Very little evidence of specialisation exists apart from the limited captive TDMs who produce tooling for their own use. Many foreign owned TDMs serving OEM's and tier one suppliers in automotive sector are partially protected by their parent company's willingness to support local operations even if the Chinese automotive market will displace automotive tooling orders for the future. It is more profitable to produce automotive parts - a shift by TDMs towards component manufacture is emerging thereby cross-subsidising unprofitable TDMs with manufacturing.

Demand conditions

South Africa produced R 2,5 billion of TDMs in 2004 and consumed R 3,2 billion of TDMs. Metal tooling dominated at 64% of the production, followed by 31% in plastic mould manufacture, the rest being glass and other tooling. However, metal packaging is forecasted to lose market share to Paper, plastics and glass packaging in future. A negative trade balance of R850 million resulted from exports at R 400 million and imports of R 1,250 million. Its production has followed the general low growth in South Africa's economic growth with the latest growth coming mainly from the FDI coming from the automotive industry aimed at large vehicle export contracts. South Africa is still a net importer of TDMs sourced mainly from Japan, Taiwan and Europe. Demand in packaging is growing and less cyclical due to the diversity of it's customer base.

The increase in imports has been driven by imports from Europe and Asia, with the most consistent sources of supply coming from Europe. Imports from that continent have risen every year in Rand terms except 2003. Asian supplies appear to be more volatile, whilst the region that has performed worst is the Americas, which have seen declines in values and market share since 2002. Oceania and Africa are not significant suppliers into the South African market. Supplies from Oceania – largely Australia – are small but fairly consistent. European countries accounted for just over 55% of the total import into South Africa from 1999 to 2004, roughly double the share of Asia, which has double the share that the Americas have. The figure changes from year to year in terms of overall share, but Europe's share of the South African market remains in the mid-fifties most years, except for when there are surges in Asian exports.

The export market for South African tooling is different in terms of both destination and market share. Europe, and in particular Western Europe, is the key destination for tooling products from South Africa, although the share of the overall market has been in decline for the last two years. It is the only region that has shown a marked decline in exports since 2002, with other regions either growing consistently, or showing declines in one year only, as in the case of the Americas and Oceania. It is interesting to note that Africa has proven to be the most resilient market for South African suppliers, even though it is much smaller than the European market.

Exports to Africa as a whole have roughly doubled since 1999, and in 2004 South Africa exported roughly the same value of tooling products into the rest of the continent (outside of the Customs Union) as she did to the Americas. This is quite a performance given the relative size of the economies in question. Over the whole period, from 1999 to 2004, Africa as a whole accounted for a greater market share than Asia and Oceania combined.

South Africa's overall imports of tooling have increased by 124% in value terms since 1999. South Africa's imports of tooling products by the technology platform of application show three key categories – metal pressing and forming tools, plastic and rubber injection moulding tools, and rock drilling tools. Of these three categories, imports of rock drilling tools have performed worst, declining since 2002 in Rand terms. Imports of both metal pressing tooling and injection moulding machinery saw a sharp drop in 2003 in value terms, although in both instances the overall trend has been to strong growth in imports. Metal moulding tooling imports are relatively small by comparison, although they have shown the greatest growth, increasing by over 160% from 1999 to 2004, and reaching R84 million in 2004.

South Africa's exports of tooling have grown by a more sedate 62% from 1999 until 2004, with marked differences in the performance by technology platform. Rock drilling tooling and metal pressing and forming tooling are by far the most important export categories from South Africa. Exports of rock drilling tooling saw huge growth from 1999 to 2003 before falling away quite dramatically in 2004, whilst exports of metal pressing and forming equipment have shown incremental growth at best. Other sectors are very small, with only exports of jigs and fixtures in 2001-2 being noteworthy.

