

Most tool-making companies are aware of the SMEDP Programme and have made or attempted to make use of it. The main criticism of the SMEDP is that it does not take cognisance of the nature of the tooling industry's machinery and equipment investment requirements, which unlike other industrial processes [requiring one major capital investment and then an upgrade in 10 years], needs continuous smaller capital equipment upgrades to stay ahead of technology development. The SMEDP only allows for one expansion, which limits its usefulness as an investment instrument. It is also penalising the large-scale investors due to its diminishing scale of support as the investment increases in size. Access to the fund is also difficult for SMMES as they need to allocate additional administrative resources to comply with the complex application requirements and the time required to receive the funding.

Capacity Utilisation Levels

By international standards, capacity utilisation in South African tool-rooms is considered low as most tool-rooms work a single shift as opposed to the three shift operations of Europe and the Far Eastern countries.

Average capacity utilisation in South African tool-rooms is estimated to be 1 shift, 65-70% , which is relatively consistent for non-automotive sector tooling suppliers. In the automotive sector the added problem of project driven cyclical demand sees some tool rooms running at 1 shift, 30% capacity levels at the lower end and 1 shift, > 100% when projects are underway. This is normally managed by, increasing to a second shift and using contracted labour, or contracting work to other tool-rooms. Work is normally contracted to the same selected tool-rooms.

Related and Supporting Industries

CAD/CAM/CAE software is principally imported from US and Europe. Parts and components such as high-quality systems for hot runner, hydraulic and pneumatic installations as well as limit and proximity switches are mostly sourced from specialised manufacturers and importers. Robots are becoming important pieces of equipment in jigs and fixtures tooling as well as large body-in-white systems and assembly lines.

Indigenous TDM producers often do not use software for design and manufacturing and some copy milling is still evident. If they have to, it is not uncommon to buy programmes from a large local IT supply base. Increasingly, customers use design houses that does the designs of Tools off-shore but then there is no CAM systems in place to at the local TDMs to speed up the tool path programmes required for production.

Technology capabilities are focused on the low and medium of the product complexity spectrum. This means a lot of production for small speciality shops, which in turn supply the larger tool-rooms. Foreign owned TDMs however are capable of producing high-precision and more complex TDMs but they are in a minority. Much of the indigenous TDM industry is perceived as being backward and generally weak regarding quality levels and competitiveness.

Metrology laboratories and adequate inspection facilities are almost non-existent in the SMMES leading to poor quality tools and production limitations, resulting in the capacity to produce only low-tech tools in an increasingly Hi-Tech Industry requiring extremely precise and efficient tooling.

Access to capital is generally not the main issue but the willingness of indigenous TDMs to invest in new technology is lacking due to low levels of demand and unavailability of skilled toolmakers to man those machines. South Africa's high real cost of capital is also seen as a deterrent to investment. Interestingly, in spite of clear spatial cluster having formed naturally proximate to the major customers, very little collaboration has taken place in the industry.

The TDM industry in South Africa has only recently organised itself and created the Tooling Association of South Africa or TASA, with a growing membership. TASA has realised that its members are facing serious competitiveness problems and is in the process of developing and finalising its constitution which they believe will assist them to lobby government for urgently needed support.

South African Industry Structure

The vast majority of the TDMs in South Africa are SMMEs and as such, the factors and dynamics that impact on SMMEs in South Africa, as well as the factors that impact on the TDM industry itself, apply. Only 4.3% of firms have over 50 to 200 employees, and this is consistent with global trends.

Table Nineteen: TDM Firm Size and Distribution

Firm size and distribution (sample taken from SATISI Database)						
	Number of companies	Number of Employees				
		1 to 5 Micro	5 to 20 Very small	20 to 50 Small	50 to 200 Medium	200 + Large
Gauteng	20	2	16	2	0	0
KZN	10	2	7	1	0	0
Eastern Cape	8	3	2	1	2	0
Western Cape	9	3	4	2	0	0
Total	47	21.28%	61.70%	12.77%	4.26%	0.00%

Source: SATISI Adapted by Blueprint (2004)

The industry has been in the process of restructuring itself in order to prepare itself for growth for some time now. The following diagram is the structure towards which the industry is moving. It requires a solid institutional framework and the development of collaborative working mechanisms in the existing spatial cluster. As the figure below shows, the South African industry is structured with a main focus on tools and dies and less on moulds, and with the automotive industry as the dominant customer group, followed by packaging, consumer goods and then other applications. As a consequence of the dominance of the automotive industry, the industry has clustered spatially for the most part near the automotive industry clusters in Pretoria, the Eastern and Western Capes, and KZN although other groupings do occur in other industrial areas.

Government support

The government has a number of general support measures available aimed at FDI, skills upliftment, marketing and some technology enhancement mechanisms. The TDM industry in South Africa uses only two, which is the SMEDP and Skills training schemes. Some automotive tool-rooms also benefit from the MIDP. The Productive Asset Allowance, however has no local content stipulation and as such competes against local TDM's as an incentive by OEM's to invest in tooling whether it is sourced locally or from abroad.

The general company income tax rate is high at 29% with a secondary tax on dividends of 12,5% , making South Africa one of the highest tax paying countries in the developing world. The tool and die industry is a cross-cutting factor of production in many sectors of manufacturing but does not enjoy sector specific support from Government. TDM specific import tariffs are low (zero) compared to other competing nations.

A major structural adjustment of the TDM Industry is lacking and uncoordinated efforts by various supply side measures can be extremely disruptive and confusing from industrial, monetary, fiscal, technology and labour policy point of view. A dire shortage of skills should allow the TDM's to employ immigrants but current Home Affairs policy and practise make it extremely difficult to do so. In countries like Australia and the UK, skills shortages are targeted through immigration and foreign recruitment policies. Contract labour is a norm in this sector due to the cyclical nature of contracts earned but our labour policies mitigate against this practise.

Supporting organisations such as the CSIR and AIDC could be utilised to play the role of implementing agencies for government intervention, but no government budget allocation is available to fulfil such a mandate. Powerful support instruments like the National Industrial Participation and Public-Private-Partnerships have not been sufficiently exploited by the industry members, who typically are not aware of the government support programs with the exception of the SMEDP.

Tertiary Education Institutions does little but offer generic engineering degrees and diplomas. The career path of a highly skilled toolmaker, designer, programmer and metrologist is a difficult one and needs careful consideration and leadership in government, labour and industry as well as supporting industries to make a success of the TDMs. Finally, a common vision, mission and strategy is lacking and a lot can be learned from the MIDP and it's support mechanisms in the MIDC. A master plan for the TDM industry needs to be negotiated and implemented soon to avoid the demise of this underpinning industry.

South African TDM Trade

The categories evaluated for the period 1997 to 2004 are the standard categories as follows:

Table Twenty: Categories Analysed for Trade in TDM

South African Tooling Exports (in Rands) - Major Regions and World

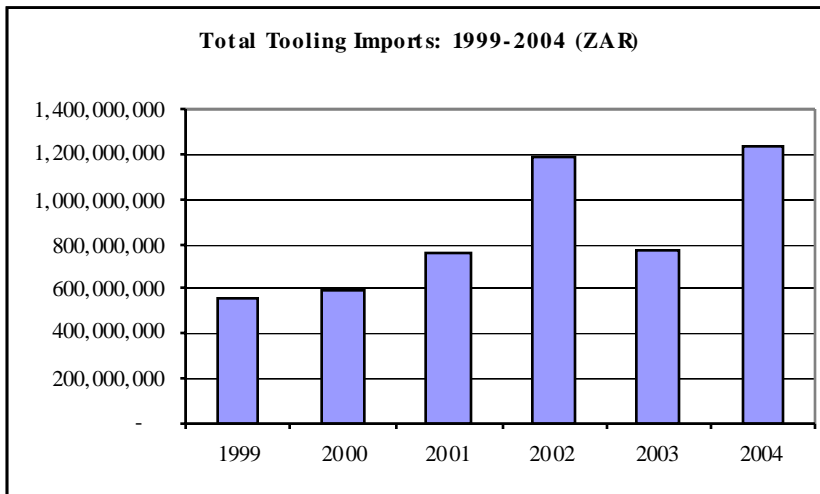
HS Code	Product(s)
HS 8207	Interchangeable tools and dies for hand, power and machine tools
H820720	Dies for drawing or extruding metal
H820730	Tools for pressing, stamping or punching
H820740	Tools for tapping or threading
H820760	Tools for boring or broaching
H820780	Tools for turning
H820790	Screwdriver bits and other interchangeable tools
	Total - Tool and Dies
HS 8480	Moulds for metals, plastic, rubber, etc.
H848010	Boxes, moulding, for metal foundry
H848020	Bases, moulding
H848030	Patterns, moulding
H848041	Moulds, injection or compression, for metals/carbides
H848049	Moulds for metal or metal carbides, nes
H848050	Moulds for glass
H848060	Moulds for mineral materials
H848071	Moulds, injection & compression, for rubber or plastic
H848079	Moulds for rubber or plastic, nes
	Total - Moulds for metals, plastic, rubber, etc.
HS846620	Work Holders for Machine Tools in Capters 84.56 to 84.65 (Jigs & Fixtures)
H846630:	Dividing heads/attachments for machine tools

Source: TradeMap (ITC Global Trade Statistics)

Overview of South Africa's Trade in Tools, Dies and Moulds 1999-2004

South Africa's trade in tooling since 1999 has been characterized by a number of factors. First, there has been a general trend in increases of imports over the last six years, although there has not been consistent growth, with 2002 and 2004 showing far higher levels of imports than the other years.

