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FUNCTIONALITY AND COMPARATIVE ADVANTAGES AMONG THE PROVINCES OF SOUTH AFRICA: A LOCATION QUOTIENT ANALYSIS OF EMPLOYMENT DISTRIBUTION.

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A thesis submitted in partial fulfilment of the requirements for the Degree of Master of Philosophy in Population Studies, Department of Statistics and Population Studies, Faculty of Natural Science, University of the Western Cape.

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Declaration

Functionality and Comparative Advantages among the Provinces of South Africa: A Location Quotient Analysis of Employment Distribution, is my own work. It has not been submitted before for any degree or examination at any other university. Full reference details acknowledging all sources used or quoted have been provided.

Moyin John Date: _14 November 2019

Signed 

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Abstract

The purpose of the study is to examine the functions of provinces in South Africa and their respective comparative advantages from 2013 to 2017, in terms of employment absorption. It is predicted or assumed that there are considerable spatial disparities in the functions and comparative advantage profiles among provinces, some of them performing highly sophisticated functions and being comparatively better in terms of labour market outcomes than others. It is also assumed that this comes as a result of spatial preferences in location of firms. These could also be the result of the deployment patterns of the labour force across the sectors of employment. These assumptions suggest the formulation of appropriate policy interventions to promote a balanced spatial development across the country. The method of data analysis is guided by that of Location Quotient (LQ) to assess the extent to which industries are concentrated in a province as compared to South Africa. The study makes use of secondary data, notably the Labour Force Survey conducted by Statistics South Africa (Stat SA) in 2013 and 2017. The motive for the choice is also guided by the ease involved in terms of making use of data derived from a survey to profile the functions of each province. The study focussed on variables such social economic characteristics (branch of activity where an individual is working and province of enumeration). The geographical scope of the study covered the nine provinces of South Africa. The study was guided by the theory of regional localisation of firms. In essence the theory specialises in terms of functions among the provinces resulting in differing comparative advantage in the labour market dynamics.

***Keywords*:** Spatial planning, regional development, labour force, regional policy, city, rural development, labour market.

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Dedication

This thesis is dedicated to my late mum Mrs Mary John and late brother Abiodunde Paul John, wish you were here to witness my achievements. Always love you.

My dedication is also extended to people who are precious in my life that I had to put aside in order to complete this thesis. Thank you for understanding. Ogboh!

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List of Abbreviations

CURDS……. Center for Urban Regional Development Studies

EC .....Eastern Cape

FS .....Free State

GDP.....Gross Domestic Product

GT .....Gauteng

GVA.....Gross Value Added

KZN .....Kwazulu-Natal

LP.....Limpopo

LQ .....Location Quotient

MP.....Mpumalanga

NC.....Northern Cape

NW.....North West

QLFS.....Quarterly Labour Force Survey

SA .....South Africa

SADC……Southern African Development Community

SIC .....Standard Industrial Classification

SPSS……. Statistical Package for the Social Sciences

Statistics South Africa.....Stats SA

WC.....Western Cape

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CHAPTER ONE

INTRODUCTION

1.1 Introduction to the Study

A function is basically a role, or an activity, carried out by a specified institution (Lubell, 2013; Nord, 2014; Veblen, 2017). For example, if a geographical entity, such as a country, is considered as an institution – as this study does – functions would refer to its various economic sectors such as agriculture, mining, manufacturing, finance and insurance. In this study, the term *institutions* refers to the nine provinces of South Africa, viz.: Western Cape; Eastern Cape; Northern Cape; Free State; KwaZulu-Natal; North West; Gauteng; Mpumalanga; and, Limpopo. The study begins from the premise that there are considerable spatial disparities (that is, unequal amounts of activity, resources and services across South Africa's provinces) in the provinces' functions; it supposes that there are comparative advantage profiles among the provinces, with some of them performing highly sophisticated functions; it is also assumed that some provinces are comparatively better in terms of labour market outcomes than others (Combes et al., 2012). In addition, it is hypothesised that any comparative advantage enjoyed by a particular province comes as a result of spatial preferences in location of firms (Cieślik, 2005; Jofre, Marín & Viladecans, 2011; Orhun, 2013; Nguyen et al., 2013; Bhat, Paleti, & Singh, 2014; Desmet & Rossi, 2014; Hsieh & Moretti, 2019; Verhetsel et al., 2015; Fajgelbaum et al., 2018). The comparative advantage could also be the result of the deployment patterns of the labour force across the sectors of employment. Although a function may be conspicuously prominent in a certain province, for example wine production in the Western Cape, the function may not exhibit general dominance in employment (it may not be the greatest employer in that province). The

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purpose of this study is to examine the functions of South Africa's provinces, from 2013 to 2017, with a special focus on employment absorption (job creation): the objective is to establish whether, in fact, there are any respective comparative advantages in this regard; this is to be accomplished by testing the assumptions stated above. Afterwards, the study will seek to establish whether there is a relationship between the functionality and location quotient (LQ) with respect to employment across South Africa's nine provinces. As alluded to above, this undertaking focusses on various socio-economic sectors (functions) such as education, tourism, agriculture, manufacturing, construction, energy, commerce and finance. It is hoped that the findings of this research will assist concerned authorities in regional development planning and aid the government in allocating resources evenly; this in turn, it is further hoped, will contribute towards a healthier equilibrium of spatial patterns across South Africa and the designing of suitable policy interventions that will propel balanced spatial development across the country.

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1.2 Background to the Study

Naturally, the different regions of any given country are gifted with unique essential assets such as human and natural resources that derive from diverse socio-cultural and political backgrounds. Similarly, the various regions of any province rarely have the same economic advancement challenges (Rajalakshmi, 2013; Parveen, 2016). Also, the regions of a province that contribute to the economic advancement of a country do not do so in equitable fashion (Rajalakshmi, 2013; Parveen, 2016). This explains why, across geographical spaces in South Africa for instance, there are concentration differences in terms of firm presence and functionality. For example, Gauteng was found to dominate most manufacturing subsectors, although its historic strength was heavy industry. Indeed, at least as far as jobs are concerned, over the past decade the province saw growth in light industry, especially in the areas of

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agro-processing, chemicals, paper and publishing, while heavy industry declined (The Real Economy Bulletin, 2016b). According to Scott and Storper (2015), provinces are always rooted in more expansive systems of numerous, differing and varied political and social relationships levels. Thus, individual urban centres are identified by these varied contexts as having disparate characteristic features, which themselves result in many variants in form and function over periods of time and/or physical dimension. This is why it is evident that some provinces are primarily engaged in manufacturing employment, or some are in a post-industrial phase; some may be situated in fairly affluent regions, while others can be found in regions of dire poverty; some may comprise of homogenous societies in terms of race and ethnicity of residents, while others consist of very diversely composed societies in the same regard; some provinces may be spatially located in the North, others in the South and some may be subject to fairly totalitarian social and political structures, while others have more open and democratic systems and structures,

The functional interactions and relationships between regions are substantially impacted by their respective territorial borders. Most of the time, these borders make it more difficult to pursue common goals. The authorities of a region are more likely to try to support their own provinces without fully taking advantage of existing synergies with neighbouring provinces. Instead, they could benefit from efficiently combining activities in a cross-border logistical growth pole. At the same time, borders can increase transport costs due to administrative and transaction charges. Regions still have a long way to go concerning lowering impediments caused by border restrictions to the efficient mutual incorporation of logistics. h Such impediments in developed countries do not relate to trade barriers (the internal market is a fact) but to economic regulation, regional marketing efforts, labour mobility and the transfer modalities for innovation (Rodrigue & Notteboom, 2010).

