

**The economic impact of a changing urban mining region: The case of the West
Rand District Municipality in Gauteng province**

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ABSTRACT

The economy is constantly changing and shifting and the impact of that is felt across countries, regions and cities. The changes contribute to increased entrepreneurship and often an increased rate in innovation and technological advances. Technological breakthroughs have resulted in the extension of gold mine production in South Africa throughout the history of the country. Despite this, gold production in South Africa has been declining since 1996 at a constant rate of around 60% over the period. The West Rand, located south west of Gauteng, is a region with its economic roots settled deep in the mining sector, specifically gold mining. The study will investigate economic trends in the West Rand and compare it within the context of the bigger Gauteng. The study investigated trends in the economy of the West Rand through the analysis of up-to-date time series business data. This could contribute to valuable resources assisting municipalities such as the West Rand District Municipality with the development of future Integrated Development Plans (IDPs). Business, turnover and employment data from the Business Register were analysed and through statistical calculations, the study found that there was a decline in the total number of business establishments in the West Rand during the study period. Despite this, the research seems to suggest that employment and turnover in the West Rand are showing a positive growth pattern. The implication that these findings have for the West Rand is that local authorities can have access to an up-to-date detailed business analysis that provides sector-specific results and trends. Having time series business data available can assist regions to detect and deal with possible changes in their economy.

Keywords and phrases: *Spatial economy, economic trends, business data, mining, region, West Rand, Gauteng*

OPSOMMING

Die ekonomie is voortdurend aan die verskuif en verander, en die impak daarvan kan oor alle lande, streke en stede gevoel word. Die veranderings dra by tot 'n toename in entrepreneurskap, en dikwels ook 'n toename in die tempo van uitvindings en tegnologiese vooruitgang. Tegnologiese deurbrake het tot gevolg gehad dat goudmynproduksie uitgebrei het in Suid-Afrika regdeur die geskiedenis van die land. Ten spyte hiervan is goudproduksie in Suid-Afrika aan die afneem sedert 1996, teen 'n konstante koers van ongeveer 60% gedurende hierdie tydperk. Die Wesrand, wat suidwes van Gauteng geleë is, is 'n streek wat sy ekonomiese wortels diep in die mynbousektor gegrawe het, veral in die goudmynbedryf. Hierdie studie het ekonomiese tendense in die Wesrand ondersoek en dit vergelyk binne die konteks van die groter Gauteng. Die studie het tendense in die ekonomie van die Wesrand ondersoek deur middel van 'n analise van die bygewerkte tydreeksbesigheidsdata. Dit kan bydra dat kosbare hulpbronne aangewend word om munisipaliteite soos die Wesrand Distriksmunisipaliteit behulpsaam te wees met die ontwikkeling van toekomstige Geïntegreerde Ontwikkelingsplanne (GOP's). Besigheid-, omset- en indiensnemingsdata vanuit die Besigheidsregister is geanaliseer en deur middel van statistiese berekenings, het die studie bevind dat daar 'n afname was in die totale getal besigheidsondernemings in die Wesrand ten tyde van die studietydperk. Desnieteenstaande, wil die navorsing te kenne gee dat indiensneming en omset in die Wesrand 'n positiewe groeipatroon toon. Die implikasies van hierdie bevindings vir die Wesrand is dat plaaslike owerhede toegang kan hê tot 'n bygewerkte en gedetailleerde besigheidsanalise wat sektorspesifieke uitslae en tendense voorsien. Om tydreeksbesigheidsdata beskikbaar te hê, kan streke behulpsaam wees om moontlike veranderings in hul ekonomie op te spoor en hierdie veranderings te hanteer.

Sleutelwoorde en frases: *Ruimtelike ekonomie, ekonomiese tendense, besigheidsdata, mynbou, streek, Wesrand, Gauteng*

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ABBREVIATIONS AND ACRONYMS

Integrated Development Plans	IDP's	III
Geïntegreerde Ontwikkelingsplanne	GOP's	IV
United States of America	USA	2
United States	US	2
Doctor	Dr	2
South African History Online	SAHOL	4
Metric Tonne	t	4
The Organisation for Economic Co-operation and Development	OECD	7
Business Sampling Frame	BSF	9
Statistics South Africa	Stats SA	9
Income Tax	IT	9
Value Added Tax	VAT	9
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Standard Industrial Classification of all Economic Activities	SIC	9

1 INTRODUCTION

Numerous research has been done on declining mining regions internationally, but very limited research is available in the South African context (Beatty & Fothergill, 1996; Bradbury & St-Martin, 1983; Veiga, et al., 2001; Deasy & Griess, 1965; Baartjies & Gouden, 2012). How does a changing mining region detect and deal with possible changes in employment or large industry changes? Very limited time series data are available when decision-makers such as municipalities compile policies and plans annually. Detail data are not available for benchmarking and a limited empirical base exists for responses to policies and plans. This results in a lack of understanding trends in terms of employment, turnover and location of and number of businesses per industry in the district. Municipal IDPs could be improved if there were a more comprehensive use of available data in the district.

Although extensive and in-depth research explored the changing economies and the causes of change to industries inside those economies – see, for instance, the work of Geyer on Deferential Urbanisation (Geyer, 1996; Geyer, 2003; Geyer, et al., 2011) and Sinclair-Smith on changing spatial economies (Sinclair-Smith & Turok, 2012), there are limited research and analysis of business data that can assist municipalities to detect changes at an early stage and incorporate these into their short-term planning. Past research focused on how changes in the industries, such as technological advances, affected the economy and in particular employment in a region. In this study, the analysis of detailed business data can provide a changing mining region with information on trends that can be used in future planning.

South Africa's mining regions are on the decline. Tungsten mining in South Africa ceased in the 1970s because of depletion of the reserves (Baartjies & Gouden, 2012). Gold mining has followed suit in several provinces in the country too. Examples are gold mines in Welkom in the Free State and Dr Kenneth Kaunda District Municipality in the North West province (Kleynhans, 2012). The changes in grade, tonnage and depth of ore in South African mines are some of the biggest contributors in the closing of mines in South Africa. In terms of the location percentage, it would seem that mining is the leading sector in the West Rand, but it has been experiencing a steady decline since 2005. Mining in Westonaria, Randfontein and Merafong City dominates in terms of sector contribution. Unfortunately, like in several other districts, mining in the West Rand will not be sustainable in the future and thus the economy of several municipalities in the district needs to be diversified. Until recently, identifying and monitoring these changes in the economy was not easy with the data available.

In order to gain a better understanding of the spatial economic impacts on and characteristics of the West Rand, which is a changing mining region, this paper focuses on the analysis and comparisons of the business data for the West Rand within a bigger city region such as Gauteng. The paper will address this by creating time series data using the Business Register from Statistics South Africa. The time series was compiled with data from 2012 until 2014. The study compared the industries in the West Rand district with industries in Gauteng as a whole, based on three criteria: Firstly, the number of businesses; secondly, turnover; and thirdly, the number of employees.

