparisons can differ depending on which one is chosen.

The 'base effect' coming through in the year on year figures can be very misleading, but is unfortunately the measurement that gets the most publicity.

Manufacturing Confidence and Steel and Engineering production

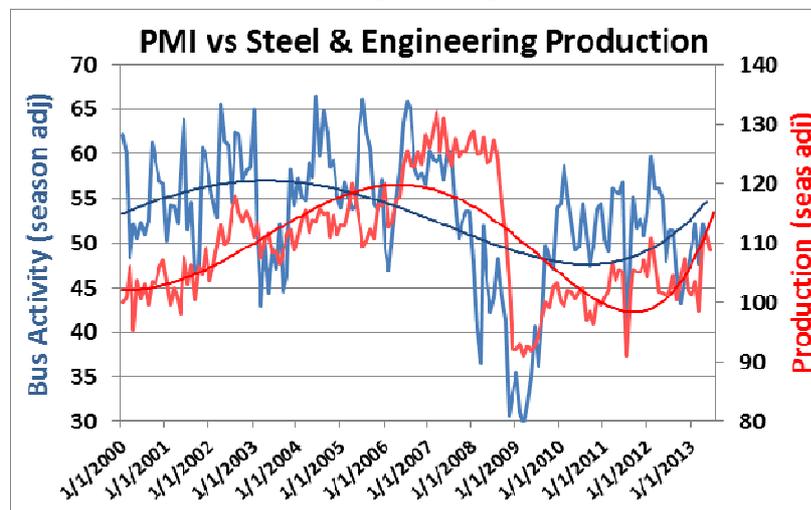
The latest **Purchasing Managers' Index** data was released early August and covered up to the month of **July 2013**. This measure gives some idea of perceptions about prospects for the total manufacturing sector, not specifically for steel and engineering. The 'business activity' sub index of the PMI seems to correlate with steel and engineering production. Table 2 shows the patterns for this sub index. There has been a small decline in July on June (column 4), but for the 7 months of 2013, the increase was nearly 7% (column 3) and for 12 months ending in July (compared to 12 months ending in July 2012) more than 8% better (column 7). July 2013 index number was slightly higher than in 2012 (column 8).

Table 2: PMI analysis

PMI	7 Mths	7 Mths	Y on Y	Mth on Mth	12 Months	12 Mths	Y on Y	Y on Y
	Year to date	Prev year to date	7 Mths	(July/June)	Year to July '13	Year to July '12	12 Mths	July 2013
	(Jan-July '13)	(Jan-July '12)	%	%	Index	Index	%	on July 2012
	Index	Index						%
	1	2	3	4	5	6	7	8
Business Activity	47.8	51.1	6.9	-1.5	48.9	53.3	8.9	0.9
Seas adj	50.9	54.2	6.6	-0.8	49.2	53.3	8.4	0.9

Source; Kagiso/BER PMI survey

Graph 5: The Purchasing Managers' Index and Steel & Engineering Production



Graph 5 compares the levels of the Purchasing Managers' Index with that of Steel and Engineering Production.

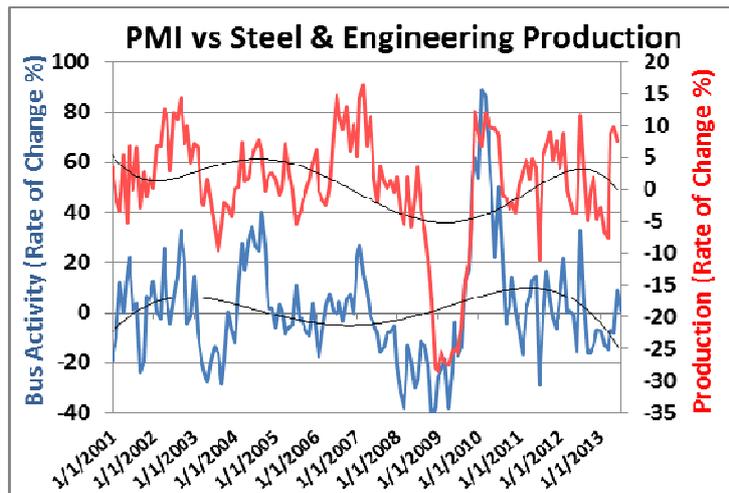
The 'business activity' (+8%) and 'new sales orders' (+4%) sub-indices of the PMI have been improving for some months now.

Source; Kagiso/BER PMI survey & Statistics South Africa

Graph 6: Rates of Change in the PMI and Steel & Engineering Production

The overall PMI has been above the 50 index level for 4 months, having improved 4% over a 12 month period. These small improvements reflect how tenuous confidence is.

Graph 6 shows clearly how changes in steel and engineering production follow the PMI activity index changes.



Source; Kagiso/BER PMI survey & Statistics South Africa

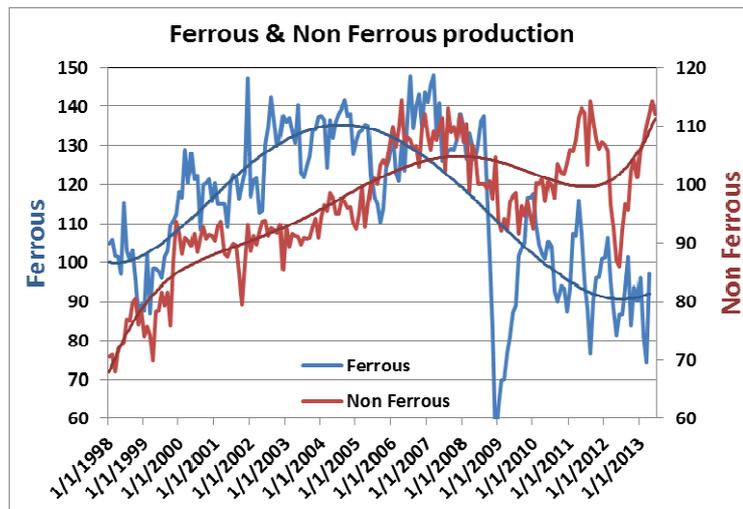
Detail on Sub Sectors in Steel and Engineering

Graph 7: Base Metal Production: Ferrous & Non

Ferrous

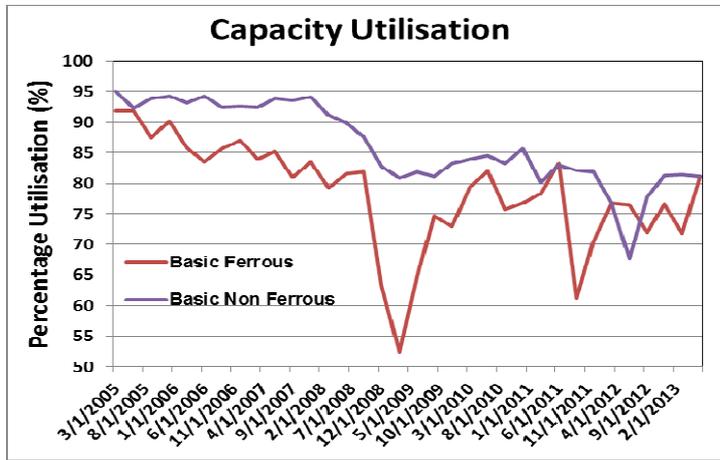
The latest data for the basic **ferrous** metal industry seems to confirm that a lower turning point has been reached.

- The June figure was nearly 2% better than May,
- 6 Months of 2013 (vs 2012) was almost 1% better than 2012, and
- 12 Months of 2013 (vs 2012) also about 1% better.
- June 2013 was nearly 20% better than June 2012, showing the 'Mittal effect'.



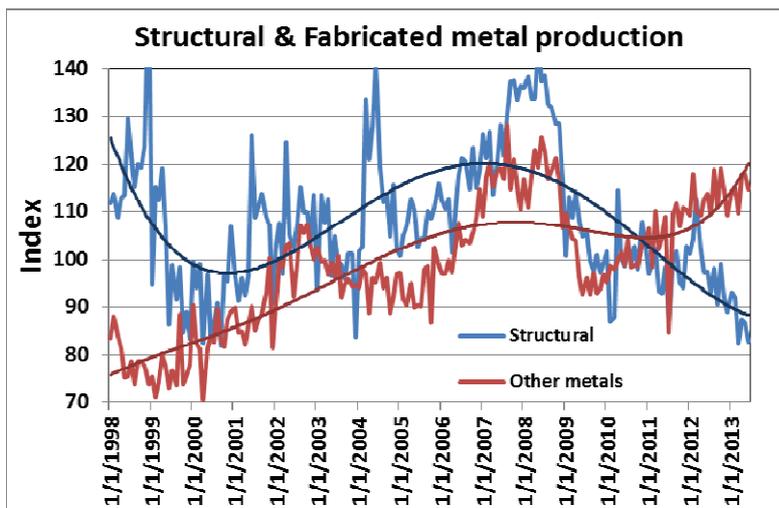
The **non-ferrous** industry is now on the pre-crisis peak production level of 2007. The last month (June) saw some pull back, and so over the last 6 and 12 month periods. June 2013 production was 30% above June 2012 however.