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In the Southern African Development Community (SADC) countries, the shift towards less concentration was stronger for South Africa's nine provinces. The main determinant of the location of resource-based industries is access to abundant natural resources, such as agriculture, forestry and mining. The share of these sectors in total manufacturing employment is approximately 32 per cent, with processed food accounting for half of that (Peterson, 2002). A province may perform one or more functions, as is the case with the Western Cape Province, whose "real economy is dominated by manufacturing and commercial agriculture" (The Real Economy Bulletin, 2016c, p. 61). The province's tourism industry has grown exponentially since 1994. The majority of international tourists to South Africa visit the province, especially the city of Cape Town, which was listed as one of the world's top five international tourist destinations in 2004. Fifty percent of international tourists to South Africa visit the Western Cape. The province's overall share of South Africa's tourism sector by gross expenditure is 24% (Western Cape Provincial Treasury, 2017). Moreover, the function is not static in time and can change or be replaced by others. Though the notion of function has certain limitations, arguably the information it conveys may help as a useful organising tool for positioning and mapping the provinces in South Africa and international system of goods and services. Provinces are engines of economic growth, but the province comprises of urban spaces that are shared by users for different activities, ranging from the informal to formal sector. To a large extent, the formal sector activities determine the functions of the province. The different occupancies of the urban space are determined and arbitrated through diverse mechanisms (Tati, Yemeru & Zawedde, 2017).

During the apartheid system of government, the majority of South Africans were confined to specified (mostly rural) tribal *homelands* and urban *townships*. This system resulted in a spatially separated workforce. Three of the largest of these so-called homelands

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(Venda, Transkei and Ciskei) are now included in the provinces of Limpopo and the Eastern Cape. The rates of unemployment by province constitute a lasting legacy of apartheid – the Eastern Cape and Limpopo had the highest 2008 unemployment rates by far. Having said this, unemployment rates in all provinces have subsequently risen, with provinces that previously had been doing better, showing greater deterioration (Leibbrandt et al., 2010). In 1997, the worst provincial unemployment rate – in the Eastern Cape – was 2.5 times that of the lowest – the Western Cape. Eleven years later, the highest rate of unemployment – Limpopo – had dropped to twice the size of the lowest – the Western Cape. Only the province of KwaZulu-Natal showed a drop in the unemployment rate of -11.4%, while the Free State experienced the highest rise, 53%. It is therefore clear that labour market dynamics are not the same across the provinces; in fact, they can differ substantiually between provinces (Leibbrandt et al., 2010).

Classified as a developing country in the upper to middle income bracket (Seekings & Nattrass, 2008; Bhorat et al., 2015), South Africa is the most consistently uneven economy in the world (Bhorat, 2008; Seekings & Nattrass, 2008; Mitchell & Andersson, 2011). In South Africa, there are disparities in terms of regional and economic development. The South African topography of severe inequality, in terms of prosperity, employment and uneven approach to convenience and improvement, has developed into a national concern (Nel & Rogerson, 2016). The South African labour market has, since post-apartheid, experienced ample development and expulsion of diverse natural circumspection upon labour market participation and approach. The crucial factor in the last five years of the 1990s and the early half of the 2000s was the swift increase in the magnitude of labour force, steered by developing labour force participation estimate rather than an expanding employed age (Casale & Posel, 2002).

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Limpopo's provincial economy is mainly driven by four sectors as follows: mining, finance, community services and trade. Among these, the mining sector's contribution to the local economy has been significant in the past years and the sector has been playing a major role in job creation for the citizens of the province (Pratt, 2019). The economies of three districts in the province – Waterberg, Sekhukhune and Mopani – are driven by mining, which contributes 48.5, 38.9 and 32.2 percent to them, and respectively to the provincial gross value added (GVA). The dominance of mining in the province exposes the provincial economy to some risks as the mining sector is dependent mostly on external factors which the province has no control over, such as mineral prices. The contributions of the agriculture, manufacturing and construction sectors are very minimal in all of the province's districts' economies; accordingly, the provincial government has had to channel more resources in supporting these sectors as they are key in job creation (Pratt, 2019).

The Western Cape, as illustrated earlier, is dominated by manufacturing and commercial agriculture, which made it possible for the wine industry to take advantage of the opening of the international market in the 1990s (Harris-White, & Heyer, 2010). Consequently, the province did not suffer from the downturn since 2011 as badly as other provinces which are more dependent on mining. The Western Cape has had a highly varied manufacturing aspect, with light industry being the point of focus. The Western Cape has been historically the only province in which the African population is in the minority and has had no so-called homelands at all; as such it has benefited from the policies imposed by apartheid that ensured that non-African communities were invested in. Its employment levels post-democracy have thus been high compared to other provinces. Again, unlike other provinces, it has also had to contend with fewer cases of government services and infrastructure needing upgarding. Nevertheless, the Western Cape has been subject to significant in-migration, particularly from the Eastern Cape. Gauteng has been the only

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province to have seen a greater growth of its population (The Real Economy Bulletin, 2016b).

It is important to re-emphasise that in terms of manufacturing – and heavy industry in particular – Gauteng dominates all other provinces. The strength of the Gauteng high technology manufacturing cluster is demonstrated by the calculation of simple location quotients as a measure of economic concentration. The high technology manufacturing, by its constituent sub-segments, once more confirms the dominance of the Gauteng high technology: it also affirms the centrality of Gauteng, in terms of location, as a crucial factor for distribution to the South African market; similarly, the province's proximity to the markets in the rest of sub-Saharan Africa cannot be ignored (Rogerson, 2002). Long established as South Africa's wealthiest and most rapidly growing province , the fact that it enjoys eminent comparative status as a world-class financial hub has undoubtedly primarily contributed to its growth, as much as its high-level services as opposed to the real economy's central sectors. Gauteng is an area whose borders established so as to exclude any former homelands and areas dominated by agriculture. Despite being the province with the most rapid growth in population it has generally been able to provide reasonable services and offers better standards of education and infrastructure as well as higher rates of employment and higher salaries than the other provinces.

