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Small and Medium-sized Metalworking Companies in the Witwatersrand: Facing the global challenge

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Introduction

Over the last two decades, small and medium-sized enterprises (SMEs) and their competitiveness in global markets have received mounting scholarly attention. The success of SMEs in Italy, Germany, Japan and the Newly Industrialised Countries has been captured in a number of models, more importantly the industrial district model of clustered SMEs in Europe and lean production based on the Japanese experience. These models commonly suggest that SMEs adopt dynamic strategies and restructure more quickly than large firms and are thus well-equipped to survive and prosper in increasingly-segmented and globalising consumer markets.

The small firm discussion has been taken up in developing countries, including South Africa which is looking for an industrial policy away from import substitution towards employment creation, a more equal income distribution and endogenous growth. SMEs are expected to be flexible and thus able to react quickly to the liberalisation of the South African economy while playing a decisive role in local economic development - similar to the experience of prospering localities in other developing countries.

South Africa, however, has long been isolated and protected from the rest of the global economy. Small firms find themselves suddenly exposed to a business environment shaped by new industrial policies and labour regulations, rapid shifts in market demand and increased competition both in the domestic and export markets. Under these circumstances, it needs to be investigated which strategies South African SMEs have adopted to respond to these changes, and - if these strategies differentiate from those put forward in the models of SME development - it is to be assessed whether the former are best suitable to the new South African business environment.

The aim in this paper is to describe the current state of the metalworking industry in the Witwatersrand, to elaborate which strategies small and medium-sized companies have adopted to respond to changes in their business environment and if the institutions surrounding the industry have been supportive of SME development. The paper unfolds through five sub-sections. First, the need for firm strategies is explained theoretically, and examples are given of firm strategies which have proven to be successful in industrialised countries. The focus then shifts to the case study of the metalworking industry in the Witwatersrand in general. The paper proceeds more detailed by presenting the findings of the survey of forty metalworking SMEs in the Witwatersrand and ends with a conclusion.

Theoretical approaches to explain the need for firm strategies

Neo-classical approach

A neo-classical view treats firms as non-strategic actors. Firms operate to maximise their profits, while markets determine the level of profit achievable. Being highly efficient markets determine as impersonal resource allocators relative factor prices (and therefore the factor proportions in the production function) and product prices.

Market imperfections and the need for strategic choices

Neo-classical economics operates with an atomised, under-socialised conception of market transactions which, in reality, involve human action and are characterised by imperfect information [Granovetter, 1985; Levy, 1996]. As access to market-related information may be restricted, market transactions are not costless, and markets are highly segmented. This entails that firm

operations are not determined by the 'invisible hand', but by the entrepreneur and his/her strategic choices.

Role of the entrepreneur

The 'human capital' contributed by the entrepreneur is now widely recognised as the fourth factor of production [King & McGrath, 1998]. However, the characteristics of the 'model type' are less clear [Milne & Lewis, 1984; Bates, 1993]. Schumpeter [1934] assigned the entrepreneur the role of a risk-taker and innovator who carries out new combinations of means of production. The entrepreneur's socio-cultural 'task environment' sets the incentives to take certain risks in a world of uncertainty by providing culturally-bound norms and beliefs [Grabher, 1993a; Khoza, 1993; Bambara, 1995; Schmitz, 1997]. The entrepreneur's role is to see to the 'embeddedness' [Grabher, 1993b] of the firm, i. e. to secure social justification for the changes wrought [Sengenberger & Pyke, 1992].

Making strategic choices

Strategic choices are influenced by the social and cultural environment, which is also considered when choosing among alternatives. The choice of firm technology, for example, depends on its availability and that of skilled workers in the given environment [Morris & Kaplan, 1987; van Dijk, 1993; Pedersen et al., 1994; Amsden, 1997]. When making the location decision at start-up or during expansion, spatial variations in factor and transport costs are still considered, but factor endowments are less decisive than a 'milieu' in which production can flourish. Indeed, 'profit surfaces in space' [Hayter & Watts, 1983] provide contact patterns, information sources and perceptions of economic opportunities which make it possible for the entrepreneur to take rational decisions and to act in (spite of) a world of increasing uncertainty [Storper, 1991].

Scope of firm strategies

The corporate response to competition in recent years has centred around a 'corporate strategy' framework that includes dimensions of choices that a firm can make. Strategy is the determination of long-term goals for an enterprise, the adoption of courses of action, and the allocation of resources needed to meet the firm's goals [Malecki, 1986]. Early work on corporate strategy focused on growth via a set of inward-focused and static firm-expanding strategies such as expansion of volume, geographical dispersion, vertical integration and product diversification as 'one-off accommodations of change' [Altman, 1994]. However, these strategies do not incorporate external influences on firm strategy, namely, the product life cycle allowing an innovator monopoly power in a certain niche and the activities of competitors or suppliers which pose a threat primarily through behaviour that can change the basis of competition, either from product to process or vice versa [Malecki, 1986; Altman, 1994, Porter, 1998]. Recent approaches to firm strategy start from the premise that competition is dynamic and evolving and focus on dynamic strategies - that firms constantly strive to identify new market niches and implement practices which permanently increase the capacity to respond to change [Coriat, 1992, Kaplinsky, 1997].

Searching for market niches

Globalising markets are becoming increasingly segmented. While price-driven mass-markets are still existent for many consumer goods, niches are created by the ability to provide unique and superior value to the buyer in terms of product quality, special features, or after-sale service which allows a

firm to command a premium price [Porter, 1998]. Accordingly, there are two basic types of competitive advantage: lower cost and differentiation [Malecki, 1986; Porter, 1998]. Any successful strategy, however, must pay close attention to both types of advantage while maintaining a clear commitment to superiority on one [Porter, 1998]. Another important variable of strategy is the competitive scope, here defined as the degree of specialisation measured with the variety of components or products manufactured. Table 1 presents the scopes and types of competitive advantage.

Table 1: Examples of market strategies [adapted from Porter, 1998]

	Competitive Advantage:	
Scope:	**lower cost**	**differentiation**
broad target	**cost leadership (offering a wide variety of products at the lowest price possible)**	**broad differentiation (offering a wide range of products with special features)**
narrow target	**cost focus (offering a selected product at the lowest price)**	**focused differentiation (offering an exclusive product)**

As the innovator monopoly in a market niche is threatened by imitating competitors, firms constantly aim to identify or 'create' new niches. Strategies to optimise production and inter-firm transactions are changed accordingly to support the market strategy chosen.

Strategies to optimise transformation

Much traditional thinking has embodied an essentially static view focusing on cost efficiency due to factor or scale advantages [Porter, 1998]. Nevertheless, shorter product life cycles increase the pressure to innovate and diversify which makes it more problematic for firms to fully use their (technical) capacity and achieve economies of scale. Competitive advantage that rests on low factor costs is vulnerable to even lower factor costs somewhere else, or governments' willingness to subsidise them. In the 'new competition' [Best, 1990], firm strategies go beyond exploiting low factor costs and focus on process technology. The latter allows for quality, specialisation and flexibility in production which reduces transformation costs because of less rework, fewer mistakes, fewer delays and better use of machines and materials [Malecki, 1986; Best, 1990]. Consequently, new principles of efficiency arise which reach beyond firm-level economies of scale and include additional monopolistic rents captured on the market through production-related 'distortions', for example a shorter lead-time at same efficiency levels or product and process flexibility. Product flexibility is based on economies of scope deriving from the possibility to use one facility for variable compositions of outputs and leading to lower average costs for each product as fixed costs sink. Process flexibility becomes realisable with programmable and thereby flexible automation which permits the use of facilities at full capacity (even with variable compositions of outputs) and yields economies of scale and scope while the overall cumulative usage results in the optimisation of the capital invested [Coriat, 1992; Amsden, 1997].

Strategies to organise and monitor transactions

Transaction costs result from the attempt to prevent possible opportunistic behaviour of business partners in exchange situations marked by imperfect information [Coase, 1937; Williamson, 1975]. Transactions are performed within the boundaries of hierarchical firms or by market processes depending on the transaction specific investment (i. e. of the costs of specifying what is being exchanged and enforcing the consequent agreements) and on the existence of formal or informal institutions. Institutions are the "humanly devised constraints that structure human interaction" [North,

1994 : 360] and can be formal (e.g. rules, laws, constitutions) or informal (e.g. norms of behaviour, conventions, self-imposed codes of conduct). Informal institutions are inherent in networks which refer to any form of inter-firm relationships such as voluntary co-operation [Pedersen & McCormick, 1996]. Such informal institutions are based, at least to some extent, on personal relations, reciprocity and trust and have been proposed as a third conception of the organisation of exchange situations between a firm and its environment [Axelrod, 1984; Good, 1988]. Whichever form of organising transactions is chosen, it is costly [North, 1987; Eggertsson, 1997]. Therefore, any firm strategy needs to target the efficient organisation and control of its exchange situations in addition to the efficient transformation of inputs. Table 2 gives examples of transaction and transformation-related strategies.

Table 2: Examples of firm strategies

Scope:	Transformation-related	Transaction-related
Static/reactive	replacing permanent with casual labour	quoting a below-cost price to win a tender
Dynamic/proactive	training, acquisition of flexible machinery	networking: long-term relationships

Competitive strategies of SMEs in industrialised countries

The success of SMEs in Italy, Germany, Japan and the Newly Industrialised Countries (NICs) has promoted interest in small firms in various strands of social science and economics, and provoked the conceptualisation of 'new competitive firm strategies' based on their experience [Humphrey, 1995; Kaplinsky, 1997]. The strategies highlighted in the following discussion emphasise the need for a strong market orientation which gives impetus to transformation and transaction processes in the firm.

Lean production

The organisation of production of successful Japanese firms has been captured in the concept of 'lean production', which presumes three related transformations as crucial to the success of a particular firm: a proactive management with a clear market focus which makes 'market-pulled' production and diversification possible, the reorganisation of production along Just-in-Time (JIT) inventory management, total quality control (TQC) and 'Kanban bay' (the term for semi-finished products being pulled through the factory), and the development of new relations with suppliers (in order to increase their commitment to supply reliably in terms of time, quality and batch size) [Coriat, 1992; Pedersen et. al., 1994; Kaplinsky, 1997; Levin, 1997a,b]. The Japanese experience points to competitiveness deriving from the organisation of production instead of capital- or labour-endowment [Morris & Kaplan, 1987] and suggests intra-firm restructuring and vertical co-operation as competitive strategy.

Locating in industrial districts

Research on SMEs in Italy, Denmark and Germany has given rise to a second model of industrial organisation which is termed 'industrial district' [Becattini, 1990]. The latter refers to the agglomeration of sector-specific SMEs marked by a deep inter-firm division of labour, co-operation and competition based on innovation. A supportive social and institutional environment is essential for the functioning of what is termed 'co-operative competition' [Humphrey & Schmitz, 1995; Locke, 1995; Schmitz, 1995]. Central to the specialisation and flexibility of SMEs organised in industrial

districts is the availability of a trained and adaptable workforce and multi-purpose machinery [Storper, 1991; Coriat, 1992]. In an industrial district, economies of scale and scope derive from positive external economies and active co-operation among firms, which are driven to innovate by the novelties introduced by their peers. Case studies from Italy, Germany and Denmark confirm that industrial districts can achieve international competitiveness in the face of unpredictable demand while at the same time attaining high employment standards and contributing to endogenous local economic development [Sengenberger & Pyke, 1992; Schmitz & Musyck, 1993; Schmitz, 1994; 1995; 1997; Anderson & Schmitz, 1997]. Locating in industrial clusters and (active) networking, in addition to the continuous training of a stable workforce and acquisition of multi-purpose machinery evolve as competitive strategies which are supported by a well-functioning institutional environment.

Investigating the relevance of internationally probed strategies

The conclusion from the research findings in industrialised countries is that SMEs have become major players in increasingly segmented markets through their capacity to adopt and implement dynamic strategies. Nevertheless, the deterministic analysis, that a specific set of firm strategies necessarily predominates in the context of the emerging competitive environment, does not offer an exhaustive elimination of other potential options [Altman, 1996]. Furthermore, there are indications that the European reference cases of industrial districts have recently undergone "difficult periods" and are beginning to restructure [Schmitz, 1995], while the success of the organisation of production in Japan is found to rely on the culturally-bound principle of seniority and high levels of education and technology [Humphrey, 1995; Kaplinsky, 1997]. Therefore, severe reservations have been put forward against the design of stylised models of industrial restructuring which may be confined to certain industries and too closely bound up with the experience of a particular time and place [Amin & Robins, 1990; Coriat, 1992; Scott & Storper, 1992; Späth, 1994; Humphrey, 1995; Schmitz, 1995]. The analysis of the survey findings in the cluster of engineering firms in the Central and East Rand will reveal whether networking and intra-firm restructuring have been adopted as successful firm strategies and whether the institutional environment actively supports SME growth.

Nature of the Study

The objectives of the study are rather descriptive than analytical. The study seeks to describe the current trends in the metalworking industry in Gauteng, and elaborate which strategies small and medium-sized metalworking enterprises, which have been successful so far, choose to respond to changes in their business environment wrought by global competition.

The questionnaire used in the firm survey of metalworkers was designed to generate information about the growth trajectory of the firm and strategies chosen by the entrepreneur - at present and in anticipation of future changes. Questionnaires were administered by means of face-to-face interviews and observations during visits to factories. Interviews were carried out in September and October 1998 and lasted about forty-five minutes each. The selection of forty successful firms drew upon listings in the 1997 Industrial Register of the UNISA Bureau of Market Research and supplemented by referrals from interview participants which gave a first indication of networking amongst manufacturers. The selection criteria applied for interviewing were that SMEs[1] had been operating in the metalworking industry for more than three years and had experienced growth in turnover, assets or numbers of employees during the past five years (or since start up if younger than five years).

[1] as defined by the Small Business Act [South Africa, 1996]

Another source of information were telephone interviews conducted in April 1999 and aimed at identifying the support needs of SMEs in Gauteng. Comments from thirty owner-managers of metalworking firms on the current state of the industry, future business plans and the use of private or para-statal (consultancy) services have been integrated into this paper. Both samples were skewed towards established and independently-owned firms (10% were public companies), and an attempt was made to identify African proprietors of metalworking SMEs that were larger than micro-enterprises. Even so, only three companies owned by Africans could be included in the sample.

A range of customers and suppliers of metalworkers was interviewed over the phone to learn about their perceptions of the metalworking industry in general and gaps between market demand and metalworkers' performance in particular.

The Central and East Rand were chosen as study areas as the geographical agglomeration of metalworking manufacturers in these areas provides linkage opportunities [Bloch & Maziya, 1995; Centre for Development and Enterprise, 1997], and the study sought to elaborate whether horizontal and vertical networking formed part of the enterprises' growth strategies.

Industry perspective: South Africa's metalworking industry

The metalworking industry is difficult to analyse because it consists of a large number of diverse activities and the degree of complexity of engineering products varies, for example from welded steel pipes to helicopter gearboxes. Most engineering activities have, however, in common that they produce either intermediate goods as inputs for other engineering activities or capital goods for the mining, construction and automotive industry. Strong intra-sectoral linkages in the engineering industry entail that contraction in the final demand from mining, for example, leads to 'multiple' contraction in all the engineering sub-sectors which are part of the mining supply chain [Rustomjee, 1993]. Overall, the metalworking industry is highly dependent on other industries' and government's capital expenditure.

Metalworking activities in the Witwatersrand

The investigation into Gauteng's metalworking industry is motivated by its high concentration in this province and its growth potential [Bloch & Maziya, 1995; Suleman, 1998]. About 70% of South Africa's engineering companies are located in the Witwatersrand of which the majority are small or medium-sized. Historically, the so-called 'iron axis' from Randfontein to Springs grew along the 'gold axis' with increased demand of the mining industry and the availability of open land, especially in the East Rand [Bloch & Maziya, 1995]. Intra-industry linkages to other types of and services to engineering activities led to the importance of agglomeration factors in location and growth and hence consolidated the importance of the Central and East Rand in this sphere of manufacturing [Cockhead, 1970].

At the close of the 1990s, the fabricated metals sector is - with a contribution of 37% to manufacturing output -the dominant industry in the Witwatersrand, followed by non-electrical machinery [Rogerson & Rogerson, 1997; Kleynhans et. al., 1998]. These sub-sectors have recorded growth in value added over the period 1985 to 1993 which was, however, accompanied by a loss of employment of approximately 4 % per annum and company closures. The recent employment losses have been caused only to a minor extent by increased labour productivity [Interview with M. McDonald, SEIFSA, 20/08/1999]. On the contrary, the downturn in the mining and other 'forward' industries, the reduction of protective tariffs as well as increasing levels of capital intensity of existing operations led to this marked decline in employment. Capital productivity has,

however, remained low mainly due to low utilisation rates[2] [Rustomjee, 1993; Rogerson, 1995; Kleynhans et. al, 1998].

As far as the general prospects for the metalworking industry are concerned, the cut-backs in production during the first half of 1999 are assumed to be reversed in the light of lower interest rates and increasing export sales which are facilitated by the recovery of the Asian economies and the free trade agreement with the European Union [Interview with M. McDonald, SEIFSA, 20/08/1999]. Because of the diverse nature of the metalworking industry, however, the precise impact on various sub-sectors may be dissimilar.

Looking inwards - firm strategies to face the global challenge

As the engineering sector comprises a wide variety of activities which, in turn, differ in capital- or labour-intensity, input and output markets and so on, a profile of the sampled firms is given before proceeding with the presentation of the research findings on firm strategies.

Profile of sampled firms

The sample consists of firms from certain sub-sectors of the metalworking industry, namely *Structural metal products, tanks, reservoirs and steam generators* (ISIC 354), *Other fabricated metal products, metalwork service activities* (ISIC 355), *General purpose machinery* (ISIC 356) and *Special purpose machinery* (ISIC 357).

A more refined classification of the sampled firms is based on their primary activity, their differing interactions with input and output markets, their drawing capacity and size and is presented in Table 3:

Table 3: Type of business, markets and size

Type of business/ Main product	Raw material use and origin	Design origin	Output destination	Size range (No. of employees)	N = 40
Foundries	As specified, mostly local	External	Engineering/mining	12-90	**6**
Components – mass production	As specified, local	External	Engineering	10-43	**4**
Components – custom-made	As specified, often imported	Ex- and internal	Engineering	3-20*	**3**
Consumables (e.g. bolts)	As needed, mostly local	Internal	End-user via distributor, engineering	27-62	**4**
Household goods	As needed, local	Internal	End-user direct or via distributor	5-120	**9**
Pressure Vessels	As needed, some imported	Internal	Various industries	45-60	**3**
Construction Work	As needed, mostly local	Internal	Various industries, governments	42-115	**4**
Other capital goods	As needed, often imported	Internal	Mining, Automotive	28-45	**4**

[2] Research into capital and labour productivity of South Africa's metalworking industry reveals that only four out of hundred firms work three shifts while two third of all metalworking firms work one shift only. Amongst the companies working three shifts those classified under Basic Iron and Steel, for example steel rolling, dominated.

Machinery	As required, some imported	Ex- and Internal	Mining, Engineering	9-30	**3**

***Note: It has been stated that no micro-enterprise was included in the sample. The fixed assets and annual turnover of the company with only 3 employees, however, were well above those given in the definition of micro-enterprises in the Small Business Act [South Africa, 1996], and this particular company was therefore included.**

Type of businesses

Foundries produce castings which feed into metal-related production processes. The foundries interviewed disclosed to specialise both in a certain type of metal (ferrous or non-ferrous, for example), and in certain weights of castings, for example up to one ton. Patterns belong to the customer who either provides them or has them made in the foundry according to his drawings.

The so-called 'jobbing' can be defined as the production of a variety of non-standardised goods to order and on short runs, with a number of different products typically being manufactured at the same time [Sitas, 1983:68]. Mass production of components takes place in fully automated workshops with dedicated and little numerically-controlled machinery (NC or CNC), while companies specialising in custom-made components are equipped exclusively with CNC machinery. Customers are engineering companies which supply drawings and specify the quality of the steel to be used.

Consumables such as bolts, nuts and springs are mass-produced in partly or fully-automated plants both to order and to forecast. Products are distributed to hardware stores or directly to repair workshops.

Amongst the household goods manufactured by metalworkers were blinds, bedsteads and lawn mower blades. The design of the product originates from the manufacturer who has often a direct contact to the end-user. Activities related to security, such as custom-made security gates with a high design component or general burglar proving, were reported to yield relatively high returns on low capital investment. Many emerging African-run entrepreneurs focus on this light engineering activity for which location is not restricted to industrial zones and portable equipment can be used.

Pressure vessel manufacturers reported to have specialised in bigger tanks and custom-made vessels where South African manufacturers are still competitive.

Structural steel work comprises a number of metalworking activities such as shaping, cutting, welding, turning and powder coating for the preparation of parts of steel constructions. The integration of various stages into one company (from the drawing room to the erection on site) inclines that these companies employ on average one hundred employees.

Other capital goods include canopies and slew rings which are produced both to stock and to order. Manufacturers' specialisation into a certain field has developed over time during which certain products have been patented.

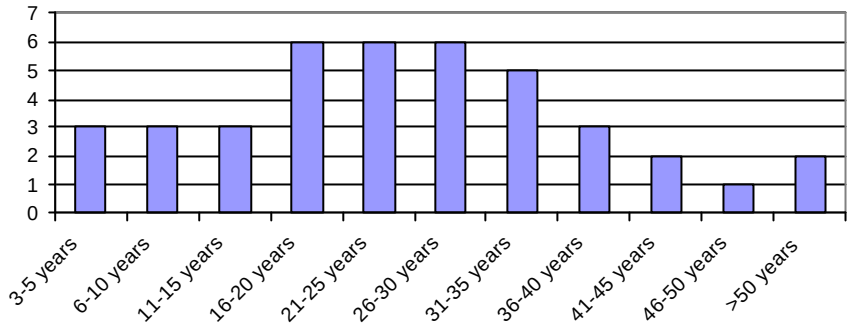
Custom-made machinery is manufactured in small workshops where the owner-manager is an engineer by profession. Raw material sourcing and drawing is initiated by an order of another engineering company or the mining houses.

Age of the businesses

The firms interviewed show a fairly even spread over different age groups [Figure 1]. Amongst the long-established businesses was one of 55 years and one of 95 years which will soon be handed

over to the third generation.

Figure 1: Age of businesses visited



Business origin and nationality of owner-managers

While thirteen companies had been founded by the father of the current owner, nine were run by the founder himself, another nine were run in a partnership with the owner and the last nine had been taken over from the previous owner or owners. While the owners of family-run businesses had all been trained in engineering and all founders of businesses were engineers, partners to engineers were in their majority accountants or sales persons who "had been asked to join the business". Only in three of the nine cases has a business been taken over and run by a non-engineer. Present owner-managers have worked or at least known the business for a number of years before taking it over.

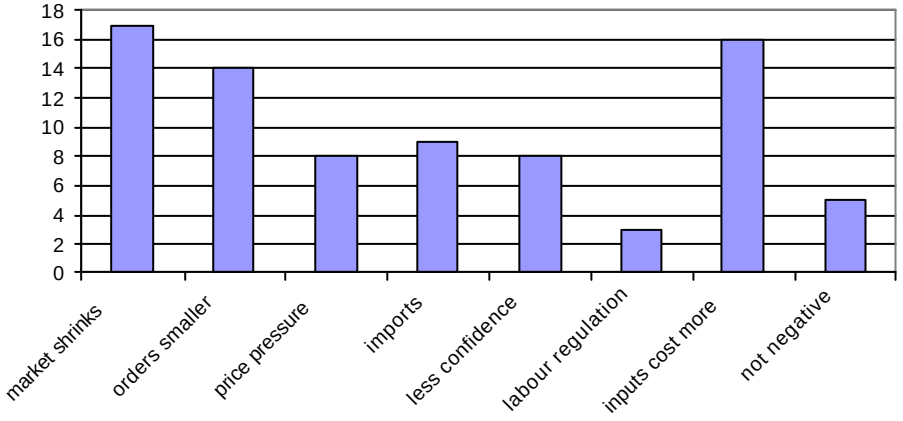
In terms of national origin, there were twenty-one South African and one Australian owner-mangers while six were German, two Austrian, five Italian, two Portuguese and two British. All European entrepreneurs reported to have contact to other manufacturers of their country of origin, both in South Africa and abroad, and all Italian-run businesses were family-businesses with strong social ties.

Perceptions of change in the business environment

In a world of interdependencies, global competition impacts upon the local business environment. The perception of changes around the small or medium-sized business by the owner-manager directly influences the latter's strategic actions.

Metalworking manufacturers in the Witwatersrand report that product markets have shrunk and become more price-driven, but do not perceive qualitative market changes.

Figure 2: Perceptions of change in the business environment [N=40 x 2]



When asked to name two major changes in their business environment since 1994, metalworking manufacturers generally perceive that "doing business has become more difficult and demanding" (as one manufacturer explains). Local market demand has shrunk which is partly explained with increased imports [Figure 1]. While all 'jobbing' factories complain about fewer and smaller orders and increased price pressure due to more manufacturers entering the market and customers ordering less, 'full' manufacturers and specialised components producers who aim to grow their businesses perceive high input costs as more striking. Capital costs have increased due to higher interest rates, the change in labour legislation has made taking on an additional worker more costly than before, and imported raw materials and machinery have become more difficult to finance because of the fluctuating exchange rate. More importantly, the fact that competitors abroad have access to cheaper inputs (paradoxically including those originating from South Africa) is of major concern to small manufacturers who have been unable to establish direct vertical linkages to the main local steel supplier ISCOR.

Three metalworkers do not feel negatively affected by changes in their business environment. On the contrary, two exporting firms suggest that they have managed to export more since 1994 as " foreigners' business confidence has increased and 'made in South Africa' has less of a bad connotation". The third company is a well-established and highly productive mass producer of components with strong customer-relationships.

Nevertheless, it is striking that the survey on metalworking manufacturers in the Witwatersrand does not reveal any perception of *qualitative* changes in their product markets, for example demand for more flexibility. Moreover, when asked whether they monitor their closest competitor, only seventeen manufacturers (42.5 %) gave a positive answer, but restricted their monitoring to local competition. Eighteen metalworking entrepreneurs (45 %) try to identify and monitor a competitor, but state that it is difficult to obtain any information apart from prices or that "everybody is slightly different" and there are therefore no direct competitors. Four manufacturers (10%) refrain from identifying a competitor as they "do their own thing". Considering increasing imports and competition in the domestic market in general, the 'passivity' of metalworking manufacturers to compare themselves with international competitors gives rise to at least some concern.

Reacting to change in the business environment - making strategic choices

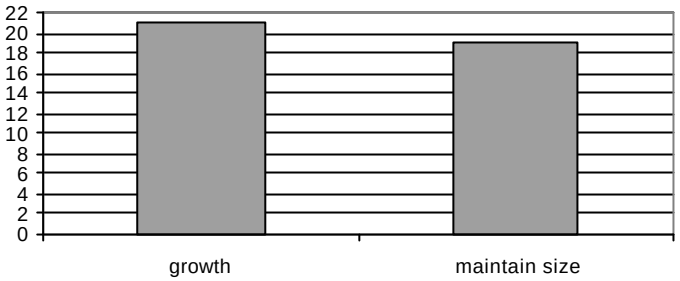
The presentation of the findings of firm strategies of metalworking manufacturers in the Witwatersrand unfolds in two subsections. First, the size of an enterprise and its market orientation will be introduced as issues of strategic choices. Having made these choices, the entrepreneurs' plans to undertake certain courses of action to support the strategies chosen will be highlighted in the second subsection.

Choosing the right size

Neo-classical theory argues that firms in an industry grow until they reach the optimum size for that industry's technology (when economies of scale are maximised). Small firms exist therefore because factory-level economies of scale are extremely limited or because - even if they are technically possible - they cannot be exploited because the market is not big enough [Hayter, 1997]. However, firm size and growth of small and medium-sized firms are also shaped by the owner-manager for whom the operation of this particular business might just be one of various interests [Dia, 1996; Ferrand, 1997; McCormick et. al., 1997]. About 50% of the metalworking companies interviewed anticipate further growth while a distinction has to be made between those who actively pursue it and a smaller group which makes future growth dependent on an increase in demand.

The investigation into the expansion plans of the forty small and medium-sized metalworking manufacturers whose firms have been *'successful'* over the past five years reveals an optimistic view: Figure 3 shows that twenty one of the owner-managers state that they will continue growing and nineteen will maintain their size.

Figure 3: Expansion plans of 'successful' metalworking companies [N= 40]



(Of the thirty *randomly* selected metalworkers, however, only eleven anticipate growth, thirteen will maintain the sizes of their operations and six will consolidate).

There are indications that the growth strategy chosen is related to the age of the owner-manager. Although the average age of the entrepreneur aspiring to growth is with 42 years not much lower than the 46 years of those who will maintain the size of their businesses, five out of six owner-managers older than 55 were in the latter group. Statements of the older owner-managers like "The days of fast growth are over" or "I could close the business, but keep it running for the sake of my workers" confirm these findings.

Tracing the reasons further why one or the other strategy was chosen, a distinction is made between on the one hand entrepreneurs who relate their expansion strategy to an allegedly limited market and, on the other, those who do not.

Table 4: Examples of reasons for choosing a certain strategy*

	Grow further	**Maintain size**	**Consolidate**
"Market shaper"	"..through take-over of the main competitor" "I will increase capacity and widen customer base abroad" [35%]	"I will increase productivity instead of adding on more workers." "This is the maximum size I can handle alone." "I am close to retirement and do not want to grow." [26%]	"I will automate more to stay competitive and downsize labour-wise." "I have grown too fast, have to streamline now and become more focused" [3%]
"Shaped by market"	"If economy picks up again" [10%]	"The market does not warrant growth" "The new labour regulation does not allow to quickly adapt to market demand. Hence, I rather go on as I am." [20%]	"The market has shrunk." [6%]

***Note: Comments from the thirty randomly selected metalworking companies are included in Table 4 where the percentage for entrepreneurs falling into each category is given in brackets.**

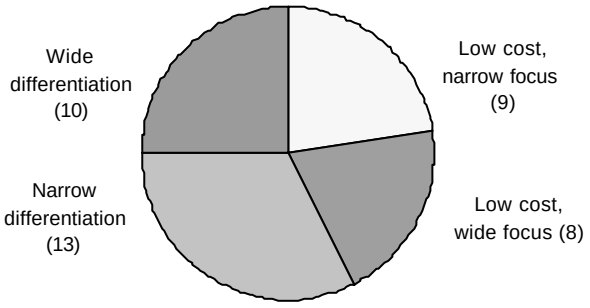
One can firstly identify a group of entrepreneurs who are 'at the mercy of their markets' [Table 4: "Shaped by market"]. In accordance with demand fluctuations, owner-managers expand or 'right-size'. These entrepreneurs feel that they cannot influence their product markets – be that for not having sufficient marketing skills, for not having sufficient resources to support marketing activities or because their firms are highly specialised and their markets are allegedly limited (as their customer base is created through referrals only). Another group of owner-managers, however, has taken a conscious decision not to grow – because they feel more comfortable with running a small company or because they have a monopoly in a certain niche and their limited production capacity increases the premium price they can demand, and so on. About a third of the metalworking companies interviewed plan to grow their companies (further), which is less a response to market demand than an actively pursued growing of their markets.

Market orientation and exporting

Firms seek to define and establish an approach to competing in their industry which is both profitable and sustainable. Choosing a market segment which is tailored to the skills and assets of a particular firm is one aspect of such an approach. The 'lower cost' approach aims to design, produce and market a comparable product more efficiently than the competitors, while differentiation refers to the ability to provide unique and superior value to the buyer in terms of product quality, special features, or after-sale service [Porter, 1998]. Firms can be furthermore distinguished in the scope of their market strategy by specialising in a certain product or activity or offering a wide range of products. Metalworking SMEs in the Witwatersrand have adopted various market strategies. Successful exporters are those who have gained export experience in more than five years and adopt differentiation strategies.

The market strategies of the small and medium-sized metalworking firms in the Witwatersrand can be classified accordingly and are presented in Figure 4.

Figure 4: Market foci of metalworking companies [N=40]



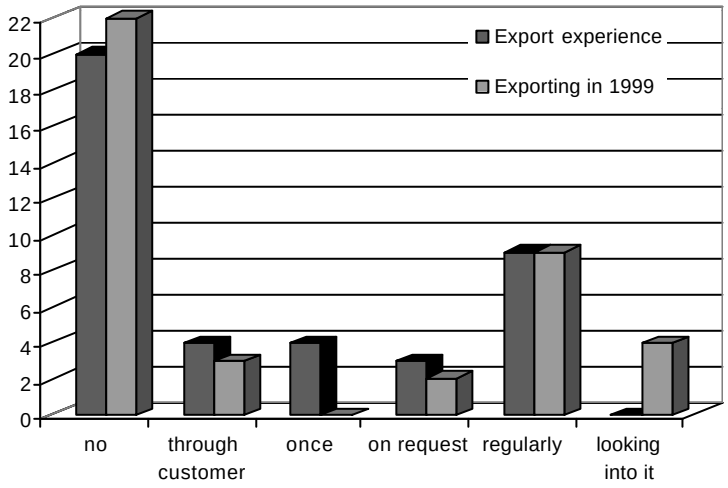
The low-cost-wide-focus strategy has, in all reported cases, emerged from a narrower focus over time. Mass producers of components or household goods use dedicated machinery to serve this market segment. The diversity of component numbers or styles and the resultant need to queue production means, however, that machine utilisation levels are low. This is reinforced by shrinking order sizes due to imports and a general decline in the economy. Manufacturers serving this market segment indicate that they might adopt a narrower market focus and complement their range with imported goods or 'rightsize', but that they do not export as they are not price-competitive. Firms aiming at cost leadership with a narrow focus have reversed their strategy of a wider focus or adopted this strategy since start-up as they use dedicated machinery with long machine changeover times. Some household goods and consumables manufacturers form part of this group. CNC

machinery allows manufacturers of custom-made components to adopt a strategy of wide differentiation. While machining times for a certain component or product can be up to ten times longer, changeover times of CNCs are minimal when compared to those of conventional dedicated machinery. Diversifying steel construction companies, two manufacturers of machinery and of other capital goods fall also in this category. Most foundries and the pressure vessel manufacturers (amongst others) have adopted a narrow differentiation strategy. As family-businesses with limited capital they have become more specialised over time as they cannot compete in market segments dominated by mass producers.

Sustaining a competitive position means re-orientating one's business in line with changes in product markets. Historically, protection led to the orientation of production capacity towards a low-volume and gradually changing South African market. Trade liberalisation entails that South African product markets change more rapidly than before. Consequently, firms have to adjust their market foci more frequently to sustain competitiveness. International experience suggests that exporting provides added incentives for improved firm performance. The prime objective of exports is to have access to a wider market requiring high volumes which allow for economies of scale which, in turn, make manufacturers able to compete in the domestic markets against imports [Barnes, 1998]. Firms which are exposed to highly competitive export markets are reported to speed up firm restructuring and adapt to international quality standards such as ISO 9002.

Of the forty small and medium-sized metalworking firms in the Witwatersrand, nine have exported regularly prior to 1994 and are still exporting in 1998. Exporters disclose that export volumes have increased since 1994 due to a drop in the exchange rate and a positive shift in the perception of South African firms as trading partners. All nine exporting firms have adopted a narrow or broad differentiation strategy.

Figure 5: Export experience of metalworking firms in the Witwatersrand [N=40]



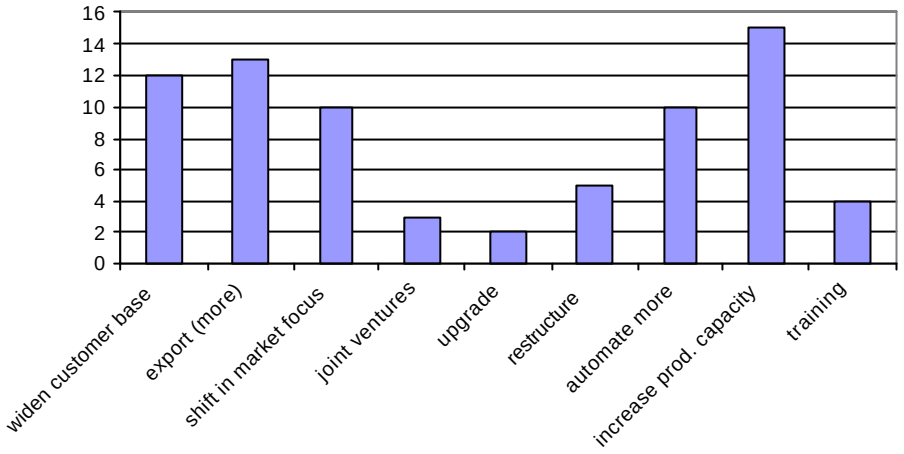
Two manufacturers export on demand as they consider it too time-consuming to pursue an active export strategy and three supply components to other engineering companies which export. Four firms have tried to export, but experienced difficulties in serving both domestic and foreign customers as they are small or they had to learn that they were not competitive enough in price and quality, while another four companies are busy exploring potential export markets. In general, export markets are perceived more quality-demanding and more price-competitive, and those manufacturers who export regularly and more than 50% of their output have been exporting for more than five years.

Choosing courses of action to support firm strategies

Firms operate in a constantly changing environment and react to it or are trying to shape it [Porter, 1998]. Static strategies are one-off solutions to perceived change, while dynamic strategies help to increase a firm's ability to react to change [Altman, 1996]. The evidence gained from the interviews with forty metalworking SMEs shows that market-related action is prioritised over more dynamic strategies which relate to intra-firm restructuring, networking and training.

The range of strategic action planned by the forty manufacturers to support their growth and market strategies is presented in Figure 6.

Figure 6: Strategic actions planned by metalworking companies [N=40x2]



Being asked to name two courses of action planned, owner-managers prioritised market-related action. Widening the customer base, starting or increasing exporting and a shift in focus - in all cases from 'cost leadership' towards 'differentiation' - positions the firm in a different market segment. The data in Figure 6 indicate that relations to forward and backward industries or subcontractors receive no or little attention. Only two manufacturers plan to intensify relations to other engineering firms through joint ventures.

Production-related changes such as restructuring, were named by only a minority (6%). This contrasts with the experience in other developing countries that plant-level performance can be significantly improved through the application of new forms of production organisation [Humphrey, 1995; Kaplinsky, 1997]. Automation, upgrading of machinery and more capital investment in general were seen as key solutions to growth, in particular to support export strategies. While international experience pinpoints the growing importance of multi-skilling through additional training in boosting competitiveness, training has received minimal consideration amongst the surveyed firms in the Witwatersrand (5%). Research into South Africa's metalworking industry explains this 'apathy' towards training with a missing recognition of soft skills (motivation, quality perception) as opposed to hard ones (machine operation), a missing clear career path and the high level of retrenchments [Rustomjee, 1993; Interview with M. McDonald, SEIFSA, 20/8/1999].

Shifting market focus or marketing oneself better is an inadequate response if market demand cannot be met [Harrison & Dunne, 1998]. Those manufacturers who plan to react to the change in market demand patterns intend to adopt static strategies - increasing capacity without specialisation or further training will not allow them to respond to requests for more flexibility and quality, and automation is limited in its cost-reducing effect due to the general under-utilisation of capital equipment in the industry [Rustomjee, 1993; Interview with M. McDonald, SEIFSA, 20/8/1999].

Collaboration amongst manufacturers and staff and management training, by contrast, place the firm on a learning curve. Therefore, the paper proceeds with a more detailed investigation of the nature of horizontal and vertical relationships established by small and medium-sized metalworking companies in the Witwatersrand.

Establishing vertical relationships

Recent studies into enterprise development disclosed that growth rates and strategies vary considerably by sector and industry and that industry-specific research which includes the competing and complementary channels of input and output linkages of firms (i. e. their backward and forward linkages) leads to a better understanding of both industry-specific and size-specific enterprise dynamics and competitiveness [Boomgard et al., 1992; Bethlehem, 1993; Manning, 1996; McPherson, 1996; Harrison & Dunne, 1998; Kaplan & Kaplinsky, 1998; Porter, 1998]. Research on successful SMEs in other developing countries points to the importance of strong vertical relationships in enterprise performance [Schmitz, 1993; Tendler & Amorim, 1996; Nadvi, 1997].

Backward linkages

SMEs report to have established long-term relationships to steel merchants, albeit not strong enough to outweigh the imbalance in the distribution of rents in favour of suppliers and merchants.

Raw and processed steel is the main input for most metalworking companies in the Witwatersrand. The production of steel is dominated by ISCOR. Other producers are Highveld Steel and Scaw Metals. Product overlap is, however, low. The minimum order size of these major producers is far larger than the average input requirements for most SMEs [Levy, 1996]. Moreover, steel prices in South Africa are set for some purchasers at levels that are significantly higher than those prevailing elsewhere and especially relative to the export prices paid for South African steel [Fine, 1998] (but are lower than the prices of re-imported steel [Interview with M. McDonald, SEIFSA, 20/8/1999]). Most small and medium-sized metalworking companies interviewed procure their requirements from steel merchants who hold stock of "export quality" steel and deliver within 24 hours. This is important for 'jobbing' firms which source inputs when an order is placed because "it has become too expensive to carry stock", "one does not know what type of steel the next customer wants" or "there is no space to hold stock". For this service and accessibility, steel merchants demand a premium price.

Being asked about their relationship to suppliers, seventeen (42.5%) manufacturers describe it as long-term, ten (25%) as close, seven (17.5%) as loyal, and six (15%) have a "pure business" relationship to their suppliers. Accordingly, twenty-two metalworking companies receive assistance from suppliers, eight from some of their smaller suppliers and ten none at all. Assistance ranges from longer terms for regular customers, to giving advice on quality of inputs and stock-holding. Nevertheless, the relationships to these mainly large steel merchants do not counterbalance the effect of ISCOR's monopolistic position as domestic producer.

Assistance from suppliers of equipment

South Africa's engineering sector is marked by the underutilisation of production capacity. Training and other assistance from suppliers of equipment could help to alleviate this problem. However, the relationships between suppliers of equipment and small and medium sized metalworking firms in the Witwatersrand are sporadic and rather loose.

The metalworking firms interviewed disclosed that they have last replaced equipment on average

eight years ago, while additional equipment is purchased "when needed". Contacts to equipment suppliers are thus sporadic in nature which does not facilitate the establishment of supportive relationships. 28% of the forty metalworking companies import equipment directly and report to travel to the machine's country of origin to take part in training courses offered by suppliers there. Local agents are giving back-up service, but no training which is not of concern to ten of the forty manufacturers as "[they] do not need any training". 25% of the small and medium-sized enterprises do buy their equipment second-hand as "there are many companies going into liquidation nowadays and new equipment has just become unaffordable". About 15% of the manufacturers build their own equipment or have it made locally. The very sporadic nature of contacts to equipment suppliers, their remoteness and the attitude of many of the owner-managers that they do not need technical advice impedes the establishment of supportive relationships between equipment suppliers and small and medium-sized metalworking companies in the Witwatersrand.

Forward Linkages

Metalworking firms' relationships to customers are the best-established ones. Nevertheless, they seem to break in the face of market pressure to increase competitiveness instead of being intensified and tabbed into.

The diversity of metalworking activities investigated entails that output channels vary considerably. Household goods, for example, are either sold directly to the public or via retailers, while components are made to order of other engineering companies. Market channels are established through word of mouth (37%), which applies in particular to component manufacturers, visits (20%) and reps (22%) or have been taken over with the business (21%). Nearly half of all manufacturers describe the relationship to their customers as long-term, more than a third as loyal and the remaining six entrepreneurs as close or respectful. Two-thirds of the small and medium-sized metalworking firms receive assistance from at least some of their customers, such as general feedback (40%), quality control (22.5%) or financial (17.5%) in the form of deposits. Nevertheless, manufacturers complain about smaller and less frequent orders and a smaller customer base due to firm closures.

While trusting subcontractors with drawings or patterns (in the foundry industry) contributes to an informal, long-term relationship, the perspective of subcontracting engineering companies has somewhat changed. Subcontractors state that they have to change component suppliers who do not meet price and quality requirements, or source components abroad as they themselves are affected by increased competition. Assisting suppliers in raising quality is only viable if the components supplied feed into an exclusively South African model or design [Interviews with several engineering companies in August 1999].

The relative stability in output channels seems to be jeopardised by increasing competition both amongst suppliers and in end markets which reveals that business relationships were long-term, but of arm's-length only. Firms which might have been cushioned by protection and believed that their customer relationships were stable will have to improve performance to maintain these relationships.

Establishing horizontal linkages

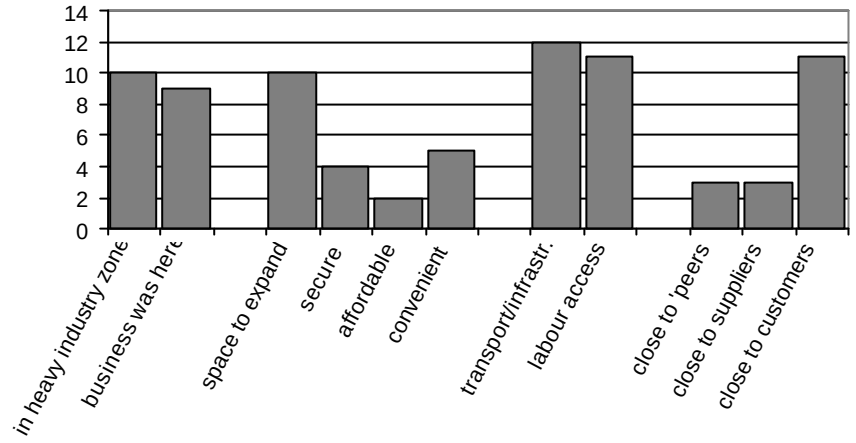
Research on successful geographical clusters of enterprises in Africa indicates that spatial proximity facilitates interaction among enterprises which gives rise to imitation, technology diffusion and positive learning [McCormick, 1997; Barr, 1998; Rogerson, 1999a]. Apart from 'passive' agglomeration economies, bilateral or multilateral 'joint action' contributes to 'collective efficiency', the term used to describe co-operative competition amongst firms located in industrial districts [Schmitz, 1995; 1997]. The Witwatersrand, and the East Rand in particular are metalworking clusters, joint action of

metalworking firms in this cluster, however, are rather limited in scope and not comparable to the 'collective efficiency' characteristic for industrial districts.

Locating in a cluster

Research on growing SMEs in Southern Africa indicates that there is a correlation between enterprise location and success [McPherson, 1996; Rogerson, 1999a]. Location strategies adopted by individual companies typically balance a complex array of factors. Where products are manufactured, it involves an assessment of sources of raw materials, markets, logistics, cost and quality of labour and so on. The evidence gained from the interviews conducted shows that firms are reluctant to relocate once they are established and do not actively seek proximity to other firms of their sub-sector.

Figure 7: Reasons for having chosen the current premises [N = 40x2]



When asked to give two reasons why firms were operating in the current premises, over a third of all manufacturers named being or having been established in a designated area for heavy industries [Figure 7]. Certain metalworking activities like founding is indeed confined to certain industrial zones and excluded from most 'industrial parks'. Accordingly, all companies (except for one) were found in industrial zones such as Alrode, Benoni, Alberton and Germiston. Thirty-one firms operate in owned premises which adds to the general reluctance for relocating capital-intensive establishments. Road access and accessibility of labour had influenced the location decision of just under a third of the metalworking firms interviewed, while security, affordability or convenience were of less importance. The data indicate that being close to output markets is considered more important than being close to suppliers who "deliver anywhere in the Witwatersrand". Furthermore, proximity to manufacturers of the same field was only a reason for three manufacturers to settle down in their current premises. Despite the awareness of being located in the "hub of the metalworking industry", proximity to firms operating in the same sub-sector was not actively sought.

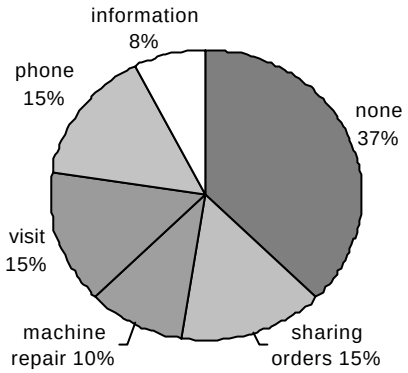
Bilateral horizontal relationships

Although proximity to other manufacturers [3]was only a reason to choose the current premises for few manufacturers [Figure 7], there are indications that - once they are in close proximity to each other –

[3] Subcontracting is one of the characteristics of the fabricated metals sector which has been highlighted in the section on vertical relations. Horizontal relations are established between manufacturers in the same field or tier-level.

manufacturers start interacting in one form or another. Similar findings are reported from South African small and medium-sized manufacturers in other industries, for example by October [1996], Harrison and Dunne [1998] and Rogerson [1999a] for the clothing industry and Ajam [1994] and Manning [1996] for the wooden furniture industry. Nevertheless, Barr [1998] stresses the need to investigate the nature and scope of interaction between firms in more detail.

Figure 8: Range of interactions amongst metalworking SMEs in the Witwatersrand



The range of interactions amongst metalworking manufacturers in the Witwatersrand is presented in Figure 8: On the one hand, fifteen manufacturers do not seek any contact to other manufacturers in their field. Six metalworkers, on the other hand, report to share and pass on orders, and four assist a competitor in case of a machine break down. Visits and phone-calls to seek advice are reported by twelve manufacturers, general information exchange by three. Nevertheless, these interactions seem to be rather sporadic and limited in scope. Orders are shared when one lacks the capacity to complete the order in the given time and passed on as a kind of customer service if one does not have the expertise required. Visits end at the factory door or the drawing room, and - according to one founder - “direct competitors one does not even greet”. Nevertheless, Italian metalworkers, for example, have established a network with other metalworking manufacturers, however not in the same field, both in the Witwatersrand and in Italy. These contacts facilitate the flow of general information about trends in the industry, about ‘best practice’ in Italy and the establishment of import supply channels.

Overall, the clustering of competing metalworking manufacturers in the Witwatersrand has thus only a limited effect on their finding common strategies to defend themselves against increased competition. As the scope of bilateral co-operation is limited, often along ethnic lines and due to a lack of trust, it does not assure the survival of its participants. The same applies to the so-called ‘socialising’ which forms an integrated part of “doing business” in the industry. Therefore, it is considered important by 25% of the manufacturers, crucial by 30% and helpful by 20%., but - as one manufacturer puts it- “Networking helps and alleviates the symptoms, but it does not solve the problems!“

Multilateral horizontal relationships

Industry associations form an integral part of the organisation of the metalworking industry, but they have not been able to promote joint action of their members as they have (so far) limited their activities to generating and passing on information.

Twenty-one of the small and medium-sized manufacturers are members of SEIFSA, the Steel and

Engineering Industries Federation of South Africa, from which manufacturers receive general information through newsletters, and information and advice regarding industrial relations through workshops and counselling. The Head of SEIFSA's economics department, Mr. Michael McDonald, admits, however, that it has been and is always difficult to reach out to small metalworking firms [Interview with M. McDonald, SEIFSA, 20/8/1999]. The Johannesburg Chamber of Commerce (JCCI) is not an industry-specific association. Nevertheless, nine manufacturers have joined the JCCI to receive general information and to be exposed to especially foreign firms. Specialised industry associations like the South African Fasteners Association or the Association of Window Covering Manufacturers were founded "to regulate the industry", which means setting product standards and registering manufacturers. Associations of sharply declining sub-sectors such as the Pressure Vessel Manufacturers Association (PVMA) or the South African Institute of Foundrymen (SAIF) have become more actively involved in "bringing everybody into the fold". Manufacturers of these sub-sectors confirm more intense contacts with other pressure vessel manufacturers and foundries respectively. The PVMA is busy setting up product standards and preparing for exploratory trade missions to several African countries such as Nigeria [Engineering News, August 13-19, 1999], while the SAIF has published a Foundry Directory and organises visits to international foundry fairs, for example to the GIFA in Düsseldorf and the FWTF in Birmingham. While the efforts of the associations to promote the industry are acknowledged, generating and distributing information is considered necessary, but not sufficient. All manufacturers who are members of these associations would like to see the application of this information demonstrated in their daily business.

Seeking support from consultants and institutions

Despite experiencing problems with generating relevant information and integrating available information into their business operations, only twenty-one out of seventy small and medium-sized metalworking firms have made use of private or para-statal consultancy services or assistance. Companies owned by holdings are at an advantage as they have easier access to consultancy services "readily available within the group".

Twenty-five metalworking companies have never sought any voluntary contact with public institutions such as the Department of Trade and Industry (DTI), the 'former' SBDC (Small Business Development Corporation) and the Industrial Development Corporation (IDC), and were most often unaware of their assistance schemes targeting small and medium-sized enterprises. Ten manufacturers have had contact on one occasion which was, however, disappointing for eight of them. Owner-managers did either not even reach the person presumably in charge, they had made application for one of the export assistance schemes but had been rejected for "no reason" or they had not qualified for a loan as they were "too big" for the one and "too small" for the other institution approached. By contrast, five of the forty metalworking companies have regular contact with the above institutions and report to benefit from their assistance which is, in all cases, financial and in three cases supports their export activities. Private consultants had only been used regularly by seven out of seventy firms. In sequence of priority labour relations, marketing, accountancy and technical advice was sought – in addition to information about the application procedures of DTI assistance schemes.

While the attitude of owner-managers towards institutions and consultants cannot be influenced by the latter, the awareness of their existence and approachability could be. The research findings suggest that making assistance *available* is not sufficient to promote small and medium-sized enterprises for which information costs are high. Therefore, any assistance to SMEs has to be

marketed, and application procedures to be simplified.

Conclusion

At the close of the 1990s, South Africa is operating in a new, more open, trading climate which is forcing its industries to cope with global competitors. The metalworking industry in particular is expected to measure up to international competition from the Newly Industrialised Countries, Brazil and Europe.

It is evident from the findings of a survey of forty small and medium-sized metalworking manufacturers in the Witwatersrand that they have perceived some change in their business environment and amended their growth strategies accordingly. While 52% of the manufacturers interviewed plan to grow further, 48% state that they will not grow, but try to maintain the size of their business. Being asked what courses of action they will take to pursue these strategies, the majority of manufacturers plan to undertake market-related action like venturing into different market segments or establishing a wider customer base, partly abroad. There are indications, however, that South African metalworking manufacturers do not understand fully the markets they serve and therefore need to adopt a stronger market orientation on which further strategies are based. Moreover, most small metalworking manufacturers in the Witwatersrand have failed to revise their static labour-cost related strategies despite the pressure of increased imports on the one hand and rising production costs on the other. Manufacturers have, for example, been unable to lobby against the oligopoly power held by steel producers which allows steel merchants as intermediaries to demand a premium price for supplying steel in required quantities. Vertical and horizontal relationships do exist, albeit are limited in their scope and thus in danger of being sacrificed under current unstable market conditions. When facing global competition manufacturers who choose static strategies are unlikely to grow in the future as competitiveness in the global metalworking market depends on continuously improving performance. South African metalworkers have to learn to understand that strategic choices have to be made continuously and one-off solutions do not lead to success as they result in complacency. Accordingly, small metalworking manufacturers in the Witwatersrand will have to urgently adopt more dynamic strategies like firm-level restructuring and intensified networking if they are to survive the ‘new competition’.

Internationally, industry associations have proved to play a vital role in small business development. In the South African metalworking industry, however, the associations under investigation limit their activities to channelling general information or setting standards while manufacturers would require international benchmarking and applicable information. Assistance schemes designed by the government to promote small and medium-sized enterprises and their competitiveness are available, but not marketed sufficiently for enterprises whose relative searching costs are high.

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