Graph 8: Capacity utilisation in the ferrous & non-ferrous industries



Capacity utilisation in the non-ferrous industry has been continuously better than that in the ferrous industries. The production disruptions due to facility incapacity and labour unrest much earlier in the latter are clearly visible.

Source: Statistics South Africa



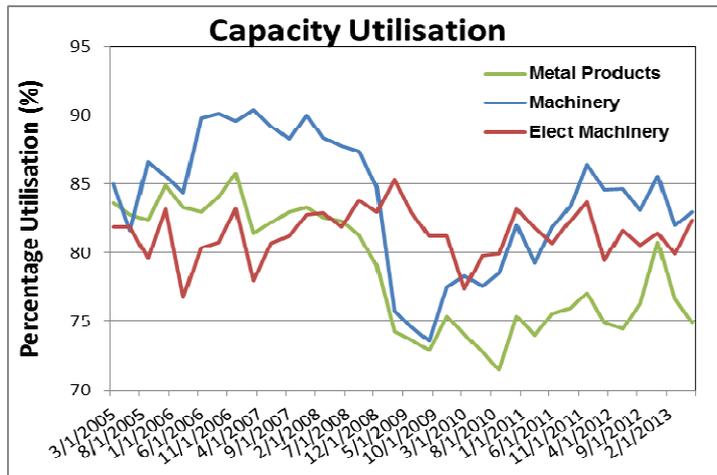
Graph 9: Fabricated metals production

All comparisons with previous periods show small declines for the **fabricated/other metals** data. However, the recovery is continuing since the lower point reached 2009. Production levels are about 10% below the peak of 2007.

In contrast, production of **structural metal products** shows an almost continued decline since the beginning of 2008, with two upward 'spikes' at the end of 2009 and 2011. The June 2013 figure compared to June 2012 still shows a 15% contraction. However, the 6 months (+17%) and 12 months (+9%) up to June 2013 were much better than comparative periods during 2012.

These production figures still beg the question, of why the large infrastructure projects in SA do not seem to have an effect on these (construction related) industries. Some of the answers lie clearly in import penetration as spelled out by Kobus de Beer (SAISC) in the previous SEIFSA News.

Graph 10: Capacity utilisation in metal products, general purpose & electrical machinery

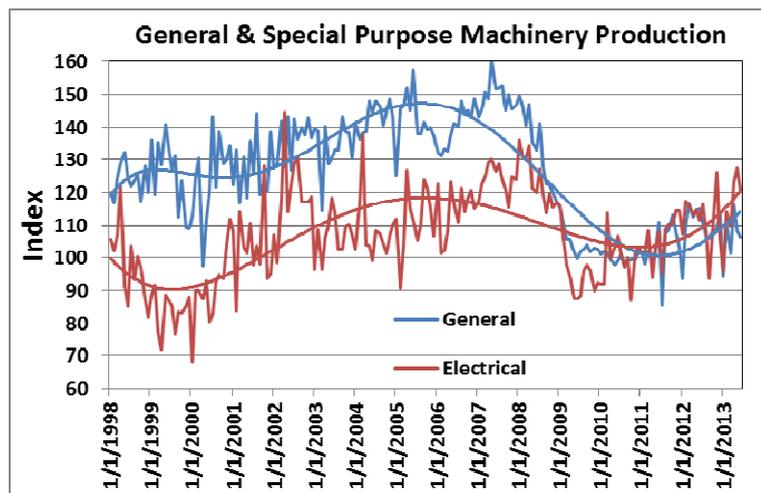


The trends in the two components of the metal products sector are reflected in the capacity utilisation figures in graph 10. There has hardly been a recovery since the lower turning point during 2010. In contrast, general purpose and electrical machinery have been faring better, but also not spectacularly so.

Source: Statistics South Africa

Graph 11: General Purpose & Electrical Machinery

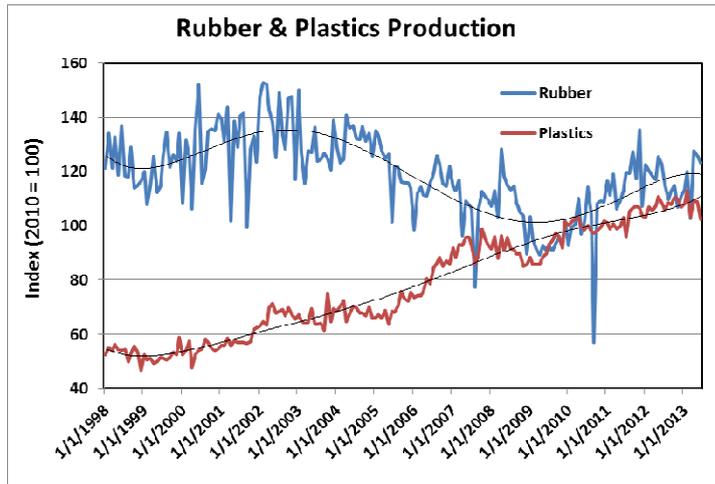
The long term trend for **general machinery** shows a recovery starting in the middle of 2009. The 6 months up to June 2013 was 4% better than during 2012, but the compared to June 2012, and to 12 months ago, declines were measured.



The production of **electrical machinery** has more or less the same patterns as general purpose machinery, albeit slightly better performing over a year period. Electrical machinery and equipment are input components into the large electricity capacity expansions and reflect the improved demand to an extent.

Although both these industries show positive trends, actual production patterns are highly volatile and still between 40% (general machinery) and 10% (electrical machinery) below the pre-crisis levels.

Graph 12: Plastics & Rubber Production figures



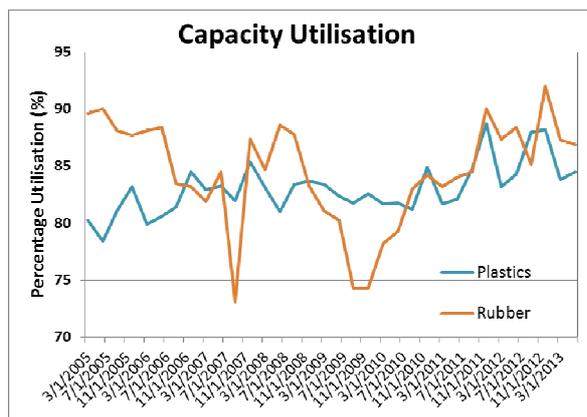
The **plastics** industry seems to be taking a breather with all comparisons showing contractions.

Although the **rubber** industry is having roughly the same patterns as plastics, the last 6 months and last 12 months were better than comparable periods earlier.

Source: Statistics South Africa

Graph 13: Capacity utilisation in plastics & rubber

In contrast to the other sub sectors, plastics and rubber show consistent utilisation levels above 85% which is 'full capacity' in economic terms.



Source: Statistics South Africa

Chapter 9: Apprenticeships from an International perspective

Apprenticeship is defined as a contract between an employer and a young person combining on-the-job training, formal learning and productive work. Once entered into, the agreement places upon both employer and the young person a set of reciprocal rights and duties.

The employer agrees to ensure that the apprentice follows the stipulated programme of vocational education and training which will be based on national standards formally recognised by the sector concerned. A non-negotiable part of the agreement will be that on-the-job training will be complemented by off-the-job training in an educational institution.

In return, the apprentice agrees to conscientiously pursue the stipulated programme of education and training, to undertake productive work related to his/her course of training within the company and to accept a training wage appropriate for his/her age and the stage of his/her apprenticeship training.

By apprenticeship, we understand a model of learning in which the apprentice acquires the skills and knowledge required of the skilled worker, technician or professional practitioner. This model works as successfully for highly-qualified professionals - chartered accountants and doctors - as it does for the more usual range of intermediate level occupations - from business administrators to qualified electricians. Good apprenticeship has the potential to meet young people's aspirations for relevant and flexible education and training post-16 (Post 16 education is for people over compulsory school age of 16, which does not take place in secondary schools in England. It may be in a further education college, a sixth-form college or a higher education institution.).

It also delivers the wider range of skills so urgently needed by business. Equally important, the training experience and expertise developed by firms which offer apprenticeships helps firms to develop as 'learning workplaces'. These developments benefit all employees because of the wider opportunities that a 'learning workplace' can offer for upgrading and development

The apprenticeship model of learning and training continues to enjoy status among young people and their parents in Britain. Failure to modernise and reform in the 1970s and 1980s led to a serious decline in numbers trained. Modern Apprenticeship was introduced five years ago. It's based on improved principles of cost sharing

between employers, young people and government and provides a foundation on which to expand provision.