The paper is structured in four sections. Firstly, a literature overview and background will be provided. This will shed some light on why some areas such as the West Rand that seems to be a declining mining region, are still dominated by the mining industries. Secondly, the methodology will be addressed, and thirdly, a discussion of results and analysis will provide some interesting

findings within all three business categories, namely number of businesses, turnover and the number of employees. Lastly, this will be followed by a conclusion and recommendations section.

2 LITERATURE REVIEW

The literature review starts with an overview of space economy and changing economic regions. Secondly, the factors that contribute to a change in industry in a region, such as differential urbanisation, migration, advancements in technology and two other mining-specific factors, namely geological factors and external factors, will be discussed. Lastly, it concludes with an overview of gold mining in South Africa and the trends in employment in that sector.

Changing economies are nothing new. An example in Europe is the industrial revolution from around 1760 until somewhere between 1820 and 1840. This was caused by extensive advances in industrial innovation. This phenomenon is also not new to the USA. Borchert proposed a model of five stages of urban development in the US in 1967 that were related to technology/industry changes (Pacione, 2009). Vehicle manufacturing also declined considerably in Britain when the country opened its borders to international trade. It could not produce vehicles at a competitive price like some of the other countries in Europe. Examples of declining mining regions are the coal mines and heavy steel industries in England.

Gold production in the gold mines in South Africa has been declining steadily and the economy of the West Rand district is largely supported by this industry. One of the reasons for the decline in mining production is the depletion of the gold reserves in the country (Baartjies & Gouden, 2012). It was therefore expected that, as was the case with gold mining dependent areas in the rest of the country such as the Dr Kenneth Kaunda district in the North West province, mining activities would be declining in the West Rand district too. Of the two district municipalities in Gauteng, the West Rand District Municipality contributes the most to the province's economy in terms of sectors. Its contribution is over R15 billion (West Rand District Municipality, 2013). The economy of the district is driven by manufacturing, community services, mining and trade and finance. The West Rand District Municipality has consistently enjoyed comparative advantages in the following sectors: Mining (Westonaria, Merafong City and Randfontein), Manufacturing (Mogale City and Randfontein), and Construction (Randfontein and Mogale City).

Britain experienced deindustrialisation, more diversification in the economy and strong decentralisation between 1981 and 1996. Although the direct share in employment by industries reduced from 30 per cent to 18 per cent, its extensive multiplier effect made it to be still a significant force in the employment market (Turok, 1999). There were several factors contributing to these severe changes in the manufacturing industry. The first was because of a local economy that was not diversified and the metal and car manufacturing industries were highly integrated in the economy. These industries were then subjected to intense international competition. The second was that the free market and anti-interventionist philosophy that was the economic policy in the early 1980s did not mitigate the effects of the recession or the non-competitiveness of these sectors in the British industries (Pacione, 2009).

2.1 FACTORS THAT CAN CONTRIBUTE TO AN INDUSTRY CHANGE IN A REGION

2.1.1 Differential urbanisation

Not all settlements grow and develop at the same pace over time. The function of a settlement and the distribution of its natural endowments play a role in the tempo of development (Richardson, 1973). Central Places and Non-central Places develop during the urban settlement stage. Non-Central Places are settlements that developed around or near natural resources (Geyer, 2002).

Urbanisation takes place in a cyclical manner (Geyer & Kontuly, 1996; Richardson, 1973; Richardson, 1996; Geyer, 2003; Geyer, et al., 2011 and Van den Berg, et al, 1982). These concepts have been incorporated in a theory called differential urbanisation by Geyer and Kontuly. This theory postulates that all cities, whether they are large, intermediate or small cities, will experience successive periods of fast and slow growth during their development cycle. There are three main phases identified in the process of urbanisation. The Primate City phase is the initial phase when an increasing number of economic activities take place in a limited number of cities that grow faster than the surrounding cities. The Intermediate City phase starts when growth rates in primate cities start to decline. The Small City phase is the final phase of the first cycle of urban development and is a continuation of the previous phase. At the end of this phase, the urban structure has reached a saturation point because the population from the rural areas cannot be further reduced and the natural increase in the cities in advanced societies is very low. Because it is a continuous process, the next round of urbanisation in the country starts again. During the next round, the primate cities that retained their primacy in the region will again be part of the process and experience immigration and grow again (Geyer & Kontuly, 1996; Pacione, 2009 and Richardson, 1980).

The economic motivations for population urbanisation and deconcentration are twofold. Productionism leads to increased urbanisation and is driven by economic motivations. It can benefit from social economies such as more and better employment opportunities, higher wages and access to better and more services. Environmentalism, on the other hand, leads to population deconcentration and it reacts on the push factors of the negative environmental externalities of urbanism and the positive pull factors on the metropolitan fringe. Increased environmental qualities, lower congestion costs and lower land prices are listed as some of these pull factors (Geyer, et al., 2011).

When the deconcentration forces in primate cities are stronger than agglomeration forces, population and industrial deconcentration are the results (Richardson, 1973).

2.1.2 The 'Dutch Disease'

The 'Dutch Disease' is a phenomenon where a boom in one sector squeezes profitability in another sector. This can be through both directly taking resources away or by placing upward pressure on the exchange rate. If an industry experiences a boom it would result in a higher income at the same production costs. This has the same effect as a price increase in that industry. The result is an increase in labour demand for that industry. A higher demand for labour will push the wage rate up in the region. Labour from the industry not experiencing the boom will then be absorbed by the booming industry. This in turn will result in higher labour demand in the non-booming industry with a higher wage rate as a result. The non-booming industry will then have to make a decision on whether or not it can afford the higher wages at the same retail price or whether it will rather reduce output and keep the wages constant. In both cases, this will lead to a loss in profits for the non-booming industry. If the profit margin is reduced too much for a considerable period, it could result in closure of the non-booming industry (Corden & Neary, 1982).

The gold mining industry in the West Rand district experienced this when the platinum mining in Rustenburg went through a “boom” phase. Salaries were higher in Rustenburg and several of the people employed at the goldmines relocated to the platinum mines. This had a negative effect on the goldmines in the West Rand.

2.1.3 The 'New Growth' economic theory

The "New Growth" theory recognises technological innovations as an endogenous process and they believe it would result in increasing returns to investments. The reason for this is that they show innovations as idea-based and therefore provide its benefits freely to others than the ones who paid to develop them (Voyer, 1997). The following eight attributes are highlighted as being required to stimulate growth and ensure success:

- Local and regional leaders must be able to recognise the potential of knowledge-based industries;
- Regional strengths and assets must be identified and supported;
- There should be local champions to act as a catalyst;
- Entrepreneurial drive and sound business practices should be present;
- Investment capital should be available from various sources;
- There should be a cohesion of information networks, both formal and informal;
- There is a need for educational and research institutions; and, most importantly
- There is a need to have "staying power" over the long run.

It was noted that when these eight attributes are present in developing or newly industrialised countries, development and growth patterns comparable to those in industrialised countries could be achieved. South Korea and Taiwan are examples of this. Unfortunately these two countries are also the exceptions when it comes to developing or newly industrialised countries and the eight attributes. The concerns raised towards other developing or newly industrialised countries are that they might not have the ability to master advanced technologies and reach global markets. Another concern raised is that some countries may base their development strategy exclusively on multinational firms and the result may be a factor-driven economy.