According to The Real Economy Bulletin (2016a), the Eastern Cape, which is one of South Africa's poorest provinces, accounted for 7% of the country's manufacturing employment. Five of the province's manufacturing industries with the highest employment rates in 2016 were as follows: plastics and chemicals; basic iron, steel and other metal products; food and beverages; footwear, clothing and transport equipment. Transport equipment was by far the province's largest manufacturing industry, providing 28% of all South African employment. Nevertheless, there were relatively high levels of unemployment

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within the Eastern Cape– only 31% of the population of working age was employed in 2015, which is far below 40% being the national average and 60% being the international norm. As for the rest of the provinces, employment rates rose after 2010 , following the world-wide financial crisis of 2008/2009 when they were at their lowest. By contrast, employment rates in the Eastern Cape were lower in 2015 than in 2010 (only 33% of working-age adults were employed) (The Real Economy Bulletin, 2016a).

According to Bhorat, et al. (2015), the number of individuals employed in South Africa in 2015 was less than 15 million, increasing from 12.4 million in 2004. The increase of 2.6 million over that decade is equivalent to an average annualised growth rate of 2.3 per cent, with the most rapid growth occurring between 2004 and 2008, when the economy was growing at its fastest rate. Employment thus reached 14 million workers in the final quarter of 2008. The effects of the global economic recession, however, were felt heavily in South Africa, where the first three quarters of 2009 saw an estimated 900,000 jobs lost and, by the end of 2010, the number of employed people equalled 13.2 million (Oosthuizen, 2011). The South African economy created about 2.5 million jobs over the 2001-2012 period, with significant job losses in the primary sector. It is evident in the sectoral breakdown that the overwhelming majority of jobs in the other two sectors (84 percent) have emanated from the tertiary sector (Bhorat, et al., 2015).

The significance of this study lies in the fact that it examines the different functions in the nine provinces of South Africa (see Figure 1, below) in relation to geographical location; it compares the provinces, as appropriate, in order to examine the development disparities that exist among them.

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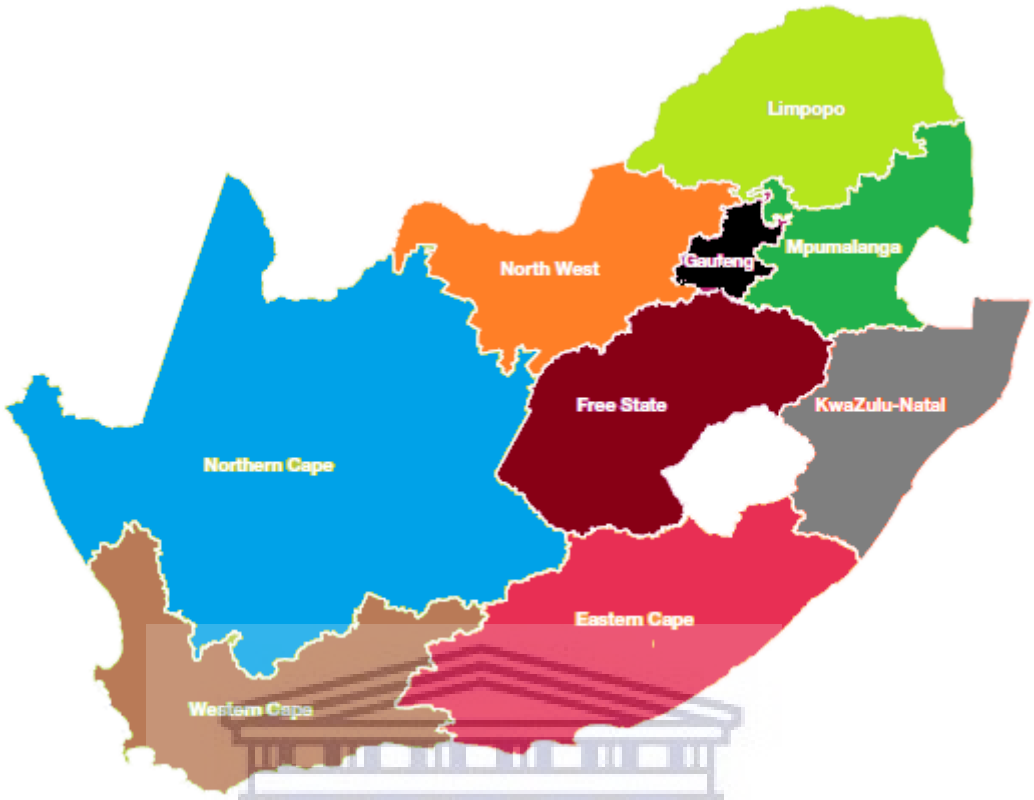

Figure 1: Map of South Africa

Adopted from Lake et al. (2019, p. 148)

As evidenced in Figure 1, South Africa has nine provinces. Four provinces share boundaries with the coast (Western Cape, Eastern Cape, KwaZulu-Natal and Northern Cape); the remaining five are inland provinces (Free State, North West, Gauteng, Mpumalanga and Limpopo). The Northern Cape is classified as a coastal province because a small part of it has a shoreline with the Western Cape. This study hopes to contribute to the regional localisation of firms theory by establishing whether the selected variables act according to the context of location of firms. Furthermore, this study could serve as a baseline to monitor specialisation in terms of functions among the provinces resulting in differing comparative advantage in the labour market dynamics.

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1.3 The Problem Statement

Function serves as an important force in the promotion of economic growth at certain economic development stages (Liu, Wang, Wang, Xiao, and Gao, 2017). Globally, quite a number of studies have been carried out on regions/provinces with dominant functions (see for example, Datt & Ravallion, 2011; Manić, Popović & Molnar, 2012; Omolo, 2012; Singh, 2015; Chreneková et al., 2016; Pike, Rodríguez & Tomaney, 2016; Lehmann & Nagl, 2019). It has been observed that, in a large economy, different regions with varying resources and endowments have different growth patterns (Williamson, 1965). South Africa, not being an exception, is facing the issue of functional disparities across its provinces.

Recently, concerns have been expressed about the lack of ability of the South African economy to provide sufficient employment for the increasing number of people seeking employment. The rate of unemployment remains firmly at the high side despite South Africa recording positive and sustained growth rates since the end of apartheid well over a decade ago (Mkhize, 2019). This has resulted in the further pronouncement of labour intensive sectors, which have failed to grow at a fast pace in order to absorb the increasing levels of labour force seeking participation and the increasing working age population over time. Startienė and Remeikienė (2014) reported that the growth of the manufacturing industry can be used to determine the level of economic power of the country, employment and social well-being across regions. Nevertheless, in the case of South Africa, there is a lack of empirical evidence on the different types of function (such as mining, agriculture, and manufacturing, to mention but a few) that could characterise the provinces. Also, the identification of the dominant functions that determine the major source of employment is lacking among the provinces of South Africa. Therefore, this present study investigates how functionality relates to location quotient with the aim of establishing whether there is convergence between the functions and comparative advantage in terms of employment.