While apprenticeships have started to reverse the long decline in numbers entering apprenticeship, these are still low relative to other countries and also relative even to numbers in the early 1990s. The real question is surrounding the issue as to why action should be taken now to exploit the potential of apprenticeship in Britain and expand numbers entering apprenticeship training.

The answer lies within sectors, some with large numbers of employees, which currently carry out little or no apprentice training. Germany is another country explored, where nearly two thirds of notional cohorts of young people enter apprenticeship training and the supply of places exceeds demand from young people. Britain has serious skill shortages and enduring skills gaps at the skilled crafts, technician and associate professional level. These shortages have consequences for the economy as a whole, contributing to wage inflation and making macro-economic policy management more difficult by pushing up wages and lowering productivity growth in the longer term.

The expansion of full-time post-16 education over the past ten years has helped to produce many more academic qualifications. However, the proportion of young people holding vocational qualifications at NVQ Level 3 as their highest qualification has hardly increased. Modern Apprenticeship programmes, which aim for high levels of skill and training together with college-based technical and general education, can supply these vital skills.

Because apprenticeship involves structured learning in the workplace, its extension to more workplaces will also have wider benefits. The learning infrastructure developed to support apprenticeship in a firm can make a powerful contribution to creating the 'learning workplace' needed to provide learning opportunities for employees of all ages.

The wide-ranging personal and social skills that are increasingly sought by employers are best developed in the 'real life' situations experienced in the programmes of workplace learning provided in apprenticeship. Moreover many young people flourish in the adult atmosphere of the workplace and benefit from learning away from a classroom atmosphere

Apprenticeships, if communicated well can improve the employment, earnings and career prospects of young people. The expansion of apprenticeship opportunities recommend include - a doubling of current starts within five years and a further

increase within ten years-. These, if attained, could improve the prospects of many young people.

This expansion would be expected to lead to around one third of every cohort of young people continuing their education and training through the apprenticeship route by 2008.

Apprenticeships can also be inclusive and offer opportunities to all ambitious and motivated young people. All modern apprenticeships are expected to aim for high standards, but employers look for a range of qualities in young people and not just academic attainment. Other aptitudes and qualities are important and mean that apprenticeship can offer a wider range of learning opportunities to a wider range of young people than can be provided in schools and colleges.

While we find that the modern apprenticeship framework provides a sound foundation for progress, we also believe it should be strengthened in a number of ways. Many young people want to keep open the option of entering courses of higher education when making post-16 choices. Many of the more able students, for whom apprenticeships would be a highly suitable choice, will only opt for that path if it offers the clear opportunity of qualifying for further study at sub-degree and degree level. One of the important developments needed in modern apprenticeships is the provision of clear routes from apprenticeship at NVQ Level 3 to part-time or full-time learning at NVQ Levels 4 and 5 (higher education).

For that to happen, the educational content of apprenticeship must be strengthened. As such, the inclusion within Modern Apprenticeship of key skills has to be taken into consideration. However, the standards of general education aimed at are still well below the levels expected in apprenticeship in other European countries.

These countries also insist on an underpinning technical knowledge component in apprenticeship. Some apprenticeships already require apprentices to follow courses of underpinning technical education but most do not. We would like to see key skills gradually strengthened and a technical knowledge component extended to all apprenticeships.

We see this as essential to provide a firm foundation for subsequent progress to higher levels of skill either through entry to higher education or through lifelong learning.

A number of issues urgently require resolution if apprenticeship is to expand. As mentioned previously, society at large and the economy generally benefit from the

skills produced in apprenticeship and we therefore consider it right that government should contribute to its cost. Employers who provide apprentice places to the standards required of apprenticeships incur significant costs which can often be only partly offset by productive work undertaken by apprentices. Government thus has to be involved and meet employers half way in the aim of building a world of work for apprentices.

To recoup costs, employers need to be able to retain good ex-apprentices without paying excessive wage premiums. This then points to the need to resolve the 'poaching' problem.

The sharing of costs between employers, young people and government must be resolved in such a way that the supply of apprentice places is sufficient to expand apprenticeship; as a result standards remain high and young people come forward in sufficient numbers to fill the places offered. The scope for redistributing training costs away from employers and towards trainees and government, particularly in high cost sectors such as engineering and building, requires further consideration.

When high quality training is provided, young people also benefit and should be prepared to accept a lower wage in the initial year or two of training than apprentices has traditionally received.

Employers need to take action to resolve the incentive problem raised so as to ensure that firms are not unduly deterred from offering apprenticeships by fear of 'poaching' of trained workers. Specific suggestions as to how this could be achieved are made below. Information flows to firms and young people concerning the benefits of apprenticeship are currently inadequate and are responsible for artificially constraining demand.

The current arrangements for matching young people to apprenticeship places at local level do not always seem to work well and, we suspect, lead to the loss of potential apprentice places.

What becomes apparent thereafter is that if apprenticeship is to retain its key strengths of closely reflecting the demand for skills and offering training to standards required for effectiveness in the workplace, employers must continue to be the primary decision-makers about how many apprenticeships to offer and the skill standards aimed for.

This means that initiatives for expanding apprenticeship must be addressed in the first instance to employers. But, as we have pointed out, the type of employer organisation which underpins apprenticeship in the German-speaking countries is largely absent in

Britain. It is widely recognised that in Britain, where firms do maintain contact with a formal organisation this is frequently trade, sector or occupationally based. This too is the pattern that can be observed abroad.

An alternative approach - and one adopted in other European countries - is to ensure that a good proportion of staff in these sectors is trained to deliver the quality of service considered desirable. This in turn encourages the development of a self-regulatory professional ethos in the occupation in question. An expansion of apprenticeship training would provide a cost-effective way of reaching these standards and encourage a professional approach in a much wider range of sectors and occupations.

Professionalism is particularly appropriate in high trust occupations. Other sectors where the public chooses to purchase a service should be encouraged by government to think in terms of defining standards of product or service quality that kite-marked firms would guarantee to deliver. This is the model that has already been developed - albeit with the stimulus of European legislation - in the travel industry. But other sectors could with advantage follow this model.

Apprenticeship training would ensure the supply of skills which would make it possible to work to consistently high standards. When as a result of increased skills, claims for sub-standard work decreased, insurance premiums of all firms in the scheme would also fall.

Benefits of this initiative would not only be the expansion in apprenticeship places but also benefits to the consumer of guaranteed standards of product quality and service. There is evidence that in some sectors - for example home building repairs - demand for the product has been suppressed by fears of poor and unreliable service. Once consumers have a proper guarantee we could expect this demand to be released and lead to increased consumption.

As explained, the low level of supply of apprentice places by firms as the main obstacle to the expansion of apprenticeship. This low supply of apprenticeships is not necessarily evidence of a low level of skill need. All the evidence points in the other direction, but we see the supply of places held back by poor information flows and weak employer organisations especially at the local level. Employers need to reconsider the level of apprentice salaries - currently relatively high - so that a larger number of apprenticeship places can be provided. If the quality of apprenticeships can be improved along these lines, then young people will be content with more modest earnings while in training.

A distinct contractual status for apprentices as exists in Germany could contribute to greater cost-sharing by young people. And also, the demand for apprentices can be stimulated by direct and indirect government action to protect consumers of goods and services. This would take the form of strengthening safety standards in some sectors and encouraging groups of firms to assume collective liability for guaranteed quality standards.

It is clear from the research that the issue of skills development, in particular, for youth, remains a global challenge. The opportunity exists to build on models from both developed and developing countries in order to address the issues that remain a challenge within the South African skills development environment.

CHAPTER 10: THE SIGNIFICANCE OF OCCUPATIONAL HEALTH AND SAFETY TO SKILLS SHORTAGES

10.1 INTRODUCTION

There is a symbiotic relationship between technical skills and occupational health and safety performance. The level of education and training affects the acuity with which a worker perceives risks. A more skilled workforce is more likely to understand risks associated with a task and protect themselves from harm.

10.2 OCCUPATIONAL HEALTH AND SAFETY POLICY

The current Occupational Health and Safety (OHS) legislation is often dubbed as inadequate, and there has been substantial effort in formulating new legislation by amalgamating all four Acts, i.e. The Occupational Health and Safety Act, Compensation for Occupational Injuries and Diseases, Mine Health and Safety Act and Occupational Diseases in Mines and Works Act. This gave rise to the National Occupational Health and Safety Bill in 2005 which was in circulation for years before it was aborted. Currently, the Occupational Health and Safety Act and most of its regulations are under revision in order to improve their clarity and effectiveness.