The domestic automotive customer base in South Africa for TDMs is growing as foreign manufacturers continue to locate and expand production locally supported by the MIDP. The trade balance for automotive tooling is still negative as shown in the table below:

Table Eleven: Trade Balance for Automotive Tooling in South Africa

	2001	2002	2003	2004
Imports	1289	1547	1002	1728
Exports	441	363	529	363
Trade Balance	(848)	(1184)	(473)	(1365)

Source:- TISA

From the above table it is clear that imports normally surge when new models are introduced in the following year. The BMW 3 series, Ford Focus , Toyota IMV, Fiat Strada are examples of this phenomenon and also indicate the highly cyclical nature of this industry not only locally but also globally. A concern here is that despite the MIDP support for tooling exports, very little evidence of growth can be detected.

Lead times in the automotive metal pressing tool making sector are generally longer compared to Japanese and Chinese TDMs. Lead times for similar tools are 70 days in South Africa compared to 53 days in Japan. Quality is generally perceived to be poor if local materials and machining equipment are used by indigenous TDMs. However the automotive industry demands high quality materials and precision which means that materials and tool making machines are all imported.

Prices are on par with the US and Europe due to lower wage rates and longer working hours (35 per week vs. 45 per week) which keep overheads low. However, when one adds additional costs incurred in logistics, prices in South Africa are at a premium against EU ex factory prices.

Factor conditions

Labour

South Africa's TDM industry is estimated to employ 2,800 persons and is plagued by a serious shortage of skilled toolmakers due to the brain drain experienced over the last decade. The toolmaking profession overseas attracts South African qualified workers not only because of its relatively high wages but also because of the recognised role TDMs play in foreign country development. The industry is characterised by a lack of experienced designers, IT specialists, project managers and toolmakers, as much of the workforce is older people in their mid 50's. The workforce also lacks a significant number of women as compared to other countries. Nominal wage rates have increased by 10% -15% over the past five years (depending on the skills level). Skilled artisans wages are rising by as much as 15% pa due to a shortage of skills.

Actual wage levels for skilled and semi-skilled employees over the past five years have risen as follows:

Table Eleven: Actual Wage levels for skilled and semi-skilled employees

Skill Level	2000	2004	2005 Wage (Expectation)
Semi-skilled wages	R9/h	R21/h	R25/h
Skilled Artisan Wages	R60/h	R100/h	R110/h

Source: Blueprint International © 2005

The wages of skilled artisans are expected to continue rising at 10% to 15% per annum for as long as the skills shortage continues.

In China, where toolmakers are the highest paid profession in the manufacturing sector an unskilled entry level workers earn wages ranging from $ 585 to $ 732pa and skilled TDM builders from $ 1463 to $5 853 pa. This is approximately five times lower than the cost of the equivalent South African labour.

New entrants are typically hired from high schools, technical schools and technical colleges. Designers and engineers are graduates from State-run universities but usually have very little shop floor experience. Technikon Students undergo internships at TDM companies prior to graduation but university students do not. Once the person is in the workforce further education is sponsored by TDMs using the Merseta training grant scheme.

Materials used in Manufacture of Tools, Dies and Moulds

Tool grade steels are used to produce tools, dies and moulds. Steel grades used for production of tools, dies and moulds are all tool grade steels. High specification tools are generally made completely from high grade tooling steels. In certain cases, for the purpose of cost reduction, tool grade steel is used for the actual working area of the tool, and mild steel is used to manufacture the components, which hold the tool in the machine. These would typically be tool components such as

bolsters, clamping plates, support bases and ejector plates. In coastal areas mild steel is normally not used at all due to corrosion.

The tool grade steels used are listed in the table below. Average listed prices are indicated for each grade and do not reflect volume discounts or other deals with suppliers. The prices are supplier average listed prices, and do not include scrap and alloy surcharges, which are revised quarterly, nor do they include heat treatment costs where applicable. The average scrap surcharge level for suppliers in 2005 is 85c/Kg but is expected to decline in the third quarter due to the introduction of alloy surcharges by suppliers. Alloy surcharges by suppliers have been introduced at about 90c/Kg. This is factored into the price increase for 2005, which is then expected to be lower than in 2004.

