The influence of location on the efficiency of manufacturers in South Africa[1]

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Abstract

This article investigates the influence of location on the efficiency of manufacturers in South Africa. Locational decisions are important when entrepreneurs decide on the location of a new plant, as well as for the design of industrial development policies by government and industry. This article considers both the traditional factors that influence location and the modern factors, especially those emphasised by the 'New Economic Geography'. This is followed by an account of empirical findings of a survey conducted among South African manufacturers regarding the location of their premises and its influence on their competitiveness and industrial efficiency.

DIE INVLOED VAN LIGGING OP DIE DOELTREFFENDHEID VAN VERVAARDIGINGSNYWERHEDE IN SUID-AFRIKA

Die invloed van ligging op die doeltreffendheid van vervaardigingsnywerhede in Suid-Afrika word in hierdie artikel ondersoek. Besluite rakende ligging is belangrik wanneer entrepreneurs die plasing van nuwe aanlegte moet bepaal, asook vir die ontwerp van nywerheidsontwikkelingsbeleid deur die owerheid en industrieë. Hierdie artikel evalueer die tradisionele asook moderne faktore wat ligging beïnvloed, in besonder dié wat deur die sogenaamde 'Nuwe Ekonomiese Geografie' benadruk word. Daar word ook verslag gelewer oor 'n opname wat onder Suid-Afrikaanse vervaardigers gedoen is, ten opsigte van die ligging van hul aanlegte en die invloed daarvan op hul mededingendheid en vervaardigingsdoeltreffendheid.

KHUETSO YA BOKGONI BJA BATSWELETSI MO AFRIKA BORWA

Khuetso ya peyo ya bokgoni bja batsweletsi mo Afrika Borwa e nyakisiswa mo temaneng ye. Diphetho tsa peyo di bohlokwa ge boragwebo ba tsea sephetho ka ga moo plante ye mpsha e swanetsego go ba gona, le ka mokgwa woo sebopego sa ka moo melawana/dipholisi tsa Mmuso le kgwebo di swanetsego go ba ka gona go lebeletswe tlhabollo ya di industri. Temana ye e tseela hlogong dilo tsa sekgale le tsa sebjalebjale tseo di huetsago peo, kudu tseo di gatelelwago ka mo go "Geography'e mpsha ya ekonomi". Se se latelwa ke tsitsinkelo yeo e tseneletsego ya dikutullo tseo di dirilwego ba tsweletsing ba Afrika Borwa go lebeletswe pego ya ditsha tsa bona le khuetso phadisanong le go soma botse ga tsona.

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1. INTRODUCTION

This article investigates the influence of location on the efficiency of manufacturers in South Africa. Locational decisions are important when entrepreneurs decide on the location of a new plant, as well as for the design of industrial development policies by government and industry. The choice of the location of their premises can influence profit margins and general competitiveness. Distance from markets and supplies could, for instance, determine transport and transaction costs, the strength of market demand and continuity in the production chain.

Determinants of industrial location are significant. Industries are perceived as creators of employment opportunities and economic growth. Even the smallest towns seek to attract industries to their region while large cities also strive for economic development. Sound knowledge of the consequences of locational factors on the establishment of manufacturers in an area is important for the provision of insight and understanding of locational factors and spatial development.

This article commences by considering the traditional factors influencing location as well as the modern factors, especially those emphasised by the 'New Economic Geography'. This is followed by an account of empirical findings of a survey conducted among South African manufacturers, regarding the location of their premises and its influence on their industrial competitiveness.

2. TRADITIONAL FACTORS OF LOCATION

The location of a manufacturing plant is selected on the basis of the simultaneous interplay of various factors. One of the traditional locational models available for a study in industrial locations is the one developed by Alfred Weber (1929) who attempted to put forward a reliable theory of industrial location. The

[1] This paper was partially delivered at the World Conference of the Regional Science Association International (2005), Port Elizabeth. South Africa. Suggestions were incorporated.

essential argument in Weber's theory of the location of industries is that the position of a site is selected in order to minimise transportation costs (movement), implying the minimisation of distance, mass and effort (Weber, 1929: 41). In his theory Weber (1929: 37-38) made the following additional three basic assumptions to simplify the spatial system: first, that the physical occurrence of raw material is set; secondly that the places of expenditure (market) are set in terms of location and size, and finally that there are only a number of fixed locations for manual labour. Weber suggested that three factors influence the location of industries (Smith, 1981: 70): transport and labour costs (regional factors), and the forces of agglomeration or deglomeration (local factors). Weber (1929: 49) used the locational triangle to demonstrate the derivation of the least-transport-cost location (see Figure 1). In the space economy one point of consumption (C) is illustrated, as well as the most useful deposits of two raw materials (M_1 and M_2). Each corner of the triangle exerts an attraction force on the point (P) for the location of the industry. The least-transport-cost location (L) is the point at which the total number of ton-miles concerned in transporting materials to a place of production and the final product to the market-place is the lowest.