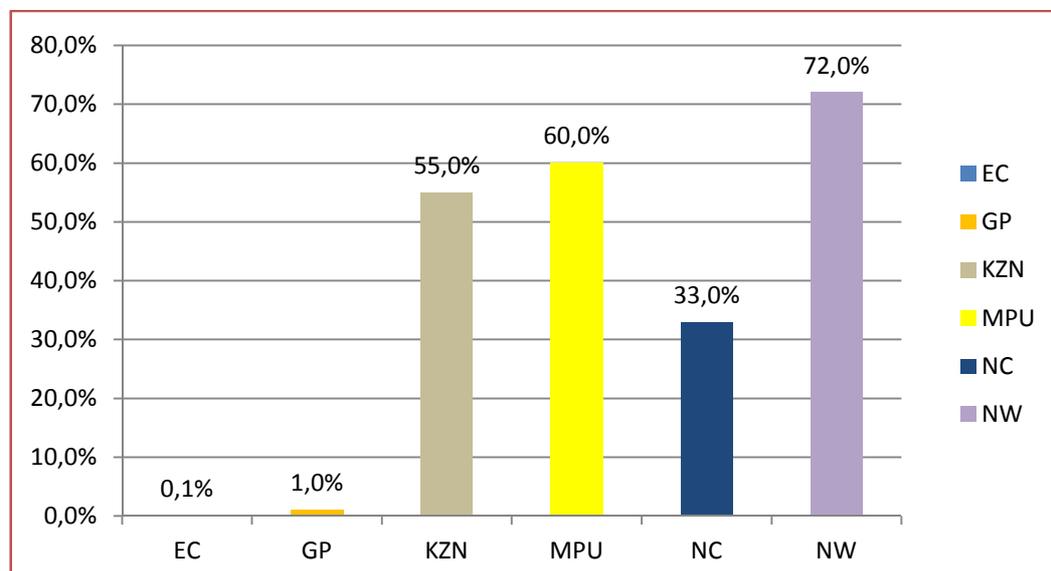
10.3 OHS COMPLIANCE IN THE STEEL AND ENGINEERING INDUSTRY

Occupational health and safety compliance remains a concern in the steel and engineering industry. The Iron and Steel Sector remains one of the 12 high risk industries identified by the Department of Labour.

The policy review backdrop is a reflection of the Department of Labour's efforts to improve compliance. Every year, Department conducts blitz inspections on the Iron and Steel Sector, and the results are almost always disheartening. The area of most concern is that of Risk Identification, Assessment and Control.

The summarised results of the 2011/2012 inspection blitz conducted in the iron and steel sector are illustrated below. Companies in Gauteng, Eastern Cape were found to have the lowest compliance levels. The highest compliance levels were found in Northwest, followed by Mpumalanga. Compared to the results of the 2010 Safety Blitz, compliance levels have dropped and the trend remains the same.

Health and Safety Compliance: Safety Blitz in the Iron and Steel Sector (2011/2012)



In November 2012, the Department issued guidelines on the how to carry out risk assessment. The impact of these guidelines is still yet to be assessed in the 2013/2014 inspection blitz.

According to the Compensation Fund 2012 Annual report, 160 554 claims for compensation were accepted from the manufacturing industry in the 2010/2011 period. Amongst these 53 606 were cases of more than 30% permanent disability. 184 of the accepted claims involved fatalities. The iron and steel sector, being one of the high risk sectors contributed significantly to these figures.

10.4 OHS SKILLS CHALLENGE

Poor OHS performance and high incident rates are a sign of either an unskilled workforce and or unsafe working conditions. Unsafe working conditions are a symptom of poor OHS coordination and management. This is a gap that can only be closed by competent OHS Practitioners. The common tendency in the industry is to shift all OHS responsibility to HR Managers. While an HR manager can deal with Compensation for Injuries and Diseases issues, they do not have the expertise to coordinate and manage OHS.

The shortage of competent OHS practitioners in the construction industry has led to significant developments in the Construction policy arena. The new construction regulations, which are soon to be promulgated, will require competent OHS practitioners to assess risks, conduct audits and play a more significant role in incident prevention.

10.5 HIV/AIDS AND WELLNESS

HIV/AIDS and employee personal health have a significant impact on skills retention. According to the ANC 2011 statistics, HIV/AIDS national prevalence rate was at 29.50%. Research conducted by the merSETA in 2011 revealed that the prevalence rate in the metal processing sector at 17.3%, which is significantly higher than in other sectors.

In February this year, Dr Larry Distiller, Director of The Centre for Diabetes and Endocrinology declared that 6% of the South African population suffers from Diabetes, while according to Medical Research Council 25% of the population between the ages of 15 and 64 suffer from high blood pressure.

Poor management of HIV/AIDS and other chronic illnesses such as diabetes and hypertension contribute significantly the reduction of the life span of the work force. Large enterprises in the steel and engineering industry have curbed this threat to skills

loss by implementing in house wellness programs. However, SME's, who as previously discussed, have less resources at their disposal are hardest hit by these phenomena.

10.6 CONCLUSION

Occupational Health and Safety is a crucial part of sustainable skills growth. When a skilled worker becomes totally permanently disabled or dies, their competence and expertise is lost, and so is the opportunity for skills transfer. A rife skills shortage in OHS professionals leads to poor management of health and safety risks. A high accident frequency rate in turn perpetuates overall skills shortage.

Chapter 11 The State of Industrial Relations in the Metal Sector

11.1 Introduction

Recent negotiations in other major sectors have been tough and uncompromising. Fortunately, however, these developments have not had a direct effect on most employers in the metal and engineering industry, owing to the current three year agreement in the industry. Discussions with the trade union parties have also commenced via the industry's bargaining council aimed at addressing the major challenges currently facing the industry.

11.2 Extension of the Main Agreement

The decision by the Minister of Labour to gazette and extend the 2011 / 2013 Main Agreement to all parties and non-parties in industry amounts to a vote of confidence for centralised collective bargaining in the metal industry. The decision by the Minister finally lays to rest the question whether or not parties who represent the majority of employers and employees in industry have the right to extend their agreements to non-parties.

The gazettal and extension of the 2011 / 2013 Main Agreement settlement agreement by the Minister of Labour - entered into between SEIFSA on behalf of the 27 federated employer associations and the industry's six trade unions - vindicates a long held view that agreements entered into between the majority of contesting parties, at considerable cost and very often after extensive power-play must, through statute, become the basis on which employers throughout industry conduct their businesses.

The 2011 / 2013 three-year wage deal is one that was probably not to everyone's liking, but it has delivered on its promise of maintaining industrial peace and stability over the last three years - a period that could quite easily be characterised as the most unstable and volatile period of industrial relations experienced in a very long time in our country.

Collective bargaining is not a perfect model and challenges will continue both against its supposed appropriateness and more, importantly, on the constitutional question surrounding the custom and practice of extending agreements to non-parties.

The majority of parties to the Metal and Engineering Industries Bargaining Council (MEIBC) support centralised collective bargaining and the long established practice of extending collective agreements to non-parties. They have welcomed the decision by the Minister of Labour and interpret this not only as a vote of confidence in our collective bargaining processes and practices but an important signal that the Government will continue to support the extension of collective agreements to minority parties who have exercised their right not to participate in the process.

11.3 Wage increases for 2013

The agreed increases for all grades and sub-sectors were calculated by reference to the following wage model:

- Rate A (skilled employees): 7% and Rate H (unskilled employees): 8%
- However, if the CPI (April figure published in May) is 8% or above, then the actual wage adjustment will be based on CPI (April figure published in May) plus 2% respectively
- Because the CPI figure for April 2013 was 5.9%, the agreed minimum increases of 7% to 8% for Rates A to H have been applied.

In view of the continuing difficult trading conditions, the parties to the Metal and Engineering Industries Bargaining Council (MEIBC) embarked on a comprehensive campaign to provide assistance to those companies requiring relief from the nationally applicable increases. This campaign and the industry wage increase exemption process appears to have functioned well and affected employers were authorised by the bargaining council to implement lesser increases than those prescribed in the Main Agreement.

11.4 Industry Policy Forum

The 2011/2013 Settlement Agreement was successful in initiating a high-level commitment by the industry's employer and trade union leadership to start engaging one another on the critical challenges facing the metal and engineering industry.

The establishment of the Industry Policy Forum creates a vitally important strategic forum on which the employer association's leadership, the unions' presidents and general secretaries and government ministers will commence engagement on a range of national challenges, including the following:

- The identification of the specific factors that have contributed to the decline of the metal industry (in terms of output, employment, contribution to GDP and the like)

and then design strategies and implementation plans to grow investment, promote business, develop skills and create a competitive manufacturing capability in the domestic and global market.

- The promotion of the growth and viability of the industry as a key contributor to SA's growth, investment and employment objectives.
- The development of strategies and implementation plans to secure the long-term future of the metal industry companies, including a dispensation for small business, some form of regional dispensation, more effective wage exemption processes and other relevant policies.
- The formulation of an industry view on the national industrial and trade strategies.
- The development of strategies directed at promoting effective job retention and employment creation mechanisms in the industry.

A strategic and operational planning process is currently under way between employers, trade unions, the bargaining council and StratAlign (the independent body appointed by the parties to facilitate and co-ordinate the IPF project) with a view to giving proper definition to and enable buy-in to the objectives and plans of the IPF.