If there is too much reliance on external international technologies, the country will never be the home base for any industry. The danger for local industries is that as the economy opens up to international technology, it also opens up to international markets. Inevitably, the industries will have to compete with these international markets. If the industry were not able to master the new technologies, it might have to close because imported products might be cheaper to the local market than what locally produced items are.

2.2 THE HISTORY OF GOLD MINING IN SOUTH AFRICA AND GAUTENG AND THE WEST RAND

A turning point in the history of South Africa was the discovery of gold on the Witwatersrand in 1886. It transferred the country from an agricultural society to the biggest producer of gold in the world (SAHOL, n.d.). Of the total gold mined throughout history in the world, South Africa has produced more than one third. The country is one of the major producers of gold in the world although it is not the main producer anymore. In 1970, South African gold production peaked at an output of 1 000t.

According to Baartjies and Gouden, the five overarching reasons for mine decline are Grade, Tonnage, Depth, Markets and Compliance. These can be grouped into two groups, namely "Geological Factors" and "External Factors" (see Figure 1) (Baartjies & Gouden, 2012).

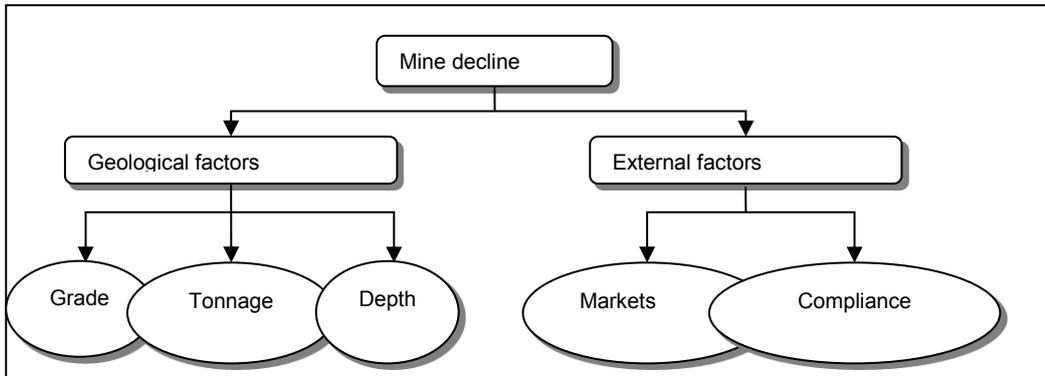


FIGURE 1: FACTORS OF MINE DECLINE

Source: (Baartjies & Gouden, 2012)

Increasingly deep-level mining pushed up the cost of production and the difficulty of extracting ore. Coupled to high labour cost and the low price of gold experienced until recently, the production of gold has reduced steadily (Baartjies & Gouden, 2012). 2006 was the last year that South Africa was the biggest gold producer in the world. In 2008 the country produced 221 tons of gold which made it the third highest producer in the world. Production would have been much lower if it had not been for the improvement in technology to enable tailings dam retreatment and the mining of remaining deep and lower grade shallow resources (Viljoen, 2009; Kleynhans, 2012; Anglo Gold Ashanti, Gold Fields, 2008).

The story of gold in South Africa cannot be divorced from gold in Gauteng. Gold was discovered in Johannesburg on the farm Langlaagte in 1886. More than 98% of all gold recovered in South Africa came from this basin. By 1980, the mines from Johannesburg contributed only 3 per cent to national production (Fair & Muller, 1981). Gold contributed less to the local and regional economy because of two facts. The first is because the economically viable ores had largely been worked out, and the second is the fact that new mines had opened on the Far West Rand (Randfontein and Carletonville) and in the Orange Free State (see Figure 2). These new mines were highly productive. There came a wide variety of secondary industries that replaced the gold mining industry in the Witwatersrand. Along with these industries came the expansion of tertiary services

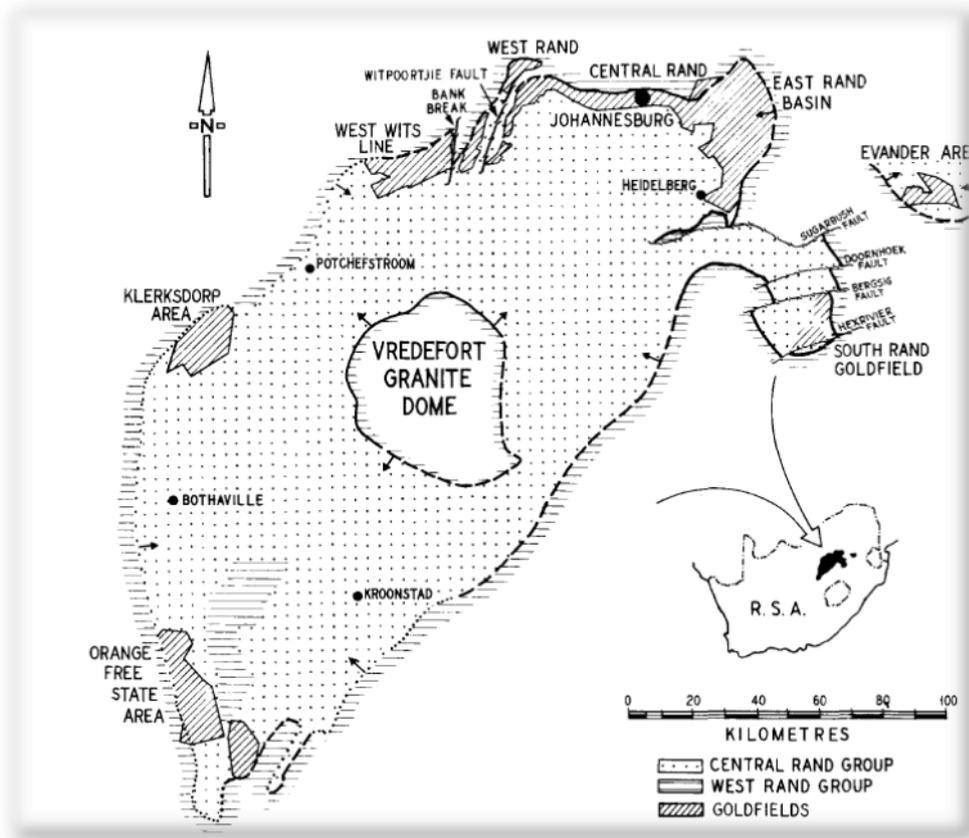


FIGURE 2: MINING AREAS OF THE WITWATERSRAND BASIN

Source: (Janisch, 1986)

According to Randgold Resources, most of the gold mines in South Africa will close within the next twelve to fourteen years (Kleynhans, 2012; Sake24, 2013). This was confirmed by Michael Schroder when he said that South Africa was likely to hoist its last skip of gold from the Witwatersrand deposit in 2019 (Schroder, 2014).

The level of unemployment can be negatively influenced by many factors that are not related to a specific industry or changes in that industry. Government policy can have a direct impact or an indirect impact on employment levels. State welfare is financed through taxes, which places an increased burden on industry through increased production costs and reducing profits. It also has an impact on the earned income of workers by reducing their ability for consumption of products. Organised labour has an impact on the profitability of industries and can have an influence on international investment in an industry and in a region. A change in industry in a region also has an impact on the employment rate in that region. The severity of the impact is determined by the type of industry, the size of the industry and cause of the industry change.

Some of the policies being implemented in South Africa currently have already proven to have had a negative impact on the production of industries in Britain and other countries when these were implemented there. Some of these policies have an unintended negative reaction on developing industries and could cause a slowdown in production, a rise in production cost or a drop in profitability.

In South Africa in the gold mining sector, there was a big drop in employment due to a reduction in the production of gold. This was caused by the high cost of deep-level mining, the relatively low price of gold and the cost of labour.

3 METHODOLOGY

3.1 STUDY AREA

South Africa as a developing country still has a very high reliance on employment in the primary and secondary industries (Statistics South Africa, 2014). Gauteng province consists of three highly urban metropolitan municipalities (Johannesburg Metropolitan Municipality, Tshwane Metropolitan Municipality and Ekurhuleni Metropolitan Municipality) and two more rural district municipalities (West Rand District Municipality and Sedibeng District Municipality) (Figure 3). The three metropolitan municipalities are more reliant on secondary and tertiary industries (Statistics South Africa, 2010; Statistics South Africa, 2014), whereas the two district municipalities are much more in line with the overall picture South Africa paints of being reliant on primary industries such as mining and farming (Statistics South Africa, 2014). The three metropolitan municipalities and the district municipalities form part of the Gauteng city-region with a population of more than 11 million people, and rapidly growing, especially from in-migration (OECD, 2011; Gauteng Provincial Government, 2012; Gauteng Provincial Government, 2013; Gauteng Provincial Government, 2014). The Gauteng city region is larger than Gauteng province. Several municipalities outside Gauteng, such as Rustenburg, Madibeng, Potchefstroom and Klerksdorp in North West province as well as some municipalities in Limpopo and Mpumalanga province are included in the area. Figure 3 indicates the Municipalities currently considered by the Gauteng City-Region Observatory to be part of the Gauteng City-Region. The whole of Gauteng province has a population of over 12 million people who contribute to 33% of the national economy.



FIGURE 3: LOCAL MUNICIPALITIES CONTAINED IN THE GAUTENG CITY REGION

Source: (GCRO, 2013)

Gauteng is the Sesotho word for "place of gold". In the 1800s, the province was built on the wealth of gold found deep underground. Diversification of the economy took place and more sophisticated sectors such as finance and manufacturing entered the economy. Gold mining is not the most important sector anymore. Financial and business services, logistics and communications are the sectors currently dominating the economy. The head offices of more than 70 banks from foreign countries are located in the province. Coupled with the fact that at least that number of South African banks, stockbrokers and insurance giants are also situated in the province, it can easily be classified as Africa's financial capital. The economy of the province is diverting from traditional heavy industries and low value-added production towards a more sophisticated high value-added production. Industries developing here are in particular information technology, telecoms and other high-tech industries (Office of the Premier, n.d.) The province can essentially be seen as one large city of which 97% of its population is living in urban centres.

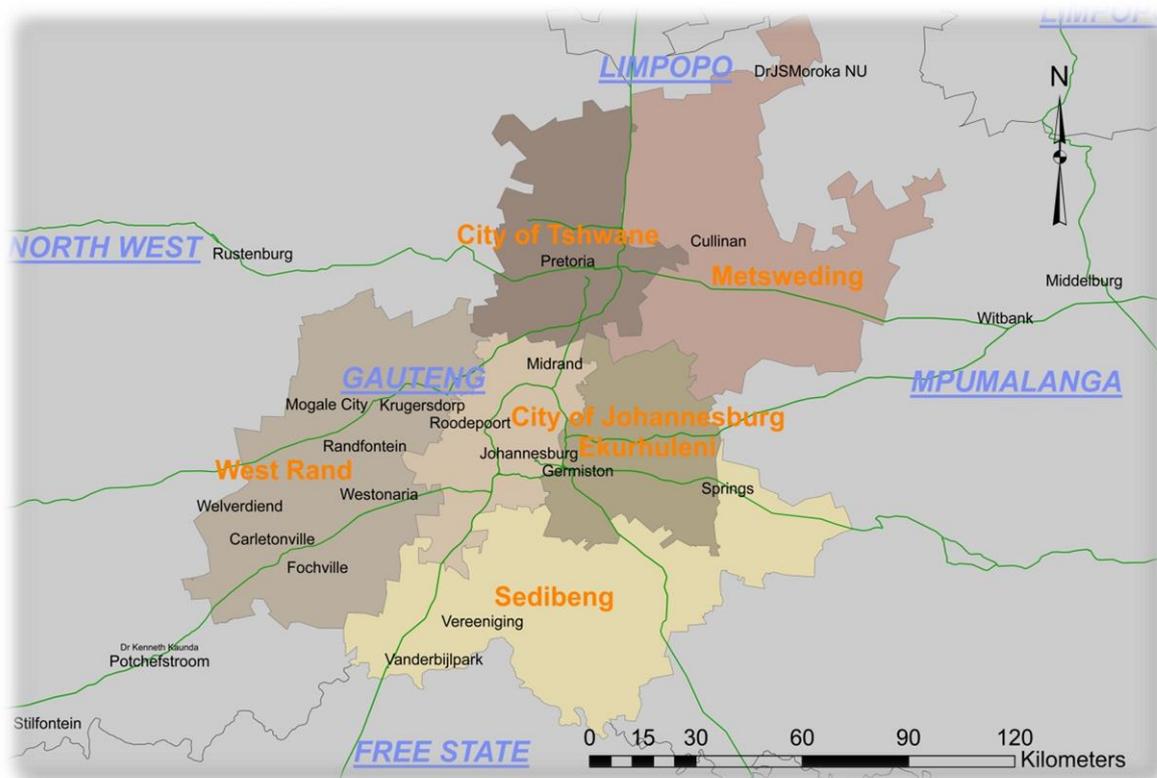


FIGURE 4: LOCALITY MAP OF GAUTENG

Although small in area compared with other provinces in South Africa (1.1% share in total SA area), the agricultural sector of the province provides the cities and towns of Gauteng with daily fresh produce. The so-called Maize Triangle covers a large area of Gauteng. The districts of Bronkhorstspuit, Cullinan and Heidelberg hold important agricultural land, where ground-nuts, sunflowers, cotton and sorghum are produced mainly in the Heidelberg, Cullinan and Bronkhorstspuit districts. Food, food processing and beverages make up a significant part of the province's economy, with half of South Africa's agricultural product processing companies operating in Gauteng (Reporter, 2012).