Heat treatment is normally priced at a rate per kilogram. Heat treatment of a 100 Kg tool of tool grade steel would cost approximately R2500 up to 1080 degrees centigrade and approximately R5000 above this temperature to a maximum 1300 degrees centigrade. The cost of heat treatment reduces by about 15-20% for tool over 200 Kgs.

Also shown in the table below is the percentage of total tonnage supplied to the tooling sector for each tool steel type. Cold work steels are the largest steel type used at approximately 45%, followed by Plastic mould steels with 32%, hot work steels 19% and high speed steels 1.5%. These three tooling steels types make up approximately 97.5% of the tool grade steels supplied for the manufacture of tools, dies and moulds. This suggests that in terms of tooling technology platforms approximately 65.5% of tooling manufactured is for metal tooling and 32% for plastic moulding.

Table Twelve: Tool Steels

Steel Type	Steel Grade German Werkstoff No.	Steel Grade AISI	BS Grade	DIN	Average Prices R/Kg	Percentage Supplied to tooling of Total Tonnage
Plastic Mould Steels	1.2735 1.2312 1.2311 1.2738 1.2316 1.2083	 P20 P20 420		1.2735 1.2312 1.2311 1.2738 1.2316 1.2083	R 28 R 48	32%
High Speed Steels	1.3343 1.3243	M2 M41	BM2 BM35*	1.3343 1.3243	R 120 R 150	1.5%
Cold Work Steels (Metal press)	1.2080 1.2379 1.2101 1.2550 1.2510 1.2767	D3 D2 S1 01	BD3* BD2 B01	1.2080 1.2379 1,2101 **1.2542 1.2510 1.2767	R 45	45%

Steel Type	Steel Grade German Werkstoff No.	Steel Grade AISI	BS Grade	DIN	Prices R/Kg	Percentage of Total Tonnage Supplied to tooling
	1.1730			1.1730	R 22	
Hot Work Steels (Die steel)	1.2581 1.2344 1.2365 1.2714	H21 H13 H10 L6	BH21 BH13 BH10 5*(BS224)	1.2581 1.2344 1.2365 1.2714	R50 R35	19%
High Tensile Nitriding Steels	1.6582 1.8550		816M40*	1.6582 1,8550		.5%
Powder Metallurgical Steels	Only supplier specific grades					Miniscule

Source: Blueprint International © 2005

The estimated total tonnage of tool steel supplied to the South African tooling industry in 2004 was slightly less than 3,000 metric tons or 3 million Kilograms, at about 2,970 Mt. Of the total tonnage supplied, 45% was made up of Cold work steels, 32% Plastic mould steels and 19% Hot work steels. Total turnover of the tool steel supplier industry in 2004 is estimated at approximately R 119 million. The average price of tool grade steel per the grades utilised by the tooling manufacturers is estimated to be R39/Kg.

The price of tool grade steels varies depending on the type and grade as is shown in the table above. Given the industry consumption levels of tool grade steels per grade in 2004, the average price paid by the industry was R39 per Kilogram for that year.

The price of tool grade steels has risen year on year over the past four years, but has increased more year on year since 2003. In 2001 and 2002 relatively small increases of about 3-4% were instituted, but in 2003 the increase was significantly higher at about 15% and 8% in 2004. A price increase of about 7-8% is expected in 2005.

Mild Steel

Mild steels used in the tooling industry is not used to produce the working part of tools, dies or moulds as indicated above, but rather components such as clamping plates, support bases and ejector plates. The certified mild steel grade used is 300 WA, but as is indicated in the table below approximately 80% of the steel supplied for this purpose is commercial quality non-certified mild steel. This has until now been largely price driven as non-certified commercial grade mild steel has been cheaper by approximately R2.00/Kg than certified 300 WA mild steel.