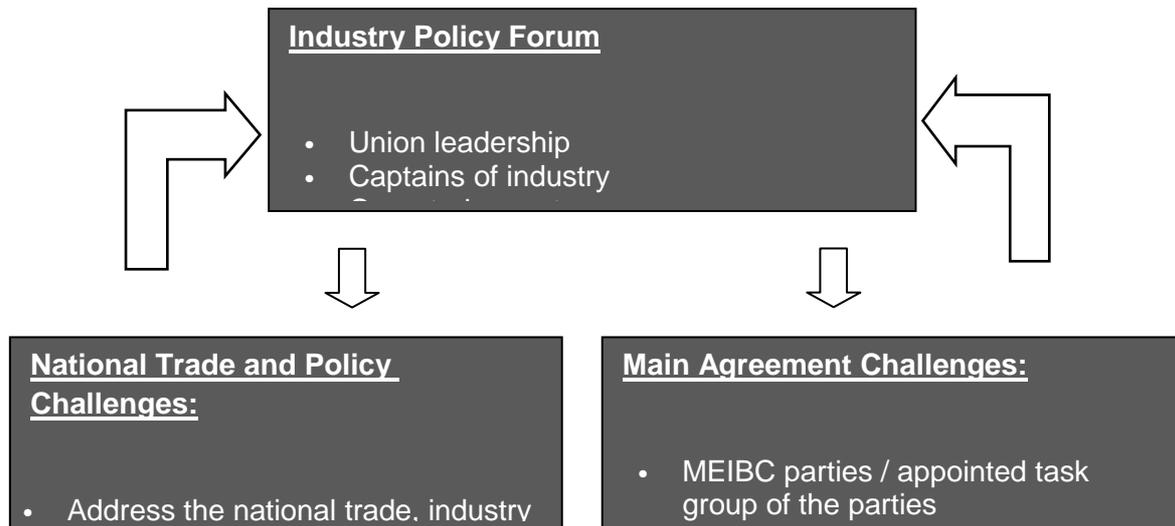
Discussions are aimed at the signing-off on a strategic plan for the IPF which seeks to clarify the identity, vision and values of the IPF, its strategic objectives and enablers, its structure and modus operandi and finally, the relationship between the IPF and the Bargaining Council.

The parties have furthermore agreed to split the agreed terms of reference of the forum into the following broad categories (each driven through a simple, but effective, mission statement). This will allow the IPF to deal with all the issues concurrently and will expedite the process.

The suggested composition and grouping of the two parallel structures is as follows:

- National trade and policy challenges:
National trade and policy issues requiring attention by the industry leadership and relevant government departments
- Main Agreement challenges:
Industry issues capable of resolution by the trade union and employer negotiators working under the auspices of the bargaining council

11.5 THE STRUCTURING OF THE IPF



The work of the IPF has now begun. While the challenges are formidable, the achievement of its objectives would provide a platform for the re-engineering of the industry to meet the key challenges of the retention and creation of jobs as well as the enhanced competitiveness of the industry, to the immense benefit of all the stakeholders.

11.6 Labour Law Amendment Bills

In December 2010 the Department of Labour published the following labour law amendment Bills and presented these to the National Economic Development and Labour Council (Nedlac) for negotiation by representatives from organised business, labour and government:

- The Labour Relations Amendment Bill;
- The Basic Conditions of Employment Amendment Bill;
- The Employment Equity Amendment Bill; and
- An Employment Services Bill.

Despite the countless hours spent during protracted negotiations in Nedlac, many key and principle areas of disagreement still remained by the end of the process.

Business was particularly concerned that not enough notice had been taken of the Regulatory Impact Assessment done on the proposed Bills. It argued, for example, that the amendments relating to fixed term contracts would have enormous cost implications for employers. In addition, the amendments which extend organisational rights to minority unions and the attempt to create parity between permanent employees and those in an atypical relationship with employers would simply increase the administrative and cost burden on employers.

Labour, on the other hand, argued that the amendments relating to violence during strike action and essential services severely limit the workers' constitutional right to strike. Labour was also determined to extend the protection currently afforded to permanent employees to atypical employment relationships such as fixed term contracts and part-time employees - a move which Business argued would again add to the cost of employment.

Cosatu, as the largest trade union federation, simply refused to compromise on any of the areas conducive to job creation and remained steadfast in their demand for a total ban of labour brokers.

During 2012 negotiations on the Labour Relations Amendment Bill and Basic Conditions of Employment Amendment Bill were concluded. The Minister of Labour submitted the amendment Bills for the Labour Relations Act and the Basic Conditions of Employment Act to Cabinet which approved the submissions of these Bills to Parliament. Parliamentary hearings were conducted on both Bills by the Portfolio Committee on Labour and it is now anticipated that the Bills will be submitted to the National Assembly and the National Council of Provinces respectively for adoption.

The Nedlac negotiations on the Employment Services Bill and the Employment Equity Amendment Bill were also concluded during 2012. On the Employment Equity Amendment Bill the social partners reached consensus on amendments dealing with discriminatory matters, however, no consensus was reached on amendments dealing with compliance and enforcement. Business raised concerns regarding the competency of the labour inspectorate which has resulted in poor enforcement and indicated that there was no evidence that the proposed amendments would improve enforcement and increase compliance.

In addition, business rejected government's proposal to link fines to a percentage of turnover, arguing strongly that turnover has no relationship to the offence. Business proposed that a better approach would be to adjust the fines upwards in line with the movements in the CPI increases since the Act was last amended, and to thereafter provide for annual CPI increases. This proposal was rejected by both labour and government.

On the Employment Services Bill, some consensus has been achieved by the social partners, including in-principle agreement on:

- The establishment, role and function of the proposed public employment services agencies;
- The registration and licensing of private employment agencies (i.e. labour brokers); and
- The establishment of an Employment Services Board to advise the Minister of Labour on employment services developments and proposed regulations.

There is little doubt that the proposed legislative changes contemplated by the Bills are complex and fundamental in nature. Business interest groups will be doing everything possible to ensure that the business view is heard, and equally important, is properly recorded in anticipation of the Parliamentary process being concluded.

Chapter 12: Concluding Comments and Recommendations

12.1 Introduction

The problem statement for this research stated *To develop an understanding of the skills needs in the Metal and Engineering sector, the factors impacting on future training needs, key drivers of changes with reference to growth in the sector and national priorities (i.e.– strategic integrated projects and other relevant large scale development projects which would reinvigorate the metal and manufacturing sector).*

With all the information purported in the finding from this research on skills demand in the Metal and Engineering skills needs in our sector this research does not provide a clear answer.

The sample size of the survey was 12% and therefore cannot be regarded as representative; the data does provide sufficient indications of possible trends which could be researched further. The piloting and development of an online survey instrument proved an innovative methodology that can be used and adapted in a variety of contexts.

Data collected at the regional workshops was extremely rich and the inputs at the workshops; identified unequivocal trends which were observable in all three of the major economic hubs: Cape Town, Durban and Johannesburg,

Specific recommendations have been made in the concluding comments of each chapter throughout the report. The annexure *Findings and recommendations* provides a detailed table including overall findings and recommendation which uses

the response from the online questionnaire as well as the regional workshops. This section considers the research context and outcomes more generally and makes some additional high-level recommendations that should be considered.

12.2 Lessons from the project implementation

Through the different methodologies applied during the project lifespan, the following lessons have been derived:

- The research topic may have been too broad to provide the quantitative analysis tht was originally envisaged
- Workshops should not last longer than 3-4 hours, and should preferably take the form of a structured breakfast session

In addition there was a general lesson learnt during the research process:

- The regional workshops resulted in considerable information-sharing, not only between participants and researchers, but also amongst participants and the local and national players. This provides for an opportunity in the future networking and information sharing.

12.3 Lessons learnt from the online survey

In designing and implementing the online survey, several lessons were learned. These should be considered when planning future research projects of this nature.

The low response rate to the survey could have several causes. The data collection part of the research had originally been planned to take place in the first half of the year, but difficulties in concluding the contracts meant that the data collection process only commenced much latter. The bulk of responses came early in September, shortly after the survey was launched.

Considerable efforts were made to ensure the companies in the industry were aware of the survey. SEIFSA apprised all its associations and used its various communications channels to make companies aware of the importance of the survey as well as conducting follow up telephone conversations.

Other factors that may have contributed to the low response rates include the following:

- Many companies do not have the statistics readily available
- The statistics are not necessarily 100% accurate (this was evident in the

variations in employee numbers that was pointed out earlier)

- Many companies in the industry are currently in survival mode and felt that process consumed their time away from production.

The Metal Chamber also noted the drop in the numbers of Workplace Skills Plans submitted by industry between 2008 and 2012. This was attributed to the change in the system which meant that Skills Development Facilitators (SDF) were no longer as active in the collection and submission of data. The question as to whether there would have been a greater response rate if SDFs could have been mobilised to support the data collection was noted.