Maximum profit, and the location of an industry, will consequently occur at point "F" in the figure above, indicating the point of minimum transportation costs, including mass, distance and effort. Maximum profit is, however, the first economic assumption. Survival in the economic world requires an optimal location, where manufacturing and marketing efforts will result in the highest gains. Location will affect the costs at which raw material inputs are obtained, the costs of production, wage rates, the power of trade unions, personal and product transport, costs of marketing, as well as the quantity demanded by the market. An optimal location must be found between resources and markets in order to generate the highest possible profit margins.

Traditional factors remain important in locational decisions and in enhancing competitiveness. According to Friedmann (1966: 26), a number of factors play an important role in the location of industries and the economic development of the industry and the region at large. These include the transportation cost of material, the location of the market, the relationship between inputs and outputs, the availability of technology, and the extent of demand for the product. Other more recently identified factors include, among other things, the economic environment, services and essential infrastructure provided by the authorities, government regulations, the natural environment, and factors specific to the site, the corporate objectives and proximity to headquarters, uncertainty, as well as ambience and quality of life (see e.g. Wheeler, Muller, Thrall & Fik, 1998). Many contracts are, for instance, settled on the golf course instead of in the boardroom. Various other factors are emphasised in literature on the 'New Economic Geography', and these will be discussed in the following section.

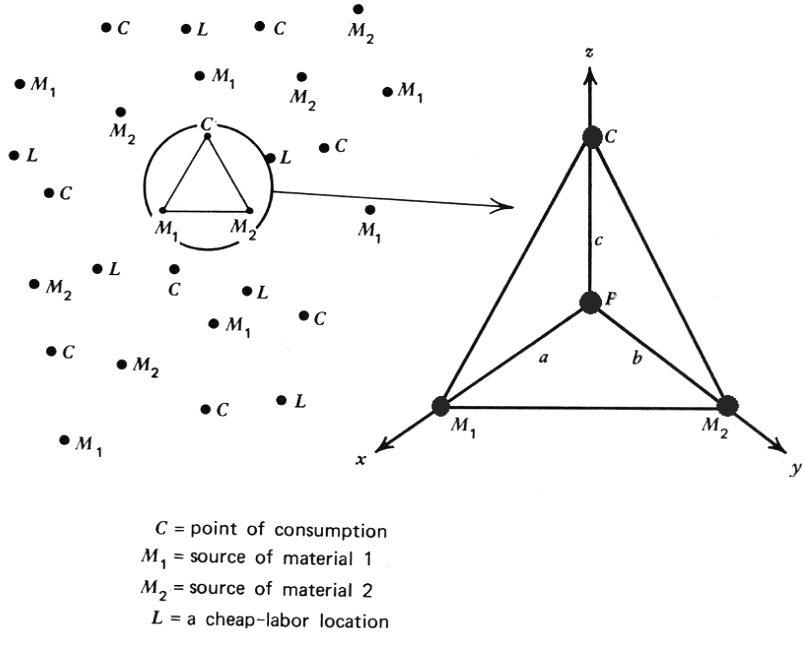

Figure 1: Locational triangle
Source: Adapted from Weber (1929: 49)

3. THE RELEVANCE OF NEW ECONOMIC GEOGRAPHY

Literature on the so-called 'New Economic Geography'[2] enhances the understanding of regional economic development and the established economic geographical theories. While the principles of the 'New Economic Geography' were stated by Alfred Marshall in 1890, the effect of globalisation and modern technology made these principles relevant once more by the turn of the third millennium.

'New Economic Geography' focuses on spatial economic development, with special attention to production management, marketing and innovation as factors that determine spatial allocation of economic activity (Krugman, 1998: 7; Isserman, 1996: 37; Martin, 1999: 75). Although over-simplified, the principles of the 'New Economic Geography' for industrial location emphasise the importance of (Krugman, 1991b: 484):

- A pool of skilled labour;
- Supply of intermediate and non-traded inputs, and
- Technological and knowledge spill-overs.