The price of non-certified steel has however recently been brought to the same level in all sectors as that of certified commercial grade steels by Mittal Steel SA, apparently as a result of purchase and on-selling by manufacturers in a certain sector other than the tooling sector. The percentage proportional utilisation as indicated between certified and non-certified mild steel is historically based and could change as a result of the price equalisation in certified and non-certified mild steel.

Table Thirteen: Mild Steels

Steel Type (Iscor)	Steel Grade	Average Price R/Kg	Percentage of Total Tonnage Supplied
Non-Certified Mild Steel Commercial Quality	Non-Certified	R 7-8/Kg*	80%
Certified Mild Steel	300 WA	R7-8/Kg	20%

Source: Blueprint International © 2005

Components

Standard off the shelf components are purchased to enable the working of the tool and are typically not manufactured by the tool rooms but rather bought in from component suppliers specialising in the manufacture and/or distribution thereof. These components include:

- Hot runner systems
- Hydraulic systems
- Pneumatic systems
- Limit switches
- Proximity switches etc.

It is has not been possible to quantify these inputs as the information is not publicly available and supply is diverse. From a trade perspective the tariff codes are too generic.

TDM Manufacturing Platforms

Tooling Technology Platforms – Relative Size Breakdown

Considering the tool steel type utilisation and consumption breakdown above, it is apparent that approximately 65,5% of total tonnage was consumed by metal tooling and 32% by plastics tooling. This indicates that in terms of the tool manufacturing technology platforms' production split between metal tools and dies and plastic moulds, approximately 65% of tooling manufactured is metal application tooling and 32% plastic mould making.

Glass moulds are produced from cast iron (with a molybdenum and titanium alloy) and are cast from a pattern into the bottle shape required. The relative size of the technology platform can therefore not be estimated from tool grade steel consumption. The size of the glass mould platform can however be estimated reasonably accurately through backward integration of the size of the

glass packaging market, which is R1960 million (versus R 9738 million for plastic packaging) to be about 2% of tool manufacture by value. There is only one glass mould maker in South Africa, which is a USA company subsidiary and which produces about 50% of the industry requirement. The balance of glass moulds are imported from Italy. The overall technology platform production breakdown is therefore estimated to be 64.2% metal tools and dies, 31.4% plastics moulds and fittings and 2% Glass moulds.

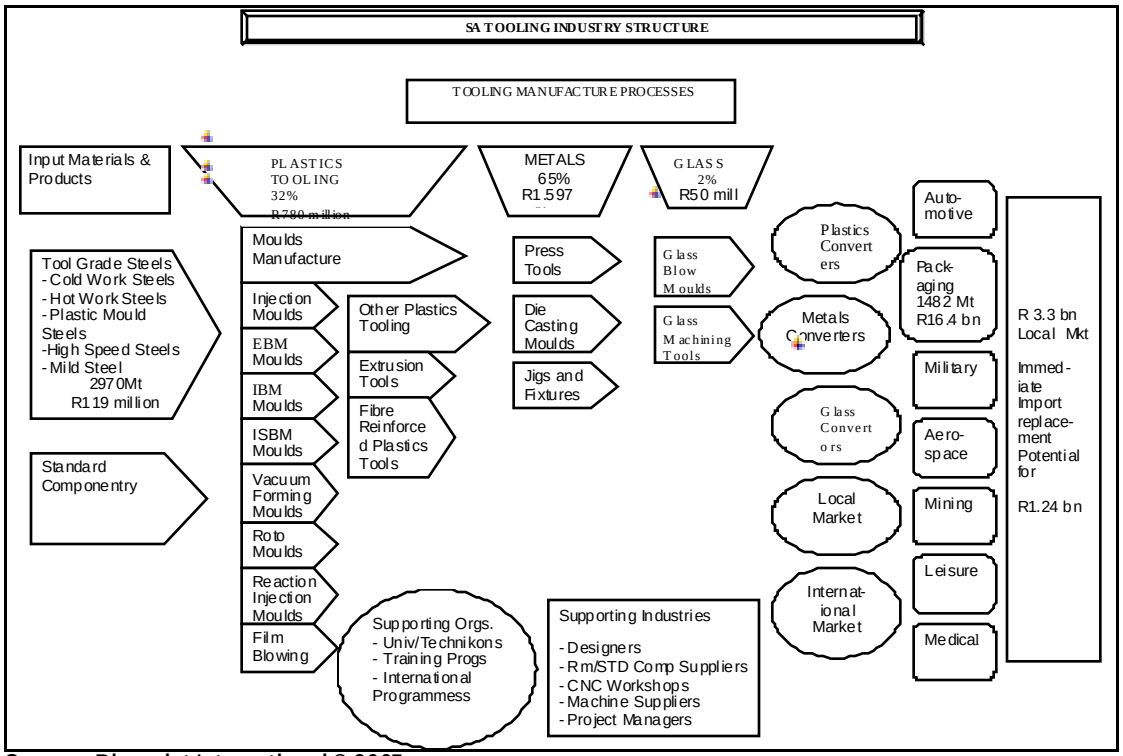
Table Fourteen: Technology Platforms Relative Sizes

