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# MULTINATIONAL ENTERPRISES IN AFRICA: A STUDY OF GERMAN FIRMS IN SOUTH AFRICA

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Abstract

A key feature of globalisation is the increasingly important role of Multinational Enterprises (MNEs) as vehicles for Foreign Direct Investment (FDI). Economic theory recognises that MNEs can benefit economic growth in developing countries through generating positive externalities (so-called spill-over effects). These spill-over effects occur predominantly through the R&D and innovation of MNEs, their outsourcing to local firms, their training of local labour and the payment of higher wages by MNEs to retain good labourers. All of these benefits can be important for Africa, the world's poorest continent, in order to accelerate growth. However, the extent to which African countries benefit from spill-over effects of MNEs remains to be empirically investigated. The need for such an investigation is can be motivated with reference to the trickle of annual FDI flows destined for Africa. In this light the present paper presents results from an empirical survey of German firms in South Africa. South Africa may be an interesting case in which to study the impacts of MNEs on African development as it has a significant presence of foreign firms. German MNEs specifically have been involved in the South African economy for over a century.

*Key words: Multinational Enterprises, Foreign direct investment, Africa, South Africa, Germany, Endogenous growth theory.*

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# MULTINATIONAL ENTERPRISES IN AFRICA: A STUDY OF GERMAN FIRMS IN SOUTH AFRICA

## 1. INTRODUCTION

In a context of globalisation Africa requires investment by multinational enterprises (MNEs) to improve its competitiveness and to facilitate micro-level structural changes required for reducing its riskiness for investment. The process of economic development is to a large extent contingent upon the cumulative effects of appropriation and development of technological advancement in which MNEs play a central role (Gilroy (1993), pp.163-18).

Most of the literature<sup>1</sup> now accepts the fact that the inflow of FDI through MNEs increases local development and utilisation of resources (compare Dunning (1993/1996), Caves (1996)). Many of the arguments found are based upon the insight that both home and host countries may gain from FDI when resources are not inevitably fully employed which leads to an industry-specific and complementary nature of capital and technology.

Africa might be in low-growth equilibrium trap, unless factors and conditions can be identified whereby MNEs can become more involved in African economies. Economic theory recognises that MNEs can benefit economic growth in developing countries through generating positive externalities (so-called spill-over effects). These spill-over effects occur predominantly through the R&D and innovation of MNEs, their outsourcing to local firms, their training of local labour and the payment of higher wages by MNEs to retain good labourers. All of these benefits can be important for Africa, the world's poorest continent, in order to accelerate growth. However, the extent to which African countries benefit from spill-over effects of MNEs remains to be empirically investigated.

This paper is therefore motivated by the fact that the role of MNEs in Africa had not yet been rigorously researched. To therefore broaden the understanding of the role of MNEs in Africa's economic performance, an empirical study of German firms in South Africa<sup>2</sup> was undertaken during 2000.

German firms in South Africa offer a potential rich field of investigation into the impacts that MNEs can have on a developing country. There are around 560 German firms in South Africa employing more than 65 000 people. The average German firm has been operating in South Africa for 22 years with some firms' presence pre-dating South Africa's industrialisation. Given the importance of skills, technology and innovation for competitiveness in a global environment the study of these firms will focus on the technological spill-over effects of these firms in South Africa. Thus, the paper will report in particular on the training, remuneration, innovation, R&D and outsourcing behaviour of the German firms in South Africa, as these are identified in the literature on MNEs and endogenous growth theory to be the most significant channels for spillovers (or positive externalities) to occur.

The paper is structured as follows. In section two the fundamental benefits of MNEs in accelerating economic growth in developing countries is set out with reference to the evolving understanding of the nature of MNEs. In section three the historical engagement of German firms in South Africa is described, and the current profile of German firms discussed. Section 4

<sup>1</sup> Of course, there exists much controversial evidence of MNEs being linked to inequitable income and power distribution, environmental debasement, and societal deprivation. Although many such instances are indeed quite spectacular or extreme in nature, they usually represent isolated examples and should not immediately be postulated to be the typical case of MNE behaviour.  
<sup>2</sup> South Africa may be an interesting case in which to study the impacts of MNEs on African development as it has a significant presence of foreign firms. Mundorf (1993:125) estimates that foreign firms account for almost 40% of the total production of the private sector in South Africa.

<sup>3</sup> However, McManus (1972) pointed out that the essence of the phenomenon of international production is not simply the transfer of capital, but rather the international extension of managerial control over foreign subsidiaries. Various other studies have defined multinationals in alternative ways (see e.g. Aharoni (1971), Macharazna (1981)). The editors, J. Stopford and J.H. Dunning, of *The World Directory of Multinational Enterprises* (1982, 1992), for example, define multinationally according to three criteria: (1) at least 5 percent of consolidated sales or assets from foreign direct investment, (2) at least 25 percent of the voting equity in at least three foreign countries, and (3) at least \$75 million in sales from foreign operations.