Figure Eleven: Total Tooling Imports 1999-2004



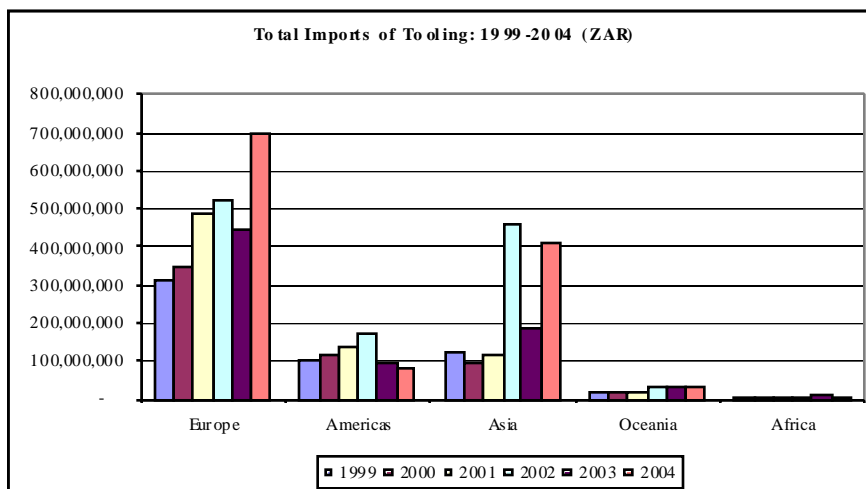
Source: TradeMap (ITC Global Trade Statistics)

At the same time, exports rose consistently between 1999 and 2002, but have since fallen back in overall terms.

Trade by Region

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 Europe 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.

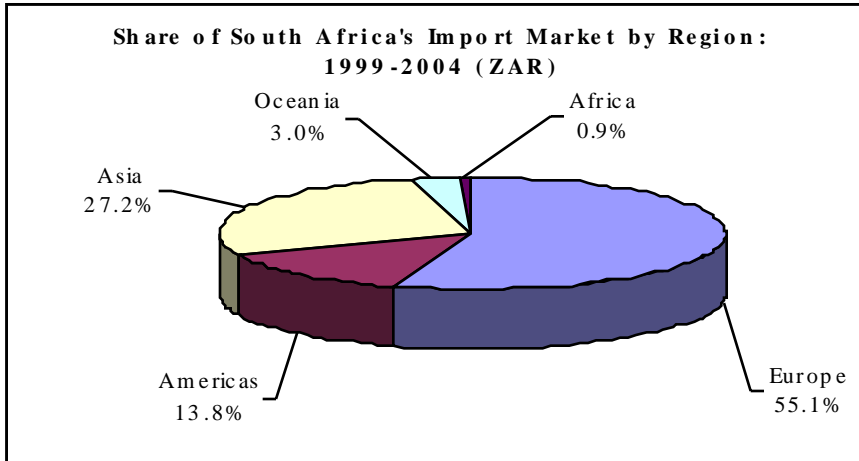
Figure Twelve: Total Imports of Tooling by Region



Source: TradeMap (ITC Global Trade Statistics)

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 roughly double the share that the Americas have.

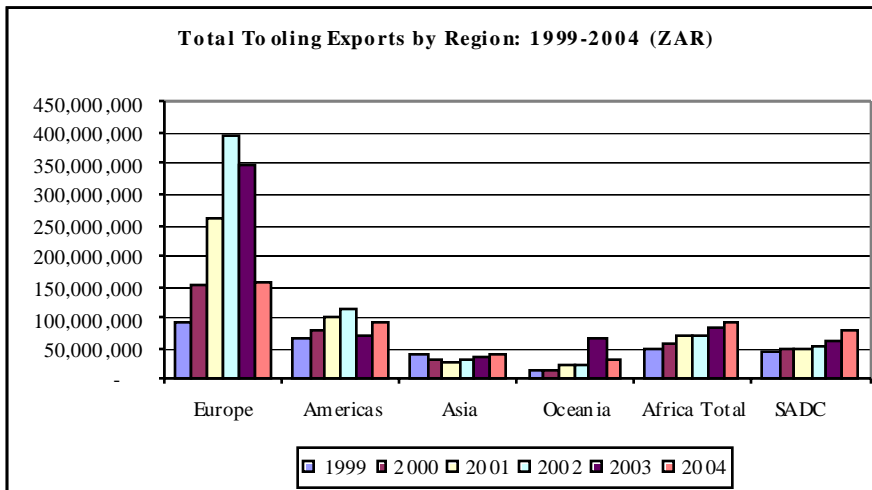
Figure Thirteen: Share of South African Imports by Region



Source: TradeMap (ITC Global Trade Statistics)

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.

Figure Fourteen: Share of South African Imports by Region

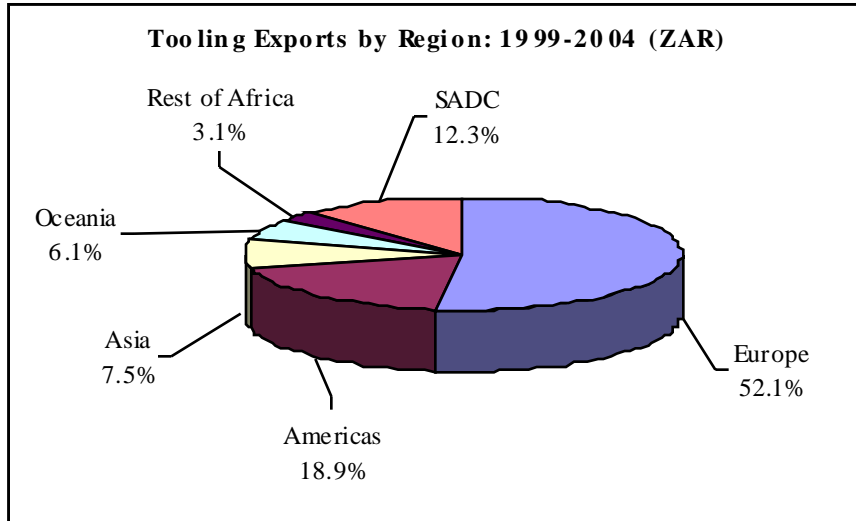


Source: TradeMap (ITC Global Trade Statistics)

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. Over the whole period, from 1999 to 2004, Africa as a whole accounted for a greater market share than Asia and Oceania combined.

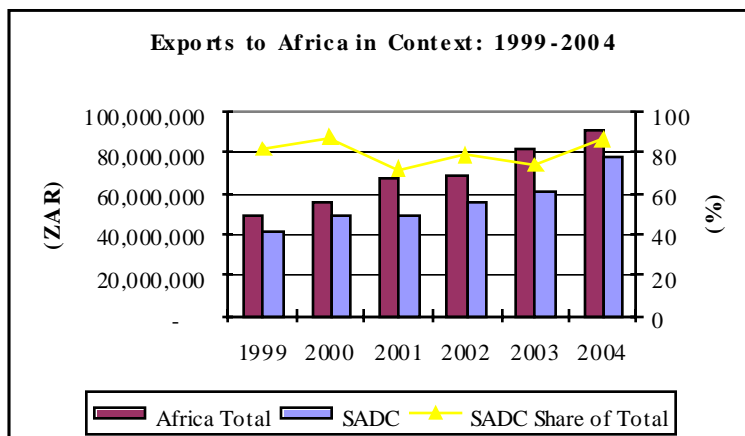
Figure Fifteen: Exports by Region



Source: TradeMap (ITC Global Trade Statistics)

Of even greater significance is the role of the Southern African Development Community (SADC) in the picture. Exports to our region have consistently accounted for around 80% of the total into Africa, and suggest that South African companies have a good presence in these markets.