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1.3.1 Research questions

The following research questions guided this study:

a) What are the different functions across South Africa's provinces?
b) What are the prevailing employment distribution patterns across the various sectors in the nine provinces of South Africa?
c) Which sectors have more dominance in the distributions of employment in South Africa between 2013 and 2017?
d) Which sectors have more dominance in comparative advantage in terms of employment distribution in South Africa between 2013 and 2017?

1.3.2 Hypotheses

The following hypotheses were tested during the course of this study:

a) There are differences amongst the provinces of South Africa with respect to their functions between 2013 and 2017.
b) The manufacturing sector dominates employment distribution patterns across the various sectors in the nine provinces of South Africa.
c) There is no dominance in functions in terms of the distribution of employment between the year 2013 and 2017.
d) There is no dominance in comparative advantage regarding the employment distribution pattern between the year 2013 and 2017.

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1.4 Objectives/Aims of the Study

Based on the problem statement outlined above, the objectives of the study were as follows:

i. To determine the distribution of employment in the different sectors of South Africa's labour market in the country's nine provinces.
ii. To determine the dominant functions in the labour market within the nine provinces of South Africa.
iii. To establish the comparative advantages of South Africa provinces.

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1.5 Professional Background to the Study

From the works reviewed, it is evident that the primary focus has either been on the economic or rural and urban development imbalances among provinces. There is a particular gap regarding the relationship between functionality and comparative advantage in terms of employment. This study hopes to address the aforementioned gap by determining this relationship. It is hoped that this will aid in identifying how functionality relates to the location quotient of a province.

1.6 Delimitation

This study focusses on the 2013 labour force survey and uses the 2017 labour force survey from Statistics South Africa (Stats SA) as a reference point for comparison purposes. Thus, the study, Functionality and Comparative Advantages among the Provinces of South Africa: A Location Quotient Analysis of Employment Distribution, is a product of secondary data and confines itself to the variables contained in the 2013 and 2017 survey results. It examines the nine provinces of South Africa, as covered by Stats SA. It is hoped that this study will help policy makers to devise more appropriate and effective policy instruments to increase employment rates in low employment provinces.

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1.7 Definition of Concepts

1.7.1 Spatial planning:

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This includes: conscious, mutual or communal efforts to "re-imagine a city, urban region or wider territory and to translate the result into priorities for area investment, conservation measures, strategic infrastructure investments and principles of land use regulation" (Healey, 2004). Spatial planning has been generally accepted as predicated upon a function for planning and forming economic, social, cultural and ecological dimensions of society via place making (Allmendinger & Haughton, 2010).

1.7.2 Regional development:

This involves the

> encouragement of a variety of flows (of commodities, money and people) into regions, processes of transformation and value-adding within those regions, and then subsequent sale and the flows of the resultant commodities out of regions, creating flows between regions scattered around the world with little or no regard for the ecological costs or, often, for the ethical consequences of so doing (Hudson, 2007, p. 4).

Regional Development simply means the administration of policies to aid processes of economic development of less unit of geographical, functional, social and cultural reasons in a country in order to address the economic disparities between the regions (Cooke & Leydesdorff, 2006; Nijkamp & Abreu, 2009).

1.7.3 Labour force

This refers to the total number of adults of working age in the population that are employed, and the unemployed, who are able to work (and willing to do so), at any given period. In a South African context, it refers to all South African individuals between 15 and 64 years who are active economically (StatsSA, 2017b). During the survey week being referred to, it is the number of people 15 years old and over who were either employed or

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unemployed. Labour force can be defined as the aggregation of people that are employed or available for employment who fall between ages 15 and 64 within a given country (Bijak et al., 2007).

1.7.4 Regional policy

Regional policy can be defined as set of concord and organised measures for ensuring development across a certain territory or regional economic policy or regional planning; it includes all forms of public interventions for geographical placement of economic activity. Regional policy attempts to make corrections in free market economy for attainment of two interrelated objectives, that is, economic growth and improved social equity, in order to ensure improvement in the quality of life of the people in the part (Jānis, 2014).

1.7.5 City

This refers to the engines of economic growth, which place a boundary on a contiguous urban area. City can be defined as the aggregate of urban units and a conglomerate of administrative entities sharing the same built-up domain with a maximal distance of 200m between buildings. It is the metropolitan areas that represent the mass of urban units focussing on over 1500 jobs and the communities where more than 40% of the labour force work in urban units (Cottineau et al., 2017).

1.7.6 Rural development

Rural development refers to the process of creating functioning institutions, the promotion of agriculture, "development of human resources, the building of performing infrastructure" and "the management of natural resources driven by transparency" (Schaltegger, 2013, p. 3) and sustainability with a view to improving the quality of life and economic well-being of people living in rural areas.

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1.7.7 Labour market

The labour market is typically defined as where jobs that make effective use of skills and knowledge gained through an individuals' studies are available for employment. The labour market is the location where workers and employees interact with each other. In the labour market, employers vie to engage the best and the workers contend for the most gratifying job (Mason, Williams & Cranmer 2009). In the context of this study, it also refers to all individuals between the ages of 15 and 64 who are employed, unemployed and economically inactive.

1.8 Structure (Chapters) of the Study

The research is organised into six chapters. **Chapter One,** the introductory chapter, provides the background to and a contextualisation for the study, the research problem, research questions and hypotheses, as well as the aim and objectives of the study.

Chapter Two provides a review of literature on regional disparities in both developed and developing countries and related concepts. It examines the functions of provinces and also provides an explanation as to what comparative advantages entail. The chapter also provides a review of some empirical work and research that has been undertaken using comparative advantages in different parts of the world.

Chapter Three presents the statistical methods and data used for the research. The chapter also describes how important variables in the research will be operationalised.

Chapter Four presents the data analysis results.

Chapter Five focuses on the empirical research, with the presentation and discussion of findings. The chapter explains the findings as they relate to the theoretical frameworks adopted for the study.

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Chapter Six presents the summary of findings, as well as suggestions and recommendations on the study subject. The chapter also provides an appropriate conclusion for the thesis.

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CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of relevant literature on the topic under study. It aims to place the research in context through a thorough synthesis of relevant scholarly works. The chapter begins with clarification on some of the key concepts in this study, such as functionality, comparative advantage(s), location quotient, and policies; thereafter, a review of theoretical literature and empirical studies follows; finally, it unveils a conceptual framework to guide the study. The aforementioned components are now sequentially presented.