Sunley (2003: 188) states that

> *Marshall described the three classic types of localization economies: the formation of a pool of skilled workers, the nearby presence of supplying and supporting industries, and the local circulation of trade knowledge and secrets.*

These factors are also interrelated. Skilled workers are, for example, in a much better position to utilise spill-overs. The dynamics of these factors provide advantages such as increasing returns at the level of the individual manufacturer (Arthur, 1996: 102). Modern technology and engineering expertise enable firms to generate increasing returns to scale over a much larger section of the production function and

[2] The study of the location of economic activity across space, to help explain why industries cluster within specific countries and regions (Krugman, 1991a).

lead to dynamic advantages that were not available earlier.

Modern research does not contradict traditional theories and 'New Economic Geography' but affirms it. It provides more insight in the role of manufacturing in the development of the spatial economic geography. Studying 'New Economic Geography' may help to verify or reject stated hypotheses and assist spatial development of less developed regions. Various studies which indicate that profits increase when industries cluster together were published in recent times by Porter (1998) and others (e.g. Arthur, 1996), supporting the 'New Economic Geography', for example.

The 'New Economic Geography' has the ability to test and confirm older economic theories empirically, thus contributing to a better understanding of regional development. Van Rensburg (2000: 35-40) summarises its contribution as follows: "'New economic geography' is based on the argument that increasing returns, economies of scale and imperfect competition are more important than constant returns, perfect competition and comparative advantage in causing trade and specialisation. The market, technology and other externalities underpinning these increasing returns are not international or even national in scope, but arise through a process of regional or local economic agglomeration. … to understand trade it is necessary to understand increasing returns, and to understand increasing returns it is necessary to study regional economic concentration and specialisation. The 'new economic geography' may be described to embrace four main research programmes, namely an investigation into the spatial agglomeration of economic activity and an investigation into the dynamics of regional growth convergence (Martin, 1999: 67). A third research programme investigates the effects of differentiated physical geography on development (e.g. Gallup, Sachs & Mellinger, 1998), whilst a fourth programme investigates the effects of geography on regional integration (e.g. Amjadi & Winters, 1997). The 'New Economic Geography' abandoned constant returns and perfect competition. It gave new insight to economic spatial development and can also be utilised in less developed regions.

Isserman (1996: 37) states that

> *…mainstream economists could not treat the messy problems of regional and development economics with formal mathematical models.*

Spatial economics can now benefit from the insights of the 'New Economic Geography' literature. Current economists possess the analytical, mathematical and econometric tools and 'technical tricks' to handle spatial problems which was not possible in earlier days, and it is now possible to shed more light on spatial science utilising new economics' mathematical models (Martin, 1999: 75).

The 'New Economic Geography' is becoming relevant as the so-called standard Marshallian trilogy of skilled labour market pools, intermediate goods, and knowledge spill-overs are rising in importance with regard to globalisation.

> *By its very nature, globalization is an economic geographical phenomenon, and traditional economic geographical ideas around spaces of flows, and places of control and production, are central to its understanding (Sheppard & Barns, 2003: 3).*

Modern technological development and engineering expertise in production, communication and competitive intelligence in this 'new economy' present new challenges to industries and regional development.

The term 'economies of agglomeration' is used in urban economics to describe the benefits that firms obtain when locating near each other. It is related to the idea of economies of scale and network effects, in that the more related firms are clustered together, the lower the cost of production and the greater the market into which the firm can sell. As manufacturing becomes more productive due to large pools of skilled labour, this may lead to an agglomeration of manufacturers at those growth nodes. According to Richardson (1973: 210), agglomeration economics are important for two reasons. First, it explains the spatial concentration within regions and cities, and secondly it can explain why factors of production are attracted to a certain area. Accordingly, agglomeration advantages are described as the presence of certain factors which render a specific location more advantageous than another (Richardson, 1973: 208). Typical factors which enhance agglomeration include the presence of supporting industries, the proximity to transport routes, the availability of technology, and others. Modern technology usually utilises skilled labour while demand for unskilled labour declines. This has specific implications for less developed African regions as modern technology puts firms in a position to attain growing returns, while firms still employing traditional methods will price themselves out of the market. On the other hand, it would be detrimental to a region if modern technology leads to the application of capital-intensive technology and employment losses. New technology utilises scientific and engineering capabilities. This requires a higher degree of literacy and especially designing, computer and communication skills (Walker, 2003: 505-509). Changes in technology are rapid and sweeping (Warf, 2003: 484), and countries without the ability to manage new developments

> *will remain beggars at the technological feast (Grant, 2003: 428).*

Human capital is becoming the most important asset as knowledge work replaces manual work and knowledge is shared and integrated in the production process. A pool of skilled workers is essential for a region if it is to become and remain nationally competitive. Furthermore, the value chain can now be sliced up in different ways and re-locate labour-intensive slices in the production process (IDC, 2001: 35). Many information-intensive activities and services previously classed as 'high value-added' activities are today 'real-time' activities that may be carried out anywhere in the global system (Unido, 2000: 8). With the production of information goods, location does not matter, causing a new spatial organisation. With modern computers, knowledge, information goods and services, as well as orders of inputs, can be out-sourced and traded anywhere in the world. Increased global networking is central to global production.