SEIFSA and the Counterpart Group also noted that it had taken quite a long time for industry to support the recycling surveys. They used a single researcher to interview key informants in industry – and they had had several iterations and updates of the survey. It was evident that SEIFSA had much more support from industry and based on this interaction, the industry participants appeared to value the information and trusted the research process.

One of the more intriguing aspects of the survey data is large contingent of people operating in the in research and development environment. Together with inputs from the regional workshops, we are drawn to the conclusion that there is currently a greater interest in research and development activities, at least in some of the participating companies. It is a fairly generally accepted truth that for an industry to grow, it must innovate; and innovation leads to new products, new ventures and employment growth.

However, in order to innovate, the Metal Chamber, MerSETA, SEIFSA, dti and industry bodies will have to work together to grow and support innovation capability. This concept is unpacked in the recommendations, but first the regional workshop process and its outputs need to be reviewed.

12.4 Stratifying the industry

There are some inherent difficulties in drawing conclusions from the data without taking in account the sample size and the portion of the industry the sample size represents. The project team was not able to establish this distinction from the data on hand.

In order to arrive at some conclusions about the possible impact of the industry views reflected above on the Metal Chamber's decision-making processes, one would need to contextualize the particular sample and its views and practices.

The approach and attitude of the majority of companies in the workshop process, as well as some of the comments of third parties, suggests that these companies form a distinct category which makes them different from others in the industry. One of the motivations to attend was to look at solutions for company and industry problems, to learn from others and to try to influence MerSETA and industry bodies to become more relevant and more pro-active.

12.5 Redefining 'training'

Embedded in and threaded through the participants' feedback, was a growing disillusionment with formal education. Similarly, faith in the efficacy of formal training is also clearly waning. Courses which are constructed as hermetic packages result in little knowledge transfer or uptake. The fault for this does not necessarily lie with the training provider nor the learners but perhaps with the system of knowledge transfer that is present within the training system. Companies are also at fault by not making use of accredited training providers or encouraging the use and application of the knowledge gained.

There was a very clear sense amongst participants that training on-the-job plays a significant role in the development of their staff and their level of proficiency. Their notion of training has been extended to include workplace learning. From an historical perspective this reverts back to the approach of the 1970s and early 1980s. (Vorwerk 2013).

Workplace learning consists of several elements:

- the integration of the learner into the workplace
- exposure to a range of workplace activities, e.g. production, maintenance, quality and planning
- continuous development within the workplace through involvement, as part of cross-functional teams, in novel activities such as commissioning of new equipment and a variety of continuous improvement projects, as well as traditional self- development through reading and technology transfer visits and events.

It is hardly surprising that this sounds very much like the traditional development trajectory of apprentice, artisan and journeyman, or the development of professionals.

Including the on-the-job component in the extended definition of training also means that there should be more learner support during the on-the-job phase. The use of coaches, mentors and recent retirees to transfer knowledge were some of the support

mechanisms mentioned during the workshops.

This represents a shift from the pattern of the past. The expectation by many employers over the past 20 years has been that training is the responsibility of others. Consequently they have adopted the approach of recruiting staff that had already been trained and who are competent. This approach is still being followed currently, as was pointed out, '*Generally, smaller companies don't train, and they just poach staff. Sooner or later, larger companies that do train get fed up with it (and stop training).*'

In the late 1980s and early 1990s, larger companies closed down their training facilities or substantially reduced their training capacity in response to economic pressures. Their view was that if they needed skills, they could simply recruit them from the labour market. If these companies did appoint unqualified staff or staff without experience, they would send them on training courses and expected them to be proficient on their return. As a result, the notion in the minds of managers of what was meant by training was gradually reduced to formal training interventions in classrooms.

Another fall-back recruitment strategy which is commonly used, especially by small and micro- companies, is simply to appoint new recruits on a first-come, first-served basis (often selecting unemployed persons who are standing at the factory gate). Once appointed, such recruits undergo no formal training and simply assimilate knowledge and skills in a relatively unguided fashion during the working process.

The implications of this expanded definition of training, which includes workplace learning, will be discussed below. It is necessary to first put the expanded definition into context, which we do in the following section.

In many corporate learning circles around the world, there is an increasing awareness that most of our learning is so-called 'informal' learning, i.e. learning on-the-job, learning from experience. Jay Cross (2007) states categorically that:

People learn informally most of what they need to do their jobs. Although every situation is different, a common assertion is that 80 percent of learning in organisations is informal. The number is backed up by the Institute for Research on Learning, the Bureau of Labour and Statistics, the Education Development Centre of Massachusetts, Capitalworks, the eLearning Guild, and Canada's National Research Network on New Approaches to Lifelong Learning. (Cross, 2007:17)

We have arrived at a somewhat heretical position in the context of a sector education

and training authority. However, it is clear that the SETA should not just look at formal training interventions. It needs to look at new models of learning and knowledge transfer

12.7 High-level recommendations

In arriving at these high-level recommendations, we are recommending that the Metal Chamber and MerSETA as a whole need to look at the workplace as the site of learning and then assist industry to build in that capability. This is not just for the new entrants to the industry but also for those who are currently employed – both the educated and the under- educated.

The Metal Chamber, however, is not well placed to implement and manage such complex and innovative projects. It would have to consider forming partnerships with other merSETA divisions, with industry bodies, government departments and training providers and also with businesses that are dedicated to developing new practices in organisations.

The current state of the metal and engineering sector is also a significant factor that must be noted in terms of expansion of training and development. As a key sector which has experienced a significant downturn on the back of the global economic crisis, companies were forced in survival mode, or face closure. As a result, training was impacted on and as companies slowly emerge from the declines of recent years (based on the PMI for August 2013), it is evident that skills development and training will regain its key positions in terms of strategy development and scenario planning.

The focus by government on large-scale infrastructure development projects, such as the Strategic Integrated Projects (SIPs) also offers an opportunity for the rebirth of the manufacturing sector. This will be aided, in particular, by a focus on local skills development and local procurement which will ensure that the downstream and upstream value chains within the manufacturing and engineering sector are able to respond to the needs of all 18 SIPs.

Fortunately the restructuring of MerSETA enabled the establishment of a division specifically focused on Innovation, Research and Development. The funding for this research project is managed by that division. The Metal Chamber should actively partner with it to plan, implement, manage and evaluate a complex and innovative projects of this nature. The outcomes would be highly relevant to other companies in the industry and across industries, as well as for the manufacturing, engineering and related services sector as a whole.

12.8 Conclusion

The research has provided some very useful information which will assist the Metal Chamber and other role players about the demand for skills in the Metal and Engineering Sector.

The project validated that demand for skills in our industry as a necessity however actual demand has a little harder to determine. It uncovered some dynamic changes within the industry, which can inform further research agendas, as well as a revised approach to skills development that supports growth, competitiveness and innovation.

Annexure A- Survey Questionnaires

METALS SKILLS DEMAND VERY LARGE COMPANY SURVEY 2013

Name of Company.....Sector.....

Name of Person completing.....Position.....

CellphoneLandline.....Email.....

Note: The above information is only if follow up clarification is needed and to avoid sending reminders to those who have completed. Individual Company responses will only be accessible to researchers and not be included in any public report.

Location: Gauteng..... KwaZuluNatal.....Western Cape..... Other....

No of Years in Business: 0-2.....3-5.....5-10.....10-20.....20-50.....>50.....

Expected shortages X:

Employee Complement:	Now	Est 3 yrs	Est 10 yrs	Short	Reason
Management					Labour turn/o
Engineers					Lead time
Technicians					New technology
Project Management					Lack candidate
Logistics/Inventory					?
Sales/Marketing					?
Administration/HR/Finance					?
Service/customer liaison					?
Other non manufacturing					
Manufacturing					
Supervisors					
Project Management					
Skilled*(see trade/occup below)					
Semi-skilled*(see trade/occup)					
Unskilled					
Other manufacturing					
Total					

*Trades

Expected shortages X:

*Trade/Occupation	Now	Est 3 yrs	Est 10 yrs	Now	Reason
Refractory Mason					Labour turn/o
Pipe Fitter					Lead time
Air-Conditioning / Refrigeration Mechanic					New technology
Refrigeration Mechanic					Lack candidate
Moulder					?
Welder					?
Fitter-Welder					?
Vehicle Painter					?
Sheet Metal Worker					
Boiler Maker					
Metal Fabricator					Labour turn/o

Structural Plater						Lead time
Rigger						New technolog
Blacksmith						Lack candidate
Toolmaker						?
Patternmaker						?
Metal Machinist						?
Fitter and Turner						?
Mechanical Fitter						
Diesel Fitter						
Diesel Mechanic						
Heavy Equipment Mechanic						
Tractor Mechanic						
Forklift Mechanic						
Scale Fitter						
Electrician						
Millwright						
Lift Mechanic						
Electrical Equipment Mechanic						
Armature Winder						
Electronic Equipment Mechanician						
Instrument Mechanician						
Telecommunications Technician						
Melter						
Railway Track Master						
Other						
Other						
Other						
Total						

Do you have major expansion plans or expect changes to your business model in next 5 yrs?

how will they impact on your skills shortages ?

.....

how will you overcome these skill shortages?

.....

What are the major constraints to expanding your business (Rank the top 3, 1= largest constraint):

-Owner capital and finance
-Debt finance for business
-Finance for customers
-Market demand inadequate
-Market price too tight
-Supply availability or cost
-Regulation/cost of doing business
-Skills availability
-Other.....
-Other.....

What are the key risks your business faces (Rank the top 3, 1= largest risk):

-Erratic demand
-Unreliable supply chains
-Loss of key skills
-Loss of major market
-Foreign competitor disrupting market
-Increased local competition
-Large customer abusing powerful position
-Government policy or regulation makes it difficult
-Other.....
-Other.....

What are the major skills constraints (Rank the top 3, 1= largest constraint):

- Quality of Secondary Education
- Quality of FET graduates
- Quality of learner and apprentice artisan graduates
- Quality of University of Technology graduates
- Quality of University graduates
- Learners who lack practical work experience
- Employee motivation / work readiness
- Employment regulation
- Other.....

Where are the key non technical skills gaps (Rank top 2, 1=largest):

-Entrepreneurial Skills
-Problem Solving Skills
-Continuous Improvement Skills
-Basic English Literacy
-Basic Numeracy
-Other.....

What are your top sources of skilled employees (Rank top 2, 1=largest):

-In house learnerships and apprenticeships
-University and University of Technology graduates
-Rely on skills developed by large metals companies
-Rely on skills developed by large non metals companies (e.g.mining, construction)
-Immigration
-Only hire people with more than 5 years experience
-Other.....
-Other.....
-Other.....
-Other.....

What could be done to improve the quality of graduates from?

Level	Constraint	Proposed Action
Basic Education		
Technical Schools		
FET Colleges		
Universities of Technology		

Universities		

Do you think more use should be made of technical schools? Please explain.....

.....

Which has the greatest impact on Metal Skills Demand (Rank top 5, 1=largest impact):

-Technology
-Economic Growth
-Government economic policies
-Government industrial policies
-Employee attitude and motivation
-Demand in rest of Africa
-Government regulation
-Demand from other sectors
-Infrastructure roll out
-Green Industries
-Other.....

How will technology impact the demand for skills, supply of skills and mix of skills required? Please explain how it will impact, what specific skills will have increased demand, how will attrition of lower skilled jobs be dealt with?

.....

Upskilling and development of existing employees:

- Beyond compliance requirements, what kind of upskilling is being done?.....
-
- What is the rationale for the upskilling ?.....
-
- What can be done to make it more effective?.....
-

Do you complete a Work Place Skills Plan?

If not why not?

If yes how could it be improved?

Are you aware of any specific skills initiatives in your Province?...Yes...No If yes:

What are they	How well are they being implemented	How could they be improved

What can be done to make the industry more attractive to students and new entrants?

.....

Project Management						Lack candidate
Logistics/Inventory						?
Sales/Marketing						?
Administration/HR/Finance						?
Service/customer liaison						?
Other non manufacturing						
Manufacturing						
Supervisors						
Project Management						
Skilled*(see trade/occup below)						
Semi-skilled*(see trade/occup)						
Unskilled						
Other manufacturing						
Total						

*Trades

Expected shortages X:

*Trade/Occupation	Now	Est 3 yrs	Est 10 yrs	Now	Reason
Refractory Mason					Labour turn/o
Pipe Fitter					Lead time
Air-Conditioning / Refrigeration Mechanic					New technolog
Refrigeration Mechanic					Lack candidate
Moulder					?
Welder					?
Fitter-Welder					?
Vehicle Painter					?
Sheet Metal Worker					
Boiler Maker					
Metal Fabricator					Labour turn/o
Structural Plater					Lead time
Rigger					New technolog
Blacksmith					Lack candidate
Toolmaker					?
Patternmaker					?
Metal Machinist					?
Fitter and Turner					?
Mechanical Fitter					
Diesel Fitter					
Diesel Mechanic					
Heavy Equipment Mechanic					
Tractor Mechanic					
Forklift Mechanic					
Scale Fitter					
Electrician					
Millwright					
Lift Mechanic					
Electrical Equipment Mechanic					
Armature Winder					

Electronic Equipment Mechanician						
Instrument Mechanician						
Telecommunications Technician						
Melter						
Railway Track Master						
Other						
Other						
Other						
Total						

Do you have major expansion plans or expect changes to your business model in next 5 yrs?
 how will they impact on your skills shortages ?

.....

how will you overcome these skill shortages?

.....

What are the major constraints to expanding your business? (Rank top 3, 1=largest constraint):

-Owner capital and finance
-Debt finance for business
-Finance for customers
-Market demand inadequate
-Market price too tight
-Supply availability or cost
-Regulation/cost of doing business
-Skills availability
-Other.....

What are the key risks your business faces (Rank top 3, 1=largest risk):

-Erratic demand
-Unreliable supply chains
-Loss of key skill
-Loss of major market
-Foreign competitor disrupting market
-Increased local competition
-Large customer abusing powerful position
-Government policy or regulation makes it difficult
-Other.....

What are the major skills constraints (Rank the top 3, 1= largest constraint):

- Quality of Secondary Education
- Quality of FET graduates
- Quality of learner and apprentice artisan graduates
- Quality of University of Technology graduates
- Quality of University graduates
- Learners who lack practical work experience
- Employee motivation / work readiness
- Employment regulation
- Other.....

Where are the key non technical skills gaps (Rank top 2, 1=largest gap):

-Entrepreneurial Skills
-Problem Solving Skills
-Continuous Improvement Skills
-Basic English Literacy
-Basic Numeracy
-Other.....

What are your top sources of skilled employees (Rank top 2,1=top source):

-In house learnerships and apprenticeships
-University and University of Technology graduates
-Rely on skills developed by large metals companies
-Rely on skills developed by large non metals companies (e.g.mining, construction)
-Immigration
-Only hire people with more than 5 years experience
-Other.....

Do you complete a Work Place Skills Plan? Y.... N....

If not why not?

If yes how could it be improved?

Are you aware of any specific skills initiatives in your Province?....Yes....No If yes:

what are they	how well are they being implemented	How could they be improved

What are your key skills constraints and how do you plan to overcome them?

Key Constraint	Plan to overcome

Any other comments about Skills Demand in the Metals Sector

.....Thank you
for your time & interest in completing this questionnaire.

METALS SKILLS DEMAND MICRO & SMALL COMPANY SURVEY 2013

Name of Company.....Sector.....

Name of Person completing.....Position.....

CellphoneLandline.....Email.....

Note: This information is only if follow up clarification is needed and to avoid sending reminders to those who have completed. Individual Company responses will only be accessible to researchers and not be included in any public report.

Location: Gauteng..... KwaZuluNatal.....Western Cape..... Other....**No of Years in Business:** 0-2.....3-5.....6-10.....11-20.....21-50.....>50.....

Employee Complement:	Now	Estimate 3 years	Estimate 10 years
Management			
Engineers			
Technicians			
Project Management			
Logistics/Inventory			
Sales/Marketing			
Administration/HR/Finance			
Service/customer liaison			
Other non manufacturing			
Manufacturing			
Supervisors			
Project Management			
Skilled* (see trade/occup below)			
Semi-skilled* (see trade/occup)			
Unskilled			
Other manufacturing			
Total			
*Trade/Occupation	Now	Estimate 3 years	Estimate 10 years
Refractory Mason			
Pipe Fitter			
Air-Conditioning / Refrigeration Mechanic			
Refrigeration Mechanic			
Moulder			
Welder			
Fitter-Welder			
Vehicle Painter			
Sheet Metal Worker			
Boiler Maker			
Metal Fabricator			
Structural Plater			
Rigger			
Blacksmith			
Toolmaker			
Patternmaker			
Metal Machinist			

Fitter and Turner			
Mechanical Fitter			
Diesel Fitter			
Diesel Mechanic			
Heavy Equipment Mechanic			
Tractor Mechanic			
Forklift Mechanic			
Scale Fitter			
Electrician			
Millwright			
Lift Mechanic			
Electrical Equipment Mechanic			
Armature Winder			
Electronic Equipment Mechanician			
Instrument Mechanician			
Telecommunications Technician			
Melter			
Railway Track Master			
Other			
Other			
Other			
Total			

What are the major constraints to expanding your business (Rank the top 3, 1= largest constraint):

-Owner capital and finance
-Debt finance for business
-Finance for customers
-Market demand inadequate
-Market price too tight
-Supply availability or cost
-Regulation/cost of doing business
-Skills availability
-Other.....