2.2 Functionality

Across any geographical landscape, there are differences in the concentration of firms, an indication of variations in function in each zone within the terrain in question (Prestwich & Taylor, 1990). Jordan (2008 as cited in Zeng, Proctor & Salvendy, 2010, p. 516) states that functionality is a practical term which is comprised of what a province provides, the different options it offers the community, and the level at which it performs its functions. According to Albala-Bertrand (2009), it is the capacity of a province to operate in a viable way. From the above definitions, it is possible to argue that functionality entails the provision of alternative services to target provinces and the means through which this delivery is actualised. On the other hand, Prestwich and Taylor (1990) postulate that, for the purposes of comparative studies, the socio-economic evaluation of urban centres, towns and cities needs to be more precisely defined in a consistent and geographically meaningful way. The definition of a town or city must include the built-up area; the question, however, is: how

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far out into the surrounding countryside should the urban boundary be extended? All urban centres have hinterlands containing small towns, villages, hamlets and farms that are dependent upon, and therefore, integrated with, the urban centre for such functions as jobs, shopping, entertainment, etc. There is, therefore, considerable logic in extending the boundary of an urban centre, to incorporate its surrounding territory, hence the urban or city region. Such a functional approach has been developed by the Centre for Urban and Regional Development Studies (CURDS) at Newcastle University. Using areas defined as a basis of 'patterns of commuting mileage to a set of centres which have been identified from employment and retailing statistics' (CURDS, 1984, p. 1), yields 228 functional urban regions containing 95 per cent of Britain's total population. The foregoing underscores the functionality and the comparative advantage inherent in the South African provinces under study.

> In a functional economic region, one [can often] identify several spatial economic nodes, [such as population centres,] which physical infrastructure networks and established economic interaction networks jointly connect. Of special importance are labour market networks, where the links between employees and employers create a tentative structure. A region's accessibility patterns decide how these contract links generate geographically contiguous labour markets of various sizes. A functional province that is operating well has greater mobility of production factors within its interacting borders than with areas outside." Johansson (1993, as cited in Karlsson et al., 2009, p. 10)

Interaction costs arise due to commuting (and various other forms of interaction) even within provinces that are functional. The spatial extent (physical size) of a region determines the magnitude of these costs. Conversely, functionality has intersections of activities that link and determine the extent of *labour market networks* within the confines of its demography. Also, according to Johansson (1993, as cited in Karlsson, et al., 2009, p. 10), the diversity of natural conditions and patterns of improvement paths taken in the past result in functional

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areas varying one from another in their economic environments, and, for that reason, provide numerous situations for industrial specialisation. The provincial economic environment consists of those location characteristics that are robust (either fixed or only changing slowly), that is out of the control of a single firm, that are not traded as anything except land attributes, and that impact on a firms' production activities (Karlsson, et al., 2009).

Furthermore, Capello and Nijkamp (2010) contend that the functional urban region is characterised by mutually intense commuting of the labour market between a group of cities and towns. Within these regions, 20 and 50 minutes is the average time it takes to travel from one urban area to another by car, which matches the idea that knowledge spill-overs are bound in space. Cities' growth is the result of a multifaceted chain that begins with scale: attributes of knowledge, capital and labour. . Internal density and own infrastructure, and external interaction with other cities and their regions also affect the productivity of an open urban economy. A combination of geography, production factors and resources added to an industrial structure (which is typified by competition, specialisation and diversity) yields innovation and increased productivity that, in turn, enhances growth in employment levels. The province function indices which tell how regional industries are concentrated are discussed below.

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2.2.1 Province function indices

According to Tati, et al. (2017, p. 17-18), "the function is intrinsically linked to the space and it can be tracked temporally. Space can be viewed as the natural one, the physical site, or the location. Both natural site and location are linked to the distinctive functions that lead to the creation of the province (discovery of a mine, proximity to maritime waters, etc.). … [also] function is linked to the urban space, insofar as a [province,] especially a major city, exerts various functions that are not necessarily aligned with the same criteria of

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[localisation].” If one considers the different levels of functions as suggested literature, the following distinctions can be made”:

i. National regions’ functions constitute a good benchmark for measuring levels and the forms of development of the country in question;
ii. each of the province’s varied, individual functions ; and
iii. how functions are distributed across the provinces within the country system.

The functionality index is a way of quantifying a region’s industrial concentration. If the index is 0.60 it indicates that the region is moderately industrialised; an index higher or equal to 0.74 shows that the province is highly industrialised, and that the province is considered to be more concentrated (Tati, et al., 2017). There are different types of functions that constitute a region, and are listed next.

2.2.2 Types of functions

Tati et al. (2017) state that a province may have one or more dominant functions; accordingly, a province could be characterised by either one or a combination of the following functions:

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i. storing or commercial function;
ii. communication or transportation function;
iii. industrial function;
iv. administrative, military or political function;
v. educational, religious, cultural, function;
vi. leisure or residential function (e.g. retirement, tourism, health).

A province’s function can change with time as the economic system goes through a shift linked to foreseeable and/or unforeseeable factors. The activities that determine the economic basis induce activities that are needed to the livelihoods of individuals employed in the non-basic economic activities (services, commerce, administration), which in turn create

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others. Hence, one cannot only measure the overall employment, the basic employment component (linked to exports), but also the induced employment, either local or residential (Tati et al., 2017). Comparative advantage is used to determine the sectors of activities that has more advantages across the province as discussed below.

2.3 Comparative Advantage

The *Comparative Advantage Theory* is among the oldest and highly crucial concepts used in economics (Costinot & Donaldson, 2012; Deardorff, 2005). Kowalski (2011) reveals that specialisation with respect to comparative advantage is a prerequisite for reaping profits from trade. He performed an empirical investigation on a group of 55 Organisation for Economic Co-operation and Development (OECD) member states and selected emerging market economies and 44 manufacturing sectors covering the entirety of merchandise trade and found that comparative advantage remains an vital determinant of trade. It is the comparative differences among regions, including changes in policy settings and policy performance that create relative variations in productivity and give increase to trade and profits from trade. Some of these discrepancies in policy settings may reflect diverse phases of economic growth but some may also reflect strategic policy choices such as investment in human rather than physical capital. This does not mean that regions should not try to catch up with their best performing peers if they so wish; it emphasises that trade yields benefit even at the early phases of such a catching-up process. More than anything, this indicates that trade openness and comparative advantage-driven specialisation is not a restraint to the economic growth process, but rather, its catalyst (Kowalski, 2011).

According to Costinot (2009, p. 1167), when there are factor and sector features that complement each other, necessary for comparative advantage to be affected by factor endowments and there is an "indirect impact of Ricardian technological differences on the

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assignment of factors to sectors, [these] may dominate direct impact on factor productivity". The Theory of Comparative Advantage "considers both sources of comparative advantage, technology and factor endowment, within a unifying, yet highly tractable framework, [which] is important not only for [generalising] results, but also because factor endowment, in practice, co-exists with technology and institutional differences" (Costinot, 2009, p. 1167). By studying different levels of intricacy of a job task required for the production of various goods, and what effect institutional quality had on the efficiency of different sectors, Costinot (2009) found that, especially in compound industries, good organisations can be a balancing source of comparative advantage.

Pelli and Tschopp (2017) note that comparative advantage is a crucial determinant of a province export sample. According to Trade Theory, regions need to concentrate on industries providing comparative advantage as doing so can result in returns from trade and economic increase.