The original studies focusing on MNEs and searching for an explanation of the phenomena are Penrose (1956, 1959), Dunning (1958), Behrman (1962), MacDougall (1960) and Kemp (1964). The advancement of the theory of monopolistic competition during the 1930s and Hymer's (1960) defiance of the capital arbitrage perspective of FDI flows being based upon relative differences in interest rates led to new insights. The basic (Hymer)/Kindleberger (1969) hypothesis is that a MNE must have some non-marketable advantage over foreign domestic firms

minimising due to 'transactional advantages' over the market. The basic starting point goes back to neo-classical theory that is primarily a theory of prices and the allocation of resources. The firm is interpreted essentially to be a 'black box', i.e. factor inputs such as land, capital and labour are simply transformed by the given technology (production function) into final consumer products and services sold in perfectly competitive markets. What role then do firms play as economic organisations? R.H. Coase (1937) was one of the first modern authors to raise the question as to why firms exist? The answer he gave was that firms must be interpreted as internal markets for transactions that do not take place on external arms length markets due to transaction costs that reflect the fact that external markets are not perfect. Given non-perfect markets, internal transactions allocated by fiat, i.e. administrative organisation through hierarchies instead of simple price allocation may prove to be more profitable and cost-

The enormous literature on the institutional phenomenon MNE has undergone rapid evolutionary changes throughout the years (see the twenty-five volumes of the United Nations Library on Transnational Corporations, e.g. Dunning (1992)). Significant theoretical contributions in the areas of international trade, industrial organisation, international finance, transaction-cost approach to economic organisation, business administration, taxation, and elements of law and political science have all been successfully applied to the domain of multinational enterprise analysis (compare e.g. Dunning (1993/96), Caves (1996), Helpman (1984), Ethier (1986), Cantwell (1991), Markusen (1984, 1995)).

Multinational enterprises (MNEs) have often been defined in the literature simply as organisations that engage in foreign direct investment (FDI) and own or controls value-adding activities in more than one country (see e.g. Dunning (1974, p. 13), Dunning (1993/96, p.3), Casson (1985, p. 31)). Chosal and Westney (1993, p. 2) describe the MNE as "one of the most complex forms of organisation currently in existence."

The aim of this section is to provide a theoretical basis from which to approach German MNEs in South Africa so as to be able to evaluate the extent to which MNEs can make a contribution to economic growth and catching up. It is indicated that the motivation for the existence and operation of MNEs in the global economy has changed over the past decades and that the need to innovate imply that MNEs may favour knowledge-rich locations (that facilitate knowledge creation and knowledge sharing) over knowledge poor locations (such as might be the case in much of Africa).

## 2. MNEs, KNOWLEDGE CREATION AND KNOWLEDGE SHARING

present the results from the survey of 31 firms in 2000, with particular emphasis on the R&D, innovation and outsourcing practices of these firms. Section 5 concludes with a summary and conclusions.

that is sufficient to overcome the natural obstacles of operating in some distant foreign market. The relevance of Hymer's work is found in essentially every study of MNEs. As postulated by Dunning and Rugman (1985, p. 228), Hymer's contribution and great insight was in articulating the process of FDI as an international extension of industrial organisation theory. Along these lines of thought FDI was due to the existence of imperfect competition, product differentiation and barriers to entry.

Thus, the common strand in the line of thought from Coase to Hymer is the notion of the firm as an internal market for transactions that are not economically permissible on spot markets. Given such transactional advantages of an internal market, the implication is that pure market failure exists or imperfect markets for other reasons. As pointed out by Penrose (1996, p. 562), such considerations still do not distinguish the MNE from domestic firms.

The traditional model of enterprises starts with the assumption that the particular means of contributing financial capital to the productive unit will define the structure of the enterprise. The enterprise is thus an institutional scheme for organising the interests of owners or equity contributors (Milde (1987)). The specific class of capital contributors and its institutional conception (common ownership/shareholding) form the centre of the organisational structure. All other inputs are integrated into this structure through specific external markets (the labour market, the market for technical and administrative know-how, the non-equity capital market, etc). Some inputs are conceived of as being "physically" integrated into the enterprise (managers, employees) through special contracts (Schanze (1986)).

This traditional enterprise model has been further developed, analysing the enterprise as a set of contracts or a nexus perspective of the enterprise (Reve (1990), Alchian and Demsetz (1972), Jensen and Meckling (1976)). This nexus model of the enterprise discards the notion of a vested priority of one specific asset. Rather, it stresses that all input/output relations should be analysed as interlocking functions of the enterprise concept (compare e.g. Schanze (1986), Johnson and Lawrence (1988)). The nexus model, however, fails to explicitly recognize the value-added effects of international networks.

Along the lines of the nexus model, the "constitution" of the enterprise is defined by the constitution of institutional "interfaces" of the various input/output relationships (Schanze (1986)). The initial nexus model as proposed by Alchian and Demsetz (1972) and Jensen and Meckling (1976) relies solely on a contractual interface. Input/output relations are described through contractual arrangements. However, as mentioned above, the importance of non-contractual interfaces and relationships has also been observed in the literature. Williamson, Wächter, and Harris (1975), for example, have argued that the characteristics of internal labour markets give the organisation efficiency advantages over alternative institutions. Radner (1975) has discussed the performance and survival implications of simple rules for allocating managerial efforts. Rules may substitute for full optimality, since sheer complexity makes its attainment impossible. Boorman (1975) has analysed the equilibrium and welfare properties of *informal networks* of ties that permit information acquisition to individuals, the need for which arises randomly. The importance of such effects for corporate networking has been emphasized e.g. by Mueller (1986).

Transactional diversification through contractual or relational arrangements often represents an entrepreneurial mechanism for capturing potential integration economies (economies of scale, economies of scope and ray economies) associated with the simultaneous supply of inputs common to a number of production processes geared to distinct final product markets (Tece (1980, p. 224)). For example, inter-enterprise collaboration in basic research in non-stabilised frontier technologies occur to the extent that no single enterprise can solely bare the costs of such research, and yet no enterprise can risk losing access to a new technology that membership in a research and development pool potentially provides. It has been observed in the literature that especially research and development facilities have become increasingly regionalised (see e.g. Mytelka (1987), Burstall and Dunning (1985), Cantwell (1988), Cantwell (1996) Santangelo

Knowledge creation can thus be expected to significantly influence the activities and motivations of MNEs. As recently pointed out by Teece (1998, p. 58), knowledge sharing itself can often be the basis of competitive advantage: "...the competitive advantage of firms in today's economy stems not from market position, but from difficult to replicate knowledge assets and the manner

complementarities economically feasible. competition and knowledge creation make further use of firm-specific operational and functional from traditional trade theory. Even if factor prices are equal, incentives based upon co-operative membership suggests that the advantages of multinationality itself may be greater than expected expand beyond the point of factor price equalization. The flexibility achieved by network manufacturing products dominate, enterprises have a further economic incentive - need - to Today, in globally competitive environment where world trade in high-value added have been the initial motivation for MNEs to enter African countries a couple of decades ago. specific intangible asset in a foreign country (Helpman and Krugman (1985)). This may also multinational may simply be to take advantage of differences in factor prices by utilising a firm-behaviour of MNEs in Africa. Originally, the economic incentive for enterprises to go production throughout their networks. This perspective may be useful to understand the internationalisation strategies that reduce costs and enhance the flexibility of knowledge accelerated the rate of technological change, obliging these firms to engage in new growth and Positioning of enterprises (strategic partnering) in such a manner that they themselves compete vital for enterprise survival: (1) Flexible and quick reaction to changing market conditions. (2) variants. The fierce and rapid expansion of internationalised competition has made two factors development while they *compete* in production, marketing, and servicing of their product obsolescence (shortened product life cycle) have compelled MNEs to *co-operate* in research and Often the high cost of research and product development and the rapid pace of product

sell. know-how trading possesses a lower transaction cost than more formal agreements to license or to apparent competitive value to both existing and potential rivals based upon reciprocity. Informal reciprocity. His data show that individuals and enterprises commonly revealed information of dilemma, Von Hippel (1989) has also studied what he terms 'collective invention' and Framing the phenomenon of know-how trading among rivals within the context of a prisoner's

of industrial districts. exchanges of information has long been recognised by economists since Alfred Marshall's analysis The possibility of a deviation of labour between enterprises and the importance of mutual the downstream industry. Thus, while vertical integration is sufficient, it is not always necessary. upstream industry can appropriate the benefits of better information by *giving* the information to when an investment type decision is of an ex ante nature. He demonstrates further also that an generate better information, increasing profit level when input supply uncertainty exists and (Mytelka (1987)). Arrow (1975) has demonstrated theoretically that vertical integration can development activities that are more likely to enhance an enterprise's competitive position internationally through inter-enterprise collaborative agreements liberates funds for further quasi-rents. Rather, it is much more the case that externalizing various transactions through New Forms of Internationalisation in no way diminishes the private appropriation of The important aspect hereby is that active co-operation inter-enterprise network structures

the relative and absolute position of MNEs in the industry. The welfare gains are unambiguous. generates the development of local industry such that domestic firms may one day reduce both Venables (1999) have demonstrated that through such linkage effects FDI acts as a catalyst which generate competitive enterprise advantage based on untraded externalities. Markusen and localised knowledge spillovers resulting from it create spatial agglomeration economies, which *clustering* of multinational enterprise activities. Locally embedded value added and the subsequent (2000). Local entrepreneurial competitiveness attracts global competitors, resulting in the

According to the South African - German Chamber of Commerce (SAGCC) there are around 560 German firms employing roughly 65 000 people active in South Africa. Most of these enterprises are in the secondary sector. Gutschleg (1999) identifies the machinery, electronic, chemical, pharmaceutical, automobile, and metal production sectors as the major hosts for German firms respectively. Gutschleg (1999:81) found that the average German firm has been operating in South Africa for 22 years. The major industrial areas of South Africa can be found in the Pretoria-Witwatersrand-Vereeniging (PWW) region, the Durban-Pinetown region, the Port Elizabeth-Uitenhage region, East London and the Cape peninsula. Of all German companies Gutschleg (1999:91) identified 89 percent in the Gauteng region, six percent in the Eastern Cape, four percent in the Western Cape and only one percent in KwaZulu-Natal. Thus, German firms tend to follow the presence of local agglomeration advantages and economies of scale.

There are strong historical and commercial ties of over a century between Germany and the Republic of South Africa. Historically, a host of German pundits in the field of mineral extraction and commercial trading already engaged in South Africa at the outset of the 19th

### 3. GERMAN FIRMS IN SOUTH AFRICA: ORIGINS AND PROFILE

To what extent are MNEs activities in Africa driven by imperatives of knowledge creation, and to what extent to this lead to knowledge sharing (or knowledge transfers)? The remainder of this paper will explore these central issues by studying the behaviour of German MNEs in South Africa.

It is not only a question of MNEs bringing their advanced technology to the location. Another precondition for a potential technology/knowledge spillover requires that receivers invest in technological learning or in their absorptive capacity. Basically, it is the creation of an innovative initiative environment which is desirable since given that firm-specific know-how is mobile, which definitely applies to the case of unembodied technology, "... then know-how is not only worldwide (Burger (1999), p. 121). "Ozawa (2000, p. 218) has termed such knowledge transfer effects accordingly as the 'market-hitchhiking' effect of trade and investment of MNEs. Thus, MNEs can bring in new created assets such as technology and skills which potentially result in powerful driving forces for economic development and structural accommodation and social upgrading processes. Since countries are characterised by different levels of industrial advancement MNEs act as vital catalysts for structural evolution. "Both leaders (lead geese) and emulators (follower geese) can mutually benefit from interactions with each other in terms of trade and investment opportunities (Ozawa (2000), p. 217)."

According to recent patent statistics, the 700 largest industrial companies - most of them MNEs - account for half of all commercial innovations (Cantwell (1996), pp. 145-180). Cohen and Levinthal (1989) and Burger (1999, p. 118) further emphasizes the fact that the spillover efficiency of MNE technology transfer requires that one takes account of the 'double function' of research and development (R & D) activities of firms. R & D activities of enterprises are simultaneously essential for innovative as well as imitative activities. Local enterprises that do not invest in learning cannot expect spillovers to have a significant effect on their level of efficiency. Training externalities, they point out, do not work when the absorptive capacity in the local firm is insufficient. Local companies, however, that do invest in training obtain additional learning economies over time (learning to learn effects), i.e. they achieve comparative advantages in external knowledge exploitation capabilities. One of the central prerequisites for endogenous regional development is the ability of the region, to adapt their economic and social structures and potentials to changing external challenges (Thierstein and Langenegger (1994)).

in which they are deployed." Obstacles in the knowledge creation process may keep MNEs from fulfilling an optimally beneficial role in a country.

From table 1 can be seen that German MNEs such as Siemens and AEG commenced their business operations even before the industrialisation process in South Africa started. The post-war period can be classified as a period for the German automobile, electronic, chemical and its supply industry. The intensification of the relations between the two countries began in the 1960s and is still continuing, although as will be indicated in the next section, there is evidence

Source: Mundorf, Dirk (1993:108-112); Guschlag, Dirk (1999:12) and expanded by the authors.

Year	Name of Personality or Company	Activity
1795	D. Friedrich Liesching	Production of natural remedies
1823	Dr. Otto Landsberg	Export of tobacco
1839	Josef and Adolf Mosenthal	Trading company
1852	Hamburgian company	Trading company
1868	SIEMENS	Electric industry in Cape Town
1895	AEG	Supply industry
1912	Ernest Oppenheimer (Anglo American Corp.)	Diamond company
1930s	Mannesmann Demag	Steel and Coal refining industry
1948	Volkswagen	Automobile production
1949	Union of German Exporter and Importer Association	Predecessor of SA-German Chamber of Industry and Commerce
1950	BASF partnership with SASOL	Coal refining plant
1958	Mercedes-Benz, East London	Automobile production
1962	Lufthansa	Airway transport

Table 1: Historical Engagement of Germans and German Firms in South Africa

German firms seem to work within an institutional network through a consultancy infrastructure that has evolved over time. For example, there exists about 13 institutions like the German Chamber of Commerce, the Goethe Institute, the Association of German Engineers (VDI); the South African Initiative for German Business (SAFR) etc. which support the German industry and its establishment in South Africa and elsewhere. Another example provided by Mundorf (1993) is the establishment of the Deutsch Afrika Linien (DAL) in 1934 which still runs the export business for companies like Audi, BASF, Degussa, Hoechst, MAN, Mercedes, Volkswagen and Demang-Duisberg (Gilly and Broil 1987:1).

In this context, Mundorf (1993) differentiates two groups of German South Africans. First German-Afrikaans with old local roots in South Africa. Second, there are about 90 000 Afrika-Germans who still hold a German citizenship and live in South Africa principally due to economic reasons. Also, cities like Heidelberg, Wuppertal, Heilbronn, and Frankfurt still reflect the profound German influence in South Africa. Economically, Germany already became the second most important trading partner for South Africa in 1914. A temporary setback due to the aftermaths of the two world wars occurred but did not significantly harm the established relations.

Table 1 shows some of the early German commercial involvements in South Africa. Today, still about 30 percent of the white population pertains of German descent, i.e. around 1 million people.