Technology Platform	Material Used	Manufacturing*
Metal Tooling	Cold Work Steel Hot Work Steel High Speed Steel	64.2%
Plastic Moulds	Plastic Mould Steel	31.4%
Glass Moulds	Cast Iron	2%
Other		2.4%

Source: Blueprint International © 2005

Figure eight below offers a comprehensive overview of the South African TDMs from a technology platform point of view. (Detail on each individual platform is available on the accompanying CD)

Figure Eight: Industry Structure: By Technology Platform



Source: Blueprint International © 2005

Value-Added in TDMs

From data obtained through the tooling industry survey TDM sample, on tooling steel material volumes purchased, conversion rates and turnover levels, as well as information obtained of material volumes and prices supplied to the industry, it is estimated that the average value-add conversion multiplier for the South African tooling industry is approximately 19 or 1,900%. This is a relatively high level of value-added, especially in the metals conversion sector, and is indicative of the technology and skills levels required in the tool making process.

For example, a one metric ton block of DIN 1.2735 plastic mould steel costing R28,000.00, given the value-added conversion ratio would be machined and converted into a plastic injection mould valued at R532,000.00. In South Africa today however, marginal value added is diminishing as tool steel grades cost more and conversion processes become more complex and expensive. When this occurs, value added is approximately 12 times the input cost.

South African Tooling Industry Production Value

The South African tooling industry is estimated to have had a total turnover in 2004 of approximately R2500 million (or R2.5 billion). Furthermore, material supply volumes from 2001 to 2004 and information from the survey sample indicate that overall local industry production level has not shown any real growth over the past five years and could be described as static. The two main reasons for this appear to be a decline in local automotive sector business, especially in the past two years, 2003 and 2004, and a sharp increase in importation levels since 2000. Although exports also showed growth, this was at much lower levels in terms of actual volumes and did not compensate for import growth.

Production values for each technology platform as indicated in the table below are estimated at R1,597 million for metal tools and dies, R780 million plastics moulds and fittings and R50 million for glass moulds.

Table Fifteen: Technology Platforms Relative Value

Technology Platform	Percentage of Total Tool Manufacturing*	Production Value (Rm)
Metal Tooling	64.2%	R 1597
Plastic Moulds	31.4%	R 780
Glass Moulds	2%	R 50
Other	2.4%	R 60

Source: Blueprint International © 2005

Value Chain

Inbound logistics

Captive tool rooms are in the minority but have the advantage of supplying into its own manufacturing operations. The majority of tool-rooms are geographically close to each other but since very little evidence of collaboration is taking place, inbound logistics are important for the

majority who import high grade tool steel and certain components. Road freight is used but as a relative cost of production is less than 1%.