In practice, though export success is incredibly focussed in industries with excessive export capabilities, nations, mainly those at decreased stages of improvement, export goods at each of the ends of the comparative advantage spectrum. A large comparative advantage industry might also, step by step, descend the hierarchy of comparative advantage, or vice versa. The United States' metal industry gives a very good illustration of these dynamics; the country, which steadily lost its comparative advantage post World War II, nonetheless accounts for a vital fraction of global metallic manufacturing today. Comparative advantage also means that, unless policies intervene with market incentives, nations stand to benefit from trade on the impression that neither will lose and at least one of them will gain. This benefit from trade is viable only if each nation exports the goods in which it has comparative advantage (Deardorff, 2005).

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Meintjes (2001, p. 26) states, “The comparative advantage of a [province] indicates relatively more competitive production function for a service in that specific [province than] in the aggregate economy .” This economy, therefore, renders the service more efficiently. Thirlwall (1999) posits that nations tend to specialise in producing goods and services in which they have a relative advantage, according to their natural or developed resource attributes.

According to Edwards (2017), the concept of comparative advantage originated in *International Trade Theory*. The international trade theory grounds itself in the fact that regions have a variety of resources at their disposal, such as land and natural resources, capital, labour, and technological expertise: cognisant that the costs of production differ among regions because resources are not distributed equally, it contends that efficiency requires that areas with lower opportunity costs of producing goods such as textiles, export those goods to areas where production costs are higher. Similarly, if a second area produces electronic components at a lower cost, this second area should specialise in electronics and import its textiles. For instance, because Region A is more efficient at producing oranges and Region B is more efficient at producing cheese, world production increases if Region B trades cheese for Region A’s oranges. Figure 2 illustrates the two linear production possibility curves of comparative advantage.

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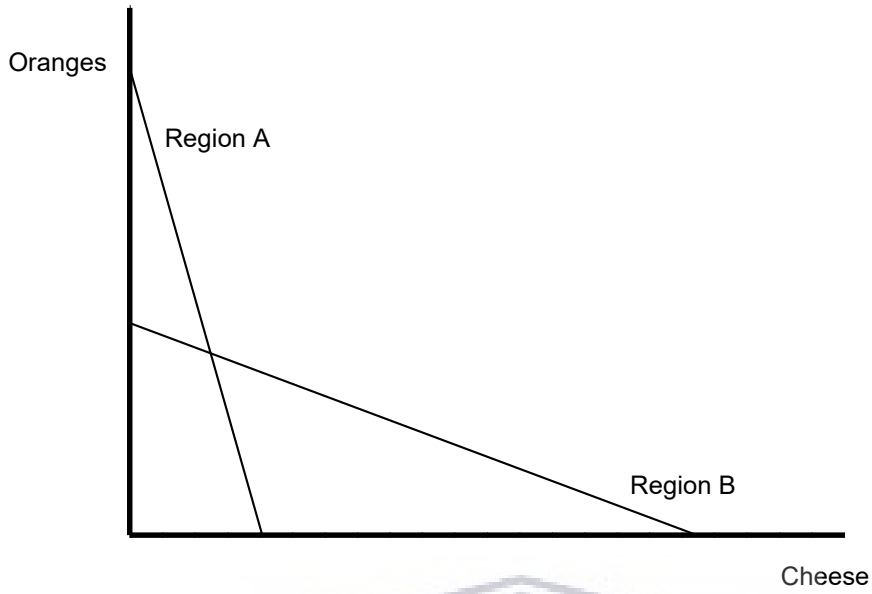

Figure 2: Two linear production possibilities curves showing comparative advantage
Adopted from Edwards (2017, p. 167)

Furthermore, as population increases, regions diversify. Diversification influences an area's comparative advantage. A region's comparative advantage could also be modified by an investment in infrastructure, education, and training, or by providing cultural and social amenities to attract skilled workers (Edwards, 2017). In basic terms, possession of a comparative advantage just means that the economy concerned is able to execute or produce a product or service more effectively and efficiently, than others. The Location Quotient (LQ) is the first aspect that shapes the comparative advantage of a region, which is used mainly to establish the levels of focus within the study area, in this case all the nine provinces of South Africa. Industry groupings that dominate a specific province will have a higher LQ and vice versa. The LQ is used to determine the comparative advantage of an economy, as discussed next.

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2.4 Location Quotient (LQ)

LQ is an indicator used to measure economic development; as a tool, it further clarifies the structural economic challenges facing a province, as it examines the economy in terms of its comparative and competitive advantages, so as to determine where or which active sectors have advantages. Tian (2013, p. 186) defines LQ as a measure of the ratio between the local and national share of productive activities of a particular industry in a region". Regional science use it rigorously due to its minimalistic data requirements and computational simplicity. According to Guimarães, Figueiredo, and Woodward (2009), LQ, typically constructed with employment data, measures the ratio of two shares, viz.: the employment share of a region's industry, and the employment share of a wider areas' industry such as a country. Guimarães et al. (2009) has stated that it is assumed by researchers that an industry is concentrated in a region if the LQ is above one, without any appropriate statistical tests to determine whether a disproportionate amount of concentration of an industry in one area can be provided by LQs.

Nevertheless, identifying an economic base of a region is most commonly achieved with the LQ approach, which is a useful way to control the concentration of industries in regions by helping policymakers or investigators to develop and appraise regional economic growth by regional base multipliers (Chiang, 2009). Meintjes (2001, p. 26) notes that "a region's economy has a location quotient larger (smaller) than one or a comparative advantage (disadvantage) in a particular sector when the share of that sector in the specific [province] is greater (less) than the share of the same sector in the aggregate economy." Edwards (2017) writes that LQs compare the relative concentration of employment in each industry of a region to that of a whole country. The methodology used to determine the LQ in this study is as follows:

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$$LQ = \frac{\text{Provincial employment in industry i}}{\text{Total provincial employment}} / \frac{\text{National employment in industry i}}{\text{Total national employment}} \quad \text{i = 1, 2,… [1]}$$

A desirable result is for the LQ to exceed one. An LQ larger than one shows a comparative advantage for a specific sector in a province compared to the same sector in the wider national economy.

Pratt (2019) found that Limpopo Province had a comparative advantage in mining (3.39), electricity (1.28), community services (1.09), trade (1.05) and agriculture (0.98). The province was found to have a significant comparative advantage in the primary sector with mining and agriculture combined taking a share of around 4.4 percent (Pratt, 2019).

The province's industry uses a greater proportion of employment than does that of the whole country; thus, it must produce more goods than its residents consume. Large LQs (greater than one) reflect local comparative advantages of a particular industry. On the other hand, if the LQ is less than one, the industry does not produce enough goods or services for local consumption and it is considered an import industry. Finally, if the LQ for an industry equals one, the industry produces just enough to satisfy local consumption (Duranton, & Overman, 2008; Edwards, 2017; Flegg & Webber, 1997; Fracasso & Vittucci, 2018; Gibson & Anderson, 2006; Guimarães, et al. 2009; Mack & Jacobson, 1996; Meintjes, 2001; Riddington, Chiang, 2009; Tian, 2013; Tohmo, 2004). The LQs for the economic sectors can be similarly calculated for the nine provinces of South Africa.

