Manufacturing development in the Southern District Municipality of South Africa

by

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PREFACE

"*Education has to provide not only job-oriented competencies and skills, but also life-skills and life-options in terms of being able to know, to act and to live together in a social environment*" (Diego Lanzi)

Unemployment is a major problem of the South African economy. The Southern District Municipality of South Africa is not an exception given that the economy of the country is characterised by jobless economic growth. This phenomenon results in socio-economic problems such as poverty, crime, diseases, illiteracy, and moral decay, to name but a few.

The challenge facing the residents and the authorities in this region is to find a viable and sustainable alternative economic activity that can replace mining as a job provider especially because this was a mining dominated area and the majority of the mines have closed down.

This means that households are without income and find it difficult to make ends meet. It is therefore incumbent upon those of us who are privileged to have formal education to put our minds together to find a lasting solution for this once vibrant area now turned into a ghost region.

This dissertation is a humble attempt to try to find solutions to this problem.

I would like to acknowledge the contribution of the individuals listed below:

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- My father Lesiba and mother Mmalehu (posthumously), brothers William and Mathope and sisters Mankhona and Sutane for their encouragement, love and inspiration.
- Above all, I would like thank the Almighty God for His Grace, Mercy and Love.

I dedicate this dissertation to my wife, Gloria and children Hloni, Neo and Tshepi for their support and all the sacrifices they made during trying times.

Sola Gratia

"*Lux tua ita luceat*" (Matthew 5:16)

Moloto Johannes Sekhobela

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ABSTRACT

This study is an investigation of the development of the manufacturing sector in the Southern District Municipality (SDM) of South Africa and its ability to create jobs and enhance growth of the Gross Value Added Production. According to Kleynhans (2003:3) and Suleman (1998:105) manufacturing leads to economies of scale and scope, positive externalities, and employment creation. Manufacturing is identified as one of the industrial sectors that have potential for income and employment creation. Manufacturing has the ability to increase economic growth through its positive impact on the Gross Domestic Product (Humphrey, 1995:5 & Nel, 2002:81).

The study began with an investigation into the theory of spatial economic growth, and the impact of the following aspects on the regional economy received attention: the economic theory of the firm, agglomeration, the Marshall, Arrow and Romer theory (MAR), Porter and the externalities theory, specialisation and diversity, human capital and knowledge, innovation and competitiveness.

An overview of the Southern District Municipality's objectives, potential and opportunities in manufacturing was taken and this was followed by noting the profile based on economically active population, gross regional product per capita, education levels and unemployment. The gross domestic product per capita revealed a rather startling situation where growth in the GDP per capita of the SDM exceeds the GDP per capita growth of the whole North West Province.

An empirical investigation to test the ability of manufacturing to create jobs in the SDM and influence the growth of the gross value added production was undertaken. Shift-Share analysis methodology was applied and data on employment and gross value added production was obtained from the REX

database of Global Insight. This method revealed the sectors of manufacturing with the highest potential for economic growth and the creation of employment.

The Shift-Share method divides analysis of the region into four sections, National Share (N), Industry Mix (M), Regional Competitive Share (S) and Total Change in Regional Share (R). The study revealed the following sectors in manufacturing as having potential for growth of the gross value added production and employment creation: Transport equipment, Wood and Paper Products, Metal Products, Petroleum and Chemicals, and Furniture. Despite the differences in ranking by employment and gross value added data, the results are similar. Transport equipment was ranked number one in both cases.

Although Textile and Clothes, Electrical Machines and Electronic Equipment show reasonable growth in gross value added production, they are not among the top five because their respective contribution to the total gross value added is less than three percent for each sector.

Recommendations are made in the final chapter for the Southern District Municipality to enable them to improve their economy and reduce unemployment, which was exacerbated by the closure of mines. However, there is scope for further research and improvement.

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OPSOMMING

Die ontwikkeling van die vervaardigingsektor in die Suidelike Distriksmunisipaliteit (SDM) van Suid-Afrika en sy vermoeë om werk te skep en stygende waarde tot produksie toe te voeg, word in hierdie studie ondersoek. Volgens Kleynhans (2003:3) en Suleman (1998:105) lei vervaardiging tot ekonomieë van skaal en reikwydte, positiewe eksternaliteite en werkskepping. Vervaardiging is geïdentifiseer as een van die nywerhede met die potensiaal om inkome en werksgeleenthede te skep. Weens die positiewe impak daarvan op die Bruto Binnelandse Produk, besit vervaardiging die vermoë om ekonomiese groei te verhoog (Humphrey, 1995:5 & Nel, 2002:81).

Hierdie studie begin met 'n ondersoek na die teorie van ruimtelike ekonomiese groei, en die impak van die volgende aspekte op die ekonomie van streke: die ekonomiese teorie van die firma, agglomerasie, die Marshall, Arrow en Romer-teorie (MAR), Porter en die teorie van eksternaliteite, spesialisasie en diversiteit, menslike kapitaal en kennis, innovasie en mededingendheid.

'n Oorsig van die Suidelike Distriksmunisipaliteit se doelstellings, potensiaal en geleenthede in die vervaardigingsnywerhede is onderneem, gevolg deur 'n profiel van die streek, gebaseer op die ekonomies-aktiewe bevolking, bruto-geografiese produk per capita, vlakke van onderwys en geletterdheid, asook werkloosheid in die gebied. Die per capita bruto-geografiese produk het aangetoon dat groei in die BBP per capita van die SMD-streek die per capita groei in BBP van die hele Noordwes Provinsie oortref.

'n Empiriese ondersoek is onderneem om die vervaardigingsektor in die SDM se vermoë om werk te skep en die groei in die bruto toegevoegde waarde van produksie te bepaal. Die skuif–aandeel analise metodologie is gebruik en data

oor indiensname en bruto toegevoegde waarde van produksie is bekom vanuit die REX databasis van *Global Insight*. Hierdie metode het aangetoon watter vervaardigingsektore die hoogste potensiaal het om werk te skep en ekonomiese groei te verhoog.

Die skuif–aandeel metode verdeel die analise van die gebied in vier afdelings, naamlik die Nasionale Aandeel (N), die effek van die Industriële Samestelling (M), die effek van Streeksmededingendheid (S) en die Totale Verandering in die Streeksaandeel (R). Die studie het aangetoon dat die volgende sektore van vervaardiging moontlik potensiaal het vir groei in toegevoegde waarde produksie en werkskepping: Vervoertoerusting, Hout en Papierprodukte, Metaalprodukte, Petroleum en Chemikalieë, en Meubels. Ondanks verskille in rangvolgorde volgens indiensname en bruto toegevoegde waarde data, was die resultate soortgelyk. Vervoertoerusting was in beide gevalle in die eerste plek as die sektor met die hoogste potensiaal.

Alhoewel Tekstiel en Klerasie, Elektriese Masjinerie en Elektroniese Toerusting redelike groei in bruto toegevoegde produksie getoon het, was hulle nie onder die top vyf sektore nie, aangesien hul onderskeie bydra tot die totale bruto toegevoegde waarde minder as drie persent vir elke sektor was.

Aanbevelings word in die laaste hoofstuk gemaak vir die Suidelike Distriksmunisipaliteit ten einde hulle in staat te stel om hul ekonomie te verbeter en werkloosheid te verminder, wat vererger was weens 'n daling in produksie van die mynwese in die gebied. Daar bestaan egter wel ruimte vir nog verdure navorsing en verfyning.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The aim of this study is to investigate the ability of manufacturing to facilitate growth in employment and gross value added in the Southern District Municipality (SDM), given the demise of the mines in this region and a general decline in gold mining in South Africa. The SDM consists of five local municipalities; Ventersdorp, Potchefstroom, Matlosana, Maquassie Hills and Merafong City. The question is why manufacturing?

Suleman (1998:105) identified manufacturing as one of the sectors that have potential for income and employment creation to foster development. According to Kleynhans (2003:3) manufacturing leads to: economies of scale and scope, positive externalities and employment creation. The importance of the manufacturing sector in economic development is that it stimulates productivity, employment, income, technology and continues to play a vital role in a knowledge-driven economy (Unido, 2006:3).

To stress the importance of manufacturing, Humphrey (1995:5) indicates four points, the centrality of manufacturing to sustained growth, the ability of a strong manufacturing sector to generate activity and employment in other sectors, the quantitative and qualitative impact of manufacturing growth on the economy and the association of manufacturing value added growth with the growth in gross domestic product. Manufacturing is the second largest contributor to the Gross Domestic Product in the South African economy hence South Africa's position as an economic power in the continent (Nel, 2002:81). The central challenges facing South Africa are economic growth and employment creation. Naudé *et al* (2002:247) argue that if African economies, including South Africa, are to grow, they must follow the Asian example and shift from traditional agricultural production towards labour-intensive manufacturing. After the 1990s the overall number of firms in South

Africa appeared to have increased but unemployment continued its upward spiral because the emerging firms are in the capital-intensive sectors (Nel, 2002:85). Simmons (1994:24) emphasises this point through the Taiwanese economy: "manufacturing has been the driving force throughout the modern development of Taiwan's economy accounting for approximately forty per cent of GNP in the mid-1980s".

Among the challenges facing manufacturing is the need to increase employment and overall productivity levels but a drawback is that many of the key exports are not products of labour intensive activity. One strategic option may be to strengthen Mineral Energy Complex (MEC) type firms with their bases and potential, because productivity, employment and export potential are probably easier to encourage in areas where comparative advantage already exists rather than in new sectors that have yet to prove their potential (Nel, 2002:91-92).

This chapter is structured as follows: section 1.2 is the problem statement, section 1.3 the research question, section 1.4 is the objectives of this study, the methodology is in section 1.5 and section 1.6 gives the layout of the study.

1.2 PROBLEM STATEMENT

The Southern District Municipality is a predominantly mining-orientated region and is home to one of the largest gold mines in the world. The demise of mining and mining activities led to high levels of unemployment and a decline in gross value added.

The Chamber of Mines (2005:25) reports that gold production is steadily declining in South Africa. Since 1996 it declined at a steady rate, falling by 60.1 per cent during the last decade and with that also South Africa's contribution as a percentage of total world production. According to Statistics South Africa (2007:6) the trend is persisting

"The impact of the low rand gold price, costs and restructuring in certain operations affected the viability of a large proportion of the sector, especially in the first half of 2005. Gold production declined by 13.1 % to 297.3 tons, the lowest level of production since 1923" (Chamber of Mines, 2005:25). According to Statistics South Africa (2007:6) gold production decreased by 5.2 per cent during July 2007 as compared to July 2006.

The economy of the Southern District Municipality is negatively affected as a result. This study attempts to investigate possible ways to identify the potential of various sectors in manufacturing to serve as alternative forms of employment and contributors to the region's economic growth.

This is confirmed by Dyason (2005:81) who asserts that "the negative GDP growth rate in the city of Klerksdorp (the city in the Southern District Municipality with the highest number of economically active people) is mainly due to the decrease in mining activity and the diminished role that mining is beginning to play in the South African economy. Diversification of their economic structure needs to take place to improve the economic outlook of the regions because only 3.2 per cent of the workforce works in the manufacturing sector".

To conduct this investigation in the Southern District Municipality, the following issues need to be looked at: the profile of manufacturing, the role played by the economically active population and the level of education of this population, the presence of institutions of learning, trends in employment and gross value added in manufacturing and the current contribution of manufacturing to the Gross Value Added production.

Such an analysis does not exist, therefore this study's contribution is to fill the gap in knowledge of Southern District Municipality manufacturing and analyse the potential for a region such as the Southern District Municipality to grow its manufacturing sector and identify the strongest sectors.

1.3 RESEARCH QUESTION

The research question that will guide this study is: Which sectors in manufacturing have the potential to grow the economy and offer alternative employment, in a mining-dominated region of South Africa such as the Southern District Municipality?

1.4 OBJECTIVES

The objectives of the study are to:

- Describe the composition of the manufacturing sector in the Southern District Municipality.
- Identify spatial and sectoral concentrations in manufacturing.
- Determine the growth or decline in manufacturing sectors.
- Identify the sectors with the highest potential.
- Make recommendations for future development and research.

1.5 HYPOTHESIS

Manufacturing has the potential to increase employment levels and gross value added in specific sectors.

1.6 METHODOLOGY

To achieve the above objectives, requires a literature review, data and empirical analysis. The literature review presents the theory of regional economic growth and the most recent research on the subject matter.

Data from the REX database (2007) is used to make the empirical analysis to determine the potential of the Southern District Municipality to develop and grow its manufacturing sector.

The empirical analysis is conducted through the traditional Shift-Share analysis technique with employment and gross value added as variables.

According to SETA (2007) the shift-share methodology indicates the extent to which competitiveness of local industries has grown. Growth is subdivided into three components, National growth, Industry Mix and the Competitive Share. The sum of these three components is the Total change in employment of the region.

The Shift-Share analysis compares the region's actual growth with national and provincial average growth rates by decomposing Total Change Regional Employment / Gross Value Added (R) into three components, National Share Effect (N), Industry Mix Effect (M) and Regional Competitive Share Effect (S).

$$\mathbf{R = N + M + S}$$

Where **R** is the total employment / production in the region, **N** shows what the result would be if the region grew at the national average growth rate, **M** is the amount of growth that can be attributed to the region's industrial structure and **S** identifies the region's leading and lagging industries.

Therefore the total employment change would be:

$$\mathbf{E\ (v) = E^{tf} - E^{ti}}$$

Where E (v) is the employment change in absolute terms, E^{tf} is the total employment in the final period and E^{ti} is total employment in the initial period.

National average growth in employment E (%) is defined as:

$$\mathbf{E\ (\%) = [\ E^{tf} / E^{ti} - 1] \times 100}$$

The total change in regional employment (R) is the difference in total regional employment in the final period and the initial period and is calculated as follows:

$$\mathbf{R = e^{tf} - e^{ti}}$$

Where R is the total change in regional employment, e is total employment in the region, ti is the initial period, and tf is the final period of analysis.

Total percentage change in regional employment R (%), is the total final regional employment divided by the total initial regional employment less one multiplied by 100 and is calculated as follows:

$$\mathbf{R\ (\%) = [e^{tf} / e^{ti} - 1] \times 100}$$

The national share effect is an indicator of how much regional employment would have grown had each of its sectors and, therefore, the regional total, grown at the same rate as the national average employment growth. The national share effect (N) is determined by:

$$\mathbf{N = e^{ti}_1[\ E\ \%] + e^{ti}_2[E\ \%] + \ldots . + e^{ti}_n[E\ \%]}$$

Where **N** is the total national share of the manufacturing industry, **e** is the regional employment in sectors **1, 2 . . .** up to **n** in the initial period $\mathbf{t^i}$ and **E %** is the national average employment growth rate.

Therefore, the industry mix effect (M), is defined by the following equation.

$$\mathbf{M = MR_1\ (e^{ti}_1\ ) + MR_2\ (e^{ti}_2\ ) + \ldots . + MR_n\ (e^{ti}_n\ )}$$

Where M is the regional industry mix, MR is the marginal rate of growth in sectors 1, 2, 3 ... up to n and e^{ti} is region's sectoral employment in the initial year.

The competitive share effect (S), is defined by rearranging equation (4.1) and it indicates how sectors in the region performed relative to the national averages for the same sectors.

$$S = R - N - M$$

These concepts are explained in detail in Chapter 4.

The Shift-Share model is a useful tool for analysing historical employment growth patterns (Andrikopoulos, Brox & Carvalho, 1990:9). Barff and Knight (1988:1) say "shift-share analysis is a relatively simple technique for analyzing employment growth in a region over a specific time period".

The Shift-Share analysis is also regarded as a way to account for the region's competitiveness and provides a picture of how well, a region's mix of industries is performing and how well individual industries are doing. This technique can also be used to analyse individual industries or the whole economy (Georgia Tech, 2007).

"The classical shift-share approach analyses the evolution of an economic magnitude between two periods identifying three components: a national effect, a sectoral effect and a competitive effect." (Fernández & Menéndez, 2005:2)

1.7 LAYOUT OF THE STUDY

This study consists of a literature and empirical analysis. An investigation to determine the development of manufacturing in the Southern District Municipality will be conducted and the layout of the chapters is set out as follows:

CHAPTER 1: INTRODUCTION

This chapter deals with the introduction, background, problem, statement, research question, objectives, hypothesis, methodology and layout of the study.

CHAPTER 2: THE THEORY OF REGIONAL ECONOMIC GROWTH.

An attempt will be made to highlight the structure, growth and development of regional economies and the role of manufacturing in chapter 2.

CHAPTER 3: PROFILE OF THE SOUTHERN DISTRICT MUNICIPALITY

This chapter considers profiles of population, poverty, unemployment, income and production as well as the contribution of the above to the gross geographic and domestic products at district and national levels, respectively.

CHAPTER 4: SHIFT-SHARE ANALYSIS OF EMPLOYMENT IN MANUFACTURING: SOUTHERN DISTRICT MUNICIPALITY

In chapter 4 an empirical analysis of employment growth is done, using the shift-share analysis technique. National, Provincial, District and Local municipalities and Magisterial districts data are used for the analysis to identify the growing and declining sectors.

CHAPTER 5: SHIFT-SHARE ANALYSIS OF PRODUCTION IN MANUFACTURING: SOUTHERN DISTRICT MUNICIPALITY

An empirical analysis of production growth of the various manufacturing sectors is made in this chapter, using the shift-share analysis technique. National, Provincial, District and Local municipalities and Magisterial districts data are applied to analyse sectors that possess growth potential.

CHAPTER 6: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The summary of empirical findings and recommendations and interventions that the Southern District Municipality can implement and the scope for future research is given in this final chapter.

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CHAPTER 2

THE THEORY OF REGIONAL ECONOMIC GROWTH

2.1 INTRODUCTION

This chapter focuses on the theory of regional economic growth. Regions have unequal distribution of wealth because they have different industries and supporting environments comprising, among others, universities, research establishments, business and producer services providers and information and communication technologies infrastructure (Huggins & Izushi, 2008:71).

To explain employment growth at regional level, the following are relevant: local education levels, wages, population diversity and industrial structure (Shearmur & Polèse, 2007:454). Miles and Scott (2005:88-90) emphasise the value of education by stating that there is a strong correlation between the amount of education and the standard of living. Continual improvements in education can help to achieve long-run growth and differences in education can explain why investments still flow to rich countries.

Suleman (1998:104-105) states the following on the development of human capital: high growth rates lie in the region's ability to produce, attract and accommodate experienced human resources through improved literacy rates, development of skills, management training, upgrading of the education system and promotion of the role of the private sector and tertiary institutions in training.

Agglomeration is a determination of spatial economic growth, whereas specialisation has to do with a region's economic structure while, concentration is the way that specific economic sectors are distributed within the region (Krugell, 2005:18-24). Diversification or variety is a measure of the extent of the distribution of employment among assorted industries that are different in nature and it is preferred for its stabilisation effect on employment and income (Nissan & Carter, 2006:186-195).

Learning is most efficiently performed at regional level due to its collective and interactive nature. The region because of its prominent position of scale is best suited to tacit knowledge, which necessitates face-to-face contacts (Zientara, 2008:63).

Knowledge spill-overs within a given location stimulate economic growth especially in geographically concentrated firms (Acs, 2004:636-637). According to Jacob's theory of externalities, competition stimulates economic growth because it speeds up adoption of new technologies (Van Stel & Niewenhuijsen, 2004:395). Varga and Schalk (2004:978-979) argue that scientific-technological knowledge and progress account for three quarters of per capita Gross Domestic Product and that macro economic growth is positively related to knowledge spill-overs.

The chapter is structured as follows: Section 2.2 is the theory of the firm. Section 2.3 discusses agglomeration. Section 2.4 considers the Marshall, Arrow and Romer (MAR) theory, section 2.5 is a discussion of the Porter and externalities theory, specialisation and diversity are discussed in section 2.6, section 2.7 studies human capital, section 2.8 discusses knowledge, innovation and competitiveness and the chapter concludes with a summary in section 2.9.

The fact that manufacturing may be an engine of growth can be shown, using pure economic theory. The following section provides an explanation thereof.

2.2 THE THEORY OF THE FIRM

Competitive firms under conditions of perfect competition (many buyers and many sellers, homogeneous product, free market entry and exit, low transaction costs and perfect knowledge) face a horizontal demand curve and in the long run the quantities produced will be more and the cost to produce them will be lower. This study assumes agglomeration and according to Naudé *et al.* (2005:7) where agglomeration is directly proportional to increasing returns or decreasing costs. Therefore in a decreasing cost industry, ceteris paribus, when costs decrease, output grows and the price will go down (Perloff, 2007:239- 248). Consider Figure 2.1 which shows the relationship between price, output and marginal cost. The demand curve is horizontal because firms are price takers in the short - term.

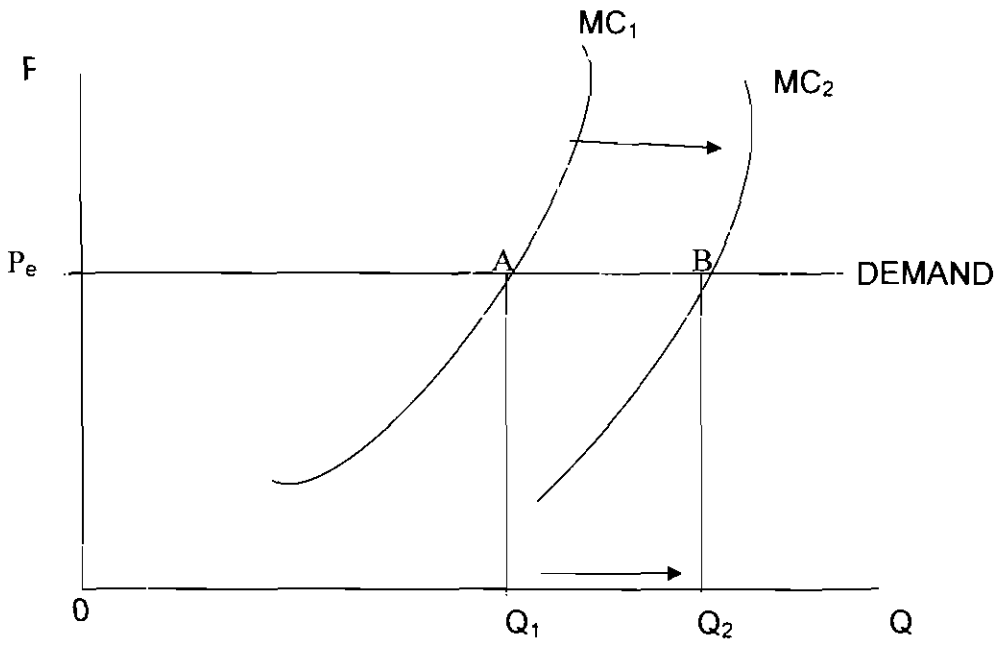


Figure 2.1 Price, Marginal Cost and Production

From Figure 2.1, output is Q_1 when price is P_e and Marginal Cost is MC_1. When production costs decline and MC_1 moves to MC_2, ceteris paribus, output increases from Q_1 to Q_2. An increase in output, ceteris paribus, will result in an increase in production, labour demand and create jobs.

In Figure 2.1 MC_1 and MC_2 represent the firm's supply curve. The individual supply curves add up to the market supply curve. The market supply curve will move to the right as costs decrease because individual firms will increase their supply. Figure 2.2 depicts the market demand and supply curves.