Outbound logistics

Captive toolrooms are less affected as they are normally adjoining their own manufacturing operations. However, the majority of tool rooms produce large, bulky and heavy tools in the automotive sector which affects it negatively when the exports are containerised and sea freighted over long distances. The large in-land distances to the coast added to a six week sea freight time lag, makes it difficult to compete with Eastern European companies who service our main European market. Likewise, Brazil and Mexico are better positioned to service the large US market. The close proximity most Asian countries have to each other make it more difficult for SA exporters to those markets.

The MIDP is to a large extend a cushion when it comes to automotive tooling exports logistics costs but was not enough of encouragement to boost export sales dramatically.

Operations

The historical nature of the tool and die industry in South Africa is one that needed to service its markets in automotive, packaging, military, aerospace, mining, medical and leisure. With the opening of South Africa to global competitors, a drastic change needs to be implemented in the basic operations of each tool room. Conversion processes, linkages and access to latest technology and time management is crucial to secure operational efficiencies and effectiveness. A tool room's ability to understand customer requirements from design concept to delivery on time, often wins contracts or lose contracts. Product differentiation is not as important as process differentiation as the former is dictated by the customer and the latter by the tool room. It is important to determine what impact the tool will have on its customers operations. Minimising rejects as a hidden cost in customer plants often develops in a trustworthy relationship, which secures contracts for the future.

South Africa still lags competing nations who are better clustered and organised in highly specialised tool rooms in a vertical structure, hence our unused capacity which burdens local toolmakers who are horizontally organised with low levels of specialisation in any discipline like, design, CNC milling, spark erosion, finishing, assembly, project management and metrology.

Marketing and Sales

Demand for press tools for the automotive and metal packaging industry have been reducing over the last decade and are forecast to contract further. Large volumes per platform in the automotive industry is the norm for metal stamping plants and whilst South African OEM's announce large export orders, these orders are still low compared to the developed markets in Europe, US and Japan. OEM's operating in these high volume countries prefer to invest in one set of tools in these high volume countries serving local high volume production and send parts globally to where they are needed. Product rationalisation of the local OEMs has also phased out the need for discontinued models parts not produced any longer.

Distance from our major trading nations is not a problem from a tool importing point of view as import tariffs are low and tools for smaller parts are not bulky and heavy, and volumetric usage of container space is high and therefore affordable. It is a different matter for exports.

A new market segment may be opening in South African aerospace production. The National Industrial Participation support instrument developed by the dti creates a lever for international aerospace suppliers such as Boeing, Airbus and Rolls Royce to invest in local manufacturing operations and tool and jig manufacturers could develop markets, which could be sustainable in the long term.

After sales service / maintenance & upgrades

The South African tool and die sector is to a large extend protected by this cost element as our tools are durable and not of the cheaper version built in some of the Asian countries. Longevity and product lifecycles tend to be longer which lowers the cost to the customer over its product life.

Firm infrastructure

The majority of South Africa's tool rooms are structured around a horizontal technology platform where self sufficiency in a widely fragmented industry with a widely fragmented customer base forces local tool rooms to be flexible and responsive to short lead times at diminishing margins, lower quality and a diminishing re-capitalization of equipment and state of the art technologies.

The nature of this structure does not lend itself to a clustering of capabilities and expertise as most tool rooms wants to be self-sufficient. Many opportunities exist for tool rooms to collaborate in terms of functional specialisation such as testing facilities, laboratories, measuring and accreditation, spark erosion and IT infrastructure.

Outsourcing can be increased through a network of accredited specialist operations and project managed in a one-stop-shop fashion. The last operation in any tool room is normally assembly and tryout of the end product before customer satisfaction. SA tool rooms often suffer from not getting paid retention money due to poor quality.

Human Resource Management

Local tool rooms suffer in production efficiency due to poor human skills availability and poor training. Skills academies at the larger TDMs still exist but a high attrition rate, specially amongst whites who emigrated abroad, created a large vacuum with few new entrants to the market.

South Africa has the opportunity to develop skilled toolmakers in the previously disadvantaged communities as these students are eager to excel and to learn new technologies and is less likely to emigrate to other competing nations.

Whilst labour rates are still competitive with the high cost countries in the triad, competition in low cost countries will become more severe and hence the demise of the tooling sector.

Customer Technology Development

In the automotive industry, where fuel efficiency forces OEMs to design lighter more fuel efficient vehicles, metal parts are increasingly replaced by light weight plastic parts of high strength. Bumpers are a good example and aluminium suspension parts as well. Tooling for the growing electronic parts market in vehicles offers another technology shift, which will change demand away from metal press tooling. South Africa is in a position to capitalise on these new technologies as a result of its lower energy cost and modern automotive industry.

Procurement

Local tooling companies are not at a disadvantage from a procurement point of view as all the latest capital equipment is available from importing machine agents. Likewise all materials are imported which does not affect quality negatively. Terms of payment in the industry favour the tooling industry as deposits from customers are used to cover all procured items up front and the speed of delivery secures profitability.

Tooling Machinery Supply in South Africa

There are five major tooling machinery suppliers in South Africa. These are: Forest, Holmach (belong to Grefor a Holding Co.), Retecon Group, Rotmac and RGC. Machinery is also supplied through other members of the Machine Tool Merchants Association. All tooling machinery in South Africa is imported and supplied directly to buyers by the above and other companies. The total South African machine tool market is valued at R600 million per annum of which R500 mill is supplied though the Machine Tool Merchants Association members and R100million through other importers and direct sourcing internationally. Most CNC machinery is supplied to tool rooms and includes CNC Milling, CNC Turning, CNC Grinding, Spark erosion, wire erosion EDM's, metal pressing and forming, measuring, engraving, inspection machines and metrology systems.

The average value of machinery and equipment invested in a tool room in South Africa is R25 million and in Europe R100 million. Tool rooms in the Far East are also significantly more highly invested in machinery and Equipment as in Europe. To keep up to date in an ideal environment, South African tool rooms should be investing about R5million pa. The current average is to invest in new equipment every 3 to 5 years (for most tool rooms closer to 5 years). The actual amount invested on average is less than R1million pa by tool rooms. Gauteng is the region which invests most in tooling machinery and equipment.

Regional / Geographic Spread of Tools, Dies and Moulds Production

The highest concentration of the industry by company location occurs in the Gauteng Province, followed by Eastern Cape and KwaZulu Natal. This dispersion suggests a strong influence on the industry by the Automotive Sector.

Table Sixteen: Geographic dispersion of South African tooling companies

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Region	Company Concentration
Gauteng	31.16%
Kwazulu Natal	24.86%
Eastern Cape PE	23.73%
Eastern Cape EL	4.84%
Western Cape	15.41%

Source: AIDC/NPDC

Geographic Dispersion by Production Volume

Survey data of material suppliers indicates that there is a difference between relative production volume and company concentration in the geographic regions with the regional production volume to company density ratio in Gauteng being higher and in the other provinces lower than the relative company concentration levels. This either indicates bigger relative company size in Gauteng and smaller companies in the other regions, and/or better productivity levels in Gauteng. (The exact data cannot be provided as there are not enough suppliers to aggregate data sufficiently).

Resource endowments by cluster

The following are the key resource endowments in these locations relevant to the industry:

Gauteng

- Biggest concentration of local converters and consumer market
- Automotive OEMs (BMW, Ford, Fiat and Nissan) involved in export programmes
- Greatest concentration of Packaging Industry (55%)
- Greatest concentration of engineering-based higher education and training institutions

KwaZulu/Natal

- Automotive OEM (Toyota) involved in export programme
- Major port for export outlet
- Reasonable concentration of packaging industry (17%)
- Availability of engineering-based higher education and skills institutions

Eastern Cape

- Automotive OEMs (VWSA, DCSA and Delta Motor Corporation) involved in export programmes
- Major port for export outlet
- Lowest concentration of packaging industry (6%)
- Availability of engineering-based higher education and skills institutions

Western Cape

- Availability of port for export outlet,
- Availability of engineering-based higher education and training institutions
- Reasonable concentration of packaging industry (12%)
- Considerable FDI interest

Value-Chain Costs, Conversion and Investment Levels

A summary of the costs along the activity chain in the South African TDM industry is shown in the table below, derived from the Blueprint industry survey findings. It is clear that labour represents the highest proportion of production cost, followed closely by raw material inputs.

Table Seventeen: Relative Costs of Sales

Item	% Cost
Raw Materials	30
Full time labour	55
Part time labour	0
Stockholding	1
Inbound & outbound logistics	2
Quality Control	5
Buy outs	2
TOTAL	95
Overheads	5
Average Margin (industry aims for 25%)	15-20

Source: Blueprint International Survey © 2005

Charge-out rates

On average, tool-rooms charge out work at between R200 and R280 per hour. There does however appear to be a differential in the charge out rate between the tool-rooms supplying the automotive sector and those supplying other sectors including packaging. In general the charge out rate to the automotive sector is lower than to other customer sectors by 20% to 30%.

Tool-rooms with modern Computer Numeric Control (CNC) machines and equipment supplying the packaging and other sectors appear to have better charge out rates and a more consistent level of demand. Tool-rooms supplying the automotive sector, which are well equipped with CNC machines and modern equipment, tend to have a lower charge out rate and a more cyclical project based demand. The impact of low skills availability and inadequate technology together amounts to nearly 65% - a relatively gross measure of competitive disadvantage but an indication of the problem areas.

Table Eighteen: Impact of Skills Availability, Technology and Labour Cost per Unit Output on Productivity

Item	% Impact
Cost of highly skilled labour	30
Cost of artisan labour	15
Cost of unskilled labour	5
Technology used	20
Capital invested	30
TOTAL	78

Source: Blueprint International Survey © 2005

Tool-Room Cash Flow

Tool-making companies in South Africa, unlike their overseas counterparts, state that they do not tend to experience any significant cash flow constraints during tooling project operations. This is primarily because they tend to hold very little if any stock, and secondly because they are paid incrementally per tool project phase, with a sizeable deposit on order. Material is ordered on a per project basis, and project cash flow is funded by the customer's deposit.

Customer payment terms are typically 40% deposit on order, 40% deposit on completion and trials and 20% on acceptance with some variations in percentages and some companies including a fourth payment phase at 50% completion.

The only area of any real potential project cash-flow concern is the delay by customers in paying the final project instalment after acceptance and installation of the tool. Typically customers are large and tool-making companies considerably smaller.

Level of Investment in New Machinery and Equipment

The average level of investment annually by TDM's over the past 5 years has been R 1 million where an investment of R2.5 million per annum is considered to be at the higher end, and R200 000 per annum at the lower end of individual company investment level.

These investment levels are considered low by international standards and South African tool-rooms will need approximately R15 million per tool-room to bring them to internationally competitive standard and then to invest 10% to 15% of annual turnover to maintain competitiveness. The average age of equipment in South African Tool-rooms is around 10 to 15 years, however a few companies have been able to modernise and bring this down to about 5- 7 years but are a relatively small minority.

The reason for the generally low levels of investment in new technology and machines is considered to be the lack of available capital to invest caused either by the inability to generate capital internally as a result of the comparatively low capacity utilisation levels and size of individual firms, and also the lack of support to purchase of new capital equipment.