International division of labour is changing while firms can benefit and exploit linkages in the value system. The flow of trade, intermediate inputs, knowledge and technological spill-overs are increasing as liberalisation follows international agreements such as the General Agreement on Tariffs and Trade (GATT) and the formation of the World Trade Organisation. This increases cross-border trade between countries while the application of modern technology accelerates this development, especially through knowledge-based computer and communication technology (UNIDO, 2000: 10).

In the new economy there are new ways of conducting business, producing goods and realising profits. Mass production (Fordism) is being replaced by flexible production processes which are able to react fast to changing market requests and/or where companies focus only on specific sections

of the total production process of a commodity. This emphasises the need for intermediate inputs and gradually changes the spatial hierarchy. Flexible production emphasises the importance of clusters, industrial districts and networks (Helmsing, 2000: 7). Related and supporting industries and institutions in the district of a firm provide the services or supply the intermediate input for production, while others complete the entire production process and deliver the final product (Helmsing, 1999: 21).

Local markets can support efficient volumes of intermediate inputs. In a growth pole (where clustering occurs) industry-specific factors of production would more likely be found, including non-traded inputs (Krugman, 1991a: 37). This generates more efficient industries and reinforces development at the specific location. Where similar companies cluster, or utilise the same services, it will be profitable for supporting industries to obtain specialised and expensive machinery (principle of agglomeration). Specialised capital equipment which focuses on one small branch of a production process can pay its expense if it is constantly utilised by various manufacturers. The presence of these inputs in a region will make settling at that location more attractive to a new manufacturer.

Literature on 'New Economic Geography' suggests that areas where many manufacturers cluster together are usually more profitable sites and the benefits out-weigh the costs (Krugman, 1995: 108; Porter, 1998: 7). External effects and spill-overs are important in the 'New Economic Geography'. When firms cluster together they benefit from the information exchange that takes place (Krugman, 1991a: 37). According to Hägerstrand (1965: 27), innovation (information exchange) is a function of communication, which he describes as follows,

> *one cannot adopt an innovation which is not one's own invention unless one has first seen it, heard of it, or read about it.*

Accordingly, the economic growth of a centre, region or country and the exchange of information and innovation are closely related. Hägerstrand (1965: 28) explains the innovation and information exchange process as one of saturation and spreading. The core areas where innovation took place will become replete at a point, but the periphery will not yet be sated; information exchange (spreading) will thus continue until the periphery is satiated, and will continue onto other areas to saturate them with information, and so forth. Jaffe, Trajtenberg & Henderson (1993) as well as Audretsch (1998: 19) paid much attention to the effect of innovations, technological and knowledge spill-overs. Krugman (1991b) acknowledges that information spill-overs gained when manufacturers cluster together, placing them in a position to obtain better production functions. The associated pecuniary externalities and demand or supply linkages also add benefits. Industrial clusters, districts or growth poles generate technological spill-overs due to the easier distribution of information, leading to the faster development of new technological innovations. Processes, machinery and business organisations improve rapidly as there are more ideas and information available in an industrial centre. Pure externalities that result from knowledge spill-overs benefit all.

Globalisation and modern technology emphasise the relevance of the 'New Economic Geography', since modern industrial development is severely limited without a pool of skilled labour, intermediate production factors as well as knowledge and technological spill-overs. These factors will influence industrial location and may improve economic efficiency, leading to increasing returns. The 'New Economic Geography' also acknowledges other important locational factors, such as historical factors (Krugman, 1991a: 66-67) and the competition between centripetal forces (inward force, e.g. agglomeration), which promote geographical concentration, and centrifugal forces (force pushing away from centre, e.g. pollution), which oppose concentration. Once development has occurred at a location it is likely to persist for some time and influence future events (Krugman, 1998: 8).

Modern and traditional factors influence the quality of human and physical resources (as production factor inputs), services, business support and linkages (which can enhance trade and financing), as well as transport and transactional costs in a modern economy. The following section considers to what extent the location of South African industries and their locational decisions enhance competitiveness, considering a survey conducted among manufacturers.