The supply curve in Figure 2.2 may shift rightwards for several reasons. This will occur as production cost decreases due to improvement in production efficiency, especially through better technology, infrastructure, subsidies, innovation, knowledge and higher labour productivity, as well as through training and experience (Mankiw & Taylor, 2006:699).

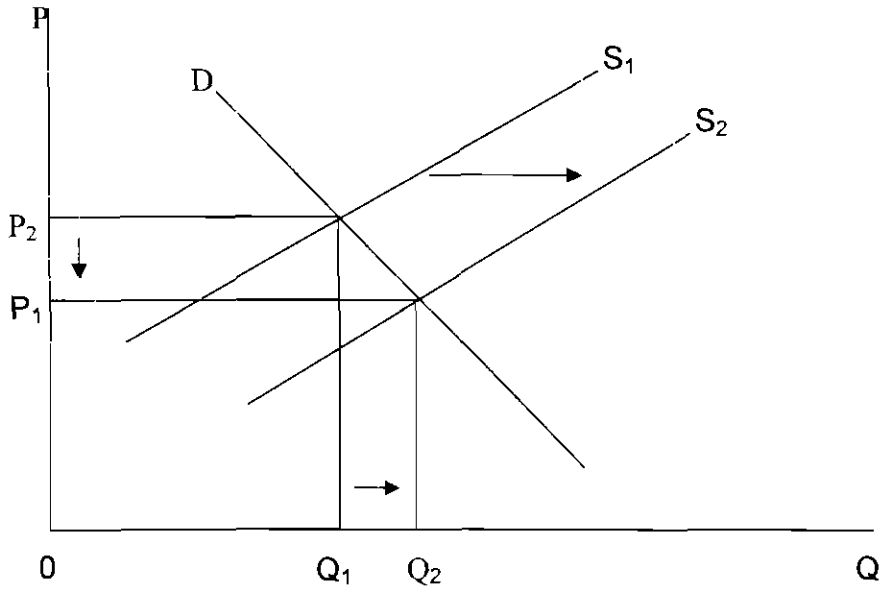


Figure 2.2 The market equilibrium and the shift in the supply curve

From Figure 2.2, the supply curve S_1 shifts to the right to S_2, as a result of a decrease in costs in Figure 2.1. The rightward shift of the supply curve depicts an increase in supply. Output will increase from Q_1 to Q_2 and the price of commodities will decrease from P_2 to P_1, as a result. When output increases, income and employment will also increase. Manufacturing has the ability, ceteris paribus, to increase the supply of goods resulting in an increase in production, income and employment. Thus manufacturing can create jobs.

Assume that the government increases its expenditure by making a productive investment such as building infrastructure or expanding public health facilities, ceteris paribus, the IS_1 curve will move up to IS_2 in Figure. 2.3. As a result, the rate of interest will rise from I_1 to I_2 and output will increase from Y_1 to Y_2. This implies that some crowding out will occur due to the high interest rates that will reduce investment spending because investment is inversely related to the interest rate, but the benefits of higher production, income levels, higher profit margins and the accompanying creation of employment opportunities in the long-term, will make up for the temporary pressures on the interest rate levels.

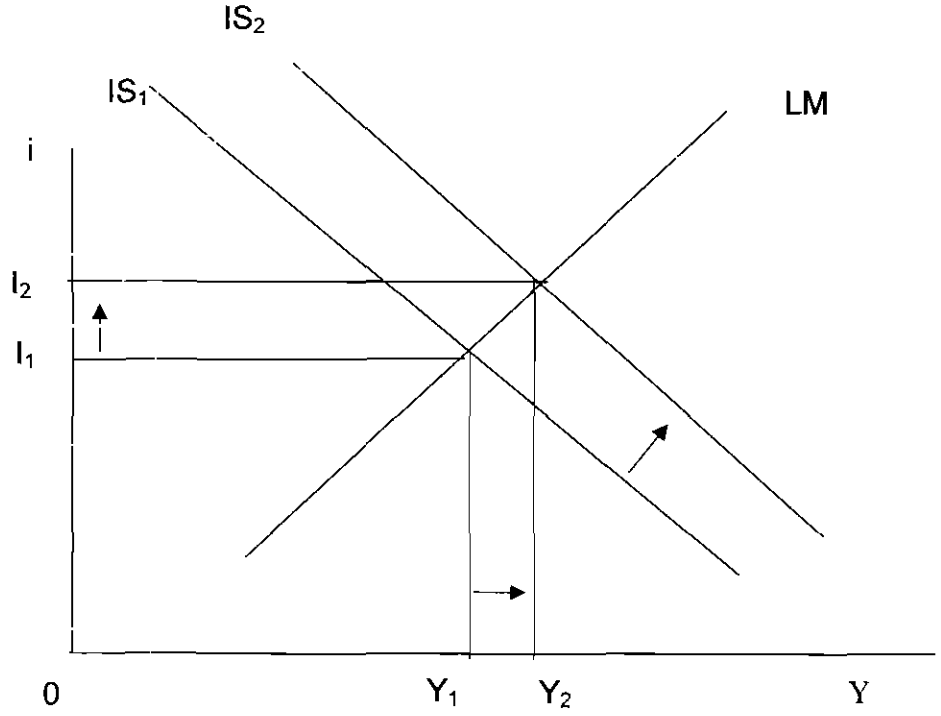


Figure 2.3 The IS-LM curves and the shift in the IS curve

The authorities may increase the supply of money, through the monetary policy, resulting in an increase in the LM curve as shown in Figure 2.4.

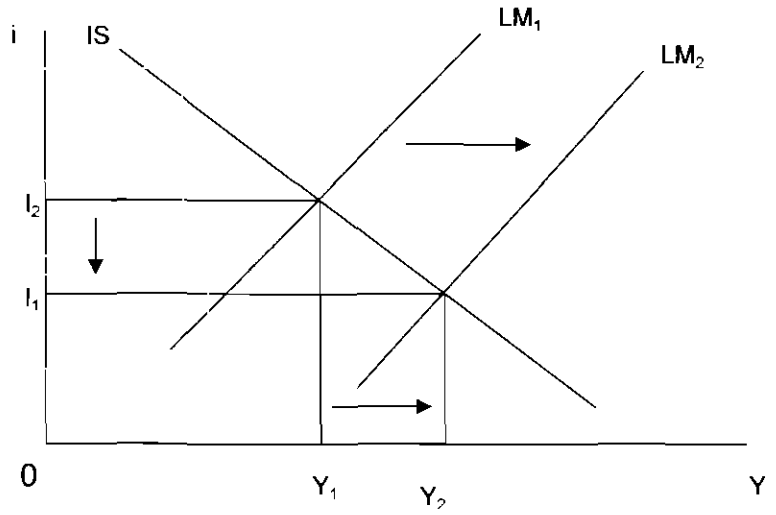


Figure 2.4 The IS-LM curves and the shift in LM curve

The increase in the money supply has the effect of increasing the LM which in Figure 2.4, will shift to the right from LM_1 to LM_2 leading to a decrease in the interest rates

and an increase in output from i_2 to i_1 and Y_1 to Y_2, respectively. The decrease in interest rate will lead to an increase in investment expenditure, output and aggregate demand (Blanchard, 2006:102 & Pentecost, 2000:247). An increase in output leads to an increase in employment and that is what manufacturing seeks to achieve.

The increase in money supply, indirectly causes an increase in aggregate demand, through low interest rates, see Figure 2.4. Figure 2.5 shows the effect of an increase in aggregate demand on the macroeconomic equilibrium.

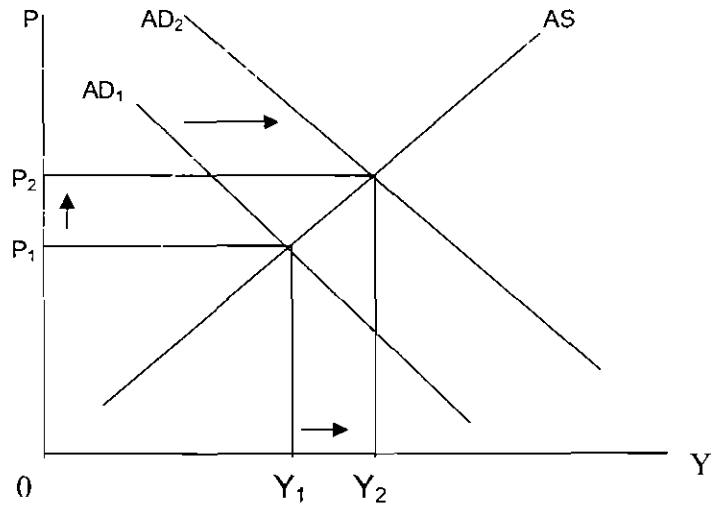


Figure 2.5 The AD-AS model and the shift of the AD curve

The increase in aggregate demand from AD_1 to AD_2, in Figure 2.5, leads to an increase in price levels and output from P_1 to P_2 and Y_1 to Y_2, respectively. Although an increase in output is desirable because it leads to increases in income and employment, the concomitant increase in price levels leads to inflationary pressures on the economy.

In this instance, the shape of the AS curve can make a difference between the respective changes in price levels and output. Figure 2.6 shows a flatter AS curve and the effects on the price levels and output.

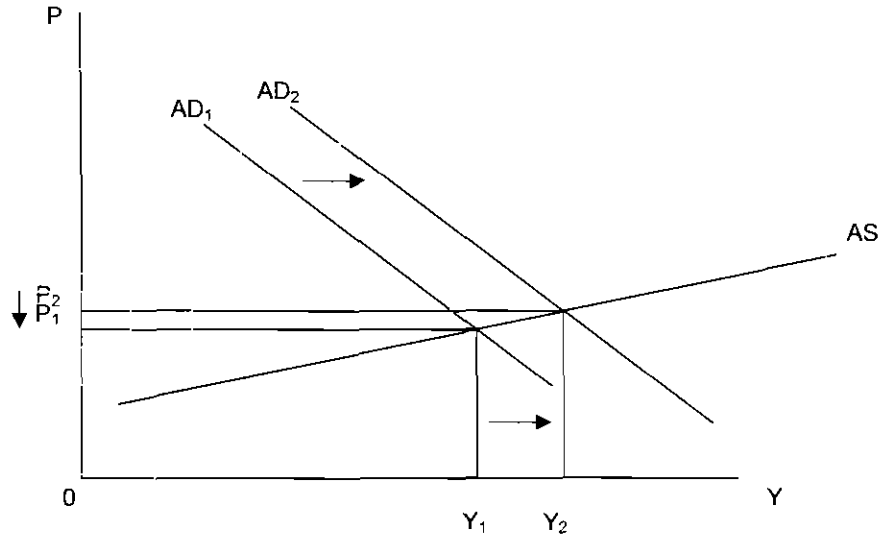


Figure 2.6 The AD-AS model with a flatter AS curve

From Figure 2.6, the increase in price levels is much lower, if not negligible, compared to the increase in output. Such that the increase in output outweighs the increase in price levels whose impact on the inflation would be minimal.

Shifts in the AS curve may be caused by, among others, changes in commodity prices, nominal wages or productivity but the complexity and dynamism of supply makes it slightly difficult to make an analysis in a static model (Krugman & Wells, 2006:656 & Dornbusch *et al.*, 1994:242). Against this background the study will attempt to analyse the shifts in the AS curve through the use of Figure 2.7. The movement of AS from AS_1 to AS_2, results in a decrease in price levels and an increase output from P_2 to P_1 and Y_1 to Y_2, respectively.

A rightward shift of the AS – curve may be due to subsidies, but more ideally due to improved productivity and/or production efficiency (Abel *et al.*, 2008:341). This will lead to higher production output, which will cause a disproportionally larger output through the multiplier in the longer-run. Such an increasing shift of the supply curve, as in Figures 2.1, 2.2 and 2.7, is the ideal situation because it is sustainable; it enlarges production and income in the longer-run, while jobs are created and the general price levels decline, which might also suggest a decline in the inflation rate, undoing stagflation. Thus, income, production, employment and welfare of everyone will increase.

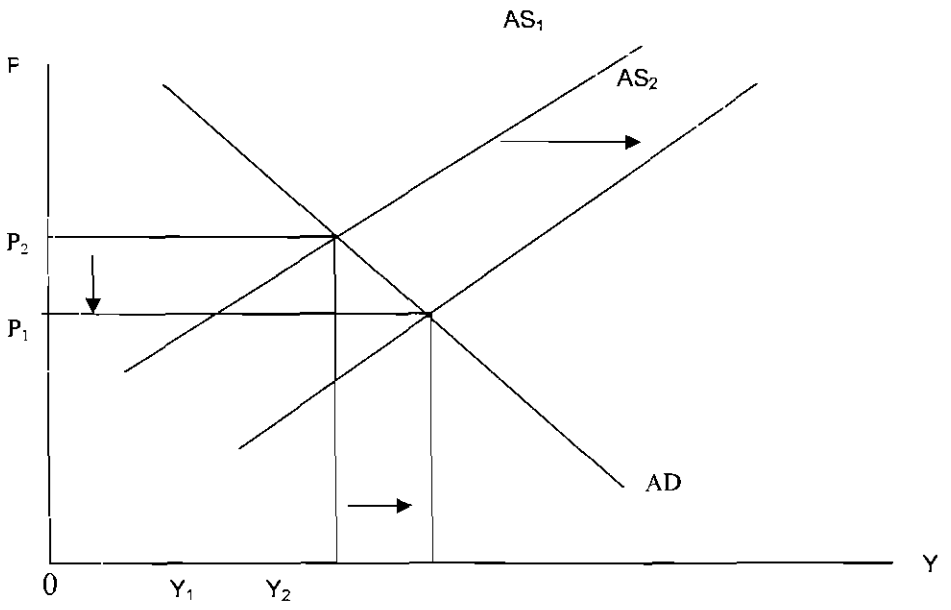


Figure 2.7 The macroeconomic equilibrium (AD-AS model) and the shift in the AS curve

The decline in price levels will ideally increase the purchasing power of the domestic currency and improve the economy while the increase in output would lead to an increase in incomes and employment, the desired outcome of manufacturing. It may be inferred, based on the above, that manufacturing production is an engine of economic growth and a creator of jobs.

The next section is a discussion of agglomeration and its sources.

2.3 AGGLOMERATION

Agglomeration is broadly defined by Van Oort (2004:25) as external economies from which a firm can benefit by being located at the same place as one or more other firms. McCann (2004:35-36) and Van Oort (2004:26) list the following as sources of agglomeration economies: *Internal Returns to Scale* is the result of a large concentration of both physical and human capital in one particular location.

Because large markets will be served, production cost efficiencies occur. *Localisation Economies* occur predominantly in smaller cities or regions and are characterised by firms in the same sector located at the same place deriving benefits from their mutual

activities. Localisation economies arise from, amongst others, high levels of labour demand, specialised suppliers and factors that reduce the average cost of production.

Urbanisation Economies arise from benefits accruing to a wide range of local sectors located at the same place and this is predominantly found in large regions or cities. Urbanisation economies comprise static and dynamic effects.

Static effects involve production factors, infrastructure, access to markets and information, whereas, dynamic effects include interaction and cooperation between firms' research and development organisations and policy makers (Werker & Athreye, 2004:507). Urbanisation economies lead to external economies because of large-scale operations. The presence of institutions of higher learning, research and development laboratories and trade associations supports the production and assimilation of knowledge and stimulates innovative behaviour and regional growth (Van Oort, 2004:28).

Urban economies according to Van Oort (2004:31) lend themselves to low costs of attracting skilled labour and savings to both business firms and individual consumers in terms of fewer inventories, pooling resources and varied retail market supplies. Dynamic urbanisation economies are about the role of prior knowledge accumulation. Both current productivity and employment growth simultaneously explain how regions grow due to mature and newer industries.

Large manufacturers attract smaller ones, which supply them with intermediate and complementary inputs, because scale economies are partly the result of complementarity in production and in labour supply. The entire production process or a particular factor of production in manufacturing may be enhanced by institutions, infrastructure, economic base and demographic characteristics (Granger & Blomquist, 1999:1861-1862). Agglomeration economies and the location of new establishments have a positive effect on employment growth and from a single location the effects of agglomeration economies in manufacturing can spread nationwide (Van Soest *et al.*, 2006:881-882).

Lee and Zang (1998:2086) found, in their studies conducted in Japan that heavy industries benefited more from localisation economies while light industries benefit more from urbanisation economies.

Localisation economies consist of: economies of intra-industry specialisation, better division of function among firms, local labour market economies that reduce the costs of worker recruitment, communication economies that diffuse adoption of innovation and scale of economies supporting public infrastructure for the needs of a specific industry. Urbanisation economies comprise large overall labour markets and large diversified service sectors interacting with manufacturing (Lee & Zang, 1998:2089).

Polèse (2005:1432) lists the following as gains from agglomeration economies:

- Scale economies due to greater market size that is within close range.
- Lower infrastructure costs due to the greater number of users.
- Lower information and transaction costs as a result of greater range and face-to-face contacts.
- Diversity and proximity of potential suppliers ensures flexible and rapid input relationships.
- The presence of a large and diversified labour pool results in lower training and recruitment costs.

Acs (2002:158), Van Stel and Niewenhuijsen (2004:395) and Van Oort (2004:29) state that the varieties of industries within a geographic region promote knowledge spill-overs, diversity and competition leading to economic growth, employment growth and innovation. This is why industrial development is so important to the Southern District Municipality (SDM) region.

The Marshall, Arrow and Romer (MAR) theory is the subject of the next section.

2.4 THE MARSHALL, ARROW AND ROMER (MAR) THEORY

The Marshall, Arrow and Romer (MAR) theory emphasises the importance of specialisation and knowledge spill-overs on economic growth and innovation because knowledge spill-overs occur between homogeneous firms.

According to this theory, competition has a negative impact on economic growth and innovation due to the inability of firms to internalise externalities associated with innovation especially in the face of intense competition. As a result a specialised economy or local monopoly is preferred (Van Stel & Niewenhuijsen, 2004:395 and Van Oort, 2004:27).

Specialisation may, in a limited number of activities, contribute to spill-overs from primarily one sector. In the MAR theory, regional sectoral growth is maximised if local competition is not too strong and if the sector is dominant in the region because according to this theory, knowledge spill-overs between firms in specialised sectors stimulate economic growth, Van Stel and Niewenhuijsen (2004:395).

The next section considers the view of Porter and the externalities theory on regional economic growth.

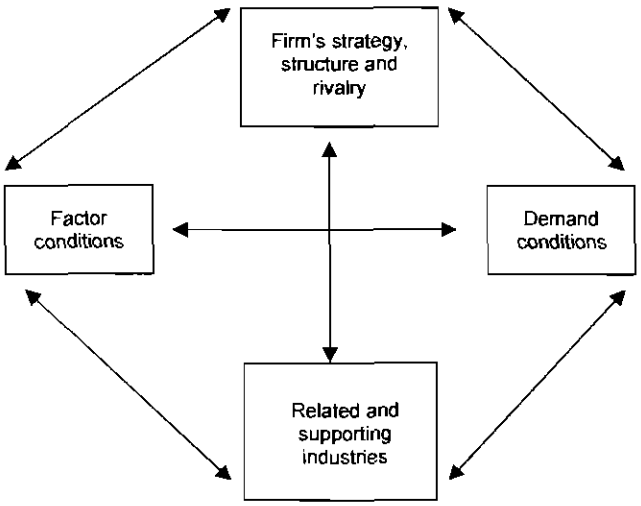
2.5 PORTER AND THE EXTERNALITIES THEORY

The theory of Porter argues that specialisation and competition have a positive impact on economic growth. According to Porter competitiveness is in the first place due to market conditions, input factors such as natural, human and capital resources, information, scientific, technological, administrative and physical infrastructure (Kleynhans, 2003:107). Competition fosters the pursuit and rapid adoption of innovation. Firms that do not innovate will not survive (Van Oort 2004:27 and Van Stel & Niewenhuijsen, 2004:395).

Firms, according to Porter (1998:70-73), gain and sustain competitive advantage through improvement, innovation and upgrading as a product of four mutually reinforcing attributes, firms strategy structure and rivalry, factor conditions, related and supporting industries and demand conditions (Kleynhans & Naudé, 2006:371).

These attributes are referred to as Porter's diamond (see Figure 2.8) and firms need to have advantages in all or most of them in order to achieve sustainable competitive

success. An advantage in one or two of the attributes may not be sufficiently sustainable because competitors can easily nullify or replicate them.



Source: Porter, 1998

Figure 2.8 Porter's diamond

Firm's strategy and rivalry entails how companies are created, organised, managed and the nature of domestic rivalry. *Factor conditions* refer to quantity, quality, cost, accessibility, availability, effectiveness and efficiency of the factors of production and infrastructure. *Related and supporting industries* consist of suppliers and competitors while *Demand conditions* are the nature and size of domestic and foreign demand for the industry's products. These four attributes are responsible for shaping the environment in which local firms compete and they may promote or impede the creation of competitive advantage (Porter, 1998:72).

Regional economic growth and stability is a function of its industrial structure and this is the topic of the next section.

2.6 SPECIALISATION AND DIVERSITY

The industrial structure of a region may be specialised (dominated by the firms from the same industry or firms manufacturing similar or related products) or diversified (dominated by firms from different industries manufacturing a variety of products).

Regional demand and supply as a result of changes in endowment of infrastructure and production factors may affect the industrial structure of a region (Werker & Athreye, 2004:513).

According to Nissan *et al.* (2006:195-196) regions with diversified industrial composition experience lower economic fluctuations compared to more specialised regions. A diversified region is therefore, better shielded from the averages of economic difficulties than a region dominated by a specific industry. When economic activity is more varied in a region, the economic performance is considered stable.

Hammond and Thompson. (2004:529), Baldwin and Brown. (2004:520), Poot (2002:206) and Frenken *et al.* (2005:2) argue that diversification of the region's economy is a cushion against external demand shocks that may lead to volatility and have a negative impact on economic growth and employment. Regions with a diverse economic structure are able to absorb exogenous price or demand shocks better than specialised ones.

Specialised regions, according to Sölvell, Ketels and Lindqvist (2008:107) enjoy the following benefits:

- Efficiency and shorter reaction time.
- High levels of innovation due to close interaction with research institutions, customers, suppliers and competitors who create new ideas and provide a lot of pressure to innovate.
- High level of start-up and reduced cost of failure.

Regions that are specialised are vulnerable to a decline in activities because they may be "locked in" to the old ways of doing business and thereby constrained in the search for new developments, which makes it difficult to respond to radical changes in the economic environment. Diversified regions are cushioned, economically stable and may be an important source of economic growth (Bishop & Gripaios, 2007:1739-1740).

The preference for firms to locate in urban rather than rural areas is according to Frenken *et al.* (2005:6) influenced by variety, presence of wider and deeper markets

and opportunities for economies of scale, which are greater in urban than rural areas. Jansen (2007:30) and Southern District Municipality (2007:2) are in agreement about the ability of manufacturing in the Southern District Municipality (SDM) to foster employment opportunities, economic growth and development.

Human capital is another factor that has an influence on regional economic growth and development and is considered in the section that follows.

2.7 HUMAN CAPITAL

Miles and Scott (2005:88) concede that human capital can also be increased by investment in education and training because they define human capital as the skill and knowledge that accumulate over time in individuals, the labour force and society. It consists of many different skills such as learning acquired at school, on-the-job training, learning by doing, shared social knowledge and conventions.