What are the major skills constraints (Rank the top 3, 1= largest constraint):

- Quality of Secondary Education
- Quality of FET graduates
- Quality of learner and apprentice artisan graduates
- Quality of University of Technology graduates
- Quality of University graduates
- Learners who lack practical work experience
- Employee motivation / work readiness
- Employment regulation
- Other.....

Any other comments about Skills Demand in the Metals Sector

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Thank you for your time and interest in completing this questionnaire.

Annexure B: References and Sources

Below are the data sources and reports that formed the detailed literature review.

- NSDSIII
- National Skills Accord
- WCG – Artisan Career Awareness Initiative
- World Bank – recent Economic Outlook
- AATP – global standards
- IPAP, NDP, Designation, Preferential Procurement, Beneficiation
- merSETA SSP
- Industrial Structures and Skills in the Metal beneficiation Sector in SA
- Engineering News
- What employers need – Oregon Labour Market Information System
- *Qualityinfo* –Fabricated Metal Skills
- Numbers and Needs – Civil Engineering
- Numbers and Needs – Local Government
- HSRC National Skills Survey
- UK IET Engineering and Technology Skills and Demand in Industry
- Innovation, Skills and Jobs – European Foresight methodology
- Australia: Forecasting Future Demands
- Dti review: Assessing the human capital outlook implications for skills development in the priority sector. Metal fabrication, capital equipment and transport equipment
- NBI Business Engagement with FET Colleges & the Skill Sector - Learning from Practice
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- 52 CLOSING THE SKILLS AND TECHNOLOGY GAP IN SOUTH AFRICA – BACKGROUND PAPER 3: THE ROLE OF EDUCATION and Social Cohesion and the Elimination of Discrimination in Public Higher Education
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- Department of Education 1997b. Higher Education Act 101 of 1997. Pretoria: Department of Education.
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Annexure C: Findings and Recommendations

Key Finding	Issue	Recommendations	Responsibility
Early Childhood Development			
Basics missing	In first five years many learning skills are moulded	Lobby for role clarity and support for effective development rather than child care	SEIFSA
Basic Education			
Quality of basic education	Low scores in critical areas of numeracy and literacy	Lobby for effective basic education with DBE and 9 provincial departments	SEIFSA
Mathematics at schools	Dinaledi is not proving successful	Partner with say ECA on a Thutuka (SAICA) type initiative	SEIFSA
English language skills	English is the technical language and the language of	Support initiatives to improve	SEIFSA
Hard skills not seen as attractive to young	Metals and engineering are lagging careers such as IT and young people are not aware of	Partner with say ECA on industry promotion	SEIFSA
Inadequate screening and aptitude	Many students end up studying what is available rather than what they can/want to do for the rest of their lives	Partner with say ECA on career guidance	SEIFSA
Higher Education			
Technical High Schools	There are not many, mainly in advantaged areas and	Engage with DBE and 9 provincial depts. to expand number and effectiveness of THS's	SEIFSA
FET Trainer quality	The level of competency and motivation	FET lecturer upgrade initiative	MerSETA
FET Management	Seen as the lesser alternative so has not attracted the best management	Look at an approach similar to www.ge4sa.org focused on partnerships between FET colleges	SEIFSA
Some Universities below par	Graduates are less likely to be employed	Assistance to be provided by private sector to those university engineering faculties	SEIFSA with ECA

Key Finding	Issue	Recommendations	Responsibility
Cross education tiers			
Poor work readiness	Lack of entrepreneurship and work understanding	Promote entrepreneurship courses and practical application as well as providing work experience exposure to students	SEIFSA and Companies
Problem solving and continuous improvement	Because of rote learning tendencies	Develop and share course material on problem solving and continuous improvement and run inter	MerSETA and SEIFSA
Industry Policy Issues			
Very cyclical	The development plans are very uncertain because of the uncertain outlook for the industry	Engage with dti and other departments and government entities to see how there can be greater certainty	SEIFSA, MerSETA, Unions
PICC needs unknown	DHET has been researching this area for some time but no information has been shared with the	Obtain details ex DHET and start planning with them and private sector entities how requirements will be met	SEIFSA, MerSETA, Unions
Over regulation	Regulation is seen as a restrictor in terms of starting	See if some of the rigidities can be lessened to increase	MEIBC led
Technology impact	The impact is variable and needs further assessment	Commission specific research looking at move to an inverted triangle	MerSETA
SETA Issues			
User friendly WSP	The WSP is admin intensive	Run focus groups to look at ways to simplify	MerSETA
Cross Seta	Many employees who are with labour brokers resort under Services SETA	Negotiate with Services SETA that if a labour broker has more than 50% of their employees (permanent or temporary) deployed in the Metal Sector then they	MerSETA
Major artisan need	Despite AATP etc there is still a major shortage of Artisans	Workout plans as to how more funds can be accessed	MerSETA
Over Research	While Workplace Skills Plan (WSP) completion rates	Include a few open ended or opinion questions in the WSP each year	MerSETA

Key Finding	Issue	Recommendations	Responsibility
Company Approaches			
Poaching, freeloading	Most small and many medium and even some large <i>companies do not undertake their own</i>	?	?
Minimise need for skills importation	Lack of awareness and forecast	Coordinate industry planning in scarce skills areas	SEIFSA and corporates
Maximise skills transfer if import	Skills transfer not always planned in	Facilitate so time is minimised and many benefit from the sharing	Corporates
Industry Organisations			
Data inaccuracies and inconsistencies	There are various industry databases and they differ widely	Undertake a major data cleansing exercise to ensure industry has up to date and reliable information	MEIBC with support from merSETA
DHET Study			
CSIR/Wits/DPRU process not clear	DHET has retained CSIR/Wits/DPRU research skills demand across all sectors	High level engagement with CSIR/Wits/DPRU to understand process and ensure that the metal Sector is adequately covered	MerSETA with support from other industry stakeholders

Annexure D: Research topic for the Metal Chamber of the merSETA

Purpose

The purpose of this submission is to inform the IRD team of the research that the Metal Chamber requires to be done in order to ultimately have a meaningful SSP developed, aligned with the sector and national needs.

Discussion

The topic in essence is “Supply and demand” with a focus on demand data.

In order to adequately express the need (as this topic can be construed in many ways), a more narrative description is required.

The research required should focus on determining the actual need of the industry in terms of vacancies or missing skills and not be based on a WSP which does not express this need. The WSP focuses on training that will be undertaken by companies for their current staff complement and thus does not reflect the needs of their vacancies (nobody to train). The vacancies or jobs that are hard to fill are the skills in demand. This need is hard to meet, thus the vacancies.

The research to be undertaken thus needs to quantify the number of vacancies or jobs not filled, across our sector, extrapolate this against the aging workforce to determine the real need over a period of time (training time required to develop learners to address the aging workforce).

i.e.

Engineer	6 years
Technician	4.5 years
Artisan	3 years
Production employee	1 year etc.

With this known demand two other actions are required; firstly, determine the number of people currently practising in their specific disciplines or “trades” (i.e. there may be 20 000 qualified artisans, however maybe only 12 000 are practising their trades as others may have moved on to higher level positions). Secondly the delta (difference) needs to be ascertained between the number of practising skilled people and the demand, this will lead to the real required training or developmental need and according to volumes per discipline grouped, will automatically provide an ideal SSP based on a real need and not conjecture.

Methodology

Although it is not the Metal chambers place to dictate the methodology to be used during this research, we do recommend that cognizance is made of the following factors that can and will influence the world of work as well as the demand side to provide a more realistic research output reflecting the real need or SSP.

- Vacancies in industry
- Time to fill vacancies in industry (reflects the hard to fill jobs or scarce skills)
- Determine the critical skills in industry based on a set of criteria that reflects the criticality of the job or position in industry
- Projection of skills development time required to develop a learner
- Large infrastructure development projects in place or being planned – this will determine future skill needs
- Green or brown field developments currently being considered by industry or government
- Changing trends in technology – requires a different skills set. (higher skilled)
- The green factor, carbon foot print considerations will change the world of work and thus skills required
- Determine the number of practising individuals (not registered individuals with professional bodies as most people do not register)
- Establish a compulsory registration body for practising artisans under NAMB

The empirical research needs to be done first as mentioned above, followed by the integration of the data sets to provide a realistic manner of representing the SSP.

Smaller working groups will be made available to assist, consisting of members of the Metal Chamber (labour as well as employer organisations) to assist in the process.

Furthermore the chamber recommends that members of the research team attend a conference in workforce planning in order to capacitate them in the required techniques which we have prudently attached.

Conclusion

If the above guidelines are executed and standard templates developed for the merSETA Metal Chamber companies, all contributing members can complete these templates with the resulting information or data sets thus available for further processing, much the same as the WSP or ATR is currently done. This will ensure a solid research output which will provide a realistic SSP for the merSETA and could also become the blueprint for determining the national need (demand) and thus a more scientific approach to determine the supply which is currently conjecture.

Yours in skills

Chair Metal Chamber merSETA