The interpretation of LQs is not particularly complex; the term LQ in this study simply refers to the measure of employment concentration across South Africa's nine provinces. Industry groupings that overshadow others in the region will have higher LQs and those that are relatively scant will have lower LQs. Table 1, below, shows the range of possible LQs resulting from the formula and their recommended interpretations. Notably, a

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low (or high) LQ does not necessarily indicate the size of the industry grouping , or its degree of importance in the region; just that it is less or more than the reference economy as a whole.

Table 1 Interpretation of Location Quotient (LQ)

Value	Implication
LQ > 1	**Province has proportionally more workers employed in a specific industry sector than in South Africa. Province industry has potential to be classified as exporter**
LQ = 1	**The industry produces just enough to satisfy local consumption**
LQ < 1	**May indicate opportunity to develop businesses in the province**

Adopted from Edwards (2017, p. 171).

Section 2.5, below, examines South Africa's apartheid era economic policy.

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2.5 Policies

The apartheid-era regional economic policy of South Africa is examined in this section. Along with the establishment of politico-social entities known as *homelands* (see map in Figure 1, above), its significance lies in the fact that a policy of decentralising industry was followed which involved the offer of various incentives to the manufacturing industry (for instance subsidies or tax deductions based on how many workers were employed) to facilitate establishment of industry in specific areas of the homelands. The country (homelands included), was divided into nine regions of development as part of the industrial decentralisation policy. Each of the country's nine regions and its development programme was set out in Regional Industrial Decentralisation Programmes (RIDPs). The reasoning behind the policy was the desire to industry close to concentrations of the labour force so as to prevent having to transport workers into the chief industrial centres in a major way; this being in line with the concept of apartheid or *separate development* (transport was

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also subsidised). The far-reaching effect that this policy had on location of industry and the impacts it had on employment is a note-worthy issue. That is to say, it is important to consider whether industry simply moved to gain what benefits incentives offered to businesses willing to settle outside main centres and also, whether they subsequently stayed in these locations once the incentives were no longer available (Naude, 2006).

According to Lewis (2001), since 1994, South Africa has made undeniable progress across several critical areas as follows: On the political front, democratic institutions are well established, and the *re-invention* of government that is continuing through the creation of new tiers of government (provincial and local) has changed the environment for governance and service delivery. On the economic front, the government has pursued policies that have restored and maintained macroeconomic stability in the context of a difficult global environment. According to Kaplan (2003), South Africa's manufacturing growth in the 1990s was only marginally higher than in the 1980s and significantly lower than the growth in the developed countries of the world and the developing countries. However, several incentives were developed accordingly to encourage manufacturing investments in less industrialised areas. South African manufacturing has always been spatially highly concentrated. One of the explicit objectives of South Africa's manufacturing policy for the new government was a more equitable geographic spread of economic activities (Barnes, Kaplinsky, & Morris, 2004).

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2.6 Theoretical Review

There are several regional development theories; in this study, the following three were considered: i) the *Filtering-down Theory*; ii) the *Growth Pole Model*; and, iii) the *Location Theory*. The aforementioned three theories explain regional development and growth in different countries and can also shed light on the development gaps that exist

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among different provinces. They have been employed in this research so as to explain the developmental disparities that exist in South Africa's nine provinces. These theories cover both functionality and LQ. For the purpose of this thesis, only the theories mentioned above have been discussed. It must be noted in advance, however, that traditional and modern economic theories of development can only assist in understanding the problem of development disparities. Engaged alone, they are not the solution to the problem of uneven development as each region is unique in terms of the development path it takes. Accordingly, the *one size fits all* solution does not apply to solving or addressing development imbalances (Ramuhashi, 2007). It is, therefore, against the preceding backdrop that the location theory has been deployed to anchor the study.

2.6.1 The Filtering-Down Theory

According to Karlsson et al. (2009), the filtering-down theory provides alternatives to the neo-classical convergence theories. It offers dynamic explanations of the location behaviour of firms, in a system of functional urban provinces, employing a central place system or the concept of location advantage. The theory assumes that the development of an industry follows a sequence, with an introduction, a growth, and a maturation phase, that takes the form of an S-shaped growth curve. The life-cycle perspective makes it possible to see patterns in the continuously adjusting spatial structure of both intra-regional and inter-regional development.

Aydalot (1984) notes that the life-cycle concept seems to be a useful device for explaining location dynamics, especially in the case of inter-regional relocation processes for new industries. Nevertheless, the filtering-down theory stresses that industries filter down through the system of functional urban provinces in a hierarchical manner from provinces with larger market areas to provinces with smaller market areas (Moriarty, 1991). Furthermore, according to Camagni, Diappi, and Leonardi (1986), regarding the filtering-

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down theory, technical and demand changes induce firms to shift the location of the production of existing products (or product groups) over time, thereby transforming the specialisation pattern of regions. This makes the filtering-down process both market-driven and technology-driven (Karlsson et al., 2009). A discussion on the Growth Pole Model follows next

2.6.2 The Growth Pole Model

According to Edwards (2017), the term *growth pole* is used in two broad ways. First, a natural growth pole is an influential element in the spatial organisation of an economy. Second, a planned or induced growth pole is the cornerstone of a government-funded investment strategy that involves the spatial concentration of infrastructure and investment in plant and equipment. Using the growth pole as a locality's investment strategy requires the artificial redefinition of the geographic space. A government could attract new firms into the urban centres of slow-growing regions through a combination of promises, such as construction of new infrastructure and monetary incentives. Edwards (2017) defined a growth pole as an urban centre with a population greater than some threshold size (market area). At a given time, this centre displays a growth in population or a greater employment rate than that of the economy of a regional standard. If an area's population or employment grows faster than its regional economy, then it is a growth pole. If, in contrast, it stops developing, it is no longer a growth pole even though the *conditions* remain unchanged.

In their work, Prestwich and Taylor (1990) contend that the growth pole in a national economy is an industry, or a group of interrelated industries, which grows more quickly and to a larger size than other industries, and which, because of its strong linkages with other industries and economic sectors, has a propulsive effect on national growth. The propulsive pole is a business unit (a company, industry) and these units are the main force of the economic development as they generate growth through the impact of strong input-output

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linkages. While citing Francois Perroux (a French economist best known for his concept of growth poles) Prestwich and Taylor (1990) note that the concept is not spatial; Perroux, they contend, dismissed the matrix of the national; as such, growth in the propulsive industry impacts other parts of the economy via the rows and columns of the matrix. Also, according to Prestwich and Taylor (1990), when an industry is in the growth pole of the national economy, then its location is of considerable significance because much of the prosperity that it generates will be spatially restricted so that its local region may grow more rapidly than surrounding regions.