Economic growth and development is a function of investment in and accumulation of productive capital, which include efforts to increase the workers' health, skills and education (Coulombe & Tremblay, 2007:965 and Curry & Sura, 2007:86). On the issue of education, Lanzi (2007:426) says "education has to provide not only job-oriented competencies and skills, but also life-skills and life-options in terms of being able to know, to act and to live together in a social environment".

In this Information Age, the components of human capital should assist people to interconnect information sources, manage tacit knowledge and take part in formal and informal knowledge networks (Lanzi, 2007:428). Dalmazzo and Blasio (2007:359-360) assert that human capital generates positive externalities on the firm's production, productivity and utility at local level. Higher levels of human capital may lead to higher levels of production, for an increase in the general skills level may result in an increase in production. Thus the growth of the regional economy is a function of human capital, which is critical for creativity and innovation (Suleman, 1998:40 & Park, 2004:284).

Productive human capital can provide the competitive edge that could result in economic growth and an increase in welfare (Kleynhans, 2006:55). According to Naudé *et al.* (2005:29) human capital is among the determinants of local economic growth rates. Werker and Athreye (2004:509) argue that human capital is one of the accumulable production factors that may lead to dynamic agglomeration effects if subjected to increasing returns to scale and positive externalities.

The quality of human capital is important to production and its improvement requires education and technology spill-overs, education and training and vocational training (Kleynhans, 2006:56). Lanzi (2007:428) divides human capital into three main components:

i. **Basic Skills**

   Basic Skills consist of elementary instruction such as reading and writing, general principles of main subjects and basic methodological references. These skills increase an individual's options as well as cognitive abilities, autonomous learning, creative thinking and specific knowledge acquisition.

ii. **Professional Competencies**

   Professional competencies refer to applied knowledge, job-oriented development of technical skills, group-work techniques or training. They increase an individual's economic self-sufficiency, definition of social identity through the work position which affects economic entitlements, life-plan options and social skills.

iii. **Complex Functions**

   Complex functions involve self-learning process, effective knowledge management / sharing, problem-solving and goal-achievement attitudes which include teamwork, conflict resolution, crisis management, inter and intra-personal skills and social skills such as acquiring self-awareness, self-esteem, self-confidence and the ability to control feelings and manage stress. The above increases an individual's ability to negotiate the rules of the game, develop ad hoc knowledge, adapt and adopt new ideas.

Regions that grow faster invest in human capital and education because economies based on information processing and knowledge creation, require well-educated and high-skilled labour (Zientara, 2008:62). Public and private institutions of learning, firms, government institutions, non-governmental organisations and civic bodies, among others, form a network system that will allow the education to effectively interact with the economic and social system to foster the accumulation of human capital, consistent with the productive and reproductive needs of the economy (Lanzi, 2007:433).

The next section deals with the impact of knowledge on innovation and competitiveness in the regional economy.

2.8 KNOWLEDGE, INNOVATION AND COMPETITIVENESS

Knowledge is a source of competitive advantage in a knowledge-based economy (Rutten & Boekema, 2004:178). Werker and Athreye (2004:506) assert that economic growth is based on the intensity of the transfer and creation of knowledge and innovation.

Education, research and development facilities and human capital serve as regional gate keepers or brokers of knowledge complementing innovative agents and helping to diffuse knowledge (Werker & Athreye, 2004:508).

Knowledge spill-overs within a given location tend to stimulate employment growth and metropolitan areas facilitate personal interchange, communication and knowledge spill-overs both within and across industries (Acs, 2002:157-158). Research shows that education is an important factor in labour productivity and efficiency (Stimson & Baum, 2004:155).

An additional source of knowledge spill-overs and innovation may according to Frenken *et al.* (2005:5) be diversity, because diverse sectors or industry mix in an urbanised locality improves opportunities to interact, copy, modify and recombine ideas, practices and technologies across industries.

Innovation can generate significant impulses for economic development, increased regional knowledge stock and competitiveness and this may lead to rising output and an increase in employment depending on the quality of new firms and efficiency of the market process (Fritsch & Mueller, 2004:963).

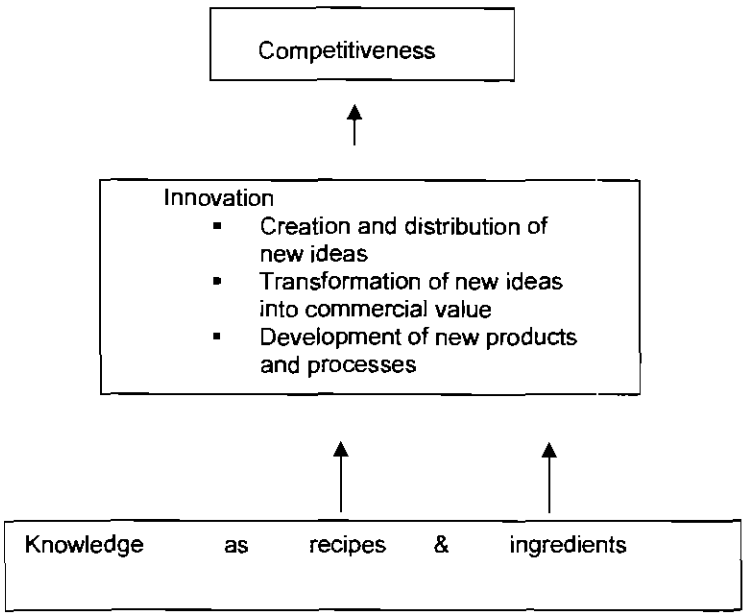
According to Varga and Schalk (2004:980) agglomerated areas with higher concentrations of research tend to have higher growth rates of knowledge spill-overs, technological progress and national per capita Gross Domestic Product growth.

Acs (2002:25) argues that, smaller firms have an advantage over larger ones with respect to innovation because small firms do not have bureaucracy and they usually place innovative activity at the centre of their competitive strategy.

Some of the advantages for manufacturers in locating near specialised suppliers, workers with specialised skills and knowledge spill-overs are according to Feser (2002:2487-2488):

- Low cost of acquiring inputs.
- Greater flexibility of supply especially in markets with volatile demand patterns.
- Ease of collaboration and cooperation between teams from both the firm and the suppliers.
- Access to labour with specialised skills affords the firm flexibility to expand and contract with minimal disruption.
- Opportunity to improve the skill of the average worker.
- Capacity to capture efficiency-enhancing knowledge from the knowledge spill-overs.
- Rapid learning from neighbouring manufacturers and relevant external effects from private and public research and development activities.

Figure 2.9 depicts the relationship between competitiveness, innovation and knowledge.



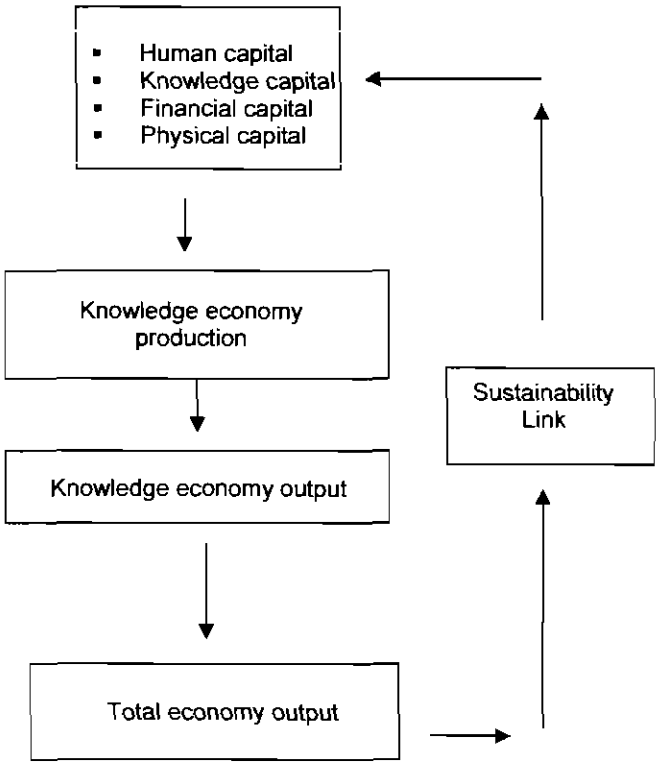
Source: Huggins and Izushi, 2008:73

Figure 2.9 Competitiveness, Innovation and knowledge

Huggins and Izushi (2008:72-73) state that a region's competitiveness is also defined by the interaction of the political, legal and macroeconomic contexts, the quality of the micro economic business environment and the sophistication of the operations and strategies of its firms.

Firms gain advantage in their economic environment, according to Figure 2.9, through cumulative stock of information and skills concerned with connecting new ideas with commercial values, development of new products and processes.

Knowledge creation, utilisation and capacity building of knowledge-based regional economies are represented by Figure 2.10.



Source: Huggins and Izushi, 2008:75.

Figure 2.10 Knowledge-economy capacity building model

The combination of the four types of capital in Figure 2.10 results in the production of knowledge-based and high value-added goods and services. The sustainability loop will be maintained through the reinvestment of wealth into capital inputs to facilitate their reproduction and further development to ensure prosperity of the regional economy. Investment in future research and development, and education and training are the key to a competitive knowledge-based economy.

Innovation generation, learning, knowledge creation and technology diffusion and learning interactional networks have all come to be seen by Zientara (2008:60-63) as crucial elements of regional development whose competitive advantage lies in its capacity to create a supportive environment for the process of learning and innovation.

Because knowledge has become the key value creator in modern economies, the links between knowledge creation and diffusion process, through individuals, organisations and systems, need to be understood as fully as possible.

The characteristics of new models of knowledge production include a drastic increase in the number and types of sites where innovation takes place, intense interaction between knowledge actors, an ever-changing pattern and dynamics of these interactions and the increasing density of interactions and the number of knowledge actors. The competitive advantage of firms, sectors, regions and nations in advanced economies is no longer defined by size, position within industry and physical assets only, but also by the mobilisation of knowledge and technological skills to create new ideas, thoughts, processes and products and to translate these into economic value and wealth (Huggins & Izushi, 2008:71-72). Innovation is generated through interaction, cooperation and proximity in terms of reducing the distance to facilitate the exchange of ideas and knowledge transfer based on reciprocal trust, Zientara (2008:62).

According to Wong, Ho and Singh (2007:42) universities worldwide are shifting from the traditional primary role as providers and creators of scientific knowledge, to an entrepreneurial entity incorporating commercialisation of knowledge and active contribution to the development of local and regional economies. Kitagwa (2005:614) and Zientara (2008:62) have established the existence of a positive link between university research and innovative activity. A healthy university-business-research institutional collaboration at local level would ensure human resource development, frequent human exchanges and flows of information.

Because innovation is a dynamic process, learning needs to be continuous and information and knowledge networks have to be an essential part of the process of innovation (Chamberlin & De La Mothe, 2004:18 and Sennet *et al.*, 2002:49).

How do cities generate economies of scale and growth? McCann (2004:38), Poot (2002:201) and Varga and Schalk (2004:980) attempt to answer this question. Cities are made engines of growth through knowledge spill-overs, specialisation, and economies of scale and are strong attractors of financial capital and skilled labour. The size of the region is positively related to the impact of spill-overs in knowledge production. Larger regions with more firms have richer network linkages which result in more applications being covered by knowledge spill over, wider selection and concentration of producer goods and services needed in technological innovation.

Cities or regions that use the latest technology and have efficient social organisations will produce the highest level of output from a given level of capital (Miles & Scott, 2005:87).

The importance of clusters lies in common technologies, skills, knowledge and purchased inputs, Porter (2003:562). Industries comprising a spatial cluster of small firms tend to be more innovative than industries consisting mainly of large firms. It is easier for small firms to collaborate and cooperate than large firms due to the absence of red tape in small firms. Rutten and Boekema (2004:182) confirm this by saying that companies collaborate on innovation because their objective requires external knowledge.

Van Oort (2004:38-39) argues that there are two approaches wherein special spatial circumstances contribute to technological and economic growth by providing favourable conditions for knowledge spill-overs, technology, research and development.

The next section is a summary and conclusions of this chapter.

2.9 SUMMARY AND CONCLUSIONS

This chapter examined the determinants of regional economic growth that specifically affect growth of employment and gross value added. The theory of the firm was used to illustrate how manufacturing production may be an engine of growth. In a free market industry, with diminishing marginal returns, and declining costs in the long-run, prices decrease, while output and employment increase. Use was made of the IS-LM and the AD-AS models to indicate the impact of policies on prices, output and employment. It could be inferred from the results of these interactions that manufacturing is an engine of growth and a creator of jobs.

Agglomeration and its sources, internal returns to scale, localisation economies and urbanisation economies are among the factors that may lead to regional economic growth depending on the size and the nature of the industrial structure of a region.

The theory of Marshall, Arrow and Romer (MAR) was explored and its views on the influence of competition and industrial structure on regional economic growth expressed.

Porter and externalities theory emphasises the positive influence of specialisation and competition on regional economic growth, while Porter's diamond stresses the competitive advantage of firms based on the four attributes: Firm's strategy, structure and rivalry, Factor conditions, Related and supporting industries and Demand conditions.

Specialisation and diversity weighs the advantages and disadvantages of a region's ability to grow and survive economic shocks based on its industrial structure, specialised or diversified, and the urban versus the rural location. The three main components of human capital were identified and their interrelationship explored. The impact of human capital on regional economic growth based on its quantity, quality and availability were explained as well as the active participation of institutions of higher learning in industrial research and development.

Knowledge, innovation and competitiveness indicated the economic importance of knowledge transfer and the relationship between knowledge, human capital, financial capital and physical capital in a knowledge-based economy. The impact of these factors on the total economy output and sustainability was also considered. Finally the ability of cities to generate economies of scale and growth was examined.

In the next chapter the profile of the Southern District Municipality is explored.

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CHAPTER 3

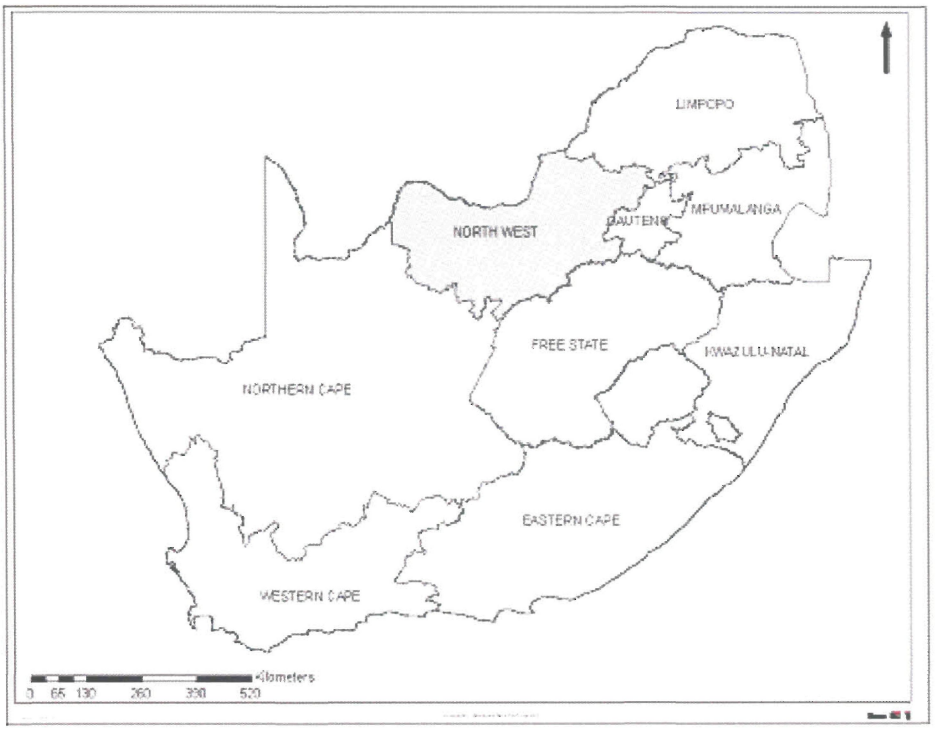
PROFILE OF THE SOUTHERN DISTRICT MUNICIPALITY

3.1 INTRODUCTION

The Southern District Municipality (SDM) is one of the five district municipalities of the North West Province; it is bordered by Bojanala, Bophirima and Central district municipalities (see Map 2). It is formed by five local municipalities, Ventersdorp, Potchefstroom, Matlosana, Maquassie Hills and Merafong City. Due to a lack of data, Merafong is not included in the empirical analysis in chapters 4 and 5.

Map 1 shows the geographic location of the North West Province (where the Southern District is situated) in South Africa.

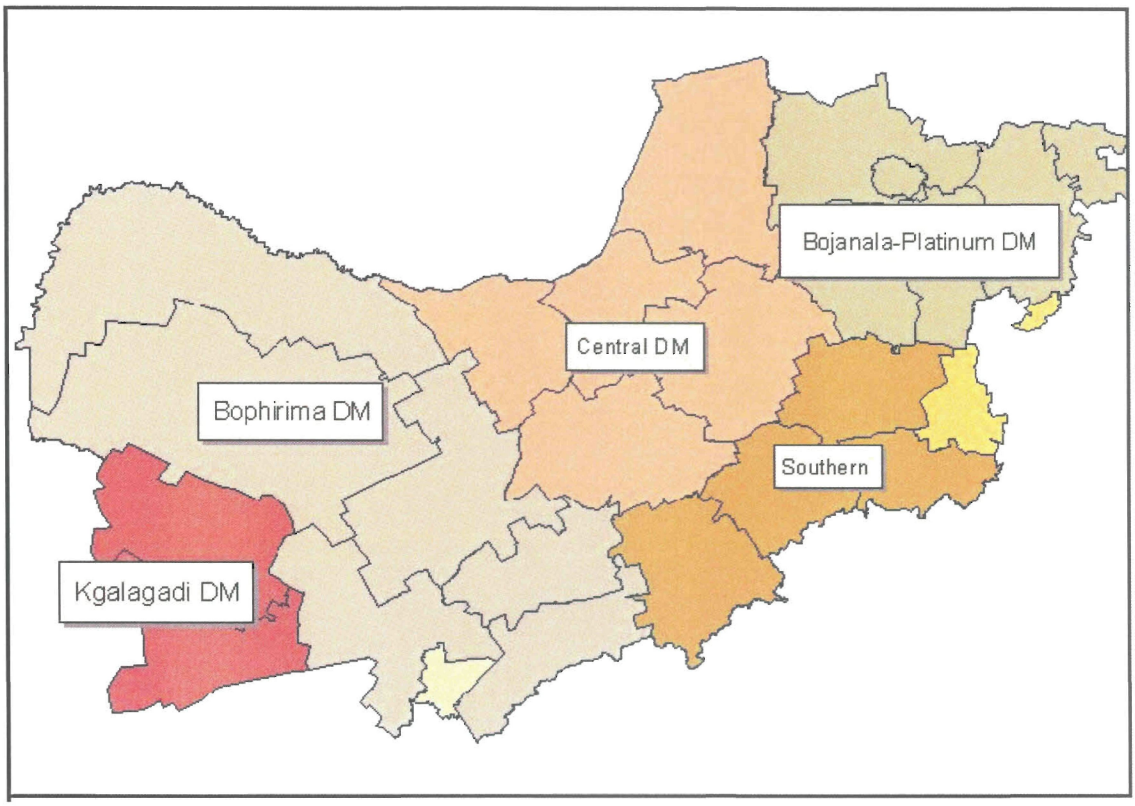
Map 1: South Africa and the North West Province



Source: StatsSA, 2006:vii.

The North West Province is, according to Map 1, one of the nine provinces of South Africa and is bordered by the Free State, Gauteng, Limpopo, Mpumalanga and Northern Cape Provinces.

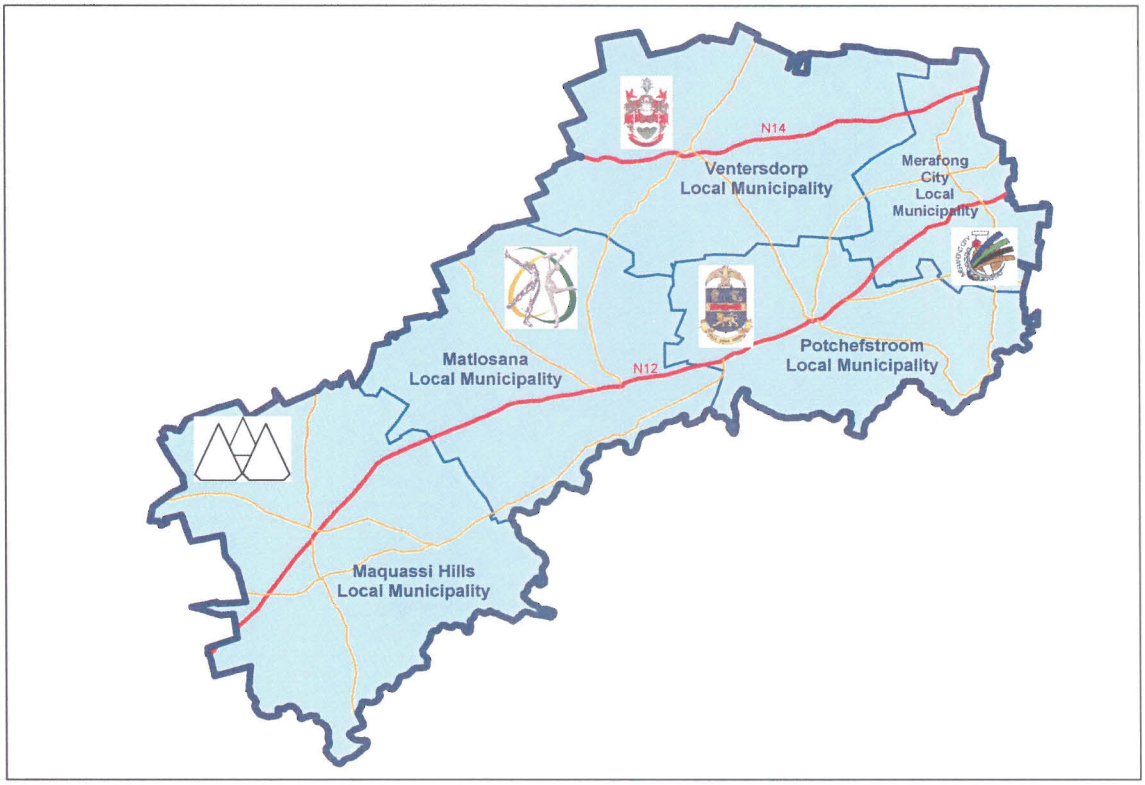
Map 2: District Municipalities of the North West Province



Source: StatsSA, 2006:viii.

The Southern District Municipality is located 65km south west of Johannesburg and borders the Gauteng and Free State Provinces on the East and South, respectively, (Southern District Municipality, 2007:10). Two significant national roads, N12 and N14 go through this district, linking it with markets for raw materials and finished goods.

Map 3: Southern District Municipality



Source: Southern District Municipality, 2007:10.

Matlosana local municipality consists of the following towns/cities: Klerksdorp, Orkney, Stilfontein and Hartbeesfontein. Maquassie Hills is made up of Leeudoringstad, Witpoort, Wolmaransstad and Maquassie (see Map 3). Merafong City covers the following towns: Carletonville, Fochville and Wedela.

The chapter is structured as follows: Section 3.2 discusses manufacturing challenges in the Southern District Municipality. Section 3.3 considers the demographic and economic overview of the SDM and the chapter concludes with a summary in section 3.4.

The next section discusses manufacturing challenges in the SDM.

3.2 MANUFACTURING OBJECTIVES, POTENTIAL AND OPPORTUNITIES IN THE SOUTHERN DISTRICT MUNICIPALITY

3.2.1 Introduction

The manufacturing sector in the Southern District Municipality has been declining and losing jobs because of low levels of competitiveness, which is a result of past inadequate management, high input costs, low quality products, small local markets, long distance to markets, high transport and storage costs, lack of technical skills and capacity, lack of entrepreneurship and insufficient Small, Medium and Micro Enterprises (SMMEs) that focus on manufacturing (Southern District Municipality, 2005:42). The following subsection considers the objectives of the SDM.

3.2.2 Objectives of the Southern District Municipality

The Southern District Municipality has set itself the following objectives in manufacturing, to be attained by the year 2014 (Southern District Municipality, 2005:43):

1) Achieve annual average growth in value added output of eight per cent.
2) Increase the share of manufacturing from seven to eleven per cent of the Gross Geographic Product.
3) Create 3500 additional manufacturing jobs and raise total employment in manufacturing from 10500 to 14000.
4) Establish an Industrial Park along the N12 between Potchefstroom and Klerksdorp in collaboration with the North West University's Science Park.
5) Export manufactured goods worth R400 million per annum.
6) Establish institutions for support and marketing, economic infrastructure, training and skills development and strengthen relationships with organised business.

7) Promote entrepreneurship, SMME development, buy-local campaigns and awareness.

The manufacturing potential of the SDM is the topic of the next subsection.

3.2.3 Manufacturing Potential of the Southern District Municipality

According to the Southern District Municipality (2005:38) manufacturing has the potential to add value to the region's primary production of agriculture and mining. Because of manufacturing's ability to be labour intensive, it can assist in creating jobs. Manufacturing in the SDM has the capacity to produce trained and skilled workers, facilitate forward, backward and horizontal linkages to other sectors, adjust readily to external shocks due to its flexibility compared to primary sectors and generate sustainable exports into world markets.

The Southern District Municipality has initiated the establishment of, amongst others, the Southern District Development Agency (SODA), which focuses on local economic development and the Potchefstroom Industrial Park (in conjunction with the North West University, Potchefstroom) aligned with the Accelerated Shared Growth Initiative for South Africa (ASGISA). Manufacturing development is top of the list of areas of opportunities identified to combat high poverty levels, dwindling agricultural sector, underdeveloped tourism, lack of skills and the high rate of unemployment (Southern District Municipality, 2007:2).

By developing its manufacturing sector, the Southern District Municipality is supposed to be diversifying into sectors that can potentially provide a sustainable economic base for growth and employment (Southern District Municipality, 2005:38). The following subsection takes a look at the opportunities in manufacturing in the SDM.

3.2.4 Opportunities in Manufacturing: Southern District Municipality

According to the Southern District Municipality (2005:42-43) the following opportunities exist:

- Import substitution, especially in chemicals, fuels and electronics.
- Exports to Africa, East Asia and the US.
- Clustering in: chemicals, metals, food processing, building materials and pharmaceuticals.

Special projects can be undertaken in the following areas in the District:

- Jewellery manufacturing.
- Diamond cutting.
- Art and crafts manufacturing.
- Bio-diesel, oils and lubricants.
- Animal feeds.
- Strengthening and supporting the role of institutions of higher learning in Research, Development and Innovation.

The following section considers the demographic and economic trends of the SDM with respect to: economically active population, gross domestic product per capita, education levels and unemployment.

3.3 DEMOGRAPHIC AND ECONOMIC OVERVIEW OF THE SOUTHERN DISTRICT MUNICIPALITY

3.3.1 Economically Active Population

The SDM comprises 21 per cent of the total North West Province's economically active population, according to Table 3.3.1. The economically active population

of the Southern District Municipality and the North West Province is indicated in Table 3.3.1 and Figure 3.3.1

Table 3.3.1: Economically Active Population, Southern District Municipality (SDM) and the North West Province (NW)- 2007

CODE	MUNICIPALITY	TOTAL
401	Ventersdorp	12984
402	Potchefstroom	93899
403	Matlosana	205304
404	Maquassie Hills	31969
	SDM	**344156**
	NW	**1605046**

Source: Global Insight, 2007

From Table 3.3.1 and Figure 3.3.1, the local municipality of Matlosana has the highest number of economically active people and the lowest number of economically active people is found in Ventersdorp local municipality (codes 401 to 404 in the table are used to identify the various local municipalities).

Each of these two municipalities represents 60 and 4 per cent, respectively, of the total SDM's economically active population. Potchefstroom is second to Matlosana and represents 27 per cent while Maquassie Hills is third and represents 9 per cent of the total SDM's economically active population (see Table 3.3.1).

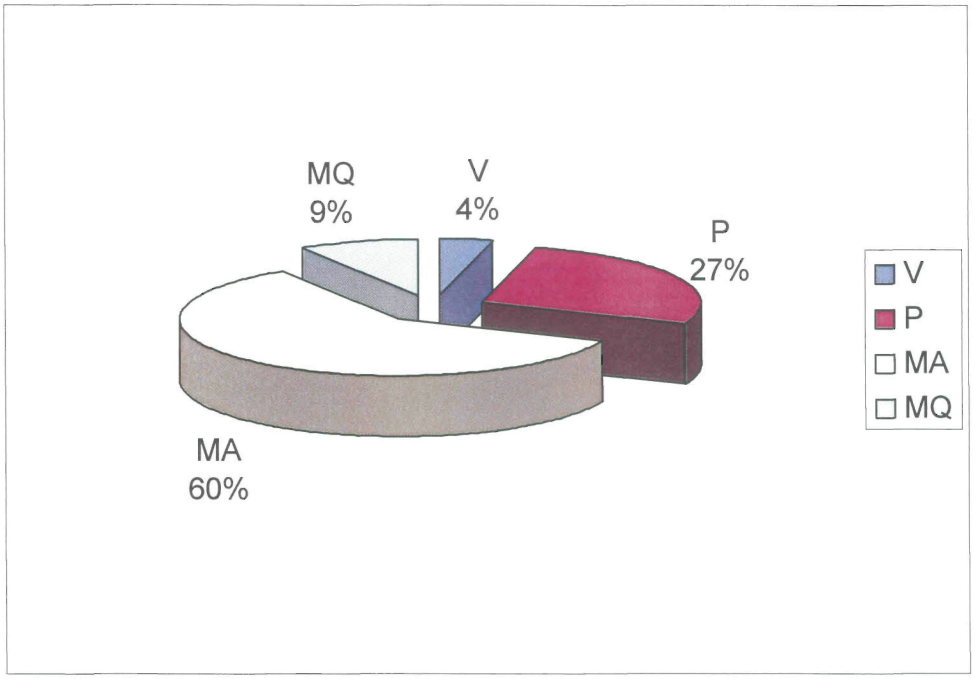


Figure 3.3.1 Economically Active Population as % of the SDM-2007

Source: Global Insight, 2007 (own calculations).

KEY: **V** stands for Ventersdorp local municipality
P for Potchefstroom local municipality
MA for Matlosana local municipality and
MQ for Maquassie Hills local municipality

3.3.2 Gross Domestic Product (GDP) per capita

The GDP per capita of the Southern District Municipality and the North West Province is captured in Table 3.3.2 and Figure 3.3.2. According to Table 3.3.2 and Figure 3.3.2, the highest GDP per capita is recorded in Potchefstroom local municipality, second is Matlosana local municipality, third and fourth are Ventersdorp and Maquassie Hills local municipalities, respectively. Their respective contributions to the total SDM's GDP per capita are 38, 32, 18 and 12 per cent.

Table 3.3.2: Gross Domestic Product Per Capita, Southern District Municipality (SDM) and the North West Province (NW) – 2007

CODE	MUNICIPALITY	TOTAL
401	VENTERSDORP	10324
402	POTCHEFSTROOM	22307
403	MATLOSANA	18795
404	MAQUASSIE HILLS	7276
	SDM	**58702**
	NW	**18534**

Source: Global Insight, 2007

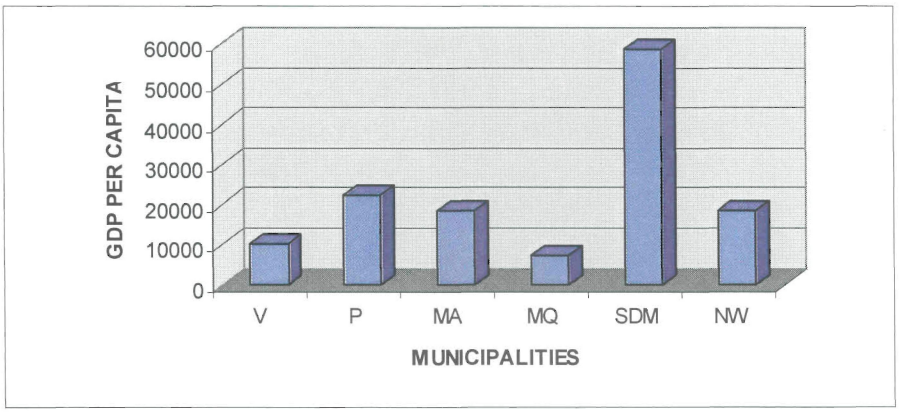


Figure 3.3.2 Gross Domestic Product Per Capita, SDM & NW-2007

Source: Global Insight, 2007 (own calculations)

The SDM's GDP per capita exceeds the North West Province's by a margin of 40168. Potchefstroom and Matlosana local municipalities have, individually, GDP's per capita that are greater than that of the province.

3.3.3 Education levels

The education levels of the Southern District Municipality and the North West Province are indicated in Table 3.3.3 and Figures. 3.3.3(a) and 3.3.3(b)

Table 3.3.3: Education levels, Southern District Municipality (SDM) and the North West Province (NW) – 2007

	No School	GR 0-2	GR 3-6	GR 7-9	GR10-11	< GR 12	GR 12
MQ	13611	2987	12104	14301	8092	190	6579
MA	23611	4502	38685	77141	61820	1722	61625
V	3527	860	5339	7340	3512	57	2561
P	10462	2418	16910	35582	26747	1242	37735
SDM	**51211**	**10767**	**73038**	**134364**	**100171**	**3211**	**108500**
NW	*299913*	*56401*	*379559*	*700312*	*524643*	*13044*	*548709*

	M+CERT	M+DIP	M+BACH	M+BACH	M+BACH	M+MAST	M+DOC	M+Other
MQ	354	1147	187	58	55	0	0	193
MA	4722	7247	2540	657	279	440	173	2263
V	141	581	168	0	27	0	0	128
P	2257	5096	2708	1074	428	715	478	1453
SDM	**7474**	**14071**	**5603**	**1789**	**789**	**1155**	**651**	**4037**
NW	*25812*	*70610*	*20163*	*4022*	*2302*	*2981*	*1707*	*21155*

Source: Global Insight, 2007

Table 3.3.3 and Figure 3.3.3. (a) indicate that the number of people whose highest level of education is Grade 12 in the SDM, constitute 20 per cent of the North West Province's total of Grade 12's. The majority of these people come from Matlosana and Potchefstroom local municipalities, 61625 and 37735, respectively. The second part of Table 3.3.3 and Figure 3.3.3. (a) reflect a 30 and 20 percent representation of the SDM's Grade 12 plus certificate and Grade 12 plus diploma, respectively, as a percentage of the North West Province's total.

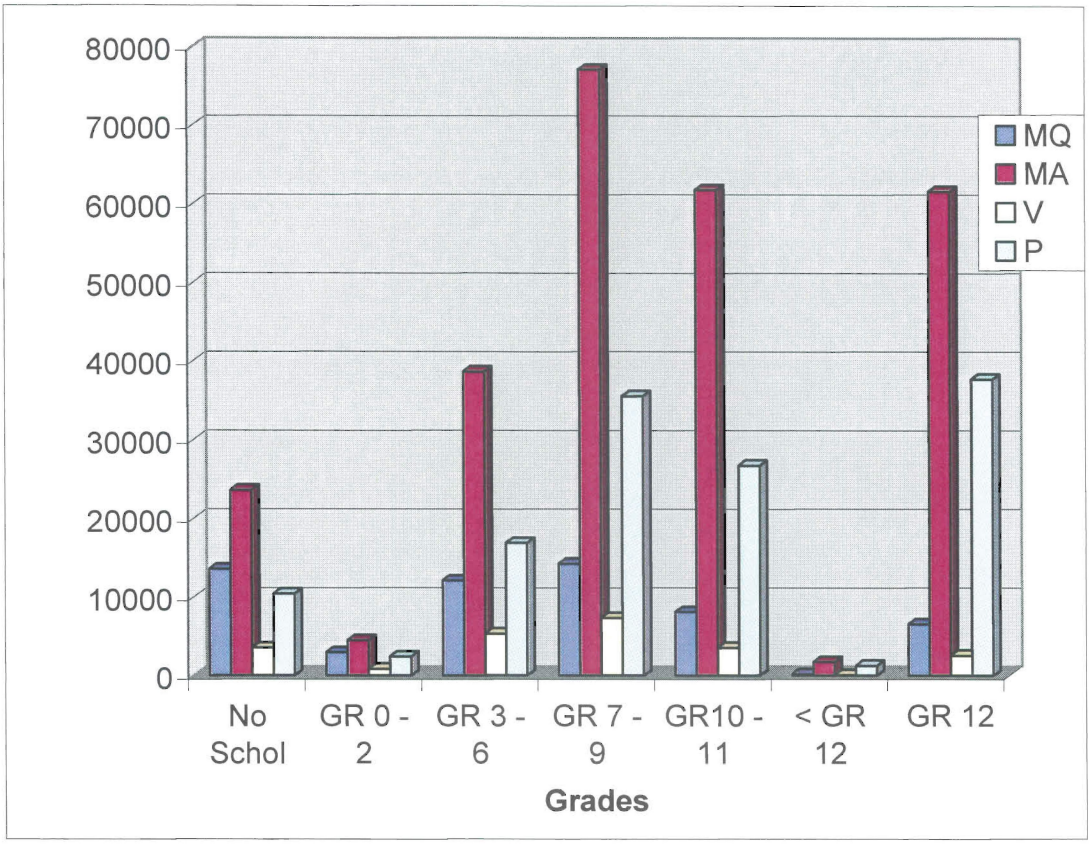


Figure 3.3.3. (a) Education Levels (School), SDM – 2007

Source: Global Insight, 2007 (own calculations)

Grade 12 plus bachelor's degrees in the SDM constitute 31 per cent of the total of the North West Province's grade 12 plus bachelor's degrees category. The majority of these individuals come from Potchefstroom and Matlosana local municipalities. Postgraduate degrees, grade 12 plus master's and doctorate degrees, in the Southern District Municipality comprise an average of 39 per cent of the total postgraduate degrees in the North West Province. The highest numbers in this category come from Potchefstroom. Maquassie Hills and Ventersdorp have no individuals with postgraduate degrees according to Table 3.3.3 and Figure. 3.3.3 (b).

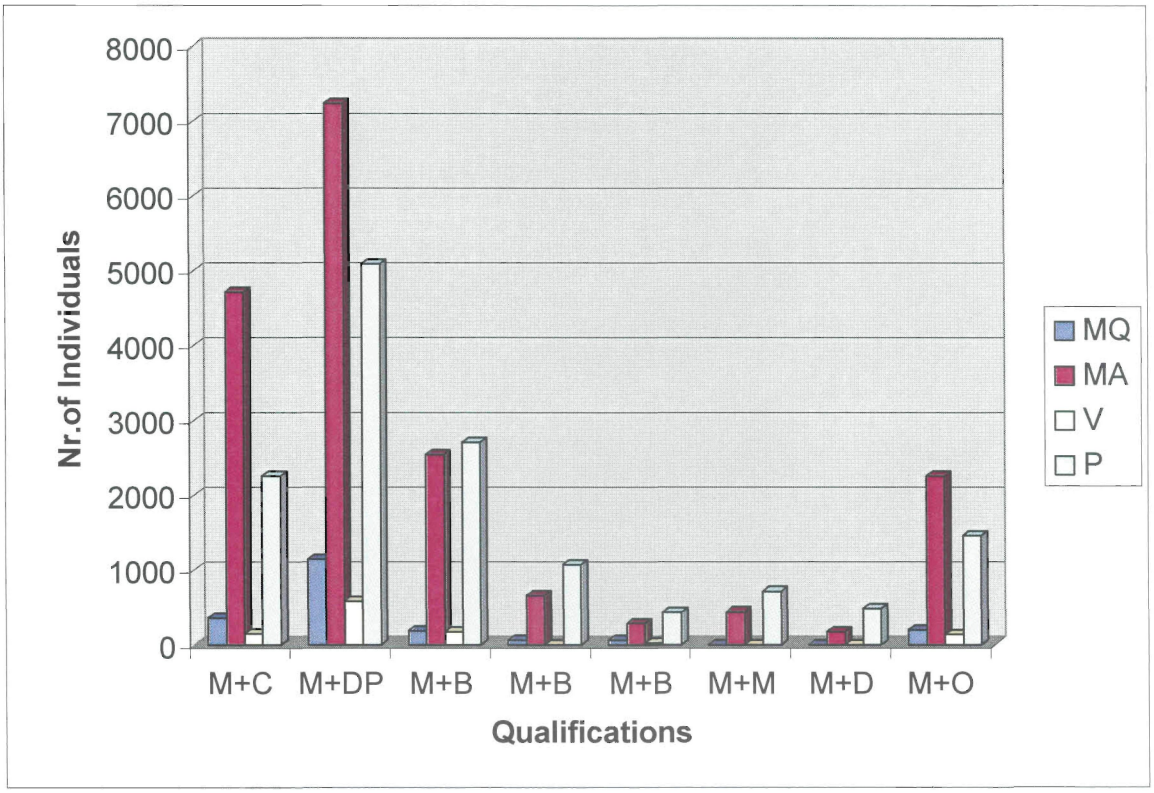


Figure 3.3.3. (b) Education Levels (Post School), SDM – 2007

Source: Global Insight, 2007 (own calculations)

KEY: **M+C** is Matric plus certificate
M+DP is Matric plus Diploma
M+B is Matric plus Bachelor's degree
M+M is Matric plus Master's degree
M+D is Matric plus Doctorate degree and
M+O is Matric plus Other qualifications

3.3.4 Unemployment

Unemployment in the Southern District Municipality and the North West Province is shown in Table 3.3.4 and Figure 3.3.4. The SDM's economy depended to a large extent on mining, especially gold mining. The closure of the mines in this area and the worldwide general decline in gold production led to a high rate of unemployment and the related problems of poverty and crime – hence this study.

Subsequent chapters of this study investigate alternative sources of employment. Manufacturing was identified as one of the sources due to its unique role in economic development.

Table 3.3.4: Unemployment, Southern District Municipality (SDM) and the North West Province (NW) – 2007

CODE	MUNICIPALITY	TOTAL
401	VENTERSDORP	4157
402	POTCHEFSTROOM	30510
403	MATLOSANA	85646
404	MAQUASSIE HILLS	12979
	SDM	**133292**
	NW	**699802**

Source: Global Insight, 2007 (own calculations).

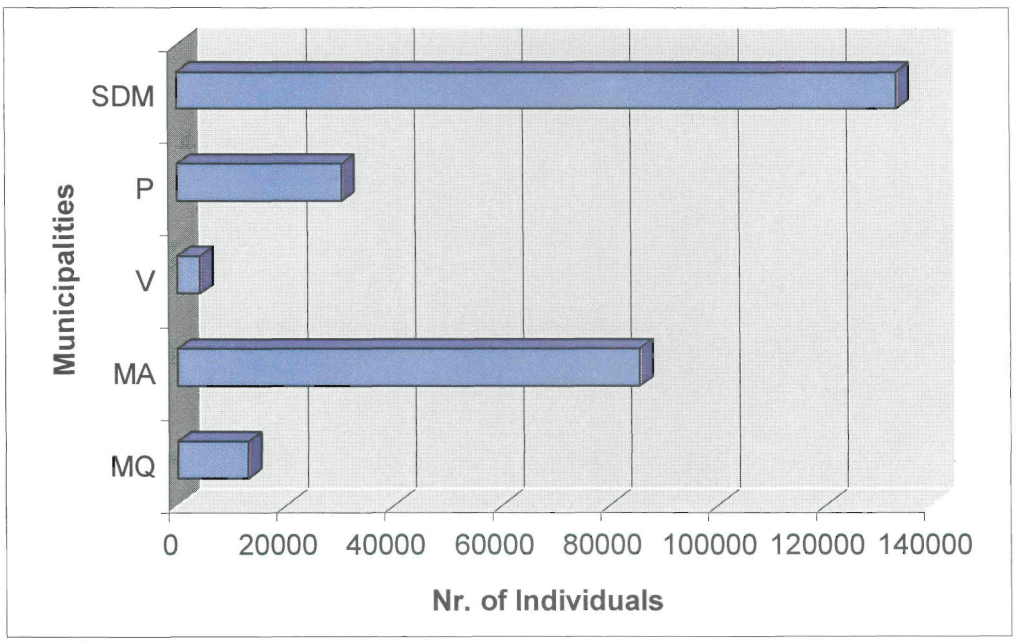


Figure 3.3.4 Unemployment, Southern District Municipality (SDM)-2007

Source: Global Insight, 2007 (own calculations).

Matlosana local municipality takes the lead in unemployment, followed by Potchefstroom, Maquassie Hills and Ventersdorp these contribute, 64, 23, 10 and 3 per cent, respectively to the total unemployment of the Southern District Municipality. The Southern District Municipality on the other hand, contributes 19 per cent to the total unemployment of the North West Province (see Table 3.3.4).

The next section concludes the chapter.

3.4 SUMMARY AND CONCLUSIONS

This chapter examined manufacturing challenges, geographic and demographic overviews of the Southern District Municipality and comparing them with the North West Province.

Two local municipalities, Matlosana and Potchefstroom dominate Maquassie Hills and Ventersdorp in all economic aspects. A unique feature of the Southern District Municipality is its GDP per capita, which is greater than that of the North West Province.

This is due to the fact that Southern District Municipality has better economic development. The policy makers, as well as private and public institutions are better advised to exploit this to their advantage and to the advantage of the communities in the Southern District Municipality. It is apparent that the Southern District Municipality has the potential to turn its economy around through the development of the manufacturing sector.

Potchefstroom local municipality surpasses Matlosana local municipality with regard to GDP per capita and the number of individuals with grade 12 plus bachelor's and postgraduate degrees and this might probably be the result of the presence of a university and the industrial activities that are associated with the academic environment.

The number of individuals with grade 12 plus certificate and diploma are higher in Matlosana local municipality than in Potchefstroom local municipality. A contributory factor might be the presence of the a university of technology and a host of Further Education and Training (FET) colleges, whose main qualifications are certificates and diplomas, in the Matlosana local municipality.

The presence of institutions of higher learning is important for manufacturing and the economy because these institutions will provide skills needed for production, the research and development and the knowledge spill-overs necessary for a vibrant and sustainable industrial economy.

The absence of individuals with postgraduate degrees in the Maquassie Hills and Ventersdorp local municipalities may be due to their small economies and lack of broad job and business opportunities. The inhabitants of these local municipalities may be acquiring postgraduate degrees but because of the abovementioned conditions, they settle permanently in big cities and are counted as inhabitants of those cities.

The next two chapters, 4 and 5, represent the empirical investigation of this study.

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CHAPTER 4

SHIFT-SHARE ANALYSIS OF EMPLOYMENT IN MANUFACTURING: SOUTHERN DISTRICT MUNICIPALITY

4.1 INTRODUCTION

One of the objectives of this study is to identify spatial and sectoral concentrations and movement in manufacturing and to determine the growth or decline in manufacturing sectors. This study emphasises manufacturing because "manufacturing deserves special attention as it is seen as an engine of growth" and leads to employment creation, economic development and an increase in the living standards of people, amongst others (Kleynhans, 2003:3). This growth or decline will assist in explaining employment patterns at regional level. According to Shearmur and Polèse (2007:454) smaller, specialised regions need employment opportunities in order to survive.

There is no evidence to suggest a straightforward and unique approach to employment creation and retention at local level. However, research revealed that in Canada, slow growing areas are usually more specialised in declining industries, which are often primary and first-transformation manufacturing (Shearmur & Polèse, 2007:453-461).

The purpose of this chapter is to conduct an empirical investigation and determine employment patterns in the Southern District Municipality's manufacturing industry using the traditional and static Shift-Share analysis method. Both the country (South Africa) and the province (North West) are used as reference areas. Shift-Share analysis is a preferred method for this study because Dinc and Hayes (2005:375) concede that "it provides reasonable, easily interpreted results due to its simple logic, analytical clarity and relatively accessible data requirement".

According to Graham and Spence (1998:516) shift-share analysis is one of the most widely used methodologies in regional and urban research, while Kobayashi and Roper (2004:430) regards shift-share analysis as a method used to measure two sources of gaps, industry mix and regional share, between the growth of a region and the national growth rate. Shift-Share analysis is a method used in regional economic analysis to examine employment changes, amongst others, and is a simple tool for disaggregating the components of employment growth (Peh & Wong, 1999:322).

Patterson (1991:211), Bendavid-Val (1993:68) and Ray (1995:21) state that shift-share analysis is a technique of disaggregating regional employment growth into three components: national share, industry mix and regional share. Bendavid-Val (1993:67) takes the point further to say that shift-share analysis assists in identifying opportunities for altering the composition of regional economies to find the means to improve their performances.

Labour force growth is, according to Armstrong & Taylor (2000:114), one of the determinants of output growth in manufacturing and since some industries have more growth potential than others, the particular mix of industries in which a region specialises, has an effect on the region's growth performance. Manufacturing in Mexico during 1990-2002, did not respond to other economic variables, except chains of industrial clusters and location-specific initiatives (Mollick *et al.*, 2006:114).

This chapter is structured as follows: section 4.2 discusses the shift-share analysis methodology; sections 4.3 and 4.4 empirically decompose employment within the region into national share effect, industry mix effect, regional share effect and total regional employment and identify growing and declining sectors.

Section 4.5 shows the comparison of the national and provincial analysis; section 4.6 gives the implications for the Southern District Municipality (SDM) and section 4.7 forms the summary and conclusion of the chapter.

4.2 SHIFT-SHARE ANALYSIS

Pearce (1986:386) defines shift-share analysis as a technique used in the analysis of regional economic growth. The region's actual economic growth is compared with the national growth rate, showing the growth that would have been observed at the regional level if each industry in the region was growing at the national growth rate of that industry. If the region's actual growth rate is G_R, the growth that would have been observed if the region grew at the national rate is G_E and the growth rate of the national economy is G_N, then the components of regional growth can be calculated as: $G_E - G_N$. This is an indication of the effect of the region's industrial structure on the growth performance. If this component is positive, then the regional industries are growing faster than the national average economic growth rate, and if this component is negative, then the regional industries are growing more slowly than the national average economic growth rate.

The residual component, $G_R - G_E$, is the "unexplained" part of regional growth which contains region-specific factors. If it is positive, the region is growing faster than its industrial structure would predict. When this component is negative, industrial growth is below the industrial structure's potential. According to Muskens and Koops (2006:3) the "Shift" is the differential growth due to the difference between the actual or observed growth and the expected structural growth, while the "Share" is the structural growth that would have been observed if each industry in the region grew at the national growth rate.

Shift-Share analysis can according to Georgia Tech (2007) be used to show, amongst others, a region's competitiveness, how well a region's mix of industries is performing, how individual industries and sectors are doing and to analyse the individual industry or the economy as a whole. Dinc and Hayes (2005:376) made the following assumptions regarding the traditional static shift-share model:

- Regional technology is similar to the reference area.
- Regional labour is as productive as the reference area.
- Regional demand patterns are similar to reference area averages.
- The traditional model ignores international and interregional trade.

These assumptions are criticised for being too idealistic and remote from real life situations. Although the shift-share analysis method is preferred in this study, it has some drawbacks and the next section considers these criticisms.

Mayor *et al.* (2007:545) and Wilson *et al.* (2005b:165) are in agreement about the inability of the static shift-share analysis to capture changes in the intermediate stages between the initial and the final periods of analysis. Graham and Spence (1998:516), Ray (1995:26) and Patterson (1991:214) criticise the shift-share analysis for being: atheoretical and unable to demonstrate causality.

According to these authors, shift-share analysis merely decomposes employment changes into various components but cannot determine the cause of regional employment growth and it cannot guarantee or test the separation of the national, industrial and regional variables into statistically independent variables. The author of this dissertation does not necessarily agree with these points of criticism, as the analysis is based on pure averages of location (see Sekhobela & Kleynhans, 2008b:7). Shift-share analysis is criticised by Van der Merwe (2006:7) as lacking consistency in, notation, definitive equations and terminology.

However, shift-share analysis remains a useful tool for supplying data to policy makers to interpret, amongst other things, changes in the industrial structure of their economies (Wilson *et al.*, 2005b:164). Restrictions on the availability of data, especially on municipal level, made the application of shift-share analysis ideal for this study using the Rex Data base from Global insight.

This study uses a combination of the notation, equations and approach of the following authors, Georgia Tech (2007), Van der Merwe (2006) and Bendavid-Val (1993). As far as possible, the notation and equations used have been adjusted to suit the conditions of this study. Employment growth in the region is disaggregated into three components: National Share Effect (N), Industry Mix Effect (M) and the Regional Competitive Share Effect (S). The sum of these three components is the Total Change in Regional Employment (R), defined symbolically as:

$$\mathbf{R = N + M + S} \qquad \mathbf{(4.1)}$$

Where **R** is the total number of jobs added or lost in the region as a net effect of the national growth, industry mix and regional competitive components, **N** is the region's potential employment growth, assuming that the region's employment is growing at the national average growth rate, **M** is the proportion of regional employment among faster, and slower, growing regional sectors relative to the national average growth rate and **S** describes how sectors in the region perform relative to the national averages of the same sectors.

The next section studies changes in national employment, national share (N), industry mix (M), regional competitive share (S) and total change in regional employment (R) of the SDM-Region.

4.3 NATIONAL SHARE (N), INDUSTRY MIX (M), REGIONAL COMPETITIVE SHARE (S) AND TOTAL CHANGE IN EMPLOYMENT (R)

4.3.1 Changes in National Employment

The changes in national employment for the period 1996 to 2006 are summarised in Table 4.1 and Figure 4.1.

Table 4.1: Changes in National Employment, South Africa, 1996-2006

	Employment		Employment Change	
SECTOR	1996	2006	Value E(v)	E %
Food & beverages	221426	192355	-29071	-13
Textile & clothes	260112	189571	-70541	-27
Wood & paper	165959	209605	43646	26
Petroleum & chemicals	177349	177137	-212	0
Other non – metal	75687	61187	-14500	-19
Metal products	276446	310322	33876	12
Electrical machines	86689	48533	-38156	-44
Electronic equipment	24090	20831	-3259	-14
Transport equipment	96274	134385	38111	40
Furniture	73105	82838	9733	13
TOTAL	**1457137**	**1426764**	**-30373**	**-2**

Source: Rex Data, 2007 (Own calculations)

Total Employment Change (value), the third column of Table 4.1 is the difference between national employment in the final period and the initial period of analysis.

Therefore the total employment change would be:

$$E(v) = E^{tf} - E^{ti} \qquad (4.2)$$

Where E (v) is the employment change in absolute terms, E^{tf} is the total employment in the final period and E^{ti} is total employment in the initial period. From Table 4.1, E (v) is – 30373 indicating a total loss of employment. The National average growth rate in employment E (%) is expressed as a percentage and defined as:

$$E(\%) = [E^{tf} / E^{ti} - 1] \times 100 \qquad (4.3)$$

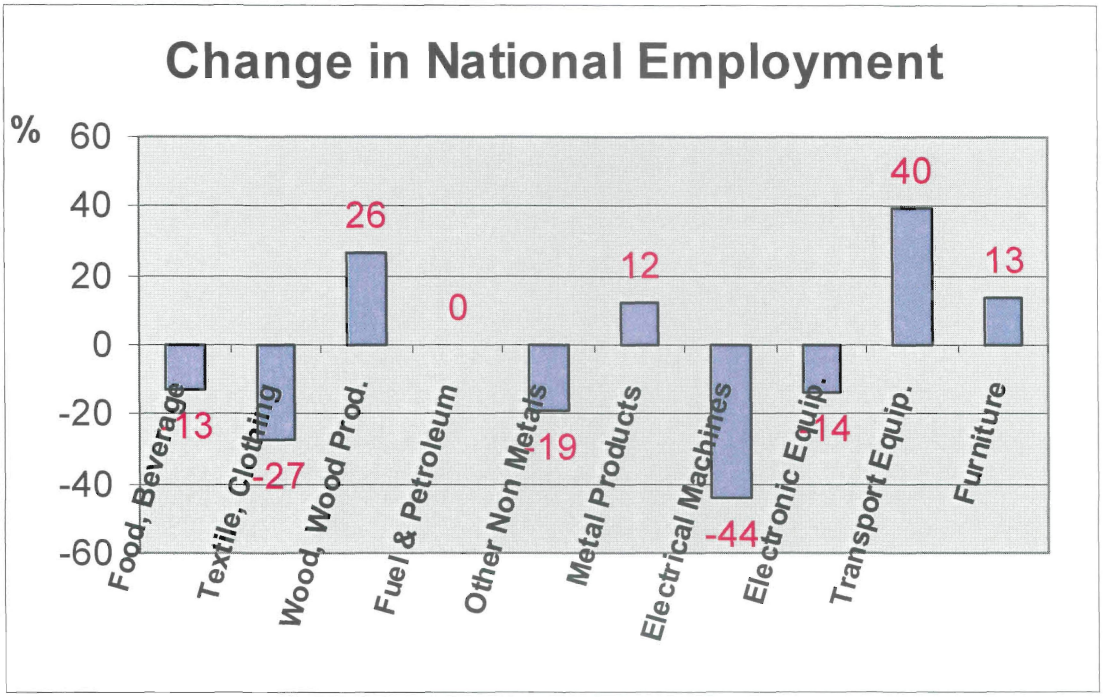


Figure. 4.1 Change in National Employment

Source: Sekhobela & Kleynhans, 2008b.

Table 4.1 indicates that the national average growth in employment declined by 2 per cent during the research period. However, Table 4.1 and Figure 4.1, show

that the following sectors have a positive growth on national level, wood and paper products, metal products, transport equipment and furniture at 26, 12, 40 and 13 per cent respectively. In the period under review, these sectors have between them, added a total of 125366 new jobs to the economy. But the total national employment declined by 30373 jobs, which means that the remaining sectors, food and beverages textile and clothes, other non-metal minerals, electrical machines and electronic equipment declined by a total of 155739 jobs. The lowest decline in employment is 44 per cent in the electrical machines while the greatest, -13 per cent, is in food and beverages. Petroleum and chemicals did not gain or loose any jobs during the research period, recording an absolute change in employment of zero.

Section 4.3.2 is the definition of total change in regional employment.

4.3.2 Total Change in Regional Employment (R)

The total change in regional employment (R) is the difference in total regional employment in the final period and the initial period. It is calculated as follows:

$$R = e^{tf} - e^{ti} \qquad (4.4)$$

Where R is the total change in regional employment, e is total employment in the region, ti is the initial period, tf is the final period of analysis. According to Table 4.2 this is equal to – 2345. A negative total employment change, R, suggests a total loss of 2345 jobs in the Southern District Municipality (SDM) region.

The total percentage change in regional employment R (%), is the total final regional employment divided by the total initial regional employment minus one, multiplied by 100, and is calculated as follows:

$$R\,(\%) = [e^{tf} / e^{ti} - 1] \times 100 \qquad (4.5)$$

The changes in regional employment for the Southern District Municipality for 1996 to 2006 are summarised in Table 4.2 and Figure 4.2.

Table 4.2: Changes in Regional Employment in the Southern District Municipality, 1996-2006

	Employment		Employment Change	
SECTOR	1996	2006	R	Per cent R (%)
Food & beverages	3051	2096	-955	-31
Textile & clothes	532	311	-221	-42
Wood & paper	610	581	-29	-5
Petroleum & chemicals	1589	1194	-395	-25
Other non – metal	786	470	-316	-40
Metal products	1978	1748	-230	-12
Electrical machines	147	64	-83	-56
Electronic equipment	169	105	-64	-38
Transport equipment	382	406	24	6
Furniture	635	559	-76	-12
TOTAL	**9879**	**7534**	**-2345**	**-24**

Source: Rex Data, 2007 (Own calculations).

According to Table 4.2, R (%) is -24 per cent. This figure represents a decline in the region's employment. Comparing this figure with the national average growth rate, -2 per cent (Table 4.1), it is observed that the region's employment in manufacturing is declining twelve times faster than the national average growth rate.

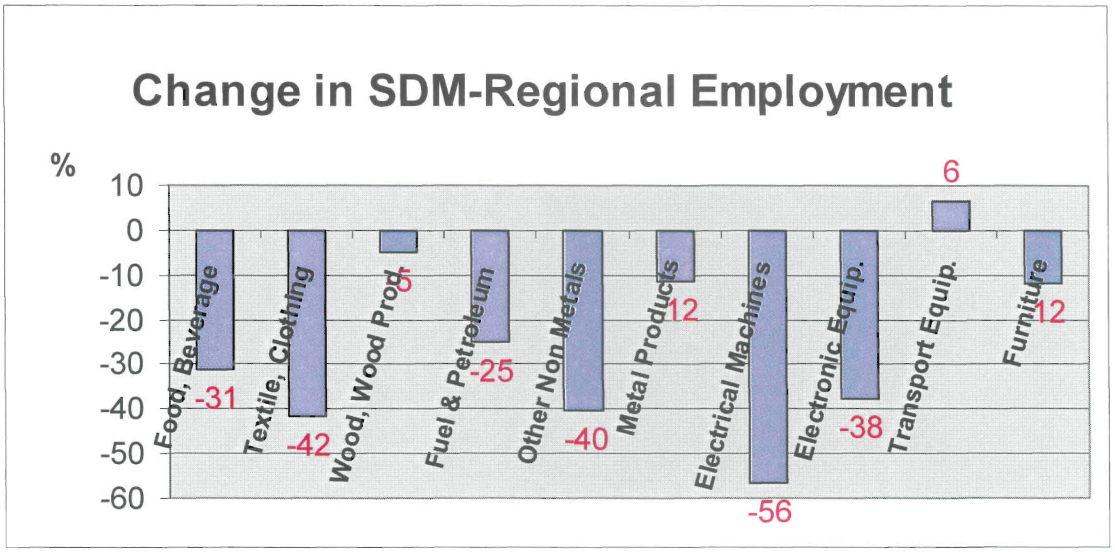


Figure 4.2 Change in SDM-Regional Employment

Source: Sekhobela & Kleynhans, 2008b:10.

Table 4.2 and Figure 4.2 indicate a decline in employment for all sectors except transport equipment which increased by 6 per cent. Job losses below 30 per cent are found in wood and paper, metal products, furniture and petroleum and chemicals products. The highest decline is in electrical machines (-56 per cent) and the lowest is in wood and paper (-5 per cent).

The question is, how can the differences between national and regional changes in employment be explained? The next section provides the answer to this question.

4.3.3 National Share Effect (N)

The National share effect is an indicator of how much regional employment would have grown had each of its sectors and, therefore, the regional total, grown at the same rate as the national average employment growth.

The National share effect (N) is determined by:

$$N = e^{ti}_1[E\ \%] + e^{ti}_2[E\ \%] + \ldots + e^{ti}_n[E\ \%] \qquad (4.6)$$

Where **N** is the total national share of the manufacturing industry, **e** is the regional employment in sectors **1, 2 . . .**, up to **n** in the initial period **ti** and **E %** is the national average employment growth rate (see equation 4.3).

Table 4.3: National Share Effect (N) in the Southern District Municipality, 1996-2006

SECTOR	1996	N	R	R – N
Food & beverages	3051	-61	-955	-894
Textile & clothes	532	-11	-221	-210
Wood & paper	610	-12	-29	-17
Petroleum & chemicals	1589	-32	-395	-363
Other non – metal	786	-16	-316	-300
Metal products	1978	-40	-230	-190
Electrical machines	147	-3	-83	-80
Electronic equipment	169	-3	-64	-61
Transport equipment	382	-8	24	32
Furniture	635	-13	-76	-63
TOTAL	**9879**	**-198**	**-2345**	**-2147**

Source: Rex Data, 2007 (Own calculations).

From Table 4.3 the total national share effect is -198. The region would have lost 198 jobs in the period under review if it grew at the national average growth rate of -2 per cent. But the actual decline in the region is 2345, which is approximately twelve times the total national share effect of 198. Therefore, something

happened in the regional manufacturing that resulted in a total difference of -2147 [-2345-(-198)] between the national and the regional sectors. This difference is captured in the last column of Table 4.3 and can be accounted for by the Industry Mix (M) and the Regional Competitive Shares (S), because equation (4.1) reads: R = N+M+S (4.1)

then R-N = M+S

but R-N = -2147

therefore M+S = -2147

The extent to which the regional growth deviates from the national average growth rate is attributable to fact that the regional manufacturing industry includes sectors that are growing faster and/or slower than the national average growth rate and this is illustrated in Table 4.3. Figure 4.3 is a graphical representation of the National Share effect (N) and according to this figure and Table 4.3; all sectors have a negative growth, with some sectors more than others.

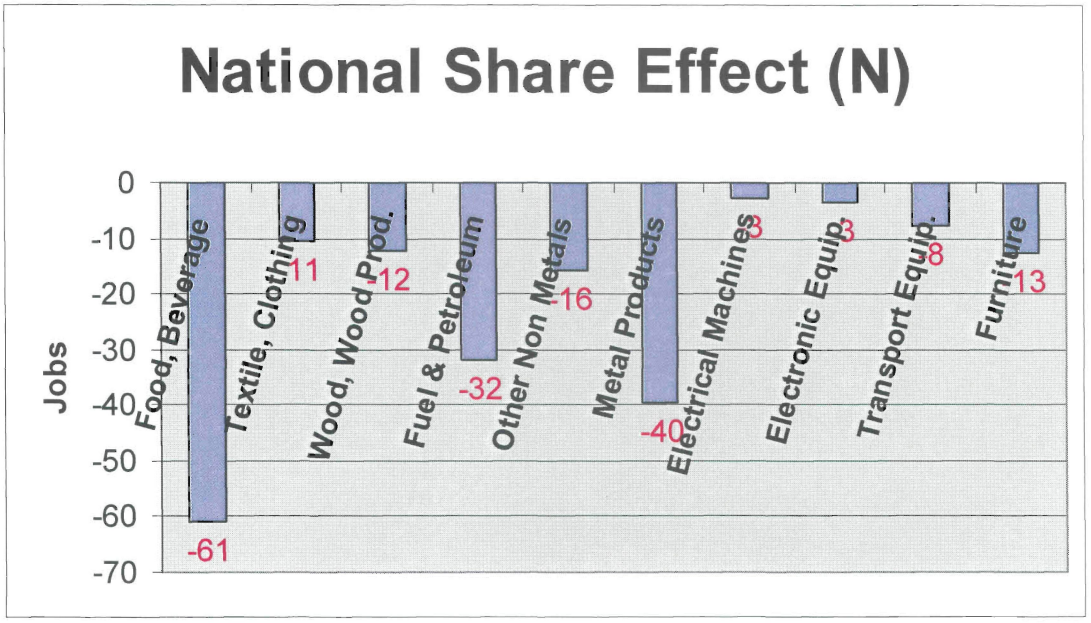


Figure 4.3 National Share Effect (N)

Source: Sekhobela & Kleynhans, 2008b:11.

Table 4.3 shows the calculations for the National Share Effect (N) in the Southern District Municipality for 1996 to 2006.

Sectors that lost most jobs are: food and beverages, metal products and petroleum and chemicals products. The least losers are: other non-metals, furniture, wood and paper, textile and clothing, transport, electronic equipment and electrical machines (Sekhobela & Kleynhans, 2008a:10).

4.3.4 Industry Mix Effect (M)

The Industry Mix (M) for the Southern District Municipality for 1996 to 2006 is summarised in Table 4.4 and Figure 4.4. The industry mix component shows how the region's industrial structure factors into its overall employment growth performance (SETA, 2007:2). When local employment is concentrated in the fast growing sectors, the rate of local employment growth would exceed the national average. If the regional employment is concentrated in slow growing sectors, the growth rate of regional employment would be lower than the national economy wide average.

The industry mix effect is calculated as the product of the region's sectoral employment in the initial year and the marginal rate of growth. The marginal rate of growth (MR %) is the difference between the national sectoral growth and the national average growth (third column in Table 4.4). Therefore, the industry mix effect (M), is defined by equation (4.7).

$$\mathbf{M = MR_1 (e^{ti}{}_1) + MR_2 (e^{ti}{}_2) + \ldots . + MR_n (e^{ti}{}_n)} \qquad (4.7)$$

Where M is the regional industry mix, MR is the marginal rate of growth in sectors 1, 2, 3, ... up to n and e^{ti} is region's sectoral employment in the initial year. The total regional industry mix (M), is equal to 51 according to Table 4.4. This positive

figure suggests that the region's industrial structure is such that there is a high concentration of employment in sectors that are growing faster than the national average growth rate resulting in a growth of 51 jobs in the region.

Table 4.4: Industry Mix Effect (M) in the Southern District Municipality, 1996-2006

	Employment Growth %		MR (%) x e / 100 = M		
SECTOR	National Sector	National Average	MR (%)	e (1996)	M
Food & beverages	-13	-2	-11	3051	-336
Textile & clothes	-27	-2	-25	532	-133
Wood & paper	26	-2	28	610	171
Petroleum & chemicals	0	-2	2	1589	32
Other non – metal	-19	-2	-17	786	-134
Metal products	12	-2	14	1978	277
Electrical machines	-44	-2	-42	147	-62
Electronic equipment	-14	-2	-12	169	-20
Transport equipment	40	-2	42	382	160
Furniture	13	-2	15	635	95
TOTAL				**9879**	**51**

Source: Rex Data, 2007 (Own calculations).

The region's industrial structure is contributing positively to the overall employment growth by reducing the loss of 198 jobs due to the national share effect by 51, resulting in a net loss of 147 instead of 198, (see Table 4.5).

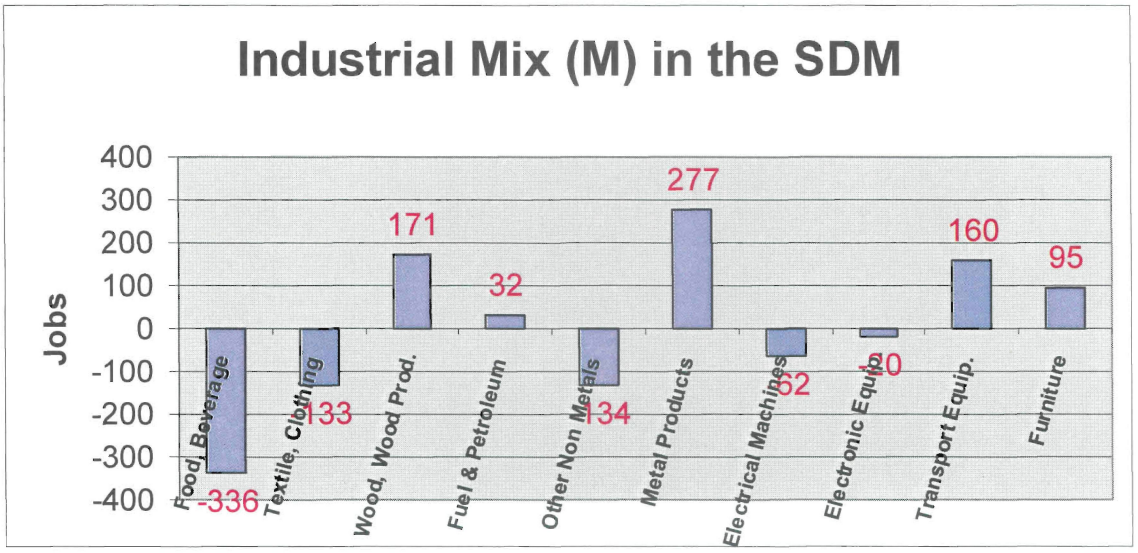


Figure 4.4 Industrial Mix (M) in the SDM

Source: Sekhobela & Kleynhans, 2008b:13.

In this way the industry mix minimised job losses in the region. Sectors that have a positive industry mix are growing faster than the national average growth rate and those that are negative are growing more slowly than the national average growth rate. Table 4.4 and Figure 4.4 indicate fast growing sectors as: wood and paper, petroleum and chemicals, metal products, transport equipment and furniture. Food and beverages, textile and clothes, other non- metal minerals, electrical machines and electronic equipment are slow growing sectors, according to Table 4.4 and Figure 4.4. The remaining component is the regional competitive share effect and is the subject of section 4.3.5.

4.3.5 Regional Competitive Share Effect (S)

The regional competitive share effect, the last column of Table 4.5 and Figure 4.5, describe how sectors in the region performed relative to the national averages of the same sectors. Table 4.5 also summarises the National share effect, Industrial mix effect and the total change in employment.

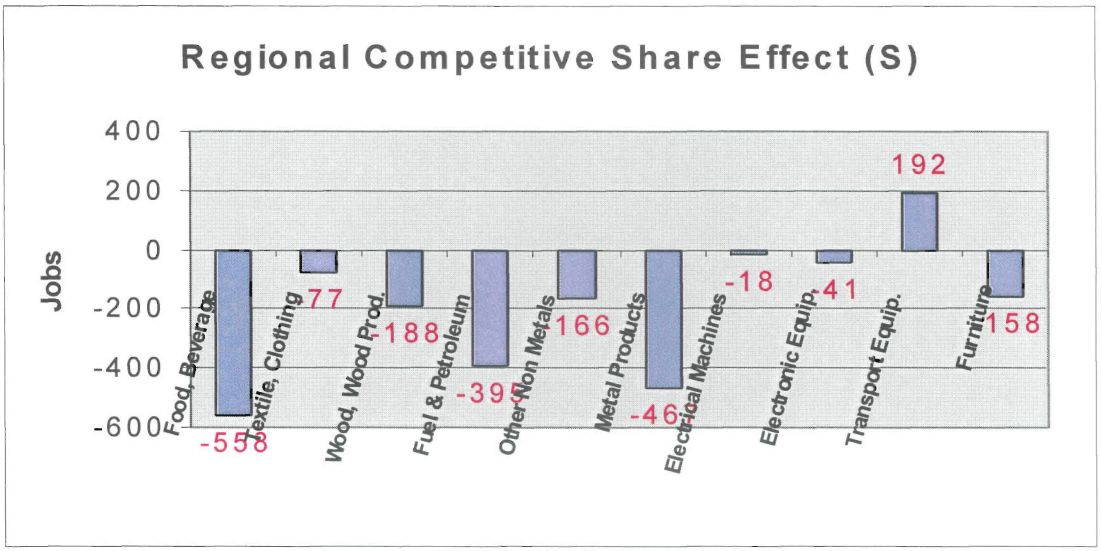


Figure 4.5 Regional Competitive Share Effect (S)

Source: Sekhobela & Kleynhans, 2008b:15.

The Regional Competitive Share Effect (S), Industry Mix Effect (M), National Share Effect (N) and the Total Change in Regional Employment (R) for the Southern District Municipality for 1996 to 2006 are summarised in Table 4.5 and Figure 4.5.

This is calculated by the multiplication of the base year employment in each regional sector, by the margin between the regional sector's growth rate and the national average growth rate of the sector (SETA, 2007:2). This is simply the difference between R, N and M. A positive regional competitive share effect suggests that the region increased its share of employment in that industry, while a negative competitive component suggests that the region's employment share was eroded during the period under investigation. For the SDM this is given in the last column of Table 4.5

Table 4.5: Regional Competitive Share Effect (S), Industry Mix (M) Effect, National Share Effect (N) and Total Change in Regional Employment (R) in the Southern District Municipality, 1996-2006

SECTOR	1996	2006	R	N	M	S
Food & beverages	3051	2096	-955	-61	-336	-558
Textile & clothes	532	311	-221	-11	-133	-77
Wood & paper	610	581	-29	-12	171	-188
Petroleum & chemicals	1589	1194	-395	-32	32	-395
Other non – metal	786	470	-316	-16	-134	-166
Metal products	1978	1748	-230	-40	277	-467
Electrical machines	147	64	-83	-3	-62	-18
Electronic equipment	169	105	-64	-3	-20	-41
Transport equipment	382	406	24	-8	-160	192
Furniture	635	559	-76	-13	95	-158
TOTAL	**9879**	**7534**	**-2345**	**-198**	**51**	**-2198**

Source: Rex Data, 2007 (Own calculations)

From equation (4.1) the total change in regional employment is defined as follows:

$$R = N + M + S \qquad (4.1)$$

then $S = R - N - M$

$= -2345-(-198)-51$

$S = -2198$

The negative total regional competitive share effect suggests that the region's employment in the region declined by 2198 jobs, according to Table 4.5. All the sectors indicate negative figures, meaning that all sectors are, according to the

regional competitive share effect, leading to job losses, except transport equipment which has a positive regional competitive share of 192, meaning that this sector added 192 new jobs into the region.

Equation (4.1) defines Total Change in Regional Employment (R) as the sum of National Share Effect (N), Industry Mix Effect (M) and Regional Share Effect (S):

$$R = N + M + S \qquad (4.1)$$

Using the totals (last row) from Table 4.5, total change in regional employment is:

$$-2345 = [-198 + 51 + (-2198)]$$

The Individual sectors are analysed in detail in section 4.4 (a), based on Table 4.5 and Figure 4.5

4.4 SECTORAL ANALYSIS

4.4.1 SECTORAL ANALYSIS (absolute figures)

Analysis of individual sectors of manufacturing for the Southern District Municipality is discussed next, with reference to Table 4.5 and Figure 4.5, both of which are based on equation (4.1), R = N + M + S.

For example: the transport equipment sector has a positive total change in regional employment of 24, which represents an increase in the number of jobs and is calculated as follows: 24 = [-8 + (-160) + 192], hence the number of jobs in this sector in 2006 is: 406 = [382 + 24]. In the following paragraphs individual sectors are analysed in the same way.

4.4.1.1 Food, Beverages and Tobacco (SIC: 30111-30600)

If the food and beverages sector had grown regionally at the national average growth rate (N), regional employment would have declined by 61 jobs (see Table 4.5). The actual decline in the region (R) was, however, 955 jobs for the period under review. Food and beverages jobs would have declined from 3051 in 1996 to 2990 in 2006 if the regional growth was equal to the national average growth rate.

The actual employment for 2006 was 2096 and the difference between the expected and the actual jobs is accounted for by the industrial mix (M) and the regional competitive share (S) effects. The difference between 2990 and 2096 is a net relative change of minus 894 jobs = M+S = [-336+ (-558)] over the research period.

The relative decrease experienced by this sector nationally is 61 less than the regional loss of jobs of 955, as can be read from Table 4.5. The net impact of the industry mix and the regional share effects exacerbated the national growth effect of -61 by a net relative change of minus 894, resulting in the total job losses of 955 for the region in the food and beverages sector.

4.4.1.2 Textile, Clothing and Leatherworks (SIC: 31111-31700)

If employment in the textile, clothing and leatherworks sector in the SDM-region grew at the national average growth rate then the number of jobs lost according to Table 4.5 would be 11 and not 221. Therefore the number of jobs in 2006 would be 521 and not 311 and the gap between 311 and 521 is -210 = M+S = [-133+ (-77)], which must be accounted for by the industry mix and regional competitive share effects. A negative industry mix and regional competitive share reflects the region's concentration in a sector that is growing more slowly than the national average growth rate and a decline in employment in that sector

compared to its national counterparts. The net of industry mix and regional competitive share effects worsened the national growth effect of -11 by a net relative change of -210, resulting in the region's decline of 221 jobs.

4.4.1.3 Wood, Paper, Publishing and Printing (SIC: 32101-32600)

Table 4.5 indicates that the industrial structure of the region led to the growth of 171 jobs in the wood, paper, publishing and printing sector of the Region. The national share effect resulted in a loss of 12 jobs and the regional competitive share effect also led to job losses to the value of 188. If the region grew at the national average growth rate, the number of jobs in 2006 would have been 598, but it is 581 because the actual regional growth is -29. The gap between 581 and 598 is -17 = [171+ (-188)] and is accounted for by the industry mix and regional competitive share effects. The net impact of the national share (-12), industry mix (171) and regional competitive share (-188) led to the region's total loss of 29 jobs.

4.4.1.4 Fuel, Petroleum, Chemicals, Rubber and Plastic (SIC: 33100-33800)

If fuel, petroleum, chemicals, rubber and plastic production in the region grew at the national average growth rate, then the number of jobs in the region would have declined by 32 from 1589 in 1996 to 1557 in 2006. The gap between 1194 and 1557 is a net relative change of -363 = [32 + (-395)] jobs over the period and is accounted for by the industry mix and the regional competitive share effects.

The regional competitive share effect of -395, is equal to the total change regional employment because the national share (-32) and the industry mix (32) cancel each out, resulting in a loss of 395 jobs in the region and a total of 1194 available jobs in 2006, which is a decline from 1589 in 1996.

4.4.1.5 Other Non-Metallic Mineral Products (SIC: 34111-34299)

The number of jobs in other non-metallic mineral products sectors of the region would have declined from 786 in 1996 to 770 by 2006 if the sector grew at the national average growth rate, but it declined to 470 due to the actual regional growth of -316, resulting in a net relative change of -300 = [-134+ (-166)] jobs over the period. This is explained by the industry mix and the regional competitive share effects.

The negative industry mix value (-134) means that the regional sector is growing slower than the national average growth rate. That is why the regional decline (316) is greater than the national decline (16). A negative (-166) regional competitive share means a loss of 166 jobs in the region in the period under review. The sum of national share effect (-16) industry mix (-134) and regional competitive share (-166) gives a total loss of 316 jobs in the region. As a result, only 470 jobs were available in 2006 from a total of 786 in 1996.

4.4.1.6 Metal, Metal Products, Machinery and Equipment (SIC: 35101-35900)

Jobs in the sector for the production of metal, metal products, machinery and equipment in the SDM-region would have declined from 1978 in 1996 to 1938 in 2006 if the regional sector was growing at the national average growth rate (see Table 4.5). But the actual employment for 2006 is 1748. The difference between 1748 and 1938 is -190 = [277 + (-467)] and is accounted for by the industry mix and regional competitive share effects.

The positive industrial mix suggests that the region's industrial structure led to employment growth of 277 jobs. This means that the region has a relatively high concentration of employment in a sector that is growing faster than the national average growth rate. Table 4.5 indicates a negative figure of (-467), for the regional competitive share effect and this means a loss of 467 jobs. The negative

regional competitive share effect, suggests that the sector is regionally growing more slowly than its national counterparts and this reduced the growth of 277 jobs by 190. The sum of the national share effect (-40), industry mix (277) and regional competitive share (-467) is a total loss of 230 jobs in the region over the period 1996 to 2006.

4.4.1.7 Electrical Machinery and Apparatus (SIC: 36100-36600)

Employment in the electrical machinery and apparatus sector in the region according to Table 4.5 would have declined from 147 in 1996 to 144 in 2006, if the region grew at the national average growth rate. But the actual employment for 2006 in the region is 64. The difference between 64 and 144 is a loss of 80 jobs and is explained by the industry mix and regional competitive share effects. The industry mix is negative (-62) and this means that the region's industrial structure leads to job losses for the sector at a rate higher than the national average growth. The negative (-18) regional competitive share suggest that the sector is growing more slowly than its national counterparts.

The industry mix and the regional competitive share, equal -80 = [-62 + (-18)], accounts for the difference between the expected (144) jobs and the actual (64) jobs in 2006. The total change in regional employment (-83), is the sum of national share effect (-3), industry mix effect (-62) and the regional competitive share effect (18) resulting in a total loss of 83 jobs, hence employment in 2006 is 64, which indicates a decline of 83 from 147 in 1996.

4.4.1.8 Electronic Equipment (SIC: 37100-37600)

Had the region's electronic equipment sector grown at the national average growth rate, then jobs would have declined from 169 in 1996 to 166 in 2006 (see Table 4.5). But the actual employment in 2006 is 105 and the gap between 105

and 166 is negative 61. The loss of 61 = [-20 + (-41)], jobs must be explained by the industry mix and the regional competitive share effects.

The industry mix is negative (-20), suggesting that the sector in the region is growing slower than the national average growth leading to job losses to the value of 20 in the period under review. The negative (-41) regional competitive share effect, implies that the regional sector is growing slower than its national counterpart, leading to a loss of 41 jobs.

The combined effect of the industry mix and the regional competitive share effect is -61, which is the difference between the expected and the actual employment growth. The total change in employment for this sector is -64, the sum of national share effect (-3), industry mix effect (-20) and regional competitive share effect (-41), results in total employment of 105 in 2006 from 169 in 1996.

4.4.1.9 Transport Equipment (SIC: 38100-38790)

If regional employment in the sector for transport equipment grew at the national average growth rate, the number of jobs would have declined from 382 in 1996 to 374 in 2006 (see Table 4.5). But the actual employment in 2006 is 406 which is an increase of 24 jobs that could have been lost if the region grew at the national average growth rate. The industry mix is negative (-160) (Table 4.5). This means that the regional sector is growing at a slower rate than the national average growth.

The regional share component is positive (192), suggesting that the regional sector is growing faster than its national counterpart leading to a gain of 192 jobs in the period under review. The industry mix and regional competitive share effects resulted in a net gain of 32 jobs = [-160 + 192]. In this case the regional competitive share worked in favour of the region by offsetting the loss of 8 jobs to a gain of 24 jobs with the result that total employment in 2006 is 406 which could

have been 374 if the region grew at the national average growth rate. The total change in employment for this sector (24), is a sum of national share effect (-8), industry mix effect (-160) and regional competitive share effect (192). Total employment in 2006 is 406 as opposed to 382 in 1996, an increase of 24 jobs.

4.4.1.10 Furniture and Other Manufacturing (SIC: 39101-39520)

Supposing that the sector for furniture and "other manufacturing" in the SDM-region was growing at the national average growth rate, then employment would decline from 635 in 1996 to 622 in 2006 (see Table 4.5). But the actual employment in 2006 is 559, which is less than the expected 622. The positive industry mix of 95 was not sufficient to reduce the impact of the negative regional competitive share effect of -158 which led to the decline of 63 jobs.

This gap, -63 = [95 + (-158)], between the actual employment in the region and the envisaged employment, as per national share effect can be accounted for by the industry mix and the regional competitive share effects. Employment in 2006 declined to 559 from to 635 in 1996.

4.4.2 SECTORAL ANALYSIS (percentages)

Percentage contribution to the relevant sectors and sectoral rankings in the SDM are summarised in Tables 4.6 and Tables 4.7. When the relative size of the individual sectors are taken into cognisance, the top performers are still important, except for electronic and electrical machinery and equipment which did far worse, while metal products and fuel, petroleum and chemicals products then moves up to the third and fifth place, respectively (see Tables 4. 6 and 4.7).

This does not mean that other sectors are less important, but that the abovementioned sectors are outstanding and deserve special attention for they

are capable of enhancing the much needed industrial growth and development in the Southern District Municipality.

Table 4.6 also illustrates the size of job creation or losses relative to the particular sector. This enables per capita comparisons between sectors. Table 4.5 might give a wrong impression when a very large sector experiences some growth in absolute terms. Furniture and electrical machines lost about the same number of workers (76 & 83) during the past decade (see Table 4.5), but the furniture sector is about four times larger than the electrical machines sector.

TABLE 4.6: Percentage Contribution to the Relevant Sectors, SDM

SECTOR	1996	R%Δ	N%Δ	M%Δ	S%Δ	R=N+M+S %
Food & beverage.	3051	-31.3	-2.00	-11.0	-18.3	**-31**
Textile & clothes	532	-41.5	-2.07	-25.0	-14.5	**-42**
Wood & paper	610	-4.8	-1.97	28.0	-30.8	**-5**
Petroleum & chemicals	1589	-24.9	-2.01	2.0	-24.9	**-25**
Other non-metal	786	-40.2	-2.04	-17.0	-21.1	**-40**
Metal products	1978	-11.6	-2.02	14.0	-23.6	**-12**
Electrical machines	147	-56.5	-2.04	-42.2	-12.2	**-57**
Electronic equip.	169	-37.9	-1.78	-11.8	-24.3	**-38**
Transport equip.	382	6.3	-2.09	-41.9	50.3	**6**
Furniture	635.0	-12.0	-2.05	15.0	-24.9	**-12.0**

Source: Rex Data, 2007 (Own calculations)

Table 4.6 shows a decline of only 12 per cent in furniture employment, but electrical machinery lost 57 per cent of the jobs in that particular sector. Table 4.6 also shows the contribution that each effect (N, M & S), has on the whole (R).

It can be seen from Tables 4.6 and 4.7 that the sector for transport equipment experienced the highest job creation rate, both in total figures, as well as the share, relative to the size of the particular sector, namely 6 per cent. On the other hand, the non-metallic metals sector experienced an absolute job loss of 316 jobs, which implies that it lies in the eighth place of these ten manufacturing sub-sectors.

With regard to the effect of the national share, the transport sector was the worst of all sectors and its competitive share effect is only in the sixth place. If this sector is to be favoured in future, these challenges will have to be addressed. The electronic equipment sector is wanting when it comes to the creation of employment, and does not deserve much attention.

Wood and paper products was identified as the second strongest job provider, but its national share and industrial mix both ended in the seventh place. The industrial mix and regional competitive share of the sector for metal products also deserve attention. When the size of the sector is taken into regard, electrical machines sector has a very low job creation potential, with regard to all the various share effects. Leading sectors in relation to the regional competitive share effect is non-metallic minerals, wood and paper and textiles and clothing.

But Tables 4.6 and 4.7 show that this sector ranks best in the SDM-Region when it comes to the national share effect, as well as the regional competitive share effect. In relation to the industrial mix in this region transport was second best, with electronic equipment in the first place and fuel, petroleum and chemicals products third.

In conclusion it seems that, with regard to the percentage contribution and the relative size of particular sectors, the sectors with the highest future employment

creation potential are transport equipment, wood and paper products, metal products, furniture and petroleum and chemicals.

TABLE 4.7: Sectoral Ranking, SDM, 1996 – 2006

SECTOR	1996	2006	R	R-	N%Δ	M%Δ	S%Δ	R%
Food & beverages	3051	2096	10	6	4	4	5	6
Textile & clothes	532	311	6	9	5	8	3	9
Wood & paper	610	581	2	2	7	7	2	2
Petroleum & chemicals	1589	1194	9	5	3	3	4	5
Other non – metal	786	470	8	8	1	9	1	8
Metal products	1978	1748	7	3	2	6	7	3
Electrical machines	147	64	5	10	9	10	9	10
Electronic equipment	169	105	3	7	6	1	10	7
Transport equipment	382	406	1	1	10	2	6	1
Furniture	635.0	559.0	4	4	8	5	8	4

Source: Rex Data, 2007 (Own calculations).

The following section studies the shift-share analysis of manufacturing in the Southern District Municipality by comparing the national and provincial data.

4.5 SHIFT-SHARE ANALYSIS: A COMPARISON OF THE NATIONAL AND PROVINCIAL FIGURES

Percentage change in employment and proportion of total employment at national, provincial and regional level are summarised in Table 4.8. The first block of Table 4.8 is a summary of employment growth, in South Africa (SA), North West Province (NW) and the Southern District Municipality (SDM) between 1996 and 2006.

Table 4.8: Employment, SA, NW and the SDM, 1996 – 2006

	Change in Employment (1996- 2006) %			Proportion of Total Employment (1996) %		
SECTOR	**SA**	**NW**	**SDM**	**SA**	**NW**	**SDM**
Food & beverages	-13	-11	-31	15	21	31
Textile & clothes	-27	-27	-42	18	11	5
Wood & paper	26	22	-5	11	6	6
Petroleum & chemicals	0	-15	-25	12	11	16
Other non – metal	-19	-17	-40	5	13	8
Metal products	12	8	-12	19	16	20
Electrical machines	-44	-55	-56	6	3	1
Electronic equipment	-14	-16	-38	2	1	2
Transport equipment	40	18	6	7	6	4
Furniture	13	7	-12	5	11	6
TOTAL	**-2**	**-7**	**-24**			

Source: Rex Data, 2007 (Own calculations).

The regional average growth rate in employment, -24 per cent, is less than the provincial, -7 per cent and the national -2 per cent, average employment growth rates. The second block of Table 4.8 provides the percentage share of total employment according to the base year, 1996 for the national, the provincial and the regional data. Discussion will be confined to sectors representing 10 per cent and more of the total employment on national, provincial and regional levels.

The leader is the regional food and beverages with 31 per cent, followed by the provincial, 21 per cent, the third and last is the national, 15 per cent. The national

is taking the lead in textile, clothing and leather goods, 18 per cent, second is the provincial, 11 per cent and the regional is below 10 per cent.

Wood and paper products sector is led by the national at 11 per cent, with the provincial and the regional below the 10 per cent mark. In the petroleum and chemicals sector, the leader is the regional, 16 per cent, second and third is the national and provincial with, 12 and 11 per cent, respectively.

In other non-metal minerals the national and the regional are below 10 per cent, the provincial is the only one with 13 per cent. Number one in metal products is the regional, 20 per cent, followed by the national, 19 per cent and the provincial 16 per cent. In the furniture sector, only the provincial made it to 11 percent, the rest are below 10 per cent.

The national, the provincial and the regional have all registered percentages below ten as a proportion of total employment in the following sectors: electrical machines, electronic equipment and transport equipment.

The next section studies total change in employment and its components (compare Tables 4.5 and 4.9).

4.5.1 Total Change in Employment and Components of Employment

The total Change in Employment (R), National Share Effect (N), Industry Mix Effect (M), Regional Competitive Share Effect (S), at Provincial level, for the years 1996 to 2006 are summarised in Table 4.9.

4.5.2 Regional Competitive Share Effect (S)

Tables 4.5 and 4.9 indicate that the national (-2198) and the provincial (-1791) reflect negative totals of the regional competitive share effect, meaning that the region's sectors are all growing at a rate that is slower that its provincial and national counterparts hence the loss of 2198 and 1791 jobs in the region according to the national and provincial analyses, respectively.

Table 4.9: Total Change in

Regional Employment, Provincial data, 1996 – 2006

	North West			
SECTOR	**R**	**P**	**M**	**S**
Food & beverages	-955	-214	-122	-619
Textile & clothes	-221	-37	-106	-78
Wood & paper	-29	-43	177	-163
Petroleum & chemicals	-395	-111	-127	-157
Other non – metal	-316	-55	-79	-182
Metal products	-230	-138	297	-389
Electrical machines	-83	-10	-71	-2
Electronic equipment	-64	-12	-15	-37
Transport equipment	24	-27	96	-45
Furniture	-76	-44	89	-121
TOTAL	**-2345**	**-692**	**138**	**-1791**

Source: Rex Data, 2007 (Own calculations).

4.5.3 Industry Mix Effect (M)

Both the national and the provincial totals of the industrial mix effects are positive, 51 (see table 4.4) and 138 (see table 4.9), respectively. This means that

the region has a high concentration of employment in sectors that are growing faster than the national and the provincial average growth rates. However, not all sectors have a positive industry mix. Positive totals suggest that the positive sectors dominate the negative ones.

The following sectors have a positive industry mix at both the national and provincial levels: wood and paper, metal products, and furniture. Food and beverages, textile and clothes, other non-metal minerals, electrical machines and electronic equipment are negative at both levels while petroleum and chemicals and transport equipment are inconsistent.

4.5.4 National Share (N) and Provincial Share (P) Effect

The totals for both national and provincial are negative and equal to -198 for national and -692 for provincial and all sectors in both national and provincial are negative, suggesting job losses. In comparison, the region is losing more jobs (692) according to the provincial than the national (198) average growth rates.

4.5.5 Total change in regional employment (R)

All sectors except transport, which registered a positive total change of 24 in employment nationally and provincially, show negative values, suggesting loss of jobs in all sectors (see Table 4.9). A quick glance at Table 4.9 gives the impression that transport equipment, wood and paper, electronic equipment, furniture and electrical machines are the top five performers. However, the loss or gain in jobs in absolute values can be misleading and therefore, the relative size of individual sectors and the percentage contribution of each sector must be considered to do proper ranking.

The next section is an analysis based on the percentage contribution by each sector based on Table 4.10.

TABLE 4.10: Percentage Contribution to the Relevant Sectors in the SDM (Provincial Data), 1996 – 2006

SECTOR	1996	R%Δ	P%Δ	M%Δ	S%Δ	R=N+M+S %
Food & beverage.	3051	-31.30	-7.01	-4.00	-20.29	**-31**
Textile & clothes	532	-41.54	-6.95	-19.92	-14.66	**-42**
Wood & paper	610	-4.75	-7.05	29.02	-26.72	**-5**
Petroleum & chemicals	1589	-24.86	-6.99	-7.99	-9.88	**-25**
Other non-metal	786	-40.20	-7.00	-10.05	-23.16	**-40**
Metal products	1978	-11.63	-6.98	15.02	-19.67	**-12**
Electrical machines	147	-56.46	-6.80	-48.30	-1.36	**-57**
Electronic equip.	169	-37.87	-7.10	-8.88	-21.89	**-38**
Transport equip.	382	6.28	-7.07	25.13	-11.78	**6**
Furniture	635.0	-11.97	-6.93	14.02	-19.06	**-12.0**

Source: Rex Data, 2007 (Own calculations).

4.5.6 SECTORAL ANALYSIS (percentages)

The percentage contribution to the relevant sectors in the SDM (Provincial Data) are summarised in Table 4.10. Table 4.10 (the last column) confirms the results of Table 4.6, which indicates transport equipment, wood and paper, metal products, furniture and petroleum and chemicals as the top five performers.

The difference between Tables 4.8 and 4.10 are the sectors of electronic equipment, electrical machines, metal products and petroleum and chemicals. Electronic equipment and electrical machines, according to Table 4.8, represent 1 and 2 per cent of total employment in the Southern District Municipality, respectively, whereas petroleum and chemicals as well as metal products,

represent 16 and 20 per cent, respectively, of the total SDM employment. Therefore, the analysis based on Table 4.10 is more realistic.

4.6 FINAL RESULTS OF THE SOUTHERN DISTRICT MUNICIPALITY

The analysis reveal the following sectors as having the potential for future economic growth: transport equipment, wood and paper products, furniture, metal products and petroleum and chemicals. This may not be interpreted to mean that other sectors are less important but that these sectors are outstanding and deserve special attention for they are capable of enhancing the much needed industrial growth and development in the Southern District Municipality.

The next section is a summary and conclusions of this chapter.

4.7 SUMMARY AND CONCLUSIONS

This chapter examined the change of employment patterns in the manufacturing sector of the Southern District Municipality using both the national and the provincial data as reference, for the period 1996 to 2006. The traditional static shift-share method was used to test for growth or decline in the various sectors in manufacturing. Shift-Share analysis was considered to be the superior method for conducting this study, as it is easy to apply and understand. It reveals the internal dynamics of the regions and works economically with data. Data restrictions were circumvented by applying this method to the Rex Database of Global Insight, which has annual data on local and district municipalities, provincial and national levels.

The region's potential for growth according to the study lies in five of the ten sectors, namely, transport equipment, wood and paper products, metal products, furniture, and petroleum and chemicals in order of merit.

The national and provincial analysis arrived at the same results for the total change in regional employment. Regional sectors will grow or decline relative to the growth or decline of their national and provincial counterparts and averages. It has also been found that employment contributes to the economic growth and development of a region.

Sectors that grow more slowly than national and provincial average growth rates, lead to losses in jobs, whereas sectors that grow faster than the national and provincial average growth rates result in an increase in employment.

Total change in regional employment is the sum of national share effect, industry mix effect and regional competitive share effect. The industry mix effect and the regional competitive share effect have a direct impact on the national share.

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CHAPTER 5

SHIFT-SHARE ANALYSIS OF PRODUCTION IN MANUFACTURING: SOUTHERN DISTRICT MUNICIPALITY

5.1 INTRODUCTION

The objective of this chapter is to identify sectors in the Southern District Municipality that have growth potential in manufacturing production output, using gross value added. This chapter is similar to chapter 4, except that the latter uses employment figures. The formulas and the approach are same.

United Kingdom (2002) defines Gross Value Added (GVA) as a measure of the value of the goods and services produced in an economy and the GVA is primarily used to monitor the performance and wellbeing of economies.

The difference between Gross Value Added and Gross Domestic Product is, according to the abovementioned authors, that Gross Value Added excludes taxes and subsidies. This relationship is symbolically represented by United Kingdom (2002), as follows:

$$GVA + Taxes - Subsidies = GDP$$

Golley (2002:780) in his research of the South Eastern provinces in China found that, above average performance in manufacturing led to industrial agglomeration and growth. This led to higher growth rates of GDP and per capita GDP, and highlights the importance of gross value added for this study.

This chapter is structured as follows: section 5.2 is a brief discussion of the shift-share analysis method and equations, sections 5.3, 5.4 and 5.5 empirically decompose gross value added within the region into the national share effect,

industry mix effect, regional share effect and total regional gross value added. Sections 5.6 and 5.7 are the comparison of the national and provincial analyses, section 5.8 is the sectoral analysis (percentage). Implications for the Southern District Municipality are in section 5.9 and section 5.10 contains the summary and conclusions of the chapter.

The next section discusses the shift-share analysis method and equations.

5.2 SHIFT-SHARE ANALYSIS METHOD

This study uses a combination of the notation, equations and approach of the following authors, Georgia Tech (2007), Van der Merwe (2006) and Bendavid-Val (1993). As far as possible, the notation and equations used has been adjusted to suit the conditions of this study. Gross Value Added growth in the region is disaggregated into three components: National Share Effect (N), Industry Mix Effect (M) and the Regional Competitive Share Effect (S). The sum of these three components is the Total Change in Regional Gross Value Added (R), defined symbolically as:

$$R = N + M + S \qquad (5.1)$$

Where: **R** is the total gross value added in the region as a net effect of the national growth, industry mix and regional competitive components.

N is the region's potential growth in the gross value added, assuming that the region's gross value added is growing at the national average growth rate.

M is the proportion of regional gross value added among faster and slower growing regional sectors relative to the national average growth rate and

S describes how sectors in the region perform relative to the national averages of the same sectors.

Therefore the change in total gross value added is:

$$E(v) = E^{tf} - E^{ti} \qquad (5.2)$$

Where E (v) is the change in gross value added change in absolute terms, E^{tf} is the total gross value added in the final period and E^{ti} is total gross value added in the initial period. National average growth rate in gross value added, E (%) is defined as:

$$E(\%) = [E^{tf} / E^{ti} - 1] \times 100 \qquad (5.3)$$

The total change in regional employment (R) is the difference in total regional gross value added in the final period and the initial period and is calculated as follows:

$$R = e^{tf} - e^{ti} \qquad (5.4)$$

Where R is the total change in regional gross value added, e is the total gross value added the region, t^i is the initial period, t^f is the final period of analysis.

Total percentage change in regional gross value added R (%), is the total final regional gross value added divided by the total initial regional gross value added less one multiplied by 100 and is calculated as follows:

$$R(\%) = [e^{tf} / e^{ti} - 1] \times 100 \qquad (5.5)$$

The national share effect is an indicator of how much regional gross value added would have grown, had each of its sectors and therefore, the regional total, grown at the same rate, as the national average gross value added growth.

The national share effect (N) is determined by:

$$N = e^{ti}_1[\,E\,\%] + e^{ti}_2[E\,\%] + \ldots + e^{ti}_n[E\,\%] \qquad (5.6)$$

Where **N** is the total national share of the manufacturing industry, **e** is the regional gross value added in sectors **1, 2 . . .** up to **n** in the initial period t^i and **E %** is the national average gross value added growth rate (see equation 5.3).

Therefore, the industry mix effect (M), is defined by equation (5.7).

$$M = MR_1\,(e^{ti}_1) + MR_2\,(e^{ti}_2) + \ldots + MR_n\,(e^{ti}_n) \qquad (5.7)$$

Where M is the regional industry mix, MR is the marginal rate of growth in sectors 1, 2, 3... up to n and e^{ti} is region's sectoral gross value added in the initial year.

The regional competitive share effect, the last column of Table 5.5, describes how sectors in the region performed relative to the national averages of the same sectors. From equation (5.1) the total change in regional gross value added is defined as follows:

$$R = N + M + S \qquad (5.1)$$

And therefore $S = R - N - M$

In the next section, N, M, S and R are determined using equations 5.1 to 5.7 above.

5.3 NATIONAL SHARE (N), INDUSTRY MIX (M), REGIONAL COMPETITIVE SHARE (S) AND TOTAL CHANGE IN GROSS VALUE ADDED (R)

5.3.1 Changes in National Gross Value Added

The changes in national gross value added at constant 2000 prices (x R1000) for the period 1996 to 2006 are summarised in Table 5.1. The calculations for Table 5.1 are based on equations (5.2) and (5.3). Table 5.1 indicates that the national average growth in production is 34 per cent over the research period. This percentage is equal in value terms to 48805083 worth of production (x R1000).

From Table 5.2, three categories of sectors can be distinguished according to growth rates. The first category consists of sectors whose production growth ranges between 50 and 70 per cent. These sectors are: electrical machines, petroleum and chemicals and transport equipment. The highest growth rate is 66 per cent recorded in the transport equipment sector and the lowest growth in this category is 50 per cent in electrical machines.

The second category comprises sectors whose production growth is between 30 and 40 per cent. These sectors are: wood and paper, metal products and furniture. In this category the highest growth is 36 per cent from furniture while the lowest is 30 per cent from wood and paper.

The third and last category has growth rates of between 0 and 20 per cent. These sectors are: electronic equipment, other non-metal minerals, food and beverages and textile and clothes. The highest is 17 per cent from textile and clothes and the lowest is 4 per cent in electronic equipment.

Table 5.1: Changes in National Gross Value Added (x R1000), South Africa, 1996 – 2006

	Gross Value Added constant 2000 prices (R1000)		Change in GVA	
SECTOR	**1996**	**2006**	**Value E(v)**	**Per cent E %**
Food & beverages	24942565	27799843	2857278	11
Textile & clothes	8015686	9357848	1342162	17
Wood & paper	15241324	19846507	4605183	30
Petroleum & chemicals	27243039	42872697	15629658	57
Other non – metal	5772321	6116330	344009	6
Metal products	30005111	39238499	9233388	31
Electrical machines	4044315	6058485	2014170	50
Electronic equipment	2105337	2187304	81967	4
Transport equipment	11892512	19745361	7852849	66
Furniture	13562291	18406710	4844419	36
TOTAL	**142824501**	**191629584**	**48805083**	**34**

Source: Rex Data, 2007 (Own calculations).

5.3.2 Total Change in Regional Gross Value Added (R)

Changes in Regional Gross Value Added at constant 2000 prices (x R1000) in the SDM for the period 1996 to 2006 are summarised in Table 5.2. The calculations for Table 5.2 are based on equations (5.4) and (5.5), except that production instead of employment is used. According to Table 5.2 the region's average growth rate is -2 per cent which represents a decline of 18537 in production. Six of the ten sectors, namely metal products, textile and clothes,

wood and paper, food and beverages, other non-metal minerals and electronic equipment registered negative growth rates with five of them being below the region's average growth rate of -2 per cent.

Table 5.2: Changes in Regional Gross Value Added (x R1000), Southern District Municipality, 1996 – 2006

	Gross Value Added (x R1000)		Change in GVA	
SECTOR	**1996**	**2006**	**R**	**Per cent**
Food & beverages	306576	273287	-33289	-11
Textile & clothes	17404	16595	-809	-5
Wood & paper	34529	32921	-1608	-5
Petroleum & chemicals	163316	180650	17334	11
Other non – metal	44979	35089	-9890	-22
Metal products	146533	145471	-1062	-1
Electrical machines	9577	11299	1722	18
Electronic equipment	9831	7182	-2649	-27
Transport equipment	31506	38369	6863	22
Furniture	107703	112554	4851	5
TOTAL	**871954**	**853417**	**-18537**	**-2**

Source: Rex Data, 2007 (Own calculations).

The lowest growth rate of -27 per cent is from the electronic equipment sector whereas the highest growth rate in this category is -1 per cent in metal products. The remaining four of the ten, furniture, petroleum and chemicals, electrical machines and transport equipment have positive growth rates, albeit, below 25 per cent. The highest growth rate in this category, 22 per cent is found in transport equipment and the lowest, 5 per cent is in furniture.

Negatively growing sectors have between them, led to a decline of 49307 in production whereas the positively growing sectors accounted for an increase of 30770 in production hence the total change in regional gross value added is = -18537 = [-49307 + 30770], this indicates a decline in production (again x R1000).

A comparison of Tables 5.1 and 5.2 shows that all the national sectors are growing positively, whereas the regional sectors have a mix of positive and negative growth rates. The national average production growth rate is positive while the regional average production growth rate is negative.

The next section explains why differences occur between regional and national production growth rates.

5.3.3 National Share Effect (N)

The national share effect shows by how much regional production would have grown had each of its sectors and the regional total, grown at the same rate as the national average production growth rate of 34 per cent, in this case. The national share effect of production is calculated using equation (5.6). From Table 5.3 the total national share effect is 296464. This is the production the region would achieve in the research period if the region was growing at the national average growth rate of 34 percent.

The actual regional growth is -18537 and results in a loss of production to the abovementioned value. The difference of -315001, between the national share and the total change in regional value added (R-N) is due to the industrial mix (M) and the regional competitive share (S), which is the subject of the next sections.

The national share effect (x R1000) in the Southern District Municipality for the period 1996 to 2006 is summarised in Table 5.3.

Table 5.3: National Share Effect (N) in the Southern District Municipality, 1996 – 2006 (x R1000)

SECTOR	1996	N	R	R – N
Food & beverages	306576	104236	-33289	-137525
Textile & clothes	17404	5917	-809	-6726
Wood & paper	34529	11740	-1608	-13348
Petroleum & chemicals	163316	55527	17334	-38193
Other non – metal	44979	152993	-9890	-25183
Metal products	146533	49821	-1062	-50883
Electrical machines	9577	3256	1722	-1534
Electronic equipment	9831	3343	-2649	-5992
Transport equipment	31506	10712	6863	-3849
Furniture	107703	36619	4851	-31768
TOTAL	**871954**	**296464**	**-18537**	**-315001**

Source: Rex Data, 2007 (Own calculations).

5.3.4 Industry Mix Effect (M)

The industry mix effect shows how the region's industrial structure affects overall production growth in the economy. The Industry Mix at (x R1000) in the Southern District Municipality for the period 1996 to 2006 is summarised in Table 5.4.

The calculation of the industry mix effect for production, Table 5.4 is achieved through equation (5.7). A positive industry mix means that the region has firms

that are growing faster than the national average growth rate and a negative industry mix would have the opposite effect.

Table 5.4: Industry Mix Effect (M) (x R1000), Southern District Municipality, 1996 – 2006

	GVA Growth %				
SECTOR	**National Sector**	**National Average**	**MR**	**GVA (1996)**	**M**
Food & beverages	11	34	-23	306576	-70512
Textile & clothes	17	34	-17	17404	-2959
Wood & paper	30	34	-4	34529	-1381
Petroleum & chemicals	57	34	23	163316	37563
Other non – metal	6	34	-28	44979	-12594
Metal products	31	34	-3	146533	-4396
Electrical machines	50	34	16	9577	1532
Electronic equipment	4	34	-30	9831	-2949
Transport equipment	66	34	32	31506	10082
Furniture	36	34	2	107703	2154
TOTAL				**871954**	**-43461**

Source: Rex Data, 2007 (Own calculations).

Table 5.4 indicates that the total regional industry mix is -43461. This negative regional industrial mix means that the region has firms that are growing more slowly than the national average growth rate. Although not all sectors are negative, the individual sectors will be discussed in section 5.4. The regional competitive share effect (S) is discussed next.

5.3.5 Regional Competitive Share Effect (S)

The regional competitive share describes how sectors in the region performed relative to the national averages of the same sectors. A positive regional competitive share suggests that the region's production in that sector is growing faster than its national counterpart and a negative regional competitive share means that the region's production in that sector is growing more slowly than its national counterpart.

Equation (5.1) is used to calculate the regional competitive effect as follows:

$$R = N+M+S$$
$$\text{Then } S = R-N-M$$
$$= -18537-(29646)-(43461)$$
$$= -271540$$

This figure of -271540 (x R1000) suggests that the regions sectors led to a decrease in production. In this case, all the sectors do because they are all negative. Individual sectors are discussed in the next section.

Regional competitive share, industry mix, national share and total change in regional gross value added (x R1000) in the Southern District Municipality for the period 1996 to 2006 are summarised in Table 5.5.

5.4 SECTORAL ANALYSIS (Absolute figures)

Analysis of the individual sectors for the Southern District Municipality is discussed with reference to Table 5.5 and use is made of equation (5.1). For example, the textile and clothes sector has a total change in regional production of –809, this is the sum of the national share effect (5917), industry mix effect (-

2959) and the regional competitive share effect (-3767) according to equation (5.1) (all x R1000)

$$R = N+M+S$$

$$-809 = [5917 + (-2959) + (-3767)]$$

Table 5.5: Regional Competitive Share (S), Industry Mix (M), National Share (N) and Total Change in Regional GVA (x R1000), Southern District Municipality, 1996-2006

SECTOR	1996	2006	R	N	M	S
Food & beverages	306576	273287	-33289	104236	-70512	-67013
Textile & clothes	17404	16595	-809	5917	-2959	-3767
Wood & paper	34529	32921	-1608	11740	-1381	-11967
Petroleum & chemicals	163316	180650	17334	55527	37563	-75756
Other non – metal	44979	35089	-9890	15293	-12594	-12589
Metal products	146533	145471	-1062	49821	-4396	-46486
Electrical machines	9577	11299	1722	3256	1532	-3066
Electronic equipment	9831	7182	-2649	3343	-2949	-3043
Transport equipment	31506	38369	6863	10712	10082	-13931
Furniture	107703	112554	4851	36619	2154	-33922
TOTAL	**871954**	**853417**	**-18537**	**296464**	**-43461**	**-271540**

Source: Rex Data, 2007 (Own calculations)

The production for 2006 in this sector is the sum of the 1996 production and the total change in regional production (x R1000), namely 16595 = [17404 + (-809)]

In the following paragraphs, individual sectors are analysed using the above reasoning.

5.4.1 Food, Beverages and Tobacco (SIC: 30111-30600)

Production in the food, beverages and tobacco sector would have been 410812 = [306 576 + 104236], in 2006 if the sector grew at the national average growth rate. The actual growth is –33289 which is in essence a decline in production hence the production for 2006 is 273287 = [306576 + (-33289),] and is lower than 410812 by – 137525 (all x R1000).

This difference is accounted for by the industry mix effect of -70512 and the regional competitive share effect of -67013. Because both are negative, the net effect is a decline in production from 306576 in 1996 to 273287 in 2006.

5.4.2 Textile, Clothing and Leather Works (SIC: 3111-31700)

Production in the textile, clothing and leather works sector would have been 23321 (x R1000) in 2006 if the sector grew at the national average growth rate, but the actual growth is (-809) resulting in production of 16595 = [17404 + (-809)].

The difference between 16595 and 23321 is (-6726) and is accounted for by the industry mix and the regional competitive share -6726 = [-2959 + (-3767)]. The negative effect of the industry mix and the regional competitive share led to a decrease in production from 17404 in 1996 to 16595 in 2006.

5.4.3 Wood, Paper, Publishing and Printing (SIC: 32101-32600)

Production of wood, paper, publishing and printing in 2006 is 32921 (x R1000), but it would have been 46269 = [32921 + 11740], if the sector grew at the national average growth rate. The industry mix and the regional competitive share, -13348 = [-1381 + (-11967)], had a negative impact on production hence the actual 2006 production is 32921 from 34529 in 1996.

5.4.4 Fuel, Petroleum, Chemicals, Rubber and Plastic (SIC 33100-33800)

The 2006 production of fuel, petroleum, chemicals, rubber and plastic would have been 218843 (x R1000), had the sector grown at the national average growth rate, but the actual growth is 180650. Although the total change in regional growth of 17334 is positive, it is less than the national share of 55527, hence the difference of -38193. This difference is a result of the positive industrial mix (37563) and a negative regional competitive share (-75756). A positive industrial mix reduced the negative impact of the regional competitive share and led to a positive growth in production, albeit smaller than the national share effect, from 163316 in 1996 to 180650 in 2006. A positive industrial mix means that this sector is growing faster than the national average growth rate.

5.4.5 Other Non-Metal Mineral Products (SIC: 34111-34299)

The actual production in the non-metal mineral products sector 2006 is 35089 (x R1000). If the sector grew at the national average growth rate it would have been 60272. The difference of (-25183), between the actual and the expected production is due to the net effect of the industry mix (-12594) and the regional competitive share (-12589) which led to a decline in production from 44979 in 1996 to 35089 in 2006.

5.4.6 Metal, Metal Products, Machinery and Equipment (SIC: 35101-35900)

If the metal, metal products, machinery and equipment sector grew at the national average growth rate the 2006 production would be 19635, but it is 145471 (x R1000). The industry mix effect (-4396) together with the regional competitive share effect (-46486) are responsible for the difference of –50883 = [-4396 + (-46486)]. This difference resulted in a drop in production from 146533 in 1996 to 145471 in 2006.

5.4.7 Electrical Machinery and Apparatus (SIC: 36100-36600)

Production in the electrical machinery and apparatus sector for 2006 would have been 12833, if it grew at the national average growth rate, but it is 11299 (x R1000). The positive industry mix effect of 1532 diluted the negative impact of the regional competitive share of -3066 resulting in a difference of –1534 which could have been worse had the industry mix been negative. However, production increased, although not as much as it would if it was according to the national share, from 9577 in 1996 to 11299 in 2006. The positive industry mix suggests that the region has firms in this sector that are growing faster than the national average growth rate.

5.4.8 Electronic Equipment (SIC: 37100-37600)

Had the sector for electronic equipment grown at the national average growth rate, then production would have increased to 13174 in 2006 from 9831 (x R1000) in 1996. But the actual production is 7182 which is lower than 13174 by 5992. The net effect of the negative industry mix and regional competitive share exacerbated the loss in production.

5.4.9 Transport Equipment (SIC: 38100-38790)

Production in the transport equipment increased from 31506 in 1996 to 38369 in 2006 and would have been more (42218), had the sector grown at the national average growth rate (x R1000 again). The difference of -3849 is due to the combined effects of the positive industrial mix (10082) and the negative regional competitive share (-13931). The positive industry mix implied that firms in this sector grew faster than the national average growth rate.

5.4.10 Furniture (SIC: 38100-38790)

The actual value of production of furniture in 2006 is 112554 and it would have been 144322 (x R1000) according to the national share. The positive industrial mix contributed to the increase in production and minimised the negative effect of the regional competitive share. Although the growth is not equal to the national share, the presence of firms that grew faster than the national average growth rate counted in favour of the regional growth, hence production increased from 107703 in 1996 to 112554 in 2006.

5.5 SECTORAL ANALYSIS (Percentages)

Percentage contributions to the relevant sectors in the SDM are summarised in Table 5.6.

TABLE 5.6: Percentage Contribution to the Relevant Sectors, SDM

SECTOR	1996	R%Δ	N%Δ	M%Δ	S%Δ
Food & beverage.	306576	-11	34	-23	-22
Textile & clothes	17404	-5	34	-17	-22
Wood & paper	34529	-5	34	-4	-35
Petroleum & chemicals	163316	11	34	23	-46
Other non-metal	44979	-22	34	-28	-28
Metal products	146533	-1	34	-3	-32
Electrical machines	9577	18	34	16	-32
Electronic equip.	9831	-27	34	-30	-31
Transport equip.	31506	22	34	32	-44
Furniture	107703	5	34	2	-31

Source: Rex Data, 2007 (Own calculations).

To rank the top five performing sectors using Tables 5.6 and 5.7, consideration is given to a high total regional change in GVA and a high percentage contribution to total GVA. In terms of these criteria, the following sectors are outstanding: transport equipment, petroleum and chemicals, furniture, metal products and wood and paper products. A look at electrical machines (Table 5.6) indicates a positive total regional change in GVA (R), but Table 5.7 shows that its percentage contribution to the total GVA is a mere one per cent and therefore does not qualify as a sector with growth potential.

Table 5.7: Changes in Gross Value Added and Proportion of Total Value Added, SA, NW and the SDM, 1996 – 2006

	Change in GVA (1996- 2006) %			Proportion of Total GVA (1996) %		
SECTOR	**SA**	**NW**	**SDM**	**SA**	**NW**	**SDM**
Food & beverages	11	11	-11	17	23	35
Textile & clothes	17	17	-5	6	3	2
Wood & paper	30	28	-5	11	4	4
Petroleum & chemicals	57	14	11	19	13	19
Other non – metal	6	1	-22	4	15	5
Metal products	31	19	-1	21	15	17
Electrical machines	50	21	18	3	3	1
Electronic equipment	4	11	-27	1	1	1
Transport equipment	66	37	22	8	8	4
Furniture	36	25	5	9	15	12
TOTAL	**34**	**16**	**-2**			

Source: Rex Data, 2007 (Own calculations).

5.6 GROSS VALUE ADDED: Comparison of National and Provincial data

National, provincial and regional percentage changes in production and proportion of total production are summarised in Table 5.7.

5.6.1 Average Production Growth, 1996 – 2006

The first three columns of Table 5.7 are a summary of production growth at national, provincial and regional levels between 1996 and 2006. The regional average growth of -2 per cent is far less than the provincial, 16 per cent and the national, 34 per cent, average growth rates. The region is thus growing more slowly than the provincial and the national average growth rates.

The next section discusses the proportion of total production per sector on national, provincial and regional levels.

5.6.2 Proportion of Total Production (base year, 1996)

The last three columns of Table 5.7 are the percentage shares of total production per sector based on the 1996 data. For the purpose of this study, discussion will be confined to sectors representing 10 per cent and more of total production. The regional food and beverages sector has the highest production of 35 per cent, followed by the provincial and the national sectors at 23 and 17 per cent respectively. In the wood and paper sector the national has 11 per cent, the rest are below 10 per cent. The regional and national petroleum and chemicals sectors are equal, 19 per cent and both are greater than the provincial, 13 per cent. The provincial other non-metal mineral sector is the only one with 15 per cent, the regional and national are below 10 per cent.

In the metal products sector, the leader is the national with 21 per cent followed by the regional and provincial sectors with 17 and 15 per cent respectively. The

furniture sector is led by the provincial at 15 per cent, closely followed by the regional at 12 per cent and the national is below 10 per cent. The following sectors are below ten per cent at regional, provincial and national levels: textiles and clothes, electrical machines, electronic equipment and transport equipment.

A comparison of total change in regional production using both provincial and national totals is the topic of the next section.

Table 5.8: Total Change in Regional GVA (x R1000): Provincial data, 1996 – 2006

	NORTH WEST PROVINCE			
SECTOR	**R**	**P**	**M**	**S**
Food & beverages	-33289	49052	-15329	-67012
Textile & clothes	-809	2785	174	-3768
Wood & paper	-1608	5525	4143	-11276
Petroleum & chemicals	17334	26131	-3266	-5531
Other non – metal	-9890	7197	-6747	-10340
Metal products	-1062	23448	4397	-28907
Electrical machines	1722	1532	479	-289
Electronic equipment	-2649	1573	-492	-3730
Transport equipment	6863	5041	6616	-4794
Furniture	4851	17232	9693	-22074
TOTAL	**-18537**	**139513**	**-332**	**-157718**

Source: Rex Data, 2007 (Own calculations).

5.7 Total Change in Regional Gross Value Added (R)

Total change in regional gross value added (R), national share effect (N), Industry mix effect (M) and the regional competitive share effect (S) using provincial data for the years 1996 to 2006 are summarised in Table 5.8. The analysis in this section is being based on Tables 5.7 and 5.8.

5.7.1 Regional Competitive Share Effect (S)

Both the provincial and national sectors are negative and their totals equal -157718 and -271540 (x R1000), respectively. The implication is that the region has sectors that are growing more slowly than their provincial and national counter parts.

5.7.2 Industry Mix Effect (M)

The petroleum and chemicals, electrical machines, transport equipment and furniture sectors show a positive industry mix, suggesting that the regional sectors are growing faster than the provincial and national average growth rates. Textile and clothes and wood and paper are positive only at provincial level and negative at national. Food and beverages, other non-metal minerals and electronic equipment are negative at both provincial and national levels. The provincial and national totals are – 332 and – 43461, respectively. This means that these regional sectors are growing more slowly than the provincial and national average growth rates.

5.7.3 National Share (N) and Provincial Share Effect (P)

All provincial and national sectors reflect positive totals. The respective totals are: 139513 for provincial and 296464 (x R1000) for national. If the region grew at the provincial and national average growth rates it would have grown positively.

However, the national growth is higher than the provincial growth so it would benefit the region to emulate national rather than provincial growth rates.

5.7.4 Total Change in Regional Production (R)

Furniture, transport equipment, electrical machines and petroleum and chemicals all have positive changes in regional production both provincially and nationally. These are the sectors in the region that have shown an increase in production according to both the provincial and national approach. However, the total change in regional production is equal to -18537 (x R1000), using both the provincial and national approaches.

5.8 SECTORAL ANALYSIS (Percentages)

Percentage contribution to the relevant sectors in the SDM (Provincial Data) are summarised in Table 5.9.

Table 5.9: Percentage Contribution to the Relevant Sectors, SDM

SECTOR	1996	R%Δ	P%Δ	M%Δ	S%Δ
Food & beverage.	306576	-11	16	-5	-22
Textile & clothes	17404	-5	16	1	-22
Wood & paper	34529	-5	16	12	-33
Petroleum & chemicals	163316	11	16	-2	-3
Other non-metal	44979	-22	16	-15	-23
Metal products	146533	-1	16	3	-20
Electrical machines	9577	18	16	5	-3
Electronic equip.	9831	-27	16	-5	-38
Transport equip.	31506	22	16	21	-15
Furniture	107703	5	16	9	-20

Source: Rex Data, 2007 (Own calculations).

Table 5.9 confirms the results of Table 5.6 in terms of the top five sectors that have growth potential, transport equipment, petroleum and chemicals, furniture, metal products and wood and paper products. Electrical machines once more may create a wrong impression that is has potential because of its positive (R), but Table 5.6 shows that its percentage contribution to total GVA is low.

5.9 FINAL RESULTS OF THE SOUTHERN DISTRICT MUNICIPALITY

Both the National and Provincial analyses reveal the following sectors as having potential for future development: transport equipment, wood and paper products, furniture, metal products and petroleum and chemicals. The authorities in the Southern District Municipality are advised to use available resources to support the development of these sectors.

The next section is a summary and conclusions of this chapter.

5.10 SUMMARY AND CONCLUSIONS

This chapter examined the change in gross value added (GVA) patterns in the manufacturing sector of the Southern District Municipality using both national and provincial data as references, for the period 1996 to 2006. A traditional and static shift-share analysis method was used. Data restrictions were circumvented by applying this method to the Rex Database of Global Insight, which has annual data on local and district municipalities, provincial and national levels. The national and provincial analysis arrived at similar results for the total change in regional change in gross value added.

Total change in regional production is the sum of national share effect, industry mix effect and regional competitive share effect. The industry mix effect and the regional competitive share effect have a direct impact on the national share.

The Southern District Municipality's potential for growth according to the study lies in five of the ten sectors, transport equipment, wood and paper products, metal products, furniture and petroleum and chemicals.

The above results for the gross value added production are similar to those of chapter 4, which considered changes in employment figures.

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CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

The aim of this study was to examine the ability of manufacturing in the Southern District Municipality to facilitate growth in employment and gross value added given the demise of the mining in this region and a general decline in gold mining in South Africa.

In Chapter 1 the economic importance, the role and contribution of manufacturing to employment and the gross value added was outlined. The problem statement, the research question and the objectives of the study were dealt with. The hypothesis was that manufacturing has the potential to increase employment levels and gross value added. A brief overview of the Shift-Share analysis methodology as one of the ways to account for a region's changes in economic growth, employment and competitiveness.

Chapter 2 reviewed the theory of regional economic growth. The theory of the firm indicated that in the long-run output increases, costs and prices decrease, ceteris paribus. An analysis of the economic growth and development variables was made, as well as agglomeration, human capital, specialisation and diversity, knowledge, competition and innovation. Agglomeration was defined and its sources explored. The theories of Porter, Marshall Arrow Romer (MAR), Jacobs externalities, urbanisation and localisation economies and internal returns to scale were discussed. A comparison was undertaken of the impact of specialisation and diversity on the economic performance of regions, and the advantages and disadvantages of each with respect to exogenous price and demand shocks.

It was established that human capital might be an engine of growth and may lead to increasing returns to scale and positive externalities. The importance and role of research and development and institutions of higher learning with respect to knowledge, production of new knowledge, dissemination, storage and utilisation of knowledge, to facilitate the processes of innovation and competition were dealt with.

Chapter 3 studied the Southern District Municipality and its constituent local municipalities namely, Ventersdorp, Maquassie Hills, Matlosana. Merafong and Potchefstroom local municipalities. The following were considered: economically active population, Gross Domestic Product per capita, education levels and unemployment. Data relating to Gross Domestic Product per capita revealed interesting results with regard to the local municipalities of Matlosana and Potchefstroom. Each of these two municipalities has a Gross Domestic Product per capita which is greater than that of the whole province.

In Chapter 4 an empirical analysis of employment in manufacturing was undertaken, using the shift-share analysis. Total change in National employment was equal to -30373, translating into an average growth rate of -2 per cent, implying a loss of thirty thousand plus jobs in the manufacturing industry of the whole country. Total change in Regional employment (R), National share effect (N), Industrial mix effect (M) and the Competitive share effect (S) are summarised in Figure 6.1.

Total change in Regional employment (R) was according to Figure 6.1 equal to -2345, indicating a loss of two thousand plus jobs of manufacturing in the Southern District Municipality. This component was the sum of the National share effect (N), Industry mix effect (M) and the Competitive share effect (S).

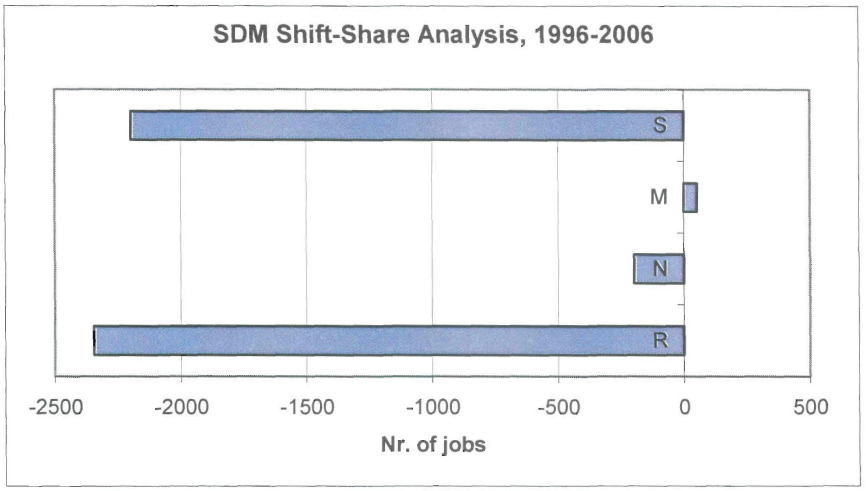


Figure 6.1 Shift-Share Analysis of Employment in the SDM

Source: Global Insight, 2007 (Own calculations).

National share effect (N) amounted to -198, indicating job losses, see Figure 6.1. It measured the region's potential employment change, assuming that its economy is growing at the national average growth rate. It was calculated by multiplying the base year employment in each sector by the national average growth rate for all sectors and the resulting values were added to obtain the total national growth.

Industry mix effect (M) described how the region's industrial structure fits into the overall employment growth performance in terms of the national average growth rate. In short, this component determined sectors in the region that grew faster or more slowly than the national average growth rate. Figure 6.1 indicates a positive figure of 51 for this component which was calculated by multiplying the base year employment in each sector by the marginal growth rate (the difference between the national average growth rate for that specific sector and the national average growth rate for all sectors). The positive amount of the industry mix effect minimised the total job losses in the region as per the total change in regional employment, which could have been more than -2345 were it not for this component.

Competitive share effect (S) explained how sectors in the region performed compared to their national counterparts and is equal to -2198 according to Figure 6.1. To determine this component, the base year employment in each regional sector is multiplied by the margin between the regional sector growth rate and the national average growth rate for that sector. This negative competitive share effect exacerbated the job losses in the region.

Sectoral ranking indicated possible sectors that had future growth potential based on the percentage contribution of each sector to the total regional change in employment and the sector's relative size of employment (percentage of total employment represented by a sector). These two criteria produced the following sectors as the top five with the highest employment creation potential:

i. Transport equipment
ii. Wood and Paper products
iii. Metal products
iv. Furniture
v. Petroleum and Chemicals

Overall results indicate that 50 per cent of the sectors in manufacturing have a potential for future growth and development. These sectors are Transport equipment, Wood and Paper products, Furniture, Metal products and Petroleum and chemicals.

Chapter 5 was a continuation of the empirical analysis of the manufacturing industry using Gross Value Added data, to determine the production dynamics of the various sectors. In principle, the structure and approach was the same as in Chapter 4 including the utilisation of the Shift-Share Analysis methodology.

Growing and declining sectors were identified through growth rates, both absolute and percentage figures, and their relative contribution to the total Gross Value Added. The total change in the National Gross Value Added was equal to 48805083 (x R1000) and 34 per cent, positive, indicating a growth in production for all sectors.

Transport equipment and Petroleum and chemicals exceeded the 50 per cent mark. Electrical machines recorded a change of 50 per cent, although its contribution to the total regional gross value added was very small and thus disqualified the sector as one of the top five sectors with future potential growth.

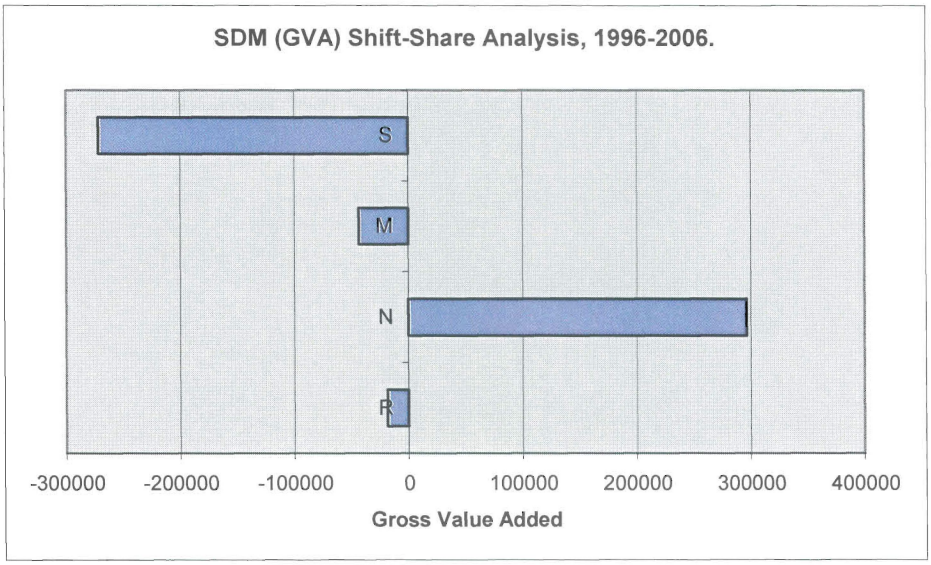


Figure 6.2 Shift-Share Analysis of the Gross Value Added, SDM.

Source: Global Insight, 2007 (Own calculations).

A summary of the shift-share analysis of the gross value added in the Southern District Municipality based on Figure 6.2 follows:

Total change in Regional Gross Value Added (x R1000) amounted to -18537 according to Figure 6.2. This meant a decrease in production in the region. Total

change in regional gross value added was the sum of the national share effect (N), industry mix effect (M) and the competitive share effect (S).

National share effect (N) was the only positive component equal to 296464 (x R1000) which indicated an increase in production country wide. According to Figure 6.2 this component minimised the negative impact on the total regional change which could have been greater than -18537. This was calculated by multiplying the base year gross value added in each sector by the national average growth rate for all sectors and the resulting values were added to obtain the total national growth.

The *Industry mix effect and the Competitive share effect* both indicated negative values -43461 and -271540 (x R1000), respectively, see Figure 6.2. These two components negated the positive national share effect of 296464, resulting in the negative total regional change of -18537. They were calculated by multiplying the base year's gross value added in each sector, by the marginal growth rate (note that the marginal growth equal to the difference between the national average growth rate for that specific sector and the national average growth rate for all sectors) and multiplying the base year gross value added in each regional sector, by the margin between the regional sector's growth rate and the national average growth rate for that sector, respectively.

Sectoral ranking based on each sector's contribution, as a percentage, to the total gross value added of the region and the percentage of the total gross value added represented by each indicated the following sectors as the top five with future potential for production growth:

i. Transport equipment
ii. Petroleum and Chemicals
iii. Furniture
iv. Metal products

v. Wood and Paper products

These results confirmed the findings of Chapter 4, that the top five performers are Transport equipment, Wood and paper products, Furniture, Metal products and Petroleum and Chemicals, with the sector for transport equipment consistently in the first place.

An interesting feature of this analysis is that the total change in the Gross Value Added of Textile and clothes, Electrical machines and Electronic equipment, is relatively high and can give a wrong impression that these sectors have production growth potential. The respective percentage contributions of each of these sectors to the total Gross Value Added is less than three per cent and therefore they do not qualify for a position among the top five.

Unlike in Chapter 4 where only one sector of the top performing sectors, Transport equipment had a positive growth figure, when considering production, three of the five sectors had a positive total change in regional Gross Value Added. These sectors are: Furniture, Transport equipment and Petroleum and chemicals. Besides these small differences between the growth rates of the same sectors in Chapters 4 and 5, the overall results are similar using both national and provincial data.

6.2 RECOMMENDATIONS

The recommendations below must be aimed at the development of the sectors that show growth potential and the maintenance of the other sectors for they too have a role.

- Strong entrepreneurial drive led and supported by local municipalities
- Sustained public-private partnerships in the manufacturing industry

- ❖ Improved and controlled access to information and financial support for entrepreneurs, especially in manufacturing.
- ❖ Fostering the culture of a labour-intensive manufacturing industry
- ❖ Improving infrastructure supporting manufacturing industries
- ❖ Beneficiation of the mining and agricultural products
- ❖ Re-skilling, de-skilling, and multi-skilling of former mineworkers and use of the existing mine infrastructure for education and training
- ❖ Continuous skills development across all sectors with achievable targets
- ❖ Greater participation of institutions of higher learning in, amongst others, research and development, training, coaching and mentoring.

6.3 SCOPE FOR FUTURE RESEARCH

This study analysed the growing and declining sectors in the manufacturing industry of the Southern District Municipality but did not delve into the causes of the growth and the decline. The results of such a research can go a long way in addressing strategies (short, medium and long-terms) that are necessary to develop the sectors of manufacturing to improve productivity and the general standard of living of the inhabitants of this region.

Further research might assist the authorities in implementing measures that may reduce unemployment and poverty levels as well as curbing migration of the working class to other regions and provinces and the resulting socio-economic problems.

There are other measures of a region's manufacturing potential and some of these are: input-output analysis, location quotient, multipliers, regression analysis, micro-economic optimal location estimates, productivity or competitiveness indices can be estimated (see for example, Kleynhans, 2006:61) and / or viable clusters could be identified (see for example, Suleman, 1998).

This study concludes that the Southern District Municipality is in a unique position to improve its economy, increase the standard of living of its inhabitants, reduce unemployment and eradicate poverty because of the potential shown by the identified sectors, the high Gross Geographic Product, the presence of institutions of higher learning and the growth potential revealed in the study. It would be in the best interest of the residents if authorities could implement the recommendations and put measures in place to ensure that there is synergy and sustainability of the various projects.

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