It seems that investment decisions by German firms in the first half of the 20th century were being determined by the location advantages of South Africa; i.e. production costs, transportation costs, delivery time, favourable exchange rate, arbitrage opportunities in natural resources and protecting customs rates.



From the above the conclusion is that firms are experiencing severe constraints as is reflected in the high rate (almost a third) of firms considering to leave South Africa or disinvest, the negative view of the adequacy of labour and concerns over educational standards, and worries about crime, violence, corruption and the incompetence of civil servants.

- In the next section results from a more expansive and quantitative questionnaire-based survey conducted by the authors during 2000 is set out and contrasted with some of the salient features
- 56% of firms regard the economic climate as either good or satisfactory with 14% regarding it as bad and very bad.
  - 64% of firms are confident and very confident in the maintenance of a market driven economy in South Africa.
  - 79% of firms expect an escalation of crime and violence.
  - 67% of firms view labour regulations as unfair.
  - 80% of all firms have considered or started or completed affirmative action programmes.
  - 83% of firms are pessimistic as to whether corruption would decrease.
  - 77% of firms have a pessimistic and very pessimistic view of the competence of the civil service.
  - 36% consider incentives for investment not to be inadequate whilst 36% are neutral.
  - Adequate returns on investment, maintenance of transport infrastructure and higher productivity of the labour force are cited by the majority of firms as the most important requirements whilst 98%-100% of firms would like to see less crime and violence, better environmental protection, maintenance of educational standards, and access to international TV.
  - 26% of firms signified their intention to leave South Africa, with 11% considering disinvestments. Only 45% considered increasing their investment in South Africa.

The questionnaire used by Pabst (2000) contained sections dealing with economic climate, basic political structures, basic economic structures, importance of certain conditions for doing business, intentions and views with respect to affirmative action and Black Economic Empowerment (BEE). The salient results are:

Since December 1993/January 1994 Gunter Pabst has conducted a qualitative survey amongst the members of the Southern African-German Chamber of Commerce and Industry. The most recent survey was conducted in May - July 2000 (see Pabst, 2000). It is a particularly noteworthy feature of German firms' involvement in South Africa that these firms can be classified overall as medium-sized based on the fact that the vast majority employs less than 100 workers.

For instance in Pabst's survey, more than 89 out of 140 firms employ less than 100 labourers, and that 6 firms had more than 2000 employees. The survey by Pabst (2000:2) shows that since 1995, the majority of respondents (70%) indicated that they had not been creating any new jobs. The survey results of Pabst (2000) suggest that German MNEs in South Africa perceive labour productivity and the activities of labour unions to be an obstacle in job creation. For instance in 2000 80% of all respondents felt pessimistic and very pessimistic about the accountability of labour unions and 69% felt pessimistic and very pessimistic about the adequacy of labour productivity. In the presentation of the extended quantitative survey conducted by the authors (see below) these results are substantiated and some possible reasons for the dissatisfaction with South African labour will be identified.

#### 4.1 Survey of Perceptions

### 4. SURVEYS OF GERMAN FIRMS IN SOUTH AFRICA

that many German firms are experiencing severe constraints in South Africa and that many considers leaving South Africa.

German firms in South Africa behave roughly in accordance with the traditional textbook model of MNEs / FDI. For instance they tend to produce mainly for the domestic market (i.e. their investment decision is not based on using South Africa as a competitive platform for exporting)

Sector	Number of Firms	Sales total (Mio. R.)	Employees per firm	Employees total
Motor vehicles & metal products	10	7.227	1.216	6.396
Chemicals & rubber manuf.	5	94	19	375
Pharmaceuticals	3	110	37	257
Electronics	4	52	13	190
Construction & Textiles	2	170	85	220
Transport	3	709	236	302
Finance a.o. services	4	274	69	354
Total	31	8.636	279	8.094

Table 2: Firms, sales and employees of German Firms in South Africa 1999

Most firms surveyed had between 1 and 5 plants (offices) in South Africa. About 96% of firms had between 1 and 5 plants (offices) and 4% had between 6 and 10 plants (offices). In 88% of the cases, firms' products/services were in conformity with ISO requirements. On average, German companies in South Africa spent about 3% of total sales on marketing - R8,06m, R8,91m, and R9,04m for the three consecutive years, 1997, 1998, and 1999, respectively. This shows a significant and steady increase in nominal marketing expenditure of 12% of the period. Most German firms in South Africa face significant competition. On average, there are 2 competitors per firm with a range of 1 and 3. In total 34 new competitors enter the market per year on average.

Table 2 below show that motor vehicles, metal products and chemicals are the sectors in which German firms more active in South Africa.

4.2.2 General Overview

The study made use of a structured questionnaire that was mailed to over 600 German firms in South Africa. The list of firms was obtained from the Southern African-German Chamber of Commerce and Industry. About 55 firms responded (10%), of which 31 questionnaires (about 5%) were satisfactorily completed. About 15 firms were visited during September - October 2000 and case studies prepared of these firms in the South African economy. The relatively small sample size makes it difficult to generalise the results and also precluded econometric analysis. However, the results are broadly consistent with the results from Fabst's survey of perceptions, as well as results from the National Enterprise Survey (NES) conducted in South Africa in 2000. This survey was the first that required detailed responses from the firms on a wide range of issues from labour turnover and R&D to competitive intelligence practices and networking. In this paper, the focus will be on the innovation, R & D and technological spill-over effects (or potential thereof).

4.2.1 Methodology

4.2 Knowledge Creation and Knowledge Sharing by German Firms in South Africa

German firms already identified in this section. It is an aim of this paper to establish in the next section how German firms are contributing to promoting economic growth and catching-up in South Africa especially through spill-over effects due to knowledge creation and knowledge sharing, as described in section 2.

\* The major destination of German trade are neighbouring countries as well as Europe and especially Germany. Other importing countries of German manufactured goods in South Africa are: Mauritius, Malaysia, England, Poland, Spain, Indonesia, Chile, Finland, Tanzania and USA.

From table 3 it may be surmised that only a few firms supplied information on R & D-expenditures. This is not surprising because of intensive competition in the markets and the effects of oligopolistic behaviour of large companies – in South Africa as in other countries. The data however suggest that distinct types of entrepreneurial behaviour determine the level and the relative changes of R & D-expenditures in the individual firms. The firms' behaviour regarding

The "knowledge creation practices" of the investigated firms include expenditures for R & D, expenditures for foreign licenses, patents owned by the individual firm and/or by the relevant group of firms.

#### 4.2.4 Research & Development (Knowledge creation)

The South African labourers employed consistent on average of 45% low skilled, 42% medium skilled, and 15% is highly skilled occupations. It was established that 69% of German firms view the existing skills in South Africa to be appropriate for South Africa's technology. However, 56% stated that training quality and skill levels in South Africa are inadequate to allow further technological transfer from abroad. Thus 66% of all questioned companies send some of employees to Germany for training and expatriates play a significant role in the top management of all firms. Furthermore about 61% of all German companies provide outside/external training to suppliers or clients. Spending on training and education by the firms in the sample increased by 24% between 1997 and 1999.

Almost two-thirds (59%) of German companies regard employment equity measures as valuable. The overall majority of firms (72%) do not consider existing labour market regulations to negatively affect investment decisions. However, despite the latter finding about 53% of German firms surveyed indicated that labour market regulations do result further employment of local labour – a finding consistent with the finding of Pabst (2000).

High wages is stated clearly as one of a number of measures used by German firms in South Africa to attract and maintain good employees. The survey found the following measures were part of the employee retention strategy of firms: creating a good environment, recognition, care and motivate employees and support teamwork (46%); followed by well pay (29%) and finally by means of financial bonuses or rewards (14%). More than 66% of all firms do not experience negative problems in maintaining technical expertise.

The total wage bill per firm surveyed ranged from R 28 million to R 33 million between 1997 and 1999. In 1999 the average wage (per employee) was R8900 (i.e. US\$ 1000) per month. This is significantly higher than the average South African monthly wage and consistent with theories of FDI that postulate that MNEs will pay more to keep their better employees.

#### 4.2.3 Labour Remuneration and Skills

For instance, the focus on the domestic market is clear from considering that marketing expenses/budgets have increased for the last three years. Bearing in mind sample problems, only 4% of all questioned companies are engaging in foreign trade suggesting that German MNEs are in South Africa to service the domestic market and that the country may not be seen to be attractive as a platform for international production. Transport and logistical services in South Africa is seen as having a substantial negative influence on the sales of companies. However, despite this exports have increased by 155% over the past three years indicating the domestic market pressures may be forcing these firms to find other outlets as well.

and as will be shown they pay higher wages that local companies and operate very much within "enclaves" from the local economy- although there are exceptions.

The innovative practices of the considered firms are indicated by their information on the evaluation of information technology and communication technology business and the related support services in South Africa. Following from the survey data, two thirds of the investigated firms accept the services as being adequate to support the IT & CT Business. Interestingly, the remaining one third of the firms do not only deny the quality of these services, but they also report not to finance any R & D-expenditures, not to evaluate the skills in South Africa if they are appropriate for the technology used, not to finance expenditures for foreign licenses and not to hold own patents. Nevertheless, these firms admit that they have earned profits. In 50 % of the considered firms ("No adequate IT & CT Business") profits/employee ranged from R10 000 to R100 000.

The second indicator of knowledge creation, the expenditure on licenses, can be seen from Table 4. From the table it appears that expenditures on foreign licenses are complementary to the expenditures for R & D - that is they are not a substitute of in-house R & D.

German firms in South Africa react on the changes of their environment by variable instruments of investment and business policy. The changes of R & D-expenditures are just one of these instruments. The investment in R & D and the level of R & D-expenditures depend on the environmental changes and on the expectations by the management of the individual companies. There are small firms demonstrating an expansive or a hesitant R & D-policy, and we find medium-sized and larger firms practicing an expansive R & D-policy. In particular, table 3 shows that "medium-sized" firms tend to spend more on R & D than either very small or very large firms.

Firm-size: employees	R & D - expenditures		
	total amount (1.000 R)	change (%)	per employee (R)
145	50	+100,0	690
48	15	- 33,3	208
120	1.000	- 80,0	1.667
130	800	+ 37,5	8.462
6	50	+ 20,0	10.000
5.906	7.000	+100,0	2.371
2 6.355	8.915	15.470	+ 73,5
	1997	1999	1997/1999
			1999

Table 3: R & D - expenditures of German firms in SA according to firm -size (employees) 1999

R&D in table 3 differ as to (a) the size (number of employees), (b) the relative change of R & D-expenditures and (c) their average amount per employee.

Table 6 gives some insight into the relationship between exports and actual R & D-expenditures; they expose the interest of the management in the stabilization and growth of the concerned companies in South Africa. Though the management of the selected firms is pessimistic as to the inflation rate of the South African economy during three years time, half of the considered

#### 4.2.5 R&D and Exports

Thus it can be concluded that the medium-sized German firms in South Africa are innovative enterprises in terms of innovative practices related to the number of employees and the creation of new jobs. Secondly, the investigated firms avoid lay-offs of employees, but they probably try to train and retrain them in-house and on-the-job or to some extent also out-of-house. The potential for growth of productivity, production, sales and profits conclusively seems to be at the most promising level – at least for the management of the concerned firms – in the group of medium-sized innovative enterprises.

Sector	Empl.	New jobs number per empl.	Foreign Licenses (1,000 \$)	Profits (+) Losses (-) (1,000 R)
Chemical	21	8	0,38	66
Chemicals	130	4	0,03	90
Fin. a.o. services	260	30	0,12	100
Motor Vehicles	20	2	0,10	+ 250
Motor Vehicles	36	4	0,11	+ 3.700
Pharmaceuticals	15	2	0,13	+ 1.500

Table 5: New jobs created by Germany firms in SA 1999

Finally, despite the noted increase in R&D, few new jobs have been created. Employment in these German firms increased by only by 4% per annum since 1997. Table 5 shows out the number of new jobs created in some of the investigated firms. Out of 31 investigated German firms in South Africa only 6 have created new jobs by technological innovations, i.e. 20 % (1999). These were in chemicals manufacturing, motor vehicles, pharmaceuticals production and finance a.o. services. It should be pointed out however, that no firm terminated jobs as a result of technological progress or innovations.

Sector	R & D-expenditures (1000 R) 1999		Foreign Licenses (1,000 \$) 1999		Employees (number)	1997	1999	+/- %	1997	1999	+/- %	
	1999	1997	1999	1997								
Motor Vehicles	82	147	+ 77	38	70	+ 84						
Metal Products	5.779	5.906	+ 2	8.600	12.100	+ 141						
Chemicals & rubber	204	411	+ 101	666	856	+ 29						
Textiles	200	200	0	250	250	0						
Fin. a.o. services	240	260	+ 8	100	100	0						
Total	6.505	6.722	+ 3	9.654	13.376	+ 39						
Sector	R & D-expenditures (1000 R) 1999		Foreign Licenses (1,000 \$) 1999		100							
Motor Vehicles	100				70							
Metal products	14.000				12.100							
Chemicals & rubber	1.100				856							
Textiles					250							
Fin. a.o. services					250							
Pharmaceuticals					100							

Table 4: Expenditures of German firms in SA on foreign licenses and agreements 1997 and 1999

Thus outsourcing by small German firms tend to be of a short-term nature. Outsourcing by medium-sized and large firms are of a longer-term nature and more often based on written contracts.

Thirdly, the data suggests that about 62 % of the firms have outsourced functions of the firm to other firms in South Africa during the past three years. Medium-sized and larger firms are more involved than small firms.

Secondly, only about 42 % of the investigated firms were involved in TTr to suppliers and clients in South Africa in 1999. These firms tend to be medium-sized firms.

Table 7 suggest the following. Firstly, about 45 % of the investigated firms sourced their inputs from small enterprises in South Africa. Mainly medium-sized firms were involved in the procurement business. One should keep in mind that the regional-economic impact of internal input-relations should not be neglected. Together with activities in technology-transfer (TTr) and in-sourcing of investment capital the inputs of resources from small firms are determinant factors of "inward industrialization" and regional economic development.

The survey contained several questions that focused on networks of German firms in South Africa. They concerned especially outsourcing activities. Though the answers did not provide quantitative data on inputs and procurement policy of all the firms, the collected data offer information about specific cases of procurement policy under the conditions of new technologies, open markets and international factor mobility.

About 88% of all German firms in South Africa were found not to have a procurement policy. However, almost half of all firms questioned engage in outsourcing and function as information or service centre for many other African firms.

4.2.6 Knowledge Sharing : Outsourcing and Technology Transfers

Value of exports (1,000 \$)	Amount spent for R & D (1,000 R)		Expectations in 3 years time concerning inflation	
	1997	1999	1997 = 100	1997 = 100
2.800	4.730	169	50	100
300	250	83	-	-
4.000	3.000	75	-	-
200	150	75	1.000	200
4	6	150	-	-
212	1.167	550	800	1.100
635	628	99	(R & D in Germany)	138
10	10	100	50	60
10	2	20	0	0
19.300	84.660	339	7.000	14.000
				200

Table 6: Exports and R & D - expenditures 1997 and 1999 and expectations concerning the inflation rates by selected German firms in South Africa

companies had decided to invest in R & D during the past three years, which means that they trust the South African economy to be stabilized in the near future. Especially medium-sized and larger companies turn out to be more optimistic as to the reduction of inflation rates. From this point of view it is not surprising, that they had decided to invest in production capacity and R & D in South Africa.

The study made use of existing survey data on German firms in South Africa, a new structured questionnaire that was mailed to over 600 German firms in South Africa, as well as case studies of about 15 firms. The survey data and list of firms was obtained from the Southern African-German Chamber of Commerce and Industry. About 55 firms responded to the structured questionnaire (10%, of which 31 questionnaires (about 5%) were satisfactorily completed. One

In this light the present paper presents results from an empirical survey of German firms in South Africa. South Africa may be an interesting case in which to study the impacts of MNEs on African development as it has a significant presence of foreign firms. German MNEs specifically have been involved in the South African economy for over a century.

All of these benefits can be important for Africa, the world's poorest continent, in order to accelerate growth. However, the extent to which African countries benefit from spill-over effects of MNEs remains to be empirically investigated. The need for such an investigation is can be motivated with reference to the trickle of annual FDI flows destined for Africa.

A key feature of globalisation is the increasingly important role of Multinational Enterprises (MNEs) as vehicles for Foreign Direct Investment (FDI). Economic theory recognises that MNEs can benefit economic growth in developing countries through generating positive externalities (so-called spill-over effects). These spill-over effects occur predominantly through the R&D and innovation of MNEs, their outsourcing to local firms, their training of local labour and the payment of higher wages by MNEs to retain good labourers.

## 5. SUMMARY AND CONCLUSIONS

Though the survey data on the activities and institutions of technology transfer are limited, from the available information it may be concluded that the medium-sized and larger firms are relatively stronger involved in R & D and in the diffusion of new technologies, but that also small firms are active innovators, mainly in the field of product innovations and smaller, but important process innovations. This conclusion is supported by results of comparative studies on the diffusion of new technologies in European countries.

Not only the direct questions for technology transfer but also further indirect questions of the survey were focussed on the diffusion of new technologies. For example the information about restructuring or reengineering activities by the investigated firms suggested that the management was orientated to innovations and flexibility of the transformation process on the firm level. Reengineering activities need new technological knowledge. It will be transferred from outside, or it must be developed in-house. The German firms in South Africa to a minor extent utilize their contacts to German companies in Europe. Instead, they make use of their contacts to firms and institutions of TTr in South Africa. The supply of specific services by the company offices in South Africa was found at a relatively large rate in the medium-sized and larger enterprises. The percentages of firms that were involved in this supply of services and in reengineering activities were the same as to both criteria.

	1-19	20-99	100-199	200 a.m.	Total
Firms with ... employees 1999	10	10	7	4	31
Number of firms	50; 5; 60;	1; 90; 100; 10; 20;	16; 1; 4; 1;	25; 40;	14/31 = 45,1 %
Percentages of inputs from small firms 1999 %					
Firms with TTr to suppliers and clients in SA 1999	3	4	4	2	13/31 = 41,9 %
Outsourced functions over past 3 years					19/31 = 61,3 %

Table 7: Employees and percentages of inputs from small firms in SA 1999

possible reason for the relative low rate of completion is due to the length and detail required by the questionnaire. This survey was the first that required rather detailed responses from the firms on a wide range of issues from labour turnover and R&D to competitive intelligence practices and networking.

Since 1994 the Southern African-German Chamber of Commerce and Industry conducted brief annual surveys of the perceptions and opinions of German firms in South Africa. From the analysis of the findings of this qualitative survey of the Southern African-German Chamber of Commerce and Industry it was concluded in this paper that German MNEs have an important role in South Africa in terms of significant employment that is directly generated. However, it seems that these firms are experiencing severe constraints as is reflected in the high rate (almost a third) of firms considering to leave South Africa or disinvest, the negative view of the adequacy of labour and concerns over educational standards, and worries about crime, violence, corruption and the incompetence of civil servants.

The position of many German MNEs in South Africa may thus be tenuous and may be obscured by the expansion of a few very large German MNEs. Not many companies engage in exporting and it seems the reason for German MNE presence in South Africa is to serve the domestic market. In the latter regard their constraints seem to reside in the labour market and uncertain macro-economic environment. As such German MNEs have not been creating significant new job opportunities, despite increasing investments in R&D activities advancements in technology. A lack of skills and concern about educational standard were expressed by firms and most prefer to train their workers in Germany.

As a result of these constraints, coupled with increased competition pressures, German MNEs have been investing more in R&D, marketing and training. The primary manner in which these knowledge creation activities spill over into the local market was found to be through labour retention policies (training, higher salaries and better employment conditions) and through outsourcing. The constraints identified may be a reason way more direct technology transfers as a way of knowledge sharing is currently almost non-existent in the behaviour of German firms in South Africa. Raising the assimilative capacity of South African human capital and creating an environment for technological learning seems to be the policy recommendations from this study.

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