Figure Sixteen: Exports to Africa

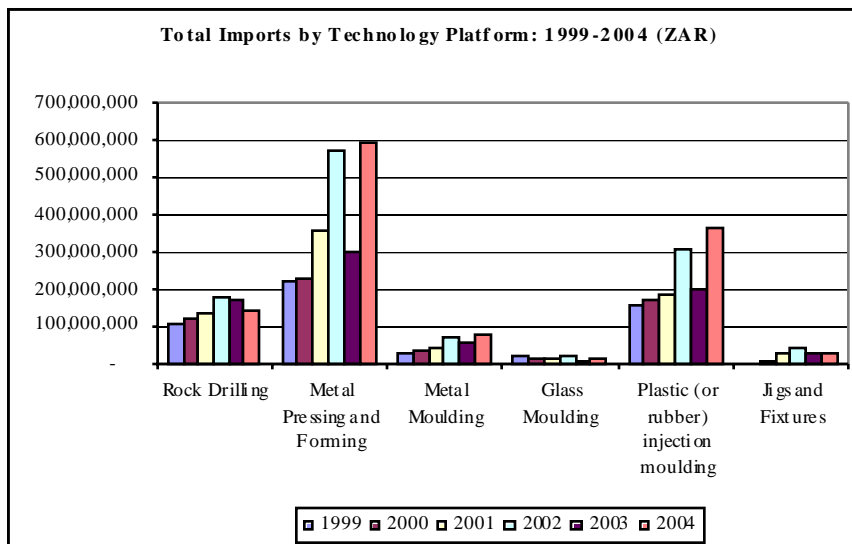


Source: TradeMap (ITC Global Trade Statistics)

Trade by Technology Platform

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 moulds saw a sharp drop in 2003 in value terms, although in both instances the overall trend has been to strong growth in imports. Metal moulds 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.

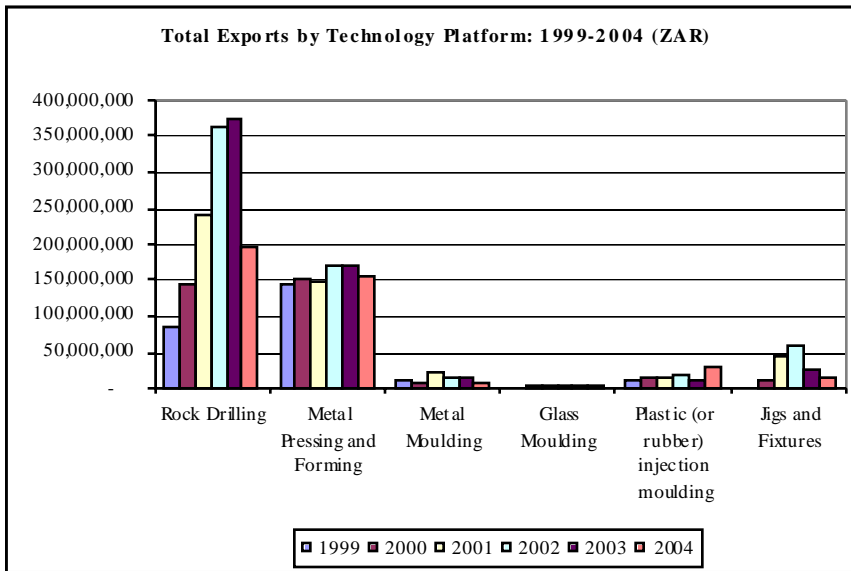
Figure Seventeen: Imports by Technology Platform



Source: TradeMap (ITC Global Trade Statistics)

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.

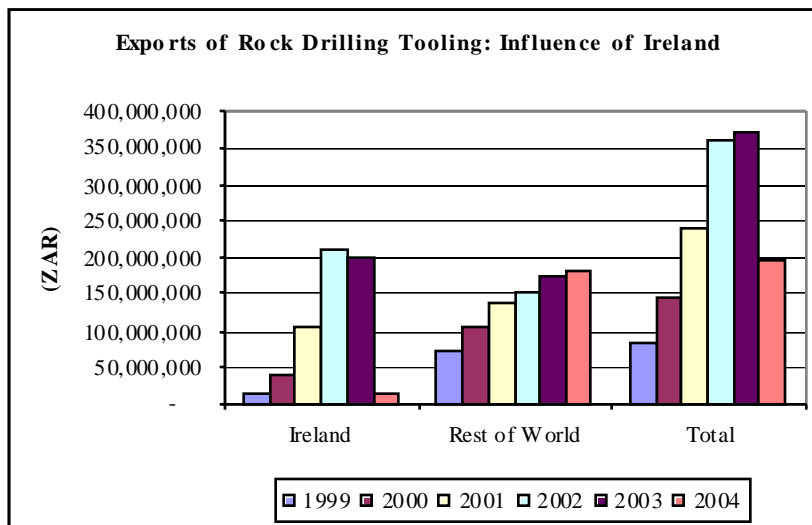
Figure Eighteen: Exports by Technology Platform



Source: TradeMap (ITC Global Trade Statistics)

A closer examination of South Africa's exports of rock drilling tooling reveals that the surge in exports until 2003 was almost totally reliant on the Irish market. As the graph below indicates, from 2001 to 2003 Ireland accounted for more than the rest of the world combined in terms of exports from South Africa. This faded again in 2004, but on a more positive note, exports to the rest of the world increased steadily during the period under review, increasing by 152% from 1999 to 2004 from R72 million to R181 million during this period.

Figure Nineteen: Exports of Rock Drilling Tooling



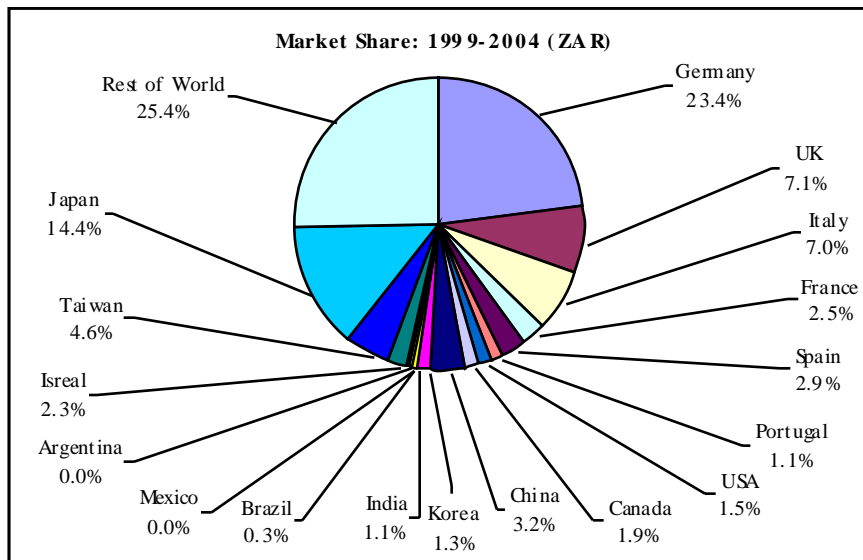
Source: TradeMap (ITC Global Trade Statistics)

Imports from Selected Countries

Whilst market shares differ from year to year, a more accurate assessment of the performance of countries is to gauge their share over an extended period. It becomes clear very quickly that the key suppliers into the South African market remain those in the EU, as well as Japan. The chart below illustrates that Germany enjoys about a quarter of South Africa's import market, and with Japan, the two countries account for just under 40% of all imports into South Africa over the period from 1999 to 2004.

The UK and Italy are the other key suppliers with roughly 7% each, whilst imports from Taiwan are important at 4.6% of the total. China, Spain and Israel are also the suppliers who are consistently significant in the South African market.

Figure Twenty: Market Share of Imports by Country



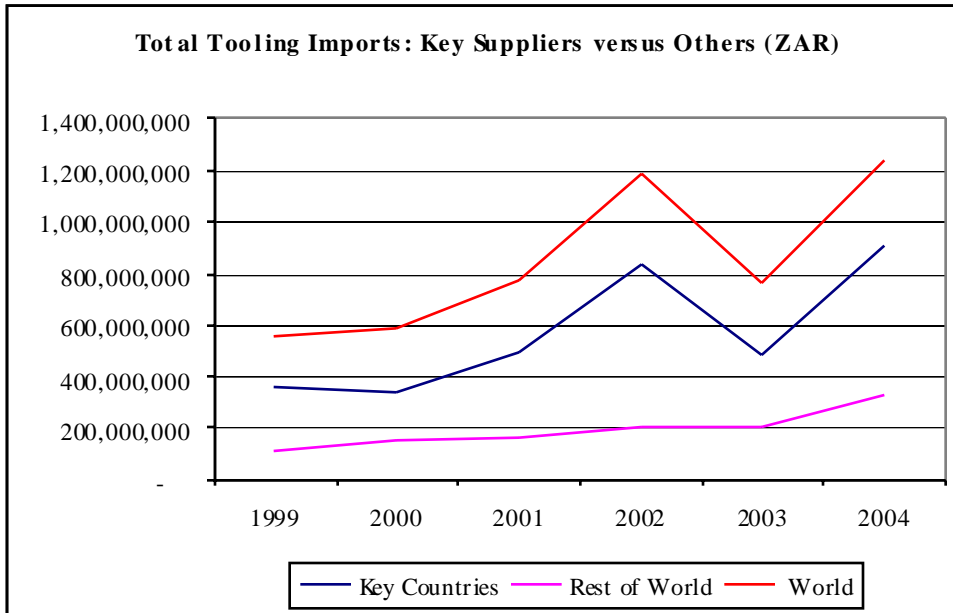
Source: TradeMap (ITC Global Trade Statistics)

A snapshot of the poles of the time series is also revealing. Germany has increased market share in South Africa, from around 16% of the total to 26%. Spain, up from less than 1% to 4.5% has also performed well in the market, whilst China's share has almost doubled from 1.8% to 3.4%. Taiwan and Japan have also increased market share in this snapshot. The biggest losers over the last six years have been the USA, down from 16% to under 6%, the UK, Italy, France and Canada, each losing significant share.

It is also noticeable that the share of the rest of the world is consistently increasing – up from less than one-fifth of the total to over one-quarter over the six years. Thus whilst the overall market trend has been to greater values of imports, the value of imports from key suppliers has been less consistent, as the graph below illustrates.

At the same time, imports from the rest of the world have grown steadily and consistently, more than trebling over the six years from R106 million to R328 million. This suggests that South African consumers of these products are not overly tied to traditional sources of supply – even though there is a strong presence of key suppliers in the market.

Figure Twenty-One: Key Suppliers to South Africa vs Other Suppliers



Source: TradeMap (ITC Global Trade Statistics)

These snapshots only tell part of the story however, and the figure below is a far more telling sketch of the evolving nature of South Africa's tool and die and mould making machinery import market. It reveals that countries such as Germany and Japan owe much of their overall market presence to surges in exports to South Africa. From a pure statistical analysis it is not possible to explain why this occurs, although it may well be a case of upgrades or expansions in the motor industry from these countries, who dominate local assembly and manufacturing market.

UK exports have declined every year since 2000, whilst imports from Italy, France and Portugal have shown little or no real growth. Spain, China and Taiwan have shown the highest levels of consistent growth, albeit of relatively low bases, with Korea and India showing small gains in the local market. Once again, the growth of other suppliers outside of these key markets is evident, with strong growth every year except 2003.

Exports to Selected Countries

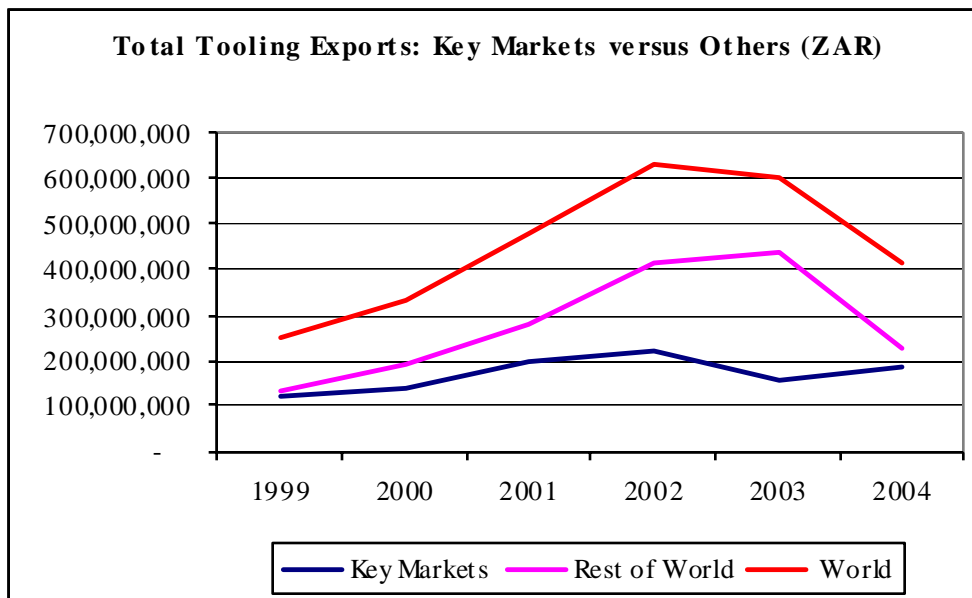
South Africa's export destinations for tool and die and moulding machinery do not match the import markets to any great degree. The industrialised countries that account for around 75% of our imports of these goods account for only 38% of our exports of tooling over the six years in question. This suggests that South African manufacturers have found good markets for their products in developing countries, and countries in Europe outside of the selection here. It should be noted that Ireland is

one of these, and is a key market for exports of rock drilling tools from South Africa, and thus will skew the picture somewhat.

Germany and the USA, as well as Canada, the UK, Brazil, and other EU countries are the significant destinations for South African exporters on balance.

The figure below illustrates both the importance of the non-industrialised markets for South African exporters, as well as the impact of the sudden surge in exports of rock drilling equipment to Ireland from 2001 to 2003. Exports to the key markets have grown rather well on balance over the last six years, increasing by 55% in total from around R120 million to R187 million, although they peaked in 2002 at R220 million.

Figure Twenty-Two: Tooling Exports to Key Markets



Source: TradeMap (ITC Global Trade Statistics)

Exports into the rest of the world grew very quickly, buoyed by Irish imports, and have subsequently come back, although still represent a larger market than the key industrialised nations. In fact, exports to these markets grew by 68% over the period in question, in no small measure due to consistent growth into African countries.

The only country to record an increase in imports from South Africa every year since 1999 is Taiwan, and that is off a low base. A worrying feature is that key countries such as Germany, the UK, Brazil and USA have all shown declines in the last couple of years. It is interesting to note that South Africa has begun to make (very limited) headway into the Chinese market, whilst Canada is emerging as a solid market for South African suppliers.

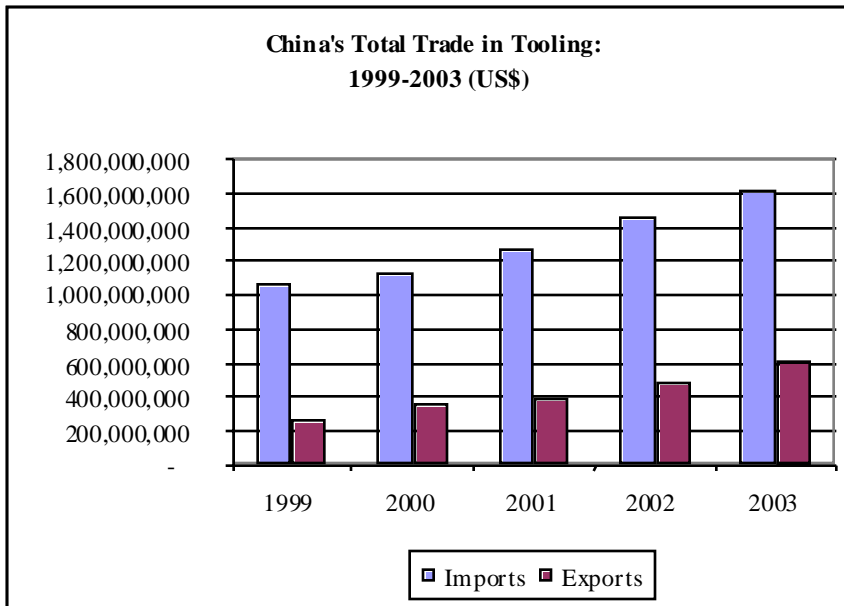
Trade Comparison with China, the Czech Republic, Germany, Portugal and UK

The following is a snapshot of imports and exports to and from the five focus countries. The data is compiled for the period from 1999 to 2003, since China, Portugal and the UK do not have 2004 data available as yet on the system. In addition, the data is shown in US Dollar values, as this gives a more accurate picture of each country's trade than converting into South African Rands. The fluctuations of the Rand, especially in the last three or four years will have had almost no bearing on the countries in question, and as such converting to rand values will distort the figures more than having them in dollar terms.

China

China's overall trade in these products has grown significantly over the last five years. The country is by some distance a net importer of tooling, even though exports are growing quickly. Total imports of this equipment grew by 53% in dollar terms from 1999 to 2003, from a little over US\$1bn to US\$1.6bn. Exports grew much faster – albeit off a lower base – from US\$267 million to just short of US\$604 million, or an increase of 126% .

Figure Twenty-Three: China's Tooling Trade

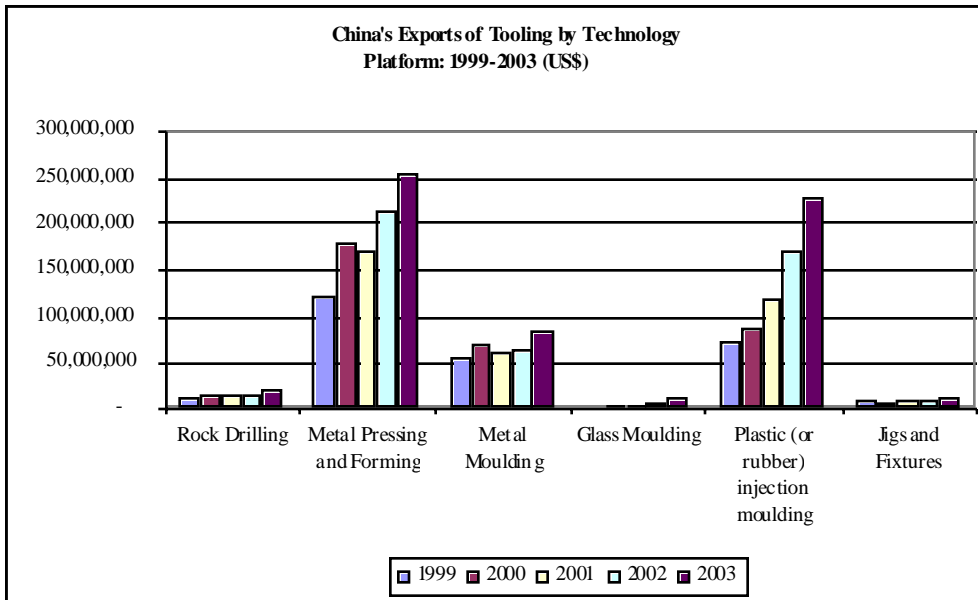


Source: TradeMap (ITC Global Trade Statistics)

Imports are dominated by metal pressing and forming machinery, injection moulding metal moulding tooling. There has been a surge in imports of the first two categories, although imports of metal moulding tooling have declined significantly over the last five years.

Exports from China are concentrated largely in the same three categories as imports, although all three have shown growth over the last five years. In addition, each of the other technology platforms, whilst small by comparison, has shown some growth over the last five years.

Figure Twenty-Four: Chinese Exports by Technology

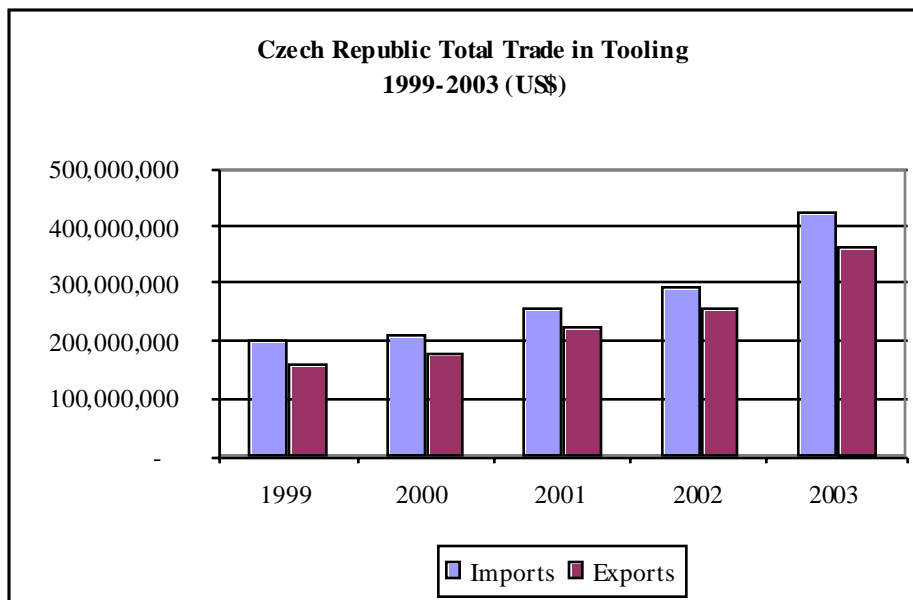


Source: TradeMap (ITC Global Trade Statistics)

Czech Republic

The Czech Republic is a net importer of these goods, and both imports and exports have shown steady growth over the last five years. Imports more than doubled from US\$204 million in 1999 to US\$423 million in 2003.

Figure Twenty- Five: The Czech Republic Tooling Trade



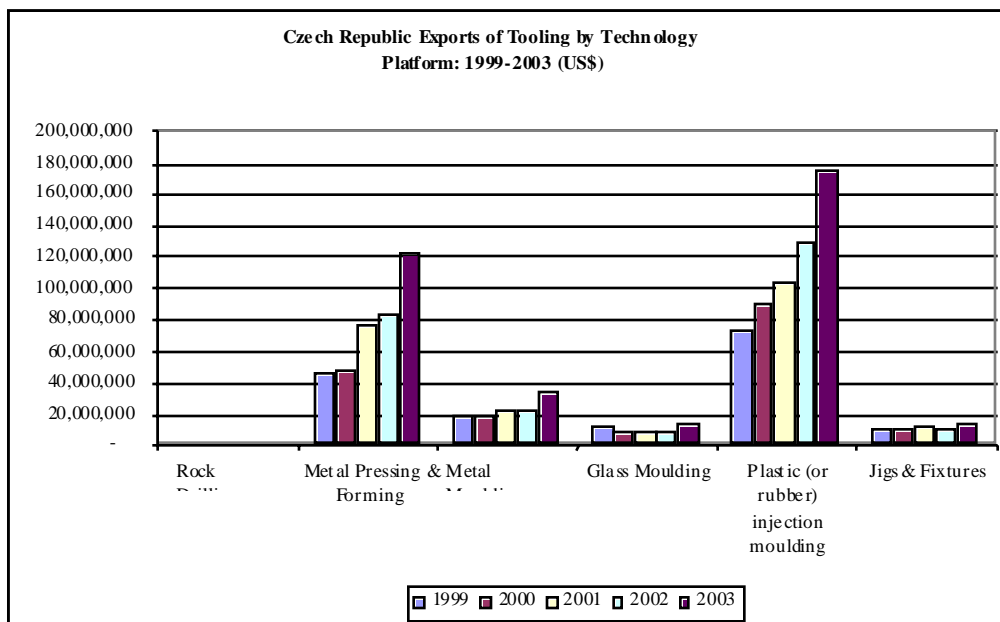
Source: TradeMap (ITC Global Trade Statistics)

Over the same period, exports grew at a slightly faster rate, from US\$161 million to US\$359 million, or 126% over the 5 years.

Imports are dominated by two categories – from a size and growth point of view – being metal pressing and forming tools and plastic or rubber injection moulding tools. Metal moulding tools and jigs and fixtures have also shown some growth.

On the export side, the situation is almost identical, with the same two categories showing the strongest growth and largest market share, whilst rock-drilling tools – where South Africa is particularly strong – is a negligible export component from the country.

Figure Twenty-Six: Czech Exports by Technology



Source: TradeMap (ITC Global Trade Statistics)

Germany

Germany is a net exporter of tools, dies and moulds. It is also by far the largest exporter and importer of these products in this survey. However, unlike China or the Czech Republic, growth has been relatively sluggish over the last five years, reflecting economic conditions in the country as much as it reflects a mature, rather than an emerging market.

Figure Twenty-Seven: German Tooling Trade



Source: TradeMap (ITC Global Trade Statistics)

Imports of metal pressing and forming equipment have shown a generally upward trend over the five years in question, although it has not been consistent. Nonetheless, imports have grown from US\$760 million to US\$980 million during this period. Imports of plastic or rubber injection mould tooling were fairly stagnant over the five years, although 2003 saw a surge in imports. Imports in the other technology groups are significant by global standards, although growth has been negligible for the most part.

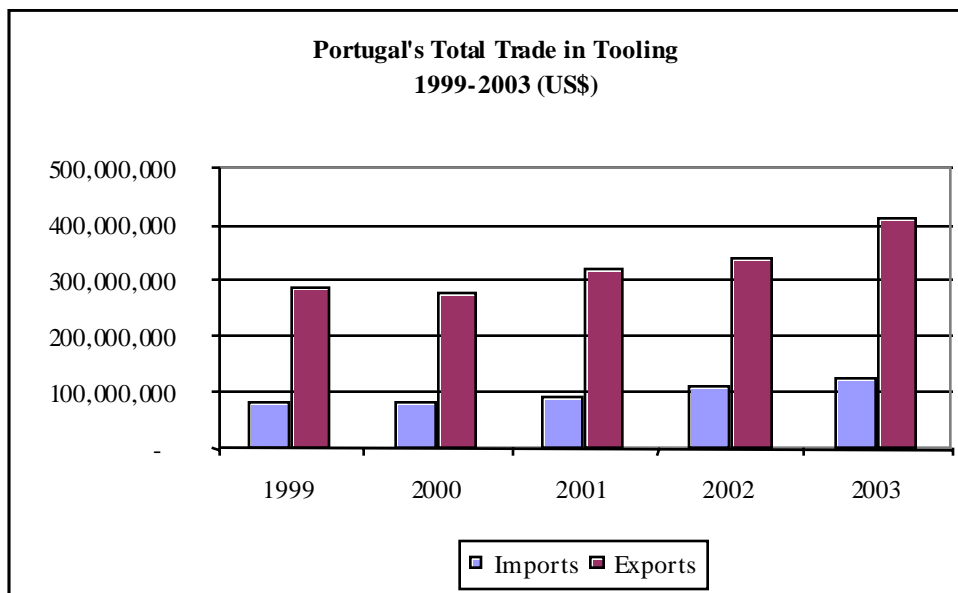
Exports from Germany have shown growth over the five years, although the period from 1999 to 2002 was generally flat. It remains to be seen whether this growth in 2003 is sustained through to 2004 and beyond.

Whilst metal pressing and forming equipment and plastic and rubber injection mould tooling are once again by far the largest of the two categories, Germany is, by comparison with other countries in this survey, also a significant global exporter within the other technology platforms as well.

Portugal

Portugal is the smallest market of the five under consideration, and has also recorded the slowest rates of growth of both imports and exports over the last five years. Interestingly, Portugal's exports are far higher than import levels, although the growth in imports has been slightly higher, at 58% over the five years compared with 44% for exports.

Figure Twenty-Eight: Portuguese Tooling Trade



Source: TradeMap (ITC Global Trade Statistics)

Portugal's imports are concentrated, as is the case with the other countries, in the metal pressing and forming and plastic injection moulding technology platforms. Both of these have shown sharp increases in import levels in recent years. There has also been a relatively good level of growth in imports of metal moulding goods. Rock drilling, glass moulding and jigs and fixtures imports are small and static.

Portugal's impressive export differential is based almost solely on exports of injection mould tooling. This technology group accounts for over 80% of the total export basket from Portugal. Metal pressing and forming, and metal forming tooling, account for the bulk of the remainder.

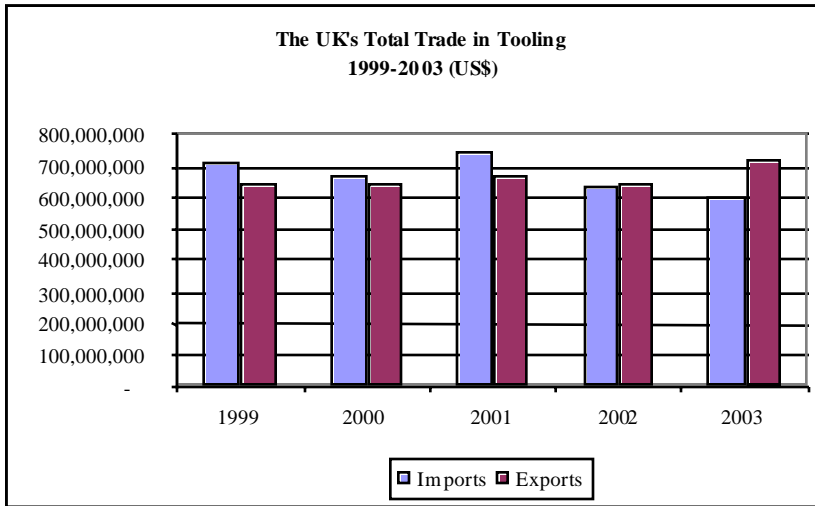
The UK

The UK is an interesting market in that it has moved from net importer to net exporter over the last five years. This has been as a result of a combination of declining imports and gradually expanding exports.

It should be noted however, that growth in this market is not strong in either direction. Imports have steadily declined from over US\$700 million in 1999 to just under US\$600 million by 2003 – a decline (2001 notwithstanding) of 15% over the five years. Exports have fared a little better, in that they have increased, but only by 12% over the five years, up from US\$644 million to US\$721 million.

The nature of imports is fairly similar to that of the other countries, declining market notwithstanding, although there has also been a tentative increase in the imports of rock drilling tooling over the five years.

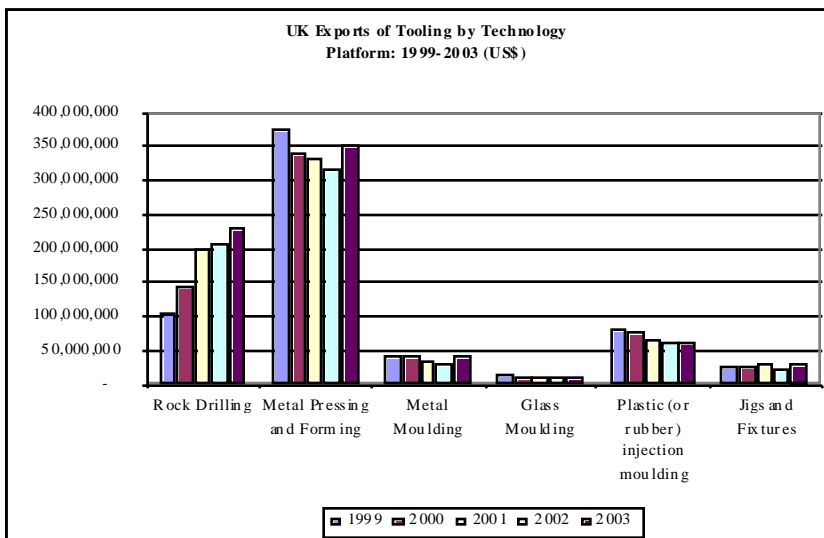
Figure Twenty-Nine: UK Tooling Trade



Source: TradeMap (ITC Global Trade Statistics)

Exports from the UK are also different from those of the other four comparative countries. Whilst metal pressing and forming tooling is the largest export group, it has been in decline for some time, 2003 being the exception. Indeed, all the technology platforms have shown no growth or decline with the notable exception of rock drilling tooling – which has shown an increase of 122% over the last five years.

Figure Twenty-Nine: UK Exports of Tooling



Source: TradeMap (ITC Global Trade Statistics)

South Africa's Trade in Tooling Machinery: A Broad Perspective

The following statistics track South Africa's trade in tooling machinery over the last five years, covering the following product categories and their subsidiary product groups:

- HS-8456: Machine-tools for working any material by removal of material, by laser etc
- HS-8457: Machining centre, single/multi-station transfer machine
- HS-8458: Lathes for removing metal
- HS-8459: Machine tools except lathes to drill, bore/mill/thread
- HS-8460: Sharpening, honing, lapping, grinding machine tools
- HS-8461: Machine-tools for shaping metals
- HS-8462: Machine-tools for forging, die-stamping, bending metal
- HS-8463: Machine-tools (metal, carbides, etc), no metal removal

The data includes both imports and exports, and is derived from South African Customs and Excise statistics, as reported to the UN Comtrade system. The most obvious point from the data is that South Africa is a net importer of these types of machinery, averaging around R960 million in imports per year since 2000, whilst exports are only around R87 million a year for the corresponding period.

Imports of these products have been more stable and predictable than exports thereof. Imports have slowed in the last two years, but have grown by an average of 17% a year from 2000, and by 70% in total over the five years. Exports on the other hand, have grown by only 3% on average since 2000, and after surging in 2001 and 2002 (relatively speaking) dropped back below the 2000 level in 2003.

Imports

Over the last five years the tooling machinery that has dominated the South African import market has been forging, stamping and metal bending machinery covering a quarter of all imports. Lathes for removing metal, and machining centres (HS8457), account for another 32% with drilling, boring, milling and threading machine tools accounting for a further 13% of the total.

Growth has not been uniform across the tariff headings under discussion, with lathes for removing metal being the only category to show steady growth every year. However, it is also noticeable that almost all of the categories showed strong growth until 2003, with several tailing off in 2003 and 2004 in Rand terms.

Suppliers into the South African market are relatively varied, with many countries (particularly from Europe) exporting small amounts into the country every year. This said, there are a number of countries that dominate the market in South Africa – notably Germany, Taiwan, Japan and the UK – which control 60% of the market between them, and are all consistent suppliers across both product groups and years.

Italy, the USA, Switzerland and China form a second tier of suppliers that have a strong presence in either some or most categories, but their share of the market tends to fluctuate more than the key suppliers.

South Africa's exports of these products are, as mentioned above, small by comparison, and generally regarded to contain a high percentage of re-exports, rather than locally made products. Growth has been erratic at best, both in terms of year-on-year growth, and product performance.

If the majority of exports from South Africa are indeed re-exports, it illustrates, as much as anything else, the importance of South Africa as a conduit for trade into the rest of the continent. Africa (including the five North African countries) account for nearly 38% of total exports from South Africa. This does include trade into the Customs Union countries of Botswana, Lesotho, Namibia and Swaziland as these are considered to be 'local sales' by Customs.

There is a high percentage of exports to Asia. A closer look at the data shows that there are strong exports into a number of Middle Eastern countries – notably Iran and Saudi Arabia – and this could reflect the growing presence of South African companies in this region, especially project houses that are possibly undertaking turn-key projects.

South African TDM Customers - Demand

The automotive and packaging sectors represent 90% of current demand for TDMs in South Africa. However During the next 20 years, 40% of current aircraft will be retired, and the medical equipment industry worldwide, is worth \$130 billion. This implies opportunities for South African toolmakers. (*R. Tinkler, 2005, Enterplan*)

Automotive

The automotive sector in South Africa is the largest customer for the TDMs in the country. Notwithstanding this, the NTI team believes that it is this sector where the most potential lies for the rejuvenation of the industry, primarily to replace the still very high level of imports undertaken by the OEMs. The following table indicates the levels of potential offered by developing the TDMs to serve the OEMs for current imports:

Table Twenty: Potential Automotive Demand for TDM: South Africa

Market 2001 & 2002	Components Imported	Components Local	Total
Vehicles Locally Sold	R5,5bn	R15,5bn	R21bn
Vehicles Exported	R62,5bn	R5.1bn	R67.6bn
Components Exported	R10.0bn	R31.5bn	R41.5bn
Total	R78bn	R52.1bn	R130.1bn

(Source; National Tooling Initiative, Management Task Team (2005) Presentation to DST).

In 2003 the South African automotive industry was ranked 20th in the world and was the leading industry in South Africa's manufacturing sector. At that time, it contributed 6.6% to GDP, and

represented approximately 84% of Africa's vehicle output. Automotive exports comprised 14,9% of South Africa's total exports by value from 12,8% in 2002 and 4% in 1995. South Africa's motor exports have overtaken that of gold. From 2004 to 2005, estimates suggest that total car and LCV sales had increased from 365 643 to 460 056, but CBU imports had also increased from 87 296 to 136 225 – an increase of 57% but from a much lower base. (*Source: NAAMSA January 2005*).

The automotive industry is seen by government as a benchmark for other prioritised economic sectors in that it has managed to achieve co-operation amongst all role-players and is now fully integrated in the global framework of parent companies and multinationals. South African component suppliers are increasingly part of international supply chains. National, provincial and local governments share a common vision for the promotion of the industry, as encapsulated in the Motor Industry Development Programme (MIDP). (*Source: Minister Mandisi Mpahlwa, opening address at the 5th Auto Africa Exhibition*). The automobile industry's strategic importance to the South African economy can be seen as coming from beneficiation and fabrication as well as the underlying potential the sector possesses in terms of creating employment on a respectable scale.

The South African automotive industry incorporates the manufacture, distribution, servicing and maintenance of motor vehicles and components. The passenger and light commercial vehicle assembly industry, in close proximity to its suppliers, is concentrated in three of South Africa's nine provinces. Gauteng is home to BMW SA, Nissan SA incorporating the assembly of Fiat, as well as Ford Motor Company of Southern Africa incorporating the assembly of Mazda, Volvo and Land Rover. KwaZulu Natal is home to Toyota SA and the Eastern Cape is home to Volkswagen of SA, DaimlerChrysler SA and General Motors South Africa. The first plants in SA, Ford and General Motors, were established in the 1920s in Port Elizabeth in the Eastern Cape. In addition, a number of Medium and Heavy Commercial vehicle and Bus OEMs are operating in South Africa.

There are approximately 18 000 enterprises which are active in selling and providing aftermarket support for a national fleet of over 6,9 million of which 4 million or 58% comprise passenger cars. SA's motor vehicle population is concentrated in Gauteng comprising 38% of vehicles followed by the Western Cape with 17%, Kwazulu-Natal with 14% and the other provinces with less than 10% each. The TDMS follow the OEMs, and clusters of TDMs are to be found wherever the OEMs and the component manufacturers are located, as well as in other areas linked to packaging and consumer electronics, medical equipment and the like.

Globally OEMs are increasingly becoming specialized in the marketing of cars and car brands while being at the cutting edge in controlling the logistics and distribution chain. In order to increase margins, competitive advantage is sought through product uniqueness, service offerings such as use car financing and aftermarket retail chains. Fundamental changes are taking place in the relationships between dealers and manufacturers and, as part of the global industry, developments also impact on the motor trade sector in SA and its employment levels. Consumers are more demanding than ever and competition is intense. The emphasis will increasingly be on service and professionalism in this sector in order to sustain and increase market size, investments and employment levels.

Packaging

The packaging sector in South Africa is the second largest customer for TDM's and provides for approximately 30% to 35% of South African TDM demand. A characteristic of demand in the sector is that it is stable and consistent and, especially in the plastic mould making technology platform provides for better charge out rates and therefore returns than other customer sectors.

The packaging sub-sectors which provide a market for the TDM's are the plastic, metal and glass packaging sub-sectors. In the packaging sector there is a tendency for the packaging companies to have their own maintenance tool rooms to maintain tooling, and some also make some of their own tooling and maintain. As a customer sector the South African packaging sector grew 2.9% in 2004 and in total had a turnover of R 24 991 million and production volume of 2.5 million metric tons. Of this the plastic, metal and glass packaging sub-sectors make up a total of R16 241 million and 1.482 million metric tons.

Total Packaging Market Size – 2004 (*Ex Converter*)

Material	'000 Tons	R m
Paper	910	8 457
Plastic	500	9 738
Metal	327	4 543
Glass	655	1 960
Other	123	293
Total	2 516	24 991

Source: BMI FOODPACK

Paper represents 36.2% by volume of demand, and 33.8% by value. Glass represents 26% of volume but only 7.8% of value, while metal is 13% of volume and 18% of value, while Plastics represents 20% of volume and 39% of value approximately (*BMI Food Pack, 2004*)

Plastic Packaging

Plastic packaging is the largest sub-sector by value and third largest in tonnage in the packaging sector. TDM's manufacture plastic moulds for the converters in this market segment and it provides a large stable and consistent demand for many of South Africa's toolmakers. The plastic packaging industry value in 2004 was R9738 million of which R3,922 million was rigid packaging and R5,817 was flexible packaging. The plastic packaging industry volume was 500 000MT of which 218 000MT was rigid packaging.

Rigid plastic packaging production volumes have grown by an average 5.3% over the twelve years 1992 to 2004 and flexible packaging by 3.1% or a market average of 4% for both sub-sectors. Growth in rigid plastic volume for 2005 is estimated at 4.7%, which is above the total sector average of 4% and for flexible packaging 0.6% or well below the average for the sector.

Rigid plastic packaging production values have grown by an average 13.9% over the 7 years 1997 to 2004 and flexible packaging by 11% with a market growth average of 12.1% for both sub-sectors. Actual year on year production values are indicated in the table and growth trend graph below. Growth in rigid plastic production value for 2005 is estimated at 14.1% , which is above the total sector average of 12.1% and for flexible packaging 9.6% or slightly below the average.

Plastic Raw Material Pricing

In South Africa plastic raw material prices are linked to international prices as well as the performance of the exchange rate and Crude Oil prices. This trend has been evident over the last few years. Raw material polymers prices increased by approximately 5.1% in 2004 after the decline recorded last year. The strengthening of the Rand to the Dollar during 2004 was offset by the notable increase in crude oil prices that ultimately resulted in the recorded raw material polymer price increase. Plastic raw material prices are primarily linked to international prices as well as the performance of the exchange rate and Crude Oil prices. This trend has been evident over the last few years.

Raw material polymers prices increased by approximately 5.1% in 2004 after the decline recorded last year. The strengthening of the Rand to the Dollar during 2004 was offset by the notable increase in crude oil prices that ultimately resulted in the recorded raw material polymer price increase.

Metal Packaging

Metal packaging is the third largest sub-sector by value and fourth largest in tonnage in the packaging sector. TDM's manufacture metal forming and cutting tools and dies for the converters in this market segment and it provides a stable demand pattern for South Africa's toolmakers. The metal packaging industry market value in 2004 was R4 543 million of which R3 804 million was cans, R426 million was drums and pails and R312 million metal closures. The metal packaging industry total production volume was 327 000 Tons of which 262 000 Tons or 80.2% was cans.

Metal Packaging Market in South Africa – 2004

Material	'000 Tons	% of Total	Rm	% of Total
METAL				
Drums and Pails	52	16.0%	426	9.4%
Cans	262	80.2%	3804	83.7%
Closures	13	3.8%	312	6.9%
TOTAL METAL	327	100.0%	4543	100.0%

Source: BM FOODPACK

Metal packaging production volumes have shrunk by an average –1.1% over the twelve years 1992 to 2004. Production volumes of cans over this period shrunk by –1% , drums and pails by –2.4% and closures grew by 2.8%. Despite small negative growth in production volumes, the trend for annual production values has been positive especially in the past four years probably due to rising

metal prices. Production value growth in cans over the 7 years 1997 to 2004 was 5.4% , closures grew by 10.5% and drums and pails by 4.9%. The average total production value growth over this period was 5.6% .

Metal Raw Material Pricing

The average metal raw material price increased year on year from 1990 to 2003 at levels of between 5% and 18% . This rising trend recorded since 1990 showed significant increases from 1999 to 2002 where material raw material prices rose by 6% in 1999 and 18% in 2002 and by 14% in 2003.

In 2004 prices increased by approximately 4.0% . This lower year on year percentage increase was caused by the decreased metal sales across the majority of the end-use markets as well as by the high increases from 2001 to 2003 which resulted in a lower than average annual increase in 2004.

Glass Packaging

Glass packaging is the smallest sub-sector by value and second largest by tonnage in the packaging sector. Glass mould making is a very specialised field. The moulds are cast from cast iron (molybdenum and titanium alloyed) from a pattern and not machined from tooling steel. There is only one glass mould making company in South Africa, which supplies one of the converters and the rest are imported from Italy. Nampak and Consol between them represent the vast bulk of demand for TDMs.

Glass packaging production volumes grew by an average 3.4% over the twelve years 1992 to 2004. In the past three years fro 2002 to 2004 average growth was 6.3% and production volumes are expected to grow by 5.7% in 2005. Glass packaging production value grew by an average 9.8% over the seven years 1997 to 2004. In the past three years from 2002 to 2004 average value growth was 12.7% and production value is expected to grow by 11% in 2005.

Aerospace

The South African government has stated that it wants an aerospace industry in South Africa and has drawn a comparison between it and the automotive industry indicating that it is expected to become as vibrant an industry as the automotive industry by the year 2014. The vision is that by this date South Africa will have a sustainable, growing, empowered and internationally recognized industry. In the last announcement made by Government in March 2005, it was announced that there is an industry support initiative planned for the aerospace sector. No implementation plan is in place yet, but one has been drafted and is being developed further. An announcement is expected shortly. The aerospace industry is that industry which covers the R&D, design, manufacture, support, maintenance, conversion and upgrade of:

- Rotary and fixed wing aircraft
- Satellites and satellite launch and tracking systems
- Air traffic control systems
- Unmanned aircraft
- Weapons Systems;

As well as their relevant subsystems and components.

Manufacturing in the context of this study encompasses not only the typical processes such as casting, sheet-metal fabrication and assembly, but also the critical upstream and downstream functions that play a role in the creation of a fully integrated aerospace product. A step improvement in global manufacturing efficiency is expected by the end of 2005, which will require significant levels of investment in capital equipment as well as human resources. This increase will be built upon the already existing global capability which includes lean manufacturing principals and methods such as high performance cutting, laser beam welding and "jig-less" flexible tooling and assembly, all methods that will be seen as commonplace and non cost effective by 2005. For the South African Aerospace Industry to be able to compete globally, significant upgrading of manufacturing facilities may be required. This will obviously require significant expenditure on equipment and on training of skilled personnel.

Increased supply chain efficiency, both in terms of delivery and price, has meant that most system integrators have actively cultivated global networks of subcontractors. Work is therefore placed in countries that provide a cost effective manufacturing solution, whilst still maintaining the required production efficiencies, quality and delivery standards. This has to be balanced with the continual drive to reduce the actual number of sub-contractors. (CSIR: 2003, Assegai Report)

The global supply chain does bring with it additional risks, since management of a widely spread international supplier base is much more difficult than that for a fully domestic industry. Hence the continual balance that needs to be maintained between risk and price. The global aerospace industry is comparable to the space industry in terms of technological complexity and because it plays a significant direct role in human and social advancement it is expected to continue to play its important role as a global driver for technological advancement and economic growth. As such it is a key industry for development and advancement of countries.

The international aerospace industry is mostly located in first world countries and the US is the global leader. The EU is catching up quickly with its aerospace program and the development of Airbus. Developed Western countries dominate the industry, with emerging economies a long way behind, and protective legislation (safety and other) provides a significant barrier to entry

Table Twenty-One: Global Aerospace Industry (2003)

Company	Country	Annual Sales (RB)*	Military Sales (RB)*	% Military
Boeing	USA	423	130	30%
Lockheed	USA	235	188	80%
EADS	EU	210	52	25%
BAE Sys	UK	174	139	80%
Raytheon	USA	156	125	80%
Northrop	USA	79	56	70%
Thompson CSF	France	62	43	70%
Finmeccanica	Italy	35	17	50%

Denel Aviation	S. Africa	1.6	1.4	88%
SA Technical	S. Africa	2.2	0	0%

Source: CSIR (2003)

The global aerospace industry is made up of five tiers, which perform well-defined functions. The following table gives a definition of these tiers and offers some explanatory examples. It is very similar to the automotive industry in that lower tier sub-contractors supplying parts or components need to have the appropriate certification before being able to supply any further up the system. Obtaining certification is costly and difficult for smaller enterprises to obtain.

Table Twenty-Two: Aerospace industry Tiers

Tier	Description	Descriptors
One (Complete System)	<p>An entire aircraft with all the required sub systems already fully integrated. This tier could also include logistics support, upgrade and maintenance of the system for a specified period.</p> <p>Examples Rooivalk helicopter Airbus A380 Hercules C130</p> <p>Players Denel Aviation Airbus Boeing Lockheed-Martin Embraer</p>	<p>Highest value added products System/business integrator level Low volumes High level human resources Very little manufacturing Mostly assembly</p>
Two (Major sub-systems)	<p>Sub-systems that are made up out of a significant number of minor sub-systems. This would still involve a level of system integration not dissimilar from the first tier.</p> <p>Examples Complete powerplant Main airframe sections (e.g. wing) Undercarriage Complete avionics system</p> <p>Players Rolls-Royce GE Snecma</p>	<p>High value added products System integrator Low volumes High level human resources Little manufacturing Assembly</p>