4. EMPIRICAL SURVEY ON INDUSTRIAL LOCATION

4.1 The Industrial Competitive Platform Survey

An empirical investigation of the industrial competitiveness platform was conducted to assess locational aspects. The Unisa Bureau of Market Research took a random sample of 450 manufacturing firms from their database, and questionnaires were posted during 2002. A response of 16.7 per cent was recorded, which is regarded as satisfactory for a mail-based survey in Africa. Although the authors preferred to report only on the responding firms of the survey, as a case study, most findings correlate with earlier studies similar to those of the South African Netherlands Programme on Alternative Approaches to Development (South Africa. Netherlands research programme…, 1999; 2000), as well as studies by Roberts & Mohamed (2005) and Walker & Phele (2005), some generalisation might be in order.

Porter's Competitiveness Diamond was used as a basis in compiling the questionnaire, taking into consideration all aspects of the industrial competitive platform, considering input factors, market conditions, 'firm strategy, structure and rivalry' and 'related and supporting firms' as the four corners of the competitive diamond (Porter, 1998). The questionnaire was extended to include aspects such as location and expectations. Most of the questions requested respondents to rate their responses on a five-point scale where five is excellent, four is good, three is fair, two is poor and one is very bad. In the determination of various indices, the methodology applied was basically similar to the IMD's calculation of their World Competitive Indices.

Affirmative factor analysis was applied to the data and the significantly high values of Cronbach-Alpha coefficients that were obtained indicated that the questionnaire was a reliable measuring instrument to measure the proposed objectives. Table 1 indicates some of the most important Cronbach-Alpha coefficients of the various groups of questions.

Table 1: Cronbach-Alpha Coefficients

Question Groups	Coefficients
Human capital	0.855
Resources	0.892
Demand conditions	0.815
Related & supporting industries & institutions	0.878
Firm strategy, structure & rivalry	0.873
Technology & innovation	0.914
Quality & environment	0.801
Perspective & expectations	0.868

Source: Kleynhans, 2003a

To be reliable Cronbach-Alpha coefficients should exceed 0.5. This table indicates that all the values were satisfactory, most of them exceeding 0.8 (Kleynhans, 2003a: 242). The high

Cronbach-Alpha values, and the consistency of the responses to the items in the survey, suggest that respondents completed the questionnaire with great care and a high degree of accuracy.

The response to the questionnaire covered a variety of firms. Approximately half of the respondents (45.5%) represented small firms (employing less than 50 employees), 28.8 per cent of the respondents were from large firms, employing more than 250 workers. The number of employees per firm ranged between one and 8 400 employees. A total of 47.6% of the responding firms have an annual turnover in excess of R 10 million; 27% were between R 1 million and R 5 million annually, and 15.9% have a turnover of less than R 1 million annually.

Considering the various sub-sectors of manufacturing, the largest response of 22.4% was from the sub-sector Manufacturing Products of Basic Metals, Machinery and Office Equipment. This was followed by 20.7% from Food Processing and Beverages; 12.1% by producers of Chemicals, Chemical Products, Coke, Petroleum Products, Nuclear Fuel, and Products from Rubber and Plastic; 21.1% represented Textiles, Clothing and Leather Products, and 10.3% represented the sub-sectors of the combined Electrical and Electronic Equipment.

Considering the spatial response from the nine provinces in South Africa, the largest response of 39.6% was from Gauteng, compared to 13.6% from the Eastern Cape, 12.1% from North West and 10.6% from the Free State. The response of some provinces was so limited, making generalisation impossible. Information on sub-sector and provincial level should therefore only be viewed as a case study and the calculation of competitive indexes as an academic exercise in which the instruments were developed for further research. Some firms were individually interviewed, making the response from Gauteng disproportionately high in comparison to the other provinces. Gauteng is, however, the most important centre of manufacturing, producing 33.3% of South Africa's GDP (StatsSA, 2007: 12). The next section reports on the most important findings of the survey.

4.2 Factors Influencing Location

The survey rendered much detail. Respondents rated most locational aspects of their respective premises to be poor. The worst factor identified was the Availability of Harbour Facilities and the Availability of Ocean Freight Services. This was probably due to the large proportion of respondents situated in Gauteng and other inland provinces. Other locational aspects, which stood out as most unsatisfactory, include International Airport Facilities, the Availability of Cold Storage Facilities, the Proximity of Raw and Semi-processed Materials, and the Availability of Intermediate Inputs and Lack of Foreign Investment. The Role and Efficiency of Government was also recorded as most unsatisfactory. Government Aid and Incentives are regarded as failing, import tariffs and other international trade restrictions are most unsatisfactory and so are political and policy stability. The strongest locational aspects concerning their premises are their Proximity to Main Road Links and the Availability of Main Courier Services. The Reliability and Quality of Water Supply and Other Utilities are regarded as excellent, although the Cost of Water, Electricity, Telecommunication Services and Other Utilities are considered to be too high.