West Rand District Municipality is located in the south west of Gauteng (Figure 4). According to the population census of 2011, it has a population of around 821 000, which is 6.7% of the total population of Gauteng. The district covers an area of just over 4 000 km² or almost 25% of

Gauteng. The Cradle of Humankind is part of the World Heritage Site and falls under the jurisdiction of Mogale City. The West Rand extends from Randfontein (the seat of the district) in the west to Roodepoort in the east, and includes the town of Krugersdorp. It is bordered by Bojanala Platinum to the north-west, the City of Tshwane to the north-east, the City of Johannesburg to the east, Sedibeng to the south-east and Dr Kenneth Kaunda to the south-west (West Rand District Municipality, 2013). The main economic contribution of the district towards the province is found primarily within the mining sector. Areas such as Krugersdorp also fulfil a residential function for many people working in Johannesburg and Pretoria. The district is the poorest region contributing to the GDP of Gauteng. Gold and uranium mining are major economic contributors and the reprocessing of old mine tailings is done using modern technology. The district focuses on attracting downstream mining industries such as refining and beneficiation. Agriculture also plays an important part in the region (West Rand District Municipality, 2013). Maize yields in the district are above average. Cattle, vegetables and cut flowers are farmed for local and export markets. Nearby Lanseria Airport provides an air link for exporting produce. Emerging farming operations are bolstered by investment from large mining houses, with a rose farm near Carletonville providing an example of this (Media, 2012-2014).

3.2 DATA AND DATA SOURCES

The primary data source for this study is official statistics provided by Statistics South Africa through the records in their Business Sampling Frame (commonly known as the Business register). The Business Register division is responsible for maintaining the Business Sampling Frame (BSF) of Statistics South Africa (Stats SA). The BSF is a database that contains information on all businesses registered for Income Tax (IT) and Value Added Tax (VAT) with the South Africa Revenue Service (SARS). The BSF forms the pillar of economic statistics and is used to select (sample) businesses to participate in a range of Stats SA's economic surveys. The defining characteristics of a reliable BSF are comprehensive coverage, accurate economic activity and size classification and updated contact information (Chauke, 2014). An improved Business Register was introduced for the first quarter of 2008 and has been updated and maintained quarterly since then. The business Register is a database of statistical information such as the size and geography of industries. It also contains indicators such as life status, classification of industry etc. The dataset was selected because it provides business related information that could be used to determine if employment levels are influenced by a change in industry in a region. Data available in the Business Register that were used in this study were the standard industrial classification code, business turnover, number of businesses and number of employees per business for 2012, 2013 and 2014. The datasets do not correspond to calendar years. The 2012 dataset is from April 2011 until March 2012, while that of 2013 covers April 2012 until March 2013 and the 2014 dataset contains data from April 2013 until March 2014. The reason for this selection is to have the data corresponding with a financial year of the businesses and to have the most up-to-date data available for the study. The classification to be used is the Standard Industrial Classification of all Economic Activities (SIC), Fifth Edition from Statistics South Africa, January 1993. The classification of businesses in Gauteng and the West Rand will be done on two levels. The first is at major division level (SIC1) where data from Gauteng province and the West Rand district will be compared. At this level there are 10 major divisions of industries. The second level is at division level (SIC2). There are 50 divisions inside the 10 major divisions (see Annexure 1). This level will be used to undertake a more detailed analysis of trends discovered in the major divisions. Not all divisions are found in Gauteng province and the West Rand district.

Once the industries have been classified on the different sector classifications and sub-classifications, they will be analysed based on three variables and the data will be extracted and sorted for each of these criteria per year:

- The number of establishments per industry
- The turnover
- The number of employees

The variable "number of businesses" will be used to determine if an industry is physically expanding or contracting across the province and the district. The variable "business turnover" is used to establish whether or not the industry is growing financially and if there is a market for its product/service. The final variable is "number of employees". A growth in this variable could be an indication of a higher production required due to an increase in demand for products or services of a specific industry.

4 FINDINGS AND DISCUSSIONS

The data will be discussed by looking at industries in Gauteng and the West Rand. Major changes and the highest contributors in each sector will be discussed in terms of number of businesses, turnover and employment.

4.1 NUMBER OF BUSINESSES

When analysing the major division levels (SIC level 1) of the business data in terms of the number of businesses per sector, the results from the study suggest that the biggest contributor to the number of businesses in Gauteng and the West Rand between 2012 and 2014 is the financial intermediation, insurance, real estate and business services level (SIC 8). In Gauteng, the changes over the three years are reflected as 60% in 2012, 60% in 2013, 61% in 2014, and in the West Rand, these changes constitute 51% in 2012, 51% in 2013, 52% in 2014 (Table1). Major division 8 increased by 1% for both the West Rand and Gauteng over the three years. The second highest contributor for both areas is the wholesale and retail trade; repair of motor vehicles, motor cycles and personal and household goods; hotels and restaurants (major division 6). In the West Rand, 20% of all businesses were in this category in 2012 and 2013, and then there was a slight drop to 19% in 2014. In Gauteng, 14% of the businesses were in SIC 6 in 2012 and 2013, with a slight increase to 15% in 2014.

Table 1: Percentage businesses per major division

Major division level (SIC)	WR_2012	WR_2013	WR_2014	GP_2012	GP_2013	GP_2014
1-Agriculture, hunting, forestry and fishing	5%	5%	5%	2%	2%	2%
2-Mining and quarrying	1%	1%	1%	0%	0%	0%
3-Manufacturing	8%	8%	8%	8%	8%	8%
4-Electricity, gas and water supply	0%	0%	0%	0%	0%	0%
5-Construction	5%	5%	5%	4%	4%	4%
6-Wholesale and retail trade; repair of motor vehicles, motor cycles and personal and household goods; hotels and restaurants	20%	20%	19%	14%	14%	15%
7-Transport, storage and communication	4%	4%	3%	3%	3%	3%
8-Financial intermediation, insurance, real estate and business services	51%	51%	52%	60%	61%	61%
9-Community, social and personal services	6%	6%	6%	7%	7%	7%
Total	100%	100%	100%	100%	100%	100%

Note: Due to rounding, numbers do not necessarily add up to totals

Although major divisions 6 and 8 registered a slight increase in the percentage of businesses in the province, in real terms, there was a significant drop in the total number of businesses in most of the other sectors from 2012 to 2014.

From Table 2, it is clear that the total number of businesses decreased in both Gauteng and the West Rand. The West Rand experienced a reduction of 8% in the total number of businesses. This equates to around 2 000 businesses.

Table 2: Change in number of businesses

SIC1	West Rand District		Gauteng Province	
	Actual *	%_Change	Actual *	%_Change
1-Agriculture, hunting, forestry and fishing	-120	-10%	-780	-9%
2-Mining and quarrying	30	8%	120	7%
3-Manufacturing	-170	-9%	-1810	-5%
4-Electricity, gas and water supply	10	19%	70	25%
5-Construction	-50	-4%	-200	-1%
6-Wholesale and retail trade; repair of motor vehicles, motor cycles and personal and household goods; hotels and restaurants	-550	-12%	-380	-1%
7-Transport, storage and communication	-250	-28%	-1030	-8%
8-Financial intermediation, insurance, real estate and business services	-590	-5%	-9070	-3%
9-Community, social and personal services	-190	-13%	-2830	-9%
Total	-1890	-8%	-16460	-4%

Note: *Values rounded up to nearest 10.
Due to rounding, numbers do not necessarily add up to totals

Major division 2 – *Mining and quarrying* showed an increase in the number of businesses in both Gauteng and the West Rand. The reason for this increase in the West Rand is that larger mines are closing down and smaller mining companies are using improved technology to extract gold from lower grade ore that was not profitable for the bigger mines (Media, 2012-2014; Janisch, 1986).

Gauteng experienced a reduction of 4% or almost 16 500 businesses. Major division 8 contributed the most in actual losses with just over 9 000 businesses. This is around 3% of the businesses in the industry in 2012 for Gauteng. These losses took place mainly in division 84 – Real estate activities, where a 3.5% drop in establishments meant that just over 6 000 establishments closed. This is also the highest number of establishments lost in all 45 divisions found in Gauteng province. Division 85 – Renting of machinery and equipment, without operator, and of personal and household goods, shed almost 3 500 businesses which equates to a reduction by 23% in that division in the province. Major division 9 – Community, social and personal services, shed almost 3 000 businesses from 2012 in Gauteng. This is a 9% reduction in the number of businesses in that sector. The biggest growth was experienced in division 61 – Wholesale and commission trade, except of motor vehicles and motor cycles, which showed an increase in outlets of just over 900. This is an increase of 4.8%.

In the West Rand, the highest number of businesses was shed in major division 8, with 590 businesses. Major division 6 was second with 550 businesses. This is a decrease of 5% and 12% for the respective industries. As is the case in Gauteng, the businesses were shed mainly by two divisions inside major division 8. These divisions are division 84 – Real estate activities, and division 85 – Renting of machinery and equipment, without operator, and of personal and household goods. The number of businesses reduced by around 300 and 150 respectively in those divisions. This represents a 4% and 24% reduction in the total number of outlets in those divisions. Although the aim of this article is not to explain why changes have taken place, it is worthwhile to take note of the extensive studies that were done on the cyclic nature of businesses (Baxter & King, 1995; Beveridge & Nelson, 1981; Presscott, 1986), while other research would suggest that the difficulty to access credit and the cost of credit could also play a major role (Bernanke, 1983). Another explanation might be that the number of firms will rise during industry establishment and then it will decline as the industry evolves. The reason for this is because innovation opportunities will fuel entry into the industry but failure to innovate will force an exit from the industry (Jovanovic & MacDonald, 1994).

The mining sector does not contribute a lot to the total number of establishments in both Gauteng and the West Rand, but it is one of the few sectors that actually registered a growth in the number of establishments.

4.2 TURNOVER

The percentage contribution to the total turnover in the West Rand and in Gauteng per major division is illustrated in Table 3. Looking at the percentage contributions per industry to the turnover in Gauteng, the trend is basically the same as in the West Rand, except for major divisions 6 and 8. Major division 6 – Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods; hotels and restaurants, showed a significant increase from an 18.5% contribution in 2012 to a 29.5% contribution in 2014. It is an increase of 11% in total contribution to turnover. The contribution of major division 8 – Financial intermediation, insurance, real estate and business services to the overall turnover in Gauteng diminished by 14.2% in the last three years. Closer examination of Table 3 reveals that there was an actual increase in the contribution from major division 8 between 2012 and 2013, and then a decrease of 17.3% between 2013 and 2014. Division 84 – Real estate activities, is the reason for the decline in turnover in major division 8 in Gauteng province. Its turnover decreased by almost 80% over the three years. In 2012 and 2013, real estate activities was one of the top four divisions in Gauteng with an annual turnover of over R1 470 billion. This has reduced in 2014 to a turnover of less than R315 billion.

Table 3: Percentage turnover per major division for the West Rand (WR) and Gauteng (GP)

SIC1	WR_2012	WR_2013	WR_2014	GP_2012	GP_2013	GP_2014
1-Agriculture, hunting, forestry and fishing	2.60%	2.40%	3.50%	0.70%	0.60%	0.70%
2-Mining and quarrying	8.00%	10.50%	13.10%	3.10%	1.80%	2.90%
3-Manufacturing	18.10%	17.60%	16.60%	12.30%	12.40%	12.40%
4-Electricity, gas and water supply	0.00%	0.60%	0.60%	0.20%	0.70%	0.70%
5-Construction	7.50%	4.80%	5.40%	3.50%	3.40%	4.20%
6-Wholesale and retail trade; repair of motor vehicles, motor cycles and personal and household goods; hotels and restaurants	32.20%	26.60%	27.70%	18.50%	18.00%	29.50%
7-Transport, storage and communication	2.50%	2.70%	2.60%	5.60%	4.60%	7.20%
8-Financial intermediation, insurance, real estate and business services	9.70%	17.30%	12.40%	47.20%	50.30%	33.00%
9-Community, social and personal services	19.30%	17.50%	18.10%	8.80%	8.20%	9.40%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Note: Due to rounding, numbers do not necessarily add up to totals

From Table 3 it seems that there is moderate fluctuation in the percentage contribution to total turnover per industry in the West Rand. The contribution by major division 2 – Mining and quarrying, increased by 5% over the last three years. In 2014, it was the fourth highest contributor to total turnover at just over 13%. Financial intermediation, insurance, real estate and business services increased its contribution from 9.7% in 2012 to 17% in 2013, and slightly lower to 12% in 2014. The contribution by Manufacturing slowed from 18.1% in 2012 to 16.6% in 2014. The contributions from major divisions 5, 6 and 9 also declined from 2012 in the West Rand.

Table 4 indicates that the biggest growth in turnover in both Gauteng and the West Rand was in major division 4 – Electricity, gas and water supply, with a 2 700% increase in the West Rand and 250% in Gauteng province. In Gauteng, division 41 – Electricity, gas, steam and hot water supply, showed the biggest increase in turnover in this major division. Turnover in this division increased by almost 400%. Although there was a significant increase in turnover in major division 8 in the West Rand, in Gauteng that was the only major division that showed a reduction in turnover. Looking only at the percentages, the 22% reduction in the turnover of major division 8 does not seem severe, but taking into consideration that the actual value of R458.2 billion is only 2% less than the total increase in turnover in Gauteng province, it is clear that there were major losses in turnover in that sector. Major division 6 showed a noticeable increase in total turnover of 77%, which is around R612.5 billion in value.

Table 4: Change in turnover per major division

SIC1	West Rand District			Gauteng Province		
	Actual *	**	%_Change	Actual *	**	%_Change
1-Agriculture, hunting, forestry and fishing	ZAR	1,698.00	59%	ZAR	2,900.00	9%
2-Mining and quarrying	ZAR	8,106.00	92%	ZAR	2,453.00	2%
3-Manufacturing	ZAR	1,642.00	8%	ZAR	61,803.00	12%
4-Electricity, gas and water supply	ZAR	690.00	2733%	ZAR	24,861.00	250%
5-Construction	ZAR	1,132.00	-14%	ZAR	48,659.00	32%
6-Wholesale and retail trade; repair of motor vehicles, motor cycles and personal and household goods; hotels and restaurants	ZAR	690.00	2%	ZAR	612,476.00	77%
7-Transport, storage and communication	ZAR	592.00	21%	ZAR	102,496.00	42%
8-Financial intermediation, insurance, real estate and business services	ZAR	5,423.00	51%	ZAR	458,185.00	-22%
9-Community, social and personal services	ZAR	2,357.00	11%	ZAR	69,748.00	18%
Total	ZAR	20,043.00	18%	ZAR	466,607.00	11%

Note: *Values rounded up to nearest 1 000 000.

**Values are given in R1 000 000.00.

Due to rounding, numbers do not necessarily add up to totals

The biggest growth in turnover in major division 4 in the West Rand was in division 42 – Collection, purification and distribution of water. Its turnover grew by more than R612 million over the past three years. The reason for this might be found in the large number of new developments in the district and because many people prefer to drink water purchased from a vendor rather than the tap water supplied by the municipalities/Randwater.

The biggest actual growth in turnover in the West Rand was in major division 2, with an increase in turnover of R8.1 billion between 2012 and 2014. This is an increase of just over 90%. Division 23 – Mining of gold and uranium ore, showed the biggest rise in turnover with around R5.5 billion or 68% from 2012 to 2014. Construction was the only sector in the West Rand that showed a decrease in total turnover. The reduction was a significant 14%. Major division 3 – Manufacturing, and major division 6 – Wholesale and retail trade; repair of motor vehicles, motor cycles and personal and household goods; hotels and restaurants, showed the lowest positive growth with 8% and 2% respectively in the West Rand.

The turnover for major division 1 – Agriculture, hunting, forestry and fishing, grew by 59% in the district. Although major division 8 grew by 51% (the fourth highest out of the 10 major divisions), its

total growth of R5.4 billion is actually the second highest after Mining and quarrying. The only division that did not show a positive growth over the past three years in this major division was division 82 – Insurance and pension funding, except compulsory social security. Its turnover was 70% less in 2014 than in 2012. Division 87 – Research and development, registered the highest percentage growth at 330%, while division 88 – Other business activities, had the biggest actual growth in turnover with almost R4.1 billion for the three years in the district.

The total turnover in the West Rand grew by 18% from 2012 until 2014. Turnover in Gauteng increased by 11% over the same period. The total turnover per year for West Rand is around 2.5% of the total turnover of the whole of Gauteng per year.

The implication for the mining sector is that its contribution to the turnover increased by around 2.5% annually in the West Rand. In Gauteng, the contribution dropped by 1.3% in 2013, but it expanded again by 1.1% in 2014.

4.3 NUMBER OF EMPLOYEES

In general there was an increase in employment in all major divisions in Gauteng (Table 5 and Table 6). The biggest percentage growth was in major division 4 with 96%, and major division 8 with 71%. The biggest single reduction in employment in Gauteng was in division 23 – Mining of gold and uranium ore, with more than 26 000 jobs lost. This is just over 25% of the number of employees in this division in 2012. This was countered by division 29 – Services activities incidental to mining of minerals, that had an increase in employment of almost 2 100 over the study period in Gauteng. This is an increase of almost 200% for the division.

Employment trends in the West Rand are the same as the turnover trends for the district over the past three year. There were no major changes in employment per major division. The industry in the West Rand that employs the most people is *Mining and quarrying*. About 40% of employed people in the West Rand were employed in major division 2. It was at almost 43% in 2012. Major division 9 – Community, social and personal services might be considered the exception because its contribution to employment grew from 1.7% in 2012 to 6.4% in 2014 (see Table 5). Since 2013, this major division has contributed more to employment than major division 1 – Agriculture, Hunting, Forestry and Fishing, in the West Rand. In Gauteng, this major division was the fourth highest contributor to employment, with around 11% for the past three years.

Table 5: Percentage employment per major division

SIC1	WR_2012	WR_2013	WR_2014	GP_2012	GP_2013	GP_2014
1-Agriculture, hunting, forestry and fishing	3.01%	3.55%	4.95%	1.00%	1.00%	1.13%
2-Mining and quarrying	42.83%	42.47%	39.96%	9.70%	7.70%	7.18%
3-Manufacturing	18.24%	16.00%	16.09%	19.94%	17.24%	18.07%
4-Electricity, gas and water supply	0.00%	0.00%	0.00%	0.55%	0.56%	0.75%
5-Construction	8.70%	6.55%	7.38%	7.26%	6.41%	6.56%
6-Wholesale and retail trade; repair of motor vehicles, motor cycles and personal and household goods; hotels and restaurants	14.52%	12.52%	12.32%	18.15%	15.06%	17.31%
7-Transport, storage and communication	1.59%	1.11%	1.11%	6.75%	6.76%	7.95%
8-Financial intermediation, insurance, real estate and business services	9.40%	11.84%	11.75%	25.35%	34.65%	30.07%
9-Community, social and personal services	1.71%	5.95%	6.44%	11.30%	10.62%	10.98%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Note: Due to rounding, numbers do not necessarily add up to totals

Major division 7 – Transport, storage and communication, was the only area that registered an overall negative growth in employment during the study period in the West Rand. Employment declined by 10% and the actual value is less than 200 (see Table 6). A closer look reveals that division 71 – Land transport; transport via pipelines and division 74 – Supporting and auxiliary transport activities; activities of travel agencies, had a reduction in employment of 12% and 6% respectively.

The division with the largest actual reduction in employment was division 33 – Manufacture of coke, refined petroleum products and nuclear fuel; manufacture of chemicals and chemical products; manufacture of rubber and plastic products. It had a reduction of just over 400 employees over the study period, which is about 10% for the division in the West Rand.

Major division 2 – Mining and quarrying, had the biggest actual growth in employment with a total increase of just over 8 000 over the past three years in the West Rand. The biggest contribution to this came from division 23 – Mining of gold and uranium ore, with just over 6 000 employees. This is an increase of 15% from 2012 until 2014. This also represents the single largest actual growth in employment in the district.

Table 6: Change in employment per major division

SIC1	West Rand District		Gauteng Province	
	Actual *	%_Change	Actual *	%_Change
1-Agriculture, hunting, forestry and fishing	3300	113%	10300	62%
2-Mining and quarrying	8600	21%	10500	7%
3-Manufacturing	2500	14%	100100	30%
4-Electricity, gas and water supply	100	200%	8700	96%
5-Construction	900	10%	35900	30%
6-Wholesale and retail trade; repair of motor vehicles, motor cycles and personal and household goods; hotels and restaurants	1400	10%	111600	37%
7-Transport, storage and communication	-200	-10%	77300	69%
8-Financial intermediation, insurance, real estate and business services	5600	62%	295600	71%
9-Community, social and personal services	6400	386%	74200	40%
Total	28200	29%	723700	44%

Note: *Values rounded up to nearest 100
Due to rounding, numbers do not necessarily add up to totals

The total employment per year for West Rand is around 5% of the total employment of the whole of Gauteng. In 2012, it was 5.8%, but it declined to 5.1% in 2013 and then increased marginally again to 5.2% in 2014.

5 CONCLUSION

The fact that gold production in the gold mines in South Africa was declining steadily, and that the economy of the West Rand district is largely supported by this industry sits behind the motivation for this study. Several sources also suggested that gold reserves in the Witwatersrand basin would be depleted or not economically mined within the next five to seven years (Chamber of Mines, 2013; Baartjies & Gouden, 2012; Kleynhans, 2012). The reason for the decline in mining production is the depletion of the gold reserves in the country. In terms of the location percentage, it would seem that mining is the leading sector, but that it has been experiencing a steady decline since 2005. Mining in Westonaria and Merafong City dominates in terms of sector contribution, but mining will not be sustainable in the future and thus the economy for Westonaria and Merafong City needs to be diversified.

The research investigates possible economic change of a changing mining region. The ability to analyse and compare detailed business data for Gauteng and the West Rand contributed to sector-specific results on the number of businesses, turnover and employment that can inform future municipal planning and be used as a benchmarking tool. The comparison is done through three variables, namely number of businesses, business turnover and employment. The dataset chosen for this study was the business frame of Statistics South Africa. Other datasets could also have been chosen such as the census data from Statistics South Africa. This study was groundbreaking in that the business frame has never been used for a study like this before. One of the reasons for selecting this dataset is the continuous updating of the data in the database. Census data are already at least a year old when these are released.

While analysing the business frame data from 2012 until 2014, it became clear that mining and quarrying in general and gold mining in particular are still playing a very important role in the economy of the district. For obvious reasons it is not featuring very high on the total number of businesses in the district or in Gauteng province. What the study found was that in 2014, major division 6 – Wholesale and retail trade; Repair of motor vehicles, motor cycles and personal and household goods; hotels and restaurants, was the largest contributor to turnover in the district. This, coupled with the fact that major division 8 – Financial intermediation, insurance, real estate and business services, had an increased contribution to turnover in the district from 9% to 12%, indicates that the economy of the West Rand might be moving away from a primary sector dominated economy.

From the analysis it is clear that although mining activities are declining sharply in Gauteng province as a whole, the same trend is not visible in the West Rand district. Mining is actually one of only two sectors in the West Rand that showed a positive growth in the number of establishments, turnover and employment. Some of the suggestions are that progress in technology would make it economically viable to process mine dumps that were previously not economically lucrative. The exchange rate would make the processing of lower grade ore profitable, and lastly, liberal labour laws and highly unionised industries sometimes prevent industries from dismissing workers even if it is not profitable to keep them. Although the figures in general do not look bad, there are one or two underlying issues that became clear. The biggest is the fact that, although the mining industry showed the biggest growth in turnover, it is the one sector that inevitably will decline. It is also extremely vulnerable to external forces such as international prices, production costs and labour related issues. The problem for the West Rand is that in 2014, almost 40% of the workforce was employed in the mining sector. Should there be an event that sees the mines closing, it would have a disastrous effect not only on the economy but also on the social environment of the district. The second worrying factor is that almost 40% of the employed people only contribute 13% to the total turnover in the district. Taking into consideration

that turnover is linked to salaries, it is clear that there is a limited amount of buying power at individual level. This might be the reason why major division 6 – Wholesale and retail trade; repair of motor vehicles, motor cycles and personal and household goods; hotels and restaurants, although having had the highest contribution to the total turnover in the district for all three years in the study period, only showed a 2% growth in turnover during these three years.

5.1 LIMITATIONS OF THE STUDY

There were a few limitations to the study that should be kept in mind:

The three biggest limitations on the business dataset itself are firstly that the records and information in the dataset are limited to formal businesses that are registered with SARS. Secondly, the updating and cleaning of the database are done daily by Stats SA staff, and therefore the database is evolving daily. Lastly, the high level of confidentiality and the sensitivity of the dataset might make it more difficult to obtain for research purposes.

5.2 RECOMMENDATIONS FOR FUTURE RESEARCH

It is recommended that a similar study with the same dataset be done again in two or three years' time. The dataset used for this study is still very recent and it is more of a challenge to pick up any significant trends over such a short period. A similar study with the data for the West Rand district and the four local municipalities inside the district municipality would also be of great value to uncover trends that are hidden at province/district comparison level.

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Annexure: List of major divisions and divisions

Private households, extritorial organisations, representatives of foreign governments and other activities not adequately defined	0
<i>Private households with employed persons</i>	1
<i>Exterritorial organisations</i>	2
<i>Representatives of foreign governments</i>	3
<i>Other activities not adequately defined</i>	9
Agriculture, hunting, forestry and fishing	1
<i>Agriculture, hunting and related services</i>	11
<i>Forestry, logging and related services</i>	12
<i>Fishing, operation of fish hatcheries and fish farms</i>	13
Mining and quarrying	2
<i>Mining of coal and lignite</i>	21
<i>Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction, excluding surveying</i>	22
<i>Mining of gold and uranium ore</i>	23
<i>Mining of metal ores, except gold and uranium</i>	24
<i>Other mining and quarrying</i>	25
<i>Services activities incidental to mining of minerals</i>	29
Manufacturing	3
<i>Manufacture of food products, beverages and tobacco products</i>	30
<i>Manufacture of textiles, clothing and leather goods</i>	31
<i>Manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials; manufacture of paper and paper products; publishing, printing and reproduction of recorded media.</i>	32
<i>Manufacture of coke, refined petroleum products and nuclear fuel; manufacture of chemicals and chemical products; manufacture of rubber and plastic products</i>	33
<i>Manufacture of other non-metallic mineral products</i>	34
<i>Manufacture of basic metals, fabricated metal products, machinery and equipment and of office, accounting and computing machinery</i>	35
<i>Manufacture of electrical machinery and apparatus n.e.c</i>	36
<i>Manufacture of radio, television and communication equipment and apparatus and of medical, precision and optical instruments, watches and clocks</i>	37
<i>Manufacture of transport equipment</i>	38
<i>Manufacture of furniture; manufacturing n.e.c.; recycling</i>	39
Electricity, gas and water supply	4
<i>Electricity, gas, steam and hot water supply</i>	41
<i>Collection, purification and distribution of water</i>	42
Construction	5
<i>Construction</i>	50
Wholesale and retail trade; repair of motor vehicles, motor cycles and personal and household goods; hotels and restaurants	6
<i>Wholesale and commission trade, except for motor vehicles and motor cycles</i>	61
<i>Retail trade, except for motor vehicles and motor cycles; repair of personal household goods</i>	62
<i>Sale, maintenance and repair of motor vehicles and motor cycles; retail trade in automotive fuel</i>	63
<i>Hotels and restaurants</i>	64

Annexure: List of major divisions and divisions (concluded)

Transport storage and communications	7
<i>Land transport; transport via pipelines</i>	71
<i>Water transport</i>	72
<i>Air transport</i>	73
<i>Supporting and auxiliary transport activities; Activities of travel agencies</i>	74
<i>Post and telecommunications</i>	75
Financial intermediation, insurance, real estate and business services	8
<i>Financial intermediation, except insurance and pension funding</i>	81
<i>Insurance and pension funding, except compulsory social security</i>	82
<i>Activities auxiliary of financial intermediation</i>	83
<i>Real estate activities</i>	84
<i>Renting of machinery and equipment, without operator, and of personal and household goods</i>	85
<i>Computer and related activities</i>	86
<i>Research and development</i>	87
<i>Other business activities</i>	88
Community, social and personal services	9
<i>Public administration and defense activities</i>	91
<i>Education</i>	92
<i>Health and social work</i>	93
<i>Other community, social and personal service activities</i>	94
<i>Activities of membership organisations</i>	95
<i>Recreational, cultural and sporting activities</i>	96
<i>Other service activities</i>	99

Source: (Statistics South Africa, 1993)