Furthermore, according to Edwards (2017), Francois Perroux used the growth pole concept to demonstrate that market forces do not guarantee the congruent stability in space predicted by the neoclassical *Growth Theory*. Economic activity does not necessarily spread evenly or equitably. Instead, activity will naturally cluster together, thus creating a dominance dependency relationship among regions. Also, she noted that Perroux preferred the term *economic space* to *geographic space*, because innovations launch new developments that influence firms and industries not just locally but in all parts of the world. According to Dobrescu and Dobre (2014, pg 263), the growth pole theory grounds itself in the fact that development is a process that is simultaneously unbalanced and hierarchical; moreover, only certain business units act as the engines of development. These units are designed economic poles of growth. Certain areas of land or infrastructure may also become growth poles. The free market economy relies on the spontaneous mitigation of disparities due to the wave of progress generated by growth poles. The shedding phenomenon can sometimes lead to increased economic disparities as the assimilative capacity of the wave of progress is higher in centres of growth poles, giving rise to other innovations that serve to eventually strengthen the position of the growth poles.

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Higgins and Savoie (2017), have noted that the issue of domination is seen as central to literature on the growth pole. Growth pole theorists see the domination of some firms as being beneficial to all parties. Also, growth pole theorists are concerned mainly with linkages between industries and the identification of propulsive and lagging sectors. Higgins and Savoie (2017) further note that, according to growth pole strategists, investment in propulsive industries generates widespread growth and increased income through backward and forward linkages. They argue that when this fails to occur, the fault lies with a defective political-economic structure and not with the growth strategy. The growth pole doctrine is, to begin with, a theory of polarisation. Economic development does not spread itself evenly throughout space, they contend. The mainspring of economic development is technological progress or innovation, and innovation tends to be concentrated in particular enterprises; that is, the propulsive industries or firms tend to be clustered in particular places. These centres of concentrated innovative activity are often cities, but, in principle, they could be areas of high-technology, agriculture or mining. The issue of domination (in terms of firms, cities, regions, and nations) pervades both the literature on growth poles and that on dependency. While theorists of growth poles uphold the idea that the dominance of certain firms constitutes a positive contribution in the development process needed to aid the majority of the population (see Higgins & Savoie, 2017), Henderson and Thisse (2004) state that changes in thinking about the nature of regional economic planning and the effective promotion of rural development are reflected in the cyclical attitude to the growth pole concept. Hansen (1981, as cited in Henderson & Thisse 2004, p. 673) suggest three growth pole phases as follows:

i. Optimism with respect to possibilities for inducing growth in a few centres and to the subsequent generation of spread effects;
ii. pessimism when the expectations of the early phase failed to materialise, and

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iii. a broader view of growth centres as one aspect of more comprehensive development planning.

The growth pole approach must be treated very cautiously in developing countries. There are many unsatisfactory experiences resulting from a careless transfer of growth pole policy ideas from developed countries, with little adjustment, to indigenous conditions. The most extreme cases have been based on heavy industrial complexes, with negligible linkages with the hinterland and minimal employment generation. Also, notes Richardson (1978, as cited in Henderson & Thisse, 2004, p. 673) in support of the preceding concern, an alternative strategy might begin with the acknowledgement of the fact it is in the rural regions that most growth poles can be found. Such poles might emphasise the development of agriculturally based industries (to enlarge the market for neighbourhood production, and thus, stimulate rural productivity and income) and the creation of higher-order services. Some aspects of the growth pole theory are especially applicable in developing countries. Similarly, counter-magnet strategies work better in situations where cities grow rapidly via in-migration from rural areas than where people are reshuffled within an established urban hierarchy in a highly urbanised society. The idea of strengthening a regional metropolis as a counterweight to the primary city is more effective if the city size distribution is still evolving than in countries where the urban hierarchy has become fossilised (Henderson & Thisse, 2004).

Todaro and Smith (2015) contend that growth pole regions are more advanced economically and socially than those around them, for example urban centres versus rural areas. “Cumulative processes for inequality within nation-states, by which growth poles may expand rapidly while other regions stagnate, can be modified by government through legislation, taxes, transfer payments, subsidies, social services, regional development programs, and so forth” (Todaro& Smith, 2015 p. 483). But the greatly uneven rewards of trade can become self-sustaining as no effective international control organisation exists to

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take on the role of making comparisons between countries. This is then bolstered by the irregular powers of national governments to advocate and safe-guard their own interests. Despite providing advice to developing countries, developed nations nevertheless defend their own favoured industries when it is in their own interest or politically expedient (such as when the United States bailed out their auto industry in 2009, to name but one high-profile case.) The shielding United States' and the United Kingdom's financial industry not only insulates the respective domestic financial systems of these countries, but also ensures the security of an industry that generates high-paying jobs. A brief discussion on the *Location Theory* follows next.

2.6.3 Location Theory

According to Capello (2016, p. 3),

> the location theory gives regional economics its scientific-disciplinary identity and constitutes its theoretical-methodological core. It has typically microeconomic foundations and it adopts a traditionally static approach. It deals with the location choices of firms. Linked with it are a variety of metaphors, and theoretical inputs from macroeconomics, inter-regional trade theory, and development theory … which have refined the tools of regional economics and extended its range of enquiry. In microeconomic terms, location theory involves investigation into the location choices of firms; but it also involves analysis of disparities in the spatial distribution of activities

Location theory enables explanation of territorial imbalances and pyramids and uses concepts of and agglomeration economies and externalities to explain various macro-territorial phenomena such as differences between the spatial distribution of activities.

According to Capello and Nijkamp (p. 36) "location theory seeks to explain the distribution of activities in space, the aim being to identify the factors that influence the location of individual [economic] activities, the allocation of different portions of territory among different types of production, the dividing of a spatial market among producers, and

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the functional distribution of activities in space." The various phenomena outlined are investigated by ignoring any physical (geographical) feature that may appear to justify concentration of activities in a particular area, so that choices of location are understood only by reflecting on the major economic forces that motivate location processes, such as agglomeration economies, which result in a concentration of activities to concentrate, or alternatively, cost of transportation which scatter activities across spaces. Location theory as advanced here examines the spatial and economic systems that control the extent of territorial agglomerations, their functional specialities and their territorial distribution (Capello, 2016).

Weber (1929), on the other hand, establishes two regional cost factors that are fundamental to the location of industry, namely, transportation cost and labour cost. Weber's analysis is extremely important in terms of its treatment of transport and labour costs – it holds one of the two components constant while allowing the other to vary. While permitting transport costs to vary and holding labour costs constant, Weber formulated his first general rule: that the location of manufacturing industries would be determined by the ratio between the two weights – of the product and of the (localised) material (Weber, 1929). Another major examination of the notions of industry concentration and localisation of specialised industry was conducted by Marshall (1920). Having noticed the concentration of certain industries in particular centres, Marshall (1920) suggested that the localisation of industries arose through various factