

SECTION FOUR- STRATEGIC OPTIONS & RECOMMENDATIONS

The primary task during this second stage was to analyse in depth the TDM supply chain in South Africa and identify with stakeholders how each level can be enhanced to create a competitive sector. This was an iterative process that involved detailed dialogue, through focus group meetings and workshops as well as individual interviews. Constraints to development were identified and debated at this stage, especially those which constitute an impediment to competitive capability.

We investigated the option of enhancing and developing existing small scale capacity aimed at niche markets, in particular the options for creating linkages between existing tool and die makers and small black owned enterprises that would then offer new and improved market possibilities.

We expected that one option would be that production will need to become more geographically concentrated to enable goods to be easily bulked for shipment which might create the potential for tool and die makers to organise joint input supply, finance, production, collection, quality control and marketing arrangements, thus enhancing the value chain; and increase the potential for Government to provide essential infrastructure and supporting services. Such developments can also provide a more general stimulus to economic growth and create additional income and employment opportunities. Detailed consideration was given to contractual arrangements between tool and die makers and users, particularly in respect of quality control and payment terms.

We examined other intermediate levels of the supply chain and considered the availability of and potential for additional linkages around the core supply chain. This would embrace a range of services such as input supply, packaging materials and financial services; and could potentially create further enterprise and employment opportunities.

CHALLENGES

- **Commodification.** This historically craft-oriented business is becoming "commodified." The core process-precision cutting of metal is no longer a distinctive competence as technology allows it to be done by any number of shops, at vast distances from the customer.
- **Technology.** Advances in design, manufacturing and quality control technology have revolutionized the die and mould making industries in the last decade. Solid parametric modeling design technologies, high-speed machining, rapid tooling development, and lean manufacturing, metrology and sophisticated quality systems are becoming standard practice in the industry.
- **Foreign Competition.** TDM Manufacturers around the world are facing increasingly strong foreign competitors that are supported by low labour costs, government subsidies and incentives designed to capture global market share. (Key lower cost competitors include Portugal, China, Thailand, Eastern Europe and Malaysia.)
- **Consolidation.** Smaller shops are consolidating and having difficulty competing as "stand-alone" firms.

- **Margin Pressures.** Margins are decreasing and there is fierce price competition. While the tooling sector has traditionally been a high margin business, its margins have been severely reduced, and now often do not look much better than low-value-added component producers.
- **Customer Requirements.** Customers are becoming more demanding and acting less like "partners." They are shrinking lead times, insisting on price reductions and stretching out payment terms.

While many of these challenges confront other manufacturing sectors, the impact on tooling firms tends to be more intense because of their small size. As a result, they tend to have undeveloped business and management systems that limit their ability to adapt to rapid changes.

STRATEGIC OPTIONS FOR SURVIVAL AND GROWTH

Competitive Business Designs for Tooling Firms

The survivors in the TDM industry are likely to be larger; highly technology oriented; focused on niche markets; utilizing a broad range of trading partners; and offering an expanded range of value added capabilities. Many of the leading firms are already pursuing the "path to worldclass competitiveness." However, the challenge is to increase the competitiveness of the overall tooling sector, not just a handful of leading firms.

Customers Have To Change Too

While there are many competitive improvements that can be made by TDM firms themselves, large-scale improvements in productivity in this sector will also depend on different behaviors from the customer base. Key among these are:

- Implementing functional build.
- Implementing clear industry-wide tooling standards.
- Better program management to eliminate last-minute engineering change orders.
- Involving tooling companies up front in the product design process.
- Measuring tooling cost competitiveness on a life-cycle basis, not just a cost-of-procurement basis.
- Providing for more "level scheduling" to improve project management and maximize return on capital investments.

TDM firms cannot make these changes alone. Buyers are also part of the equation, and need to make tooling suppliers long-term, strategic partners if they want to achieve significant cost savings.

Collaborative Business Designs

In Michigan in the USA, several groups--including the Michigan Manufacturing Technology Centre (MMTC), the Centre for Automotive Research (CAR), and The Right Place--are helping tooling firms build collaborative business models.

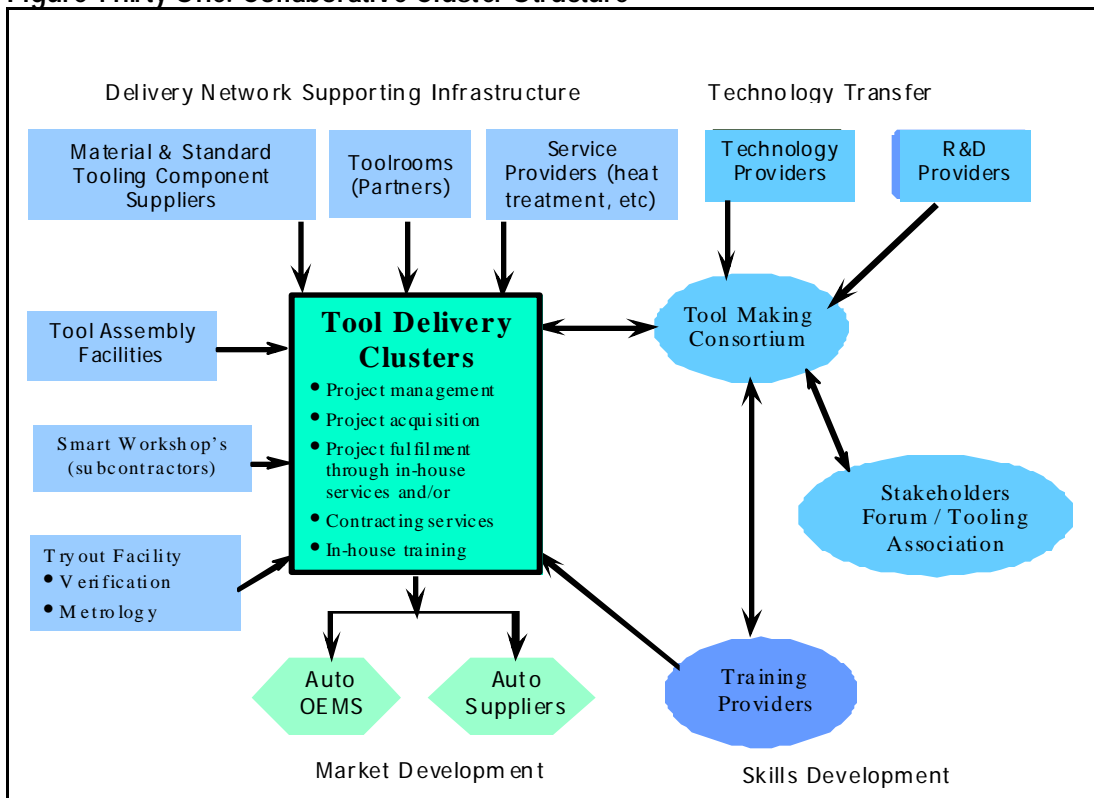
In these collaborative models, tooling firms bid as a group on tooling quotes. They present a single point of contact to the customer (including a single purchase order); divide the work among the

coalition members; do program management across firms, for the customer; and agree to utilize common standards for engineering changes, tool design, and other elements of the tool build process. The collaborative business model only makes sense for larger, more complex tooling packages where the parts built from the tools are going to interface with each other in the final product. To date, there are three coalitions that are active or in the process of formation in the US near Michigan. One focuses on large sheet metal dies for automotive body-in-white, one is organized around progressive dies, and one is organized around plastic moulds. The coalitions involve some of the largest and most sophisticated tooling firms in the area.

The firms involved in the coalitions have estimated that collaborative business practices (workload balancing; program management; functional build; lean manufacturing; and engineering efficiencies) will allow them to implement costs savings of 35% to 40% .

The coalitions are being supported by federal advanced technology investments. CAR recently secured a multi-million dollar federal grant to develop a "digital body development system" that will allow digital simulations of body-in-white tooling, forming and assembly. It will help reduce lead times, die try-out time, engineering change orders, and fit and finish defects.

Figure Thirty-One: Collaborative Cluster Structure



Source: TASA

Given the international trends towards collaboration outlined in the international section of this report, as well as the constraints and opportunities facing the South African TDM sector, it seems likely that the development of collaborative cluster mechanisms will play a key role in the re-invention of the

TDM sector. The model shown above is a baseline model for the possibility of such development and will be adjusted further for the final report. One change may centre around an understanding of which industries are the targets of imports- this may suggest an extension of existing clusters and/or the support of new ones.

Finally, from an operational environment point of view the diamond analysis for South Africa suggests that much can be done to shift the operating environment for the TDM sector in order to improve the competitive capability of the industry, and more to the point, that there are significant and sustainable commercial reasons why this should be done.

The preliminary diamond analysis indicates disadvantages relative to other regions and nations in the areas of focused government support, availability and development of essential skills, support in accessing and financing the required technology for improved productivity. Although demand is lower in global terms, simply by replacing imports in this industry, industry turnover could double. At this stage however, we need to examine export statistics more closely in order to ensure that we are not counting flows of exports coming into and then straight out of, South Africa.

Characteristics of Survivors (CAR)

- Strategically Focused
- Deep, long-term customer relationships
- Unique product or process knowledge
- Broad range of services
- Fully integrated leading design, CNC programming, Metrology and Project Management ICT technologies.
- Strong program management
- Strategic financial management, including high knowledge of real costs
- Committed to continuous improvement and lean practices
- Ability to act as a broker and manage global sourcing and production alliances
- Ability to collabourate with other firms
- Advantages of a Collabourative Approach to Tooling
- Simplifies tool sourcing for the customer
- Allows member firms to go after larger orders than they could bid on alone
- Supports more of a "systems" approach to tooling--integrating product design, engineering, tooling build, tryout and production launch
- Promotes the development of niche specialties by tooling suppliers
- Supports the implementation of functional build for dies and moulds
- Allows for significant efficiencies and cost savings.

Figure Thirty-Two: Current Initiatives in the US TDM Industry

Selected survival strategies for U.S. tool, die, and industrial mold producers: Required actions, advantages, and disadvantages			
Strategy	Actions	Advantages	Disadvantages
Cost cutting	<ul style="list-style-type: none"> • Layoffs • Reduce overhead • Wage cuts • Reduce benefits to employees 	<ul style="list-style-type: none"> • No capital investment • Immediate benefit 	<ul style="list-style-type: none"> • Hard on employees • May lose key personnel
Improve efficiency	<ul style="list-style-type: none"> • Lean manufacturing processes • Advanced manufacturing techniques • Robotics and automation 	<ul style="list-style-type: none"> • Substantial long-term benefits 	<ul style="list-style-type: none"> • Significant capital investment • Training and disruptions hurt profits in the short term
Diversification	<ul style="list-style-type: none"> • Value-added services and products • Vertical integration • Machining other than tooling production 	<ul style="list-style-type: none"> • Reduces reliance on one industry • Can make firm more valuable to its customers 	<ul style="list-style-type: none"> • Likely to be in direct competition with customers • Significant capital investment • Need people with expertise in new market to be successful
Specialization	<ul style="list-style-type: none"> • Focus on niche markets • Proprietary products or processes 	<ul style="list-style-type: none"> • Minimal capital investment • Focus on what firm is good at 	<ul style="list-style-type: none"> • Vulnerable if niche market changes • Research required to develop own products is expensive
Partnership	<ul style="list-style-type: none"> • "Partner" with foreign competitor • Move operations outside the United States • Sell business to molder or contract manufacturer 	<ul style="list-style-type: none"> • No capital investment • Immediate benefit 	<ul style="list-style-type: none"> • Does not help keep existing workforce busy • May lose business to "partner" in long term

Source: American Mold Builders Association

Current Initiatives in the South African TDM Industry

The South African TDM industry did not respond effectively to the new wave of competition which resulted from Trade liberalisation and the current poor strategic and competitive status of the industry requires that South Africa restructures its TDM industry to become more effective. SATISI believes that the restructuring has to be done on an industry wide basis and it must include the automotive industry and Government as partners in re-development.

TASA, the Automotive Industry Development Centre (AIDC) and the National Product Development Centre (NPDC) of the CSIR have begun the process of bringing key stakeholder together- the first workshop was held in 2002. This has resulted in a CSIR-NPDC/AIDC alliance with a mandate to lead a consortium of representatives, across the value chain, in implementing a South African tool making solution.

The objectives of the initiative are aimed at addressing the shortcomings that exist within the South African tool making industry, and the formulation and implementation of a strategy that will ensure

the sustainability and growth of the industry. The end objective is to source sufficient funds from Government to develop the sector in four critical ways:

- Tooling industry development (22% of funding)
- Skills development (36% of funding)
- Technology development (22% of funding)
- Black Economic Empowerment (BEE) development (22% of funding)

Ngena Mouldnet and Smiths Manufacturing KZN Initiative

The SA tooling industry does still have both the competencies and capabilities required to manufacture quality world-class tools. These competencies and capabilities are however fragmented, scarce and diminishing. This fragmented tool making 'landscape' does not lend itself to creation of the required tool making capacity for the manufacture of the required quantities of tools within the required timescales as achieved by international competition.

Knowledge Based Collaborative Clusters are an innovative approach through which conventional tool rooms and workshops are transformed into focussed 'smart' tool rooms. These smart tool rooms take part in a tooling development project by contributing specialised, knowledge and experience based, competencies and capabilities to different manufacturing elements of a tool. From the centre of such a cluster operates a design house that takes responsibility for customer interaction, project management and tool design. Focus on areas of specialisation naturally creates greater capacity from existing competencies, capabilities and infrastructure.

A SSAS (DTI) funded pilot project is already in progress to prove that a plastic injection mould can be successfully manufactured through a Knowledge Based Collaboration Cluster and Ngena MouldNet (Pty) Ltd has been contracted by the AIDC to execute this project. This project will be concluded towards the end of June 2005. The Ngena MouldNet business model is based on a Knowledge Based Collaborative Cluster. A complete Ngena MouldNet business plan exists, including financials, that outlines the implementation of this program and is available upon request.

The Smiths Manufacturing Initiative is a direct drive by a first tier supplier to benchmark the local tool manufacturing industry. Copy of presentation and results are available on request.

Sub objectives of this program include:

1. Recruitment and training of project managers to efficiently manage all projects procured by the cluster.
2. Recruitment and training of tool designers.
3. Classification of participating 'smart' tool rooms through assessments.
4. Expanding on internet technology in order to enhance collaboration.
5. Full development and documentation of the required systems and processes to ensure quality focussed and efficient collaboration. A result of this will be ISO9000 certification.
6. Elimination of collaboration inefficiencies through pilot projects and continuous improvement programs.
7. Full documentation of the business model in order to duplicate to other provincial regions as well as other mould technologies (press tools, die casting etc.)

8. Enabling the existing and remaining tool making industry to bridge the skills gap in the medium (3 to 6 years) term.

This program complies with NTI objectives 1,2,5 and 8. Motivation is given below.

Table Thirty: NTI Objectives & Ngena Project

1	Accelerate and manage the pace of skill development for Tool Making Industry
	Project management and tool design, CNC Programming and Metrology are critical elements in the tool making value chain. This program will not only focus on theoretical training of these skills but will also focus on the practical application of these skills on commercial projects.
2	Identifying the present available HR, filling the skills gap in the short term and strategizing of medium and long term goals.
	Through efficient clustering the scarce skills are effectively utilized, not only filling gaps but also optimizing the application capacity for those skills.
5	Establish an integrated effective network of specialized expertise and activities
	A Knowledge Based Collaboration Cluster is an innovative method for networking specialized expertise.
8	Nurture a paradigm shift to a new culture for the Tool Making Industry
	This program will impact on this objective the most. It is not the average tool makers culture to collaborate. Existing collaboration activities have however proven that this is a far smarter way of operation in a competitive international environment. Further development and successes of collaboration clusters will give impetus for cultural change.

Source: Ngena Mouldnet

DST Initiative: Sending Students to India

DST has sent nine students to India to study as part of the initiative to increase the number of young entrants into the tooling sector. The initiative was enabled by the current South Africa /India MOU. The learners have been sent to the Indo-German Tool Room centre in India which is a centre part of the network of tooling training centres established over the past 15 years with German Technical cooperation and support. The facility has the state of the art production facilities. The training programme has been designed specifically for the South African graduates who were studying mechanical engineering. The course undertaken has a practical component, which constitute half of the course and will be carried out in a full production environment. The course will cover all the major tooling areas such as die-casting; injection moulding; press tooling etc. (Information provided by DST and Indo-German Tooling Centre Managing Director)

It is worth noting that customising a course in this instance is not just done for South Africa, the centre has been customising its courses for individual companies and countries like China when requested.

TASA Objectives

TASA has articulated twelve objectives constituting twenty-six programs in all. The following indicates current industry objectives- a master plan for the rejuvenation of the TDM industry in South Africa.

Table Thirty-One: TASA Programmes

Programmes	Activities
TASA Base membership drive	MARKETING and PR Image – establish brand Presentation for Roadshow Roadshow Interface with media Brochure – CD on brochure – corporate statement – vision, mission, charter, and benefits and advantages. Discipline description Web portal linkage
NTI task team PMP	General project management Terms of reference Contractual agreement project roadmaps – e.g. Business plans
DOE-DOL National pact on Youth Recruitment Campaign	Linkage – cooperation Education – work DOE – DOL Career guidance to youth Expo skills orientation Bursaries scheme Scarce skills Maths and Science – task team: curricula, etc. Technical high schools Guided tours to industry Info on Subjects for careers Open door operations Early Recognition of Talent – Umsobomvu Youth Fund
National Tooling mentoring club	Database Skills identification Regionalization Linkages with learnerships Godfatherhood Refresher programmes for mentors Task definition

Programmes	Activities
National Tooling procurement agency	<ul style="list-style-type: none"> Industry service providers Document – technical library – case studies International linkages Expert Resource Centre Investigate and understand Durban Automotive Cluster (DAC) procurement chain model Database of suppliers Network of websites LUMUS network Consolidation of purchase Modify perception of buyers Constitute buyer's club Buying brief to quote Quoting software (AIDC)
PPP with DTI – DST – DOE – DOL	<ul style="list-style-type: none"> Full executive involvement Memorandum Of Understanding with National Departments Institutionalisation of TASA Endorsement – DTI – DST - partnership Full business plan Tooling desk at DTI and DST Close the associate membership Strengthen positioning with funders
Campaign “Tooling is a hi-tech industry”	
Finance National pact Incentive and Investment programs	<ul style="list-style-type: none"> Finance sourcing Applications agencies Integrate incentives Financial packages BEE funding Investor's portfolio
South Africa in the global village (localization and internationalization)	<ul style="list-style-type: none"> Mobilise bilateral agreements International tooling association mentorship Competitiveness improvement plan Cooperation agreements Strong cooperation with DST international desk Formulate attractive packages Compliance to international standards and norms ICT linkages
Tooling Golden Club (Partnership with TICA club members)	<ul style="list-style-type: none"> 2010 world cup Annual conference * Workshops

Programmes	Activities
	<ul style="list-style-type: none"> * Executive down * Keynote speakers <ul style="list-style-type: none"> * Auto Africa * Linkages with other manufacturing industry events * Exhibition * Golf day
TASA National Awards and rewards – Gala fund raising dinner	Bursaries Awards - learners Achievements Best innovations National competitions – lucky draw Sponsors Publication
NTI Interactive Info-highways (web site and national directory)	
The Tooling Gym (Tooling vs Manufacturing ring fencing workshops)	Short courses development (MERS ETA) Sectorisation of components manufacturing Classification and maximization of equipment Vertical integration vs specialized toolroom Mentality / mindset / attitude / self perception Roleplayer’s involvement Systematic audit/evaluation/assessment Rating of beneficiaries
The quality promotion National Upliftment program (Metrology Metallurgy Calibration Quality standards ISO+ Quality assurance and procedures (short courses) Alignment with national labs Project management SABS/SAQI
Fill up the FRIDGE	Benchmarks Monitor Evaluation Grading Report Productivity Competitiveness Accreditation

Programmes	Activities
Smart workshops for talent discovery (Grass roots technical education) NRF	Can identify talent through SET 's and aptitude testing.
Specialized and short courses institutes	Metrology, quality awareness, grinding, CNC, Design calibration etc.
Advanced Tooling institute coverage program (interactive network of hi-skilled education service providers)	Cover above Agreed to fulfil skills gap Non competitive activities with TASA members Dissemination systems
National Transvolution program	
National Championships (Institute Capacity Building Exercise)	Awareness campaign at local, regional and national level Develop materials and contents Create events Nominate champions and patrons
Knowledge based collaborative cluster Government compliance	TASA audit on compliance Document strategy framework (Advanced Metals Technology Strategy – Integrated Manufacturing Strategy) Establish Relationship with AMTS implementation unit Job creation monitoring BEE monitoring and BEE cluster Monetary spin-off /audit Disability
Export – import	MIDP Extension to TASA model Logistics Global village intelligence Perspective
Sustainability and growth	Cleaner production scheme Waste issues Recycle ability Additivity HIV/AIDS Health
Fast tracking	Skills import (relationships with foreign affairs Train the trainer Promotion of women

Strategy & Policy Options for the South African Tool & Die industry

The South African Tool and Die industry (TDM) is the subject of a determined and focused effort to rejuvenate and restructure on the part of all major stakeholders involved as actors or customers of the industry. (Source: *National Tooling Initiative, Management Task Team (2005) Presentation to DST*). It is in the context of this drive to that this study culminating in the development of a growth strategy for the South African industry has been undertaken.

The dti announced a restructuring and support plan for the South African Tool & Die manufacturing industry as part of a carefully researched process and strategy aimed at the development of this key sector in the economy. The development of strategic options for the TDM industry – an important underpinning sector for manufacturing in South Africa -therefore forms part of the South African Governments commitment to developing an Integrated Manufacturing Strategy for industry and creating an environment that supports continued business and economic growth.

Rationale for Options

South Africa has a strong mix of innovative businesses and industries. They operate in a competitive global environment where consumer demands, production techniques and distribution channels are constantly changing. The Governments vision statement, IMS, stressed the importance of creating new jobs in this environment by supporting industry, establishing new business structures and linkages and embracing sustainable business practices.

Tool & Die manufacturing forms the backbone of the manufacturing sector, providing the machines, tools and equipment needed to produce all manufactured goods. A South African Tool & Die Industry Strategic Plan will be grounded in the Customised Sector Programmes carried out by the Government in partnership with industry. This study focused on manufacturing & service sectors that have strong growth prospects and provide important goods, services and markets for other industries. These sector-specific industry plans will complement the Governments other business development initiatives, which includes a bouquet of supply side measures aimed at the upliftment and development of the industry in general. South Africa's future depends on knowledge-intensive industries that provide high value adding, high-paying, high-skill jobs provided by industries like tool and die manufacturing. The options outlined below indicate how the industry and the South African Government will build on the sector's strengths and address the challenges of the twenty-first century.

South Africa's Tool & Die industry is generally composed of small firms. Most are not big enough to take on large projects, such as creating the tools to produce a new car model, at least not on their own. However, our best firms have realised that they can compete for big jobs if they work collaboratively and present themselves to the world in seamless partnerships. South African companies clearly have the technical and entrepreneurial competence to deliver major tooling projects, and by combining their resources, they can bid credibly for almost any kind of work, at home or abroad. The South African Government is actively supporting this kind of collaboration through the Tool & Die Association of South Africa (TASA), which includes programs to develop the market intelligence, management know-how and infrastructure needed to form successful project consortia.

The Tool & Die industry has reached a plateau in recent years despite South Africa's sound macro-economic, monetary and fiscal policy of recent years. This slow sector growth needs to be accelerated through initiatives driven by leading firms, industry associations and the South African Government. This will lead the whole industry to higher levels of competitiveness, import replacement, exports and globally competitive performance. Once the industry's capabilities and collaborative arrangements are built and documented, individual firms, industry associations and the South African Government can take part in trade missions to forge relationships with potential customers overseas. In addition, the Tool & Die industry will benefit from South African Government and TASA's Tool & Die Consultative Council initiatives to improve TDM's image. Tool & Die is high-technology, clean manufacturing and the industry is well placed to lead and support the broader renewal of manufacturing in South Africa. Educational initiatives to provide more suitable post-apprenticeship courses suited to the Tool & Die industry will deliver the skilled workforce needed to support the growth that is expected.

Options for Intervention – Value Chain & Diamond

There are various options for intervention along the value chain, as has been demonstrated in the analytical sections of this study.

Intervention in terms of **factors of production** is likely to be most useful in the area of human resources- South Africa has virtually no ability to affect international raw material prices – a major input cost- but it does have the option of intervening in the supply and quality of the human resources needed by the industry. Such intervention is justifiable on many grounds, not the least of which is the fact that the TDM industry is labour intensive, uses skilled personnel and is typically well paid. Options for intervention here will affect the supply and productivity of human resources. It is likely that a short-term intervention will be required as well as a longer term plan, given the current shortage of skilled workers in the industry.

A second set of intervention options lies within the **structure and strategy** of the South Africa TDM industry. Presently, the industry is clustered naturally near its major customers. This natural spatial economic geography lends itself well to various means of collaboration – a crucial issue when most of the firms in the South African TDM sector are small, have difficulty accessing the necessary capital to upgrade and suffer from extreme swings in capacity utilisation.

A third set of options vests in attempting to offset some of the more **difficult operating conditions** that most SMMEs face in today's environment through a process of assisting the TDM industry to take better advantage of the existing package of government support measures.

A fourth set of options concerns itself with **improving the technology base and platform** of the TDM industry. This is linked to improving the ability of the TDM actors to access finance, but also to engage in joint ventures with international technology partners and consortia- the trend in many countries at the moment. It includes the necessity to upgrade and maintain minimum quality levels.

Finally, specific options are available on the demand side. The high level of imports represents a major opportunity for the local industry. Partnering with major customers who currently import, and

developing local products for their needs as imports become more expensive in the light of a weakening Rand -, is an essential intervention. Other important considerations are the development of export markets in carefully selected niches and using various instruments to achieve this- not the least of which is AGOA and various FTAs.

Table Thirty-One: High-Level Options for the South African TDM Industry

Issues	Options for Intervention	Comment
Small Size of firms	Develop collaboration in clusters on large projects	Clusters already exist. Begin with technology sharing. In TASA plan
Inadequate access to capital	Organise TASA to package the existing incentives effectively by first doing a cost benefit analysis and then assisting clusters to access.	Appoint competent incentives expert to undertake analysis and develop package. Improve relations between TASA and investment agencies
Shortage of Skills	Import older experts short term, train via learnerships medium term and use MERSETA more Upgrade linkages with FETs and Universities	Needs an umbrella industry specific programme with major focus. (refer South African Jewellery)
Poor design	Using ICT, focus on design skills improvement.	Needs linkage with major international research program possibly via OEM
Poor Image	Develop Image campaign	In TASA plan
Poor Quality	Metrology and Quality Standards Program	Possibly in JV with OEMs/Packaging/Defence clients / Inter Government co-operation initiatives
Inadequate technology	Upgrade throughout industry on a cluster basis	PPP with government SOAs
Poor Sales Growth	Expand exports, replace imports, diversify, niche	Identify core products (e.g. rock drilling TDM) and become global leader. Identify core African markets and use bilateral trade agreements Identify core clients (global) and niche on one or two products for these clients
Poor costing	Develop modular costing product for SMEs and make available with training to CEs	TASA to implement

Source: Blueprint International © 2005

Many of these options form part of the TASA master plan at the moment and it is useful to note that the study findings support the TASA plan, albeit with some additional recommendations. It is equally important to note that there are options at more than one level in the TDM industry.

Not all initiatives can happen at the strategic level. Unless firms themselves are motivated to participate and develop the TDM sector, little will occur in terms of growth.

Firm-Level Initiatives

- TDM producers should decrease lead times, reduce costs and thus reduce TDM prices, and offer additional customer service.
- Make investments in technology, including acquiring state-of-the-art machinery and software (3-D modelling and rapid prototyping), and inspection and verification systems.
- Increase flexibility with respect to engineering changes requested by the customer;
- Use of continuous improvement programs;
- Increased specialization in niche markets;
- Improved project management;
- Improved worker training and education;
- The establishment of foreign production capability, or partnerships or joint ventures with foreign producers.

Industry-Level Initiatives

- Firms should emulate the characteristics of world-class tooling companies,
- The TDM industry should establish support organizations and mechanisms to facilitate this goal.
- World-class tooling firms are characterized as having the following:¹
 - • Strategic focus
 - • Deep, long-term customer relationships
 - • Unique product or process knowledge
 - • Broad range of services
 - • Fully integrated, leading design technology
 - State of the art quality systems and Equipment
 - • Ability to act as a broker
 - • Strong program management
 - • Strategic financial management, including high knowledge of actual costs
 - • Commitment to continuous improvement and lean manufacturing practices
 - • Strategic vendor relationships
 - • Global sourcing and production alliances
- Enhance BEE and manage costs by using subcontractors or JVs with other firms
- Perform TDM design activities across many time zones, allowing for design to be performed around-the-clock.
- Formation of buyers groups in the existing clusters for the purchase of raw materials in order to reduce the cost e.g. cutting tools and fluids, and machinery

¹ ISTMA Strategy Report

Public Policy Initiatives

In the area of public policy, recommendations relate by definition to taxation, financial assistance, education, costs, and trade.

- Introduce investment tax credits,
- Accelerate depreciation for machinery and software,
- Provide tax credits for energy-efficient equipment and plant modifications.
- Package existing support measures effectively and ensure suitability for TDMs

Potential Impact of TDM Industry Support

By 2010:

- Widespread use of modern management techniques and new technologies, including automated equipment, advanced information technology and e-business.
- an industry with a modern, high-tech, high-value image Tool & Die enterprises that are attractive and rewarding places to work
- increased industry sales from R 2,7 billion in 2004 to R 5 billion in 2010 in real terms
- a significant portion of this growth generated from taking the value of exports of automotive tooling from R 380 million in 2004 to more than R 2 billion to the international automotive industry, particularly in growing car markets
- a large base of skilled designers, toolmakers, technicians, scientists and engineers
- formal and informal mechanisms for collaboration between companies, encouraged by TASA, NUMSA and the South African Government
- increased turnover per employee from R 1 million per annum in 2004 to R 1,5 million
- increased and improved research and development efforts leading to better materials, methods and product designs.

Challenges

While our leading companies can match the best anywhere, the industry as a whole faces several challenges. Tool & Die is a complex task that requires excellent control systems to achieve efficiency. Demand can be unpredictable and scheduling the movement of work through the plant can be a complex task. Nor has Tool & Die escaped the image problems affecting the rest of the manufacturing sector, which makes it harder to attract new students, skilled workers, R&D partners and investors.

However, the biggest challenge facing the industry is one of scale. Despite its recent growth, the South African automotive industry is still small by world standards (representing about 1 per cent of the global market). South Africa's 250 small enterprises only rarely work together and are individually unable to take on large projects either in South Africa or overseas. For example, when a new car assembly plant is built anywhere in the world, the company building it looks for a single lead supply contractor to produce its tools. No single South African firm is presently capable of fulfilling such a contract.

The answer is for several companies to collaborate on bids for big jobs, and that is what smart players in the industry are doing. However, this presents challenges of its own. As the size of the projects they bid for grows, finance is likely to become an issue unless action is taken to make funds more accessible. Ageing equipment is another challenge. While our best firms operate up-to-date equipment, **the majority do not**, particularly when compared to leading firms in Japan, Europe and the USA, and many emerging Asian operations. The modesty and variability of domestic demand means that machines are not used as fully as they are in, say, China, where they often work 24 hours a day, seven days a week. This makes it harder to justify the large investments required to keep equipment up-to-date especially when finance is tight.

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. If all the 250 TDMs in South Africa needs to make R 15 million investment, a total of R 3,7 billion is required to fill the gap.

Recommendations

This study of the Tool & Die industry concludes that the most useful interventions which could be made would work to accelerate growth, to overcome the constraints created by the small size of the local industry and market (by collaborating on export projects), improve coordination and cooperation within the industry, encourage the application of new technologies and management techniques, raise the image of the industry with job-seekers and investors, address technical and professional skill shortages, and improve access to funding for large projects in South Africa and overseas. In addition we recommend that the following eight strategic initiatives should be given the highest priority.

Industry Scale and Collaboration Initiative

Tool & Die projects tend to be bigger overseas than they are in South Africa. If small Tool & Die firms are to compete in global markets, they must be willing to collaborate and joint venture.

The South African Government will work with the industry to increase growth through import replacement and exports by promoting this kind of cooperation. There is no question that South African firms could win international projects if they joined forces. For example, the automotive industry, which currently consumes 50 per cent of the tooling sectors output in South Africa, has announced several projects to equip new plants and tool up for new models over the next few years most of them, naturally, outside South Africa. No single South African firm has the capacity to bid for these projects. However, a consortium of local firms with complementary strengths could do it. Even today, when collaboration is in its infancy, the South African Tool & Die industry could take on jobs worth R 20 million or more per annum per TDM. As networks are strengthened and joint venture

models are perfected, they could eventually bid for contracts worth up to R 30 million per annum per TDM. This could make them competitive in export markets, and also increase their ability to replace imports by competing against overseas companies operating in South Africa.

There are several ways this might work. One or two larger South African operations could work with other Tool & Die firms, venture capitalists, financiers and insurers to create an entity (joint venture, partnership) capable of taking on international projects in a collaborative team. This consortium would draw on the capabilities of other players in the industry and market those capabilities to the world. Alternatively, a small group of medium-size firms could collaborate to win work, then sub-contract some of it out to their smaller colleagues. The Portuguese tooling industry has done something like this by branding itself as **Tooling Portugal** and presenting a united front at trade shows and elsewhere. A third option would be to encourage the emergence of project integrators who could set up the core infrastructure and manage schedules, resources, marketing and financing, while farming the actual Tool & Die work out to local firms. A fourth would be to use industry associations such as TASA as a vehicle for integrating and aggregating the capabilities of members.

While increasing export sales is desirable in itself, higher and steadier demand will also give companies the incentive and the financial wherewithal to invest in advanced machinery. The result will be a virtuous cycle of rising competitiveness. To get things started, the South African Government will fund a project to prepare marketing materials to demonstrate the collaborative capability and infrastructure of the Tool & Die industry via a dedicated Export Council/ Association. The project will provide information and analysis that can be used to facilitate collaborative work. Its findings will be documented and shared with the industry so companies can use them when preparing bids for major projects. The findings will also be brought to the attention of customers in South Africa and overseas. The government will also sponsor a series of forums to build the coalition of interest needed for industry collaboration.

In addition, the Tool & Die industry and the South African Government should focus on:

- fostering trust and collaboration through joint visits to trade shows and overseas clients investigating market opportunities and identifying upcoming international projects on a global basis. The industry needs a focused set of eyes and ears in the market presenting a united front in marketing and project bids by defining and promoting the South African Tool & Die brand ensuring the import replacement, export, tooling and manufacturing capability exists to support bids for major projects providing transport cost support to level the playing field for South African firms competing against companies based closer to international project sites; this will be investigated by a working group led by the TASA
- raising the quality standards and productivity of smaller companies by extending the AIDC's competitiveness improvement project managed by TASA ensuring that response speeds in the industry are consistent with best practice, because lead times are critical to competitiveness in precision engineering tool making.

Education and Training Initiative

There is an urgent need to apply new management skills and technologies in the Tool & Die industry. The South African Government and the industry should work with the MERSETA and Further Education Institutes, and Private sector Initiatives, to encourage the development of courses catering to the specific needs of the Tool & Die industry, including courses covering technical skills, project management and marketing. These courses could be delivered by the industry itself nationally and even internationally to provide an additional return on the cost of development. Education and training providers also need to establish delivery systems (such as internet-based systems) flexible enough to reach individual students and small groups in all of the main regions of South Africa.

The South African Government should provide seed funding for a series of technical and management workshops, to be delivered in these regional centres. The workshops will be coordinated by TASA and each workshop will focus on a case study presented by an industry leader. The aim will be to spread knowledge and practical expertise, to develop professional capabilities, and build the trust and networks needed to sustain collaboration. The AIDC's competitiveness initiative initiated by the automotive industry and funded by the dti can be extended to embrace the South African Tool & Die industry. There is strong support in the automotive industry for keeping the project alive. TASA should take the lead in setting up a working group to build on this model. This strategic plan acknowledges the work already being done to lift industry skills by the MERSETA, other industry training and education institutions, and calls for even more effort to meet the Tool & Die industry's specific needs.

Access to Government Programs Initiative

The South African Government and the industry should work to improve access to government infrastructure and programs. Small Tool & Die firms find it difficult, expensive and time-consuming to access government grant and subsidy programs. Resources will be made available and mechanisms will be developed to make these programs easier to access in a collaborative fashion. Perhaps a combination of the SECTOR PARTNERSHIP FUND and the SMEDP could be used to assist the majority of the small tool and die companies to access investment support, skills support and foreign investment Grant fund as part of the total upliftment of this sector on an ongoing basis. This requires The Enterprise Organisation in the dti to make certain amendments in its rules to allow for a collaborative Public-Private approach. A combination of the Competitiveness Fund and EMIA can be used to address the image and marketing problem faced by the industry.

Design and Quality Improvement Initiatives

While the larger and more advanced Tool & Die firms use sophisticated design and inspection processes (Finite-element analysis, 3-D modelling, computer-aided design linked to computer-aided manufacturing and inspection), many smaller firms lack the knowledge and resources to differentiate themselves through superior design and innovation. The South African Government should work with the industry to address this gap by encouraging shared use of design facilities, sponsored student enrolment at private design houses, Metrology Institutes, CNC Programming Institutes sponsoring a series of workshops and other measures that demonstrate through successful case studies how superior design and quality can lead to higher levels of competitiveness in both local

and export markets. Additionally, a design sharing process could be undertaken through partnerships with larger firms, and internships with other countries and MNCs could be developed.

Import replacement and Export Initiative

The South African Government should work with TASA to organise an industry mission to showcase the strengths of the Tool & Die industry in 2005 targeting the most prominent Tool & Die Pavilions at prominent shows around the target markets globally. The mission, consisting of company representatives, government representatives, labour and industry association executives, will visit several key markets to meet and build relationships with potential customers. The local users of tool & die products in the automotive and packaging industry will be exposed in each region to the same mission.

The mission will both open up market opportunities and foster collaboration among participants. Tool & Die firms will also be encouraged to take part in existing South African Government export initiatives, such as the highly successful Export Councils which helps smaller firms research new export market possibilities; the Export Readiness program, which helps new exporters adjust to the demands of trading internationally; Export Value Chain Benchmarking, which explore new methods of marketing products and services internationally; the Finance for Growth program, which develops strategies for smaller firms deterred from competing for large import replacement and exporting contracts by financial constraints; and by incorporating the TDM sector in the expanded TISA Trade Fairs and Missions Program. The Export Communication Network will answer to the need for closer collaboration in the Tool & Die industry and the Export Value Chain Networks will encourage closer cooperation between Tool & Die companies, their suppliers and their customers, making it easier for, say, automotive assemblers, component manufacturers and their suppliers to work as a team in overseas markets.

It is essential that everyone gets involved in these programs. Even second-tier firms that do not export themselves but do supply exporters and they too need to be acutely aware of international standards and requirements.

Finance Initiative

The more successful we are in building partnerships to bid for big jobs in South Africa and overseas, the more important access to finance will become. We do not believe it is constructive for South African consortia to be handicapped in the race to secure major projects by financial constraints.

The South African Government should work with the industry and financial institutions (such as the IDC) to change the image of Tool & Die with investors and financiers by highlighting its profitability, its recent export success, its technological sophistication, and its strong growth prospects. The Industrial Development Corporation could develop a "Tool & Die Finance for Growth Program" in support of strategies for smaller firms deterred from expanding and exporting by a lack of finance. It has a great deal to offer the Tool & Die industry, in which each step up in capacity tends to be monumental rather than incremental. The industry, through TASA, and the dti as custodian of the

IDC will be invited to provide input on the implementation of the “Tool & Die Finance for Growth” programme.

Image Initiative

This FRIDGE funded study and TASA have highlighted how important it is to improve the image of manufacturing in South Africa’s TDM sector. The South African Government responded through the study with a firm pledge to lift the profile and status of the Tool & Die sector. It will champion manufacturing, including the DTI’s Aeronautical Strategy which require similar skills to that of Tool manufacture, and help the Tool & Die industry attract highly qualified graduates, skilled workers, investors, research partners and new entrants to the industry. The South African Government will work with the industry:

- to address youth attitudes to toolmaking and developing messages to counteract negative perceptions of the industry. G
- give Tool & Die Manufacturing the recognition it deserves and showcase excellence in the industry by supporting the TASA Annual Award dinner aimed at assisting companies and FE T’s to maximise the impact of their efforts
- to promote a contemporary image of toolmaking
- support the work of the Tool & Die Manufacturing Development Council, which is providing a focus for collaboration among all manufacturing stakeholders similar to the Motor Industry Development Council.

Technology Initiative

Tool & Die is a high-technology industry. Scaling the industry up through collaboration and increasing revenues by import replacement and exporting will enable companies, even smaller ones, to stay at the cutting edge by investing in new techniques and processes. Measures to promote manufacturing as a knowledge-based industry will make it easier for Tool & Die companies to forge partnerships with the research establishments and create their own intellectual property. The Tool & Die industry is also being encouraged to take part in related South African Government initiatives, including the benchmarking clubs, Advanced Manufacturing Technology Strategy, National Research Foundation and CSIR. The South African Government should work with TASA to promote these programs to the Tool & Die industry and maximise its involvement.

In addition, to ensure TDMs are at the forefront of technology developments internationally, foster links with technologically advanced research institutions in Europe, USA and ASIA. Such a link has already been established by the GCC and the Fraunhofer Gesellschaft of Germany, as well as other institutes and industry technology leaders internationally.

The South African Government, industry associations, unions and individual firms have worked together to audit the Tool & Die industry and formulate the strategic recommendations and plans outlined above and they are supported by the evidence gathered in the course of this FRIDGE Study. The strategic initiatives as described above encapsulate the specific areas as identified by the Fridge Study, for strategic intervention and a strategic plan to make it internationally competitive.

Consequently, a government policy of sector specific support through a customized sector programme is recommended for the Tool and Die Industry, such as is found in virtually all competitive nations.

Cooperation by all stakeholders and working together to uplift and develop the tooling industry platform is important if the program is to succeed for the whole industry. A strong and competitive tooling industry is necessary for the successful development of the rest of South Africa's manufacturing industry as it underpins the capability to develop and produce new products.