Both traditional factors of location and modern factors are considered to be poor relating to the location of the premises of the various respondents. Neither traditional factors such as the proximity of markets, low taxes, the availability of land, financial and trucking services, nor modern factors such as the proximity of support services, the availability of skilled labour and industrial training facilities are viewed as enhancing efficiency and competitiveness due to their location.

Of the respondents 67.7% manufactured the complete product and 37.3% indicated that they only specialise in manufacturing a part or phase of the final product. This indicates that approximately a third of the manufacturers is to some extent involved in and utilises other supporting industries and intermediate inputs in the industrial districts. These are, however, still far from true flexible production, which modern technology presents. Respondents also identified several potential industries that could settle in their vicinity due to possible forward and backward linkages.

4.3 New Economic Geography

According to recorded data (Kleynhans, 2003b), firms do not experience serious shortages of any kind, except with raw and intermediate materials and some levels of skilled labour that often cause slight problems. All aspects of the 'New Economic Geography' still fail competitiveness. In the majority of places the pool of skilled labour is inadequate, intermediate inputs are sometimes difficult to find, non-tradable factors do not enhance competitiveness adequately, and technological and knowledge spill-overs from other firms are poorly utilised. On the four corners of the Porter diamond of competitiveness (see Porter, 1998), input factors do not present serious obstacles. Demand conditions are poor, firm strategy, structure, rivalry and management are rated between fair and good while support services and institutions are inadequately provided and not sufficiently utilised.

Regarding the locational aspects of their premises, respondents on average rated the availability of skilled labour and training facilities to be poor. The availability of subcontractors, the proximity to suppliers of spare parts and the proximity of semi-processed material and/or intermediate inputs are considered very poor. The proximity of professional and support services is poor and the availability of other manufacturing industries in the industrial districts and business support services are also rated as poor. None of the main factors identified as important are rated by respondents as fair, good or superior in relation to the location of their premises.

Respondents rate human capital in South African manufacturing industries as poor. The availability of artisans, technically skilled labour and managerial staff is insufficient while vocational and industry-related training facilities are inadequate. Management skills and practices are, however, considered to be significantly better than the other levels of labour, and most aspects in this regard are rated as reasonable. According to respondents, there is a degree of flexible production regarding linkages between firms and the usage of intermediate inputs. Critical activities are shared, indicating co-operation in the value chain, and sub-contracting with other manufacturers highlights the importance of related industries in the industrial districts and clusters. Government policies such as Spatial Development Initiatives (SDIs) and Industrial Development Zones (IDZs) have little effect on manufacturers in obtaining increasing returns and economies of scale.

The typical elements of flexible production such as various linkages and subcontracting, the continuous upgrading of input and production processes and

shorter production runs, are increasing, indicating that manufacturers are gradually moving towards modern manufacturing practices which could eventually make them nationally competitive and enable them to compete in the new global economy. Sufficient investment in new technology is taking place; specialisation in the production of specific components and phases of the production process is growing, while firms are becoming increasingly dependent on related industries and services in the industrial district or virtual districts in their computer network of contacts. Support services, business associations and social infrastructure, as well as the scope available in industrial districts and networks are becoming more valuable. However, manufacturers still experience problems with the proximity of semi-processed materials and the availability of intermediate inputs.

Business as well as supporting industries and institutions exercise a positive influence on the competitiveness of manufacturers. Respondents rated their business contacts and the support from trade and business associations as having a fair influence on their competitiveness in the industrial districts. Maintenance and support services do not hamper activities and manufacturers do not think that it will do so in the near future. The utilisation of technological and knowledge spill-overs are considered to be poor, decreasing the advantages of agglomeration in industrial districts. Although some linkages, including linkages to technology and information, exist and flexible production does occur, economies of scope are not yet satisfactorily developed in most industrial districts, constraining the advantages that agglomeration has to offer. The availability of technology and knowledge support services is not obstructing activities, and manufacturers do not think that it will do so in the near future. The telecommunication services in South Africa are rated between prominently fair or good, together with the provision of electricity, water and other utilities, superior to most other supporting services. The road and rail network are regarded as fair but air and sea transport and traffic at border posts and harbours are viewed as poor and not conducive to competitiveness of industries.

As far as transport costs are concerned, the road and rail network do not present major obstacles to the competitiveness of firms unlike air and sea transport and traffic at the border and harbour posts. As most of the manufacturers are landlocked, availability of harbour facilities increases costs, but a well-developed road network in South Africa solves this problem. Respondents view costs and availability associated with trucking services as a cost factor, as does the proximity to national airports.

4.4 Spatial Development Initiatives

The Spatial Development Initiative (SDI) programme was initiated by the Cabinet in 1995 in an attempt to improve government functioning within specific regions (with greatest potential for growth) of the country. The SDI programme allows for a six-year tax holiday, three-year depreciation allowance and foreign location cash grant for potential investors within an identified SDI (Jourdan, 1998: 717). These incentives were put in place in order to create an encouraging environment for investment, stimulating direct domestic and international investment. A number of SDIs have been identified throughout the country, including the following as depicted on the map.

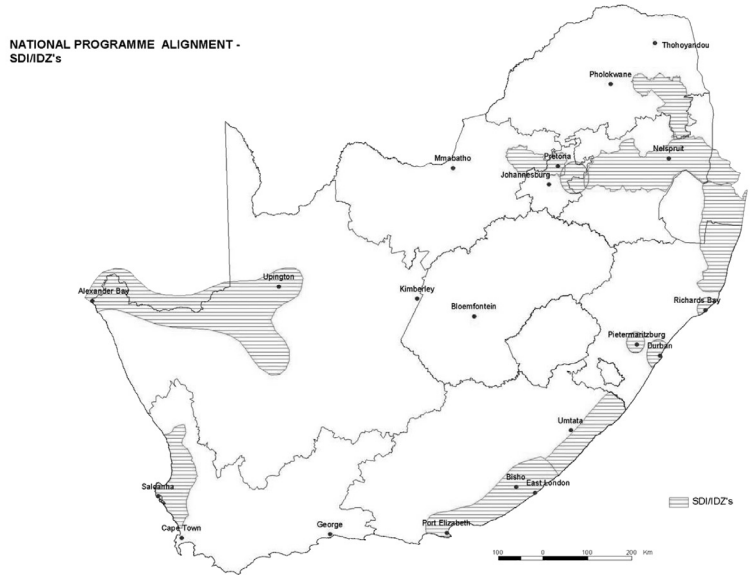

Figure 2: Current SDI development in South Africa
Source: South Africa. Department of Housing, 2001: online

The SDI programme consists of 11 local SDIs at varying stages of delivery: Maputo Development Corridor; Lubombo SDI; Richards Bay SDI, including the Durban and Pietermaritzburg nodes; Wild Coast SDI; Fish River SDI; West Coast Investment Initiative; Platinum SDI; Phalaborwa SDI, and Coast 2 Coast Corridor.

The SDI programme is premised on several key points (Jourdan, 1998: 717):

- For numerous historical and political reasons, certain areas within the country have unrealised economic potential.
- Central government aims to unlock this potential and facilitate development within the identified areas via targeted interventions.
- This could most probably lead to economic growth, wealth generation and job creation in the specified areas.

SDIs are therefore

> *targeted interventions by central government for helping unlock economic potential and facilitate new investment and job creation in a localised area or region (Jourdan, 1998: 718).*

Accordingly, the SDI programmes utilise two prominent instruments to implement this strategy (Jourdan, 1998: 718). First, blockages or constraints of investment are removed; this most often includes infrastructure constraints, i.e. roads, ports, rail. The restrictions are removed through co-operation with government on all levels to ensure that infrastructure, which is important for the success of the SDI, is prioritised. Secondly, strategic investment opportunities within the SDI are identified as this is critical to strengthening the performance of key sectors (most often tourism or industrial sectors) in the local economy.

A vast number of SDI programmes have been identified and initiated throughout the country, including the areas in this study. The following section aims to identify whether the occurrence of an SDI plays a significant role in the competitiveness of local industries.

While most firms in the survey are situated in or near SDI programmes, the majority of them were not aware thereof. Of the respondents only 12.3% indicated that they are situated in or near a SDI. This confirms the suspicion that provinces are not committed to the development of SDIs and that leadership is lacking in this regard (see Kleynhans, Naudé & Van der Merwe, 2003: 617). Of the respondents 89.7% believed that the introduction of SDIs or development corridors did not at all enhance manufacturing in their firms. Only 6.3% found that the introduction of SDIs or development corridors led to increasing returns and/or economies of scale in their companies. Poor communication from government and their agencies is evident and the following aspects need improvement: administration and service, better communication and well-planned information and propaganda campaigns from government to inform the public and improve the image of government.

5. FURTHER RESEARCH

This study estimated competitive indices for provinces and aspects such as management, resources, technology. These findings correlated well with productivity indices. The same applies to sub-sectors of manufacturing and different firm sizes; but as the response rate was too small to differentiate the sample into such small units, it can at this stage only be regarded as an academic exercise. The instruments were, however, developed in this study and can now be implemented in further investigations. Further research, especially with larger samples, can enable the comparison of firms in the various sub-sectors of manufacturing, such as food processing, basic metal products and textiles, as well as the various provinces, while suggesting a framework for development.

This study should ideally be conducted annually on a larger scale to determine whether structural changes occurred. Manufacturer's perceptions, for instance, on utilities, especially Electricity, have probably changed by now. Annual surveys will make more reliable data available and provide policy-makers, industries and researchers with instruments to design enhanced industrial development programmes and policies especially in a spatial context. It would enable generalisation of the findings and determine whether trends persist over time. However, more funds will be required to conduct additional research and follow up.

6. CONCLUSION

This study investigated the influence of location on the efficiency of manufacturing industries in South Africa. Traditional factors influencing location were considered first, followed by modern factors, especially those emphasised by the 'New Economic Geography'. This was followed by an account of empirical findings of a survey conducted among South African manufacturers, regarding the location of their premises and its influence on their industrial competitiveness.

Traditional factors, such as the economic environment, services and essential infrastructure, the natural environment, and factors specific to the site, corporate objectives and proximity to headquarters, uncertainty, as well as ambience and quality of life will remain important factors for locational decisions and for enhancing competitiveness.

Although the principles of the 'New Economic Geography' were stated by Marshall in 1890, the effect of modern technology and globalisation, as well as international agreements on tariffs and import quotas, again highlight the importance of these principles by the turn of the third millennium. Modern research does not contradict but rather affirms traditional theories and economic geography. 'New Economic Geography' provides more insight into the role of manufacturing and the development of spatial economic geography.

Modern technology and production are dependent on a pool of skilled workers, intermediate factors of production and knowledge and technological spill-overs as the world is transforming from an industrial era to the information age. Traditional factors of production, such as market demand and the availability of resources do, however, remain important aspects that influence locational decisions.

Globalisation and modern technology have a decisive influence on industrial development. The 'new economy' is characterised by high levels of market and trade liberalisation, modern technology (electronic and information technology, in particular), and increasing returns. Production processes are shorter, more specialised and easily adaptable. Mass production is gradually being substituted by flexible production, and the 'New Economic Geography' indicates that maximum profits are no longer limited to processes within the firm. The 'New Economic Geography' shows that competitive industrial districts and industrial clusters, with a variety of supporting services, networks, pools of skilled workers, available intermediate inputs, knowledge and technological spill-overs are becoming increasingly important in the production process, and in the achievement of increasing returns to scale and higher profits. All these aspects of the so-called 'New Economy' exert an influence on the competitiveness of industries and regions and their ability to create employment, alleviate poverty and increase the general welfare of inhabitants.

The last section of the article reported on aspects affecting location, which were revealed in a survey conducted among manufacturing firms in South Africa. Special attention was paid to factors influencing location, linkages, 'New Economic Geography', and flexible production in order to determine spatial differences.

Firms do not experience serious shortages of any kind except with raw and intermediate materials and some levels of skilled labour that can cause slight problems. Of the trilogy of the 'New Economic Geography' all aspects still fail competitiveness. In most places the pool of skilled labour is inadequate, intermediate inputs are often difficult to find, non-tradable factors do not enhance competitiveness adequately, and technological and knowledge spill-overs from other firms are poorly utilised.

As far as locational aspects of their premises are concerned, respondents on average rated the availability of skilled labour and training facilities to be poor. The availability of subcontractors, the proximity to suppliers of spare parts and the proximity of semi-processed materials and/or intermediate inputs are regarded as very poor. The proximity of professional and support services is poor and the availability of other manufacturing industries in the industrial districts and business support services are also rated as poor.

Government policies can influence industrial location and development, and modern policies should enhance the competitiveness of industries in the 'new economy' and ensure that people receive the necessary skills and that the country obtains the capabilities and technology it needs. The survey has shown that the country does possess better levels of human capital, technology and quality than is usually assumed, but it still lacks most factors that would attract new industries to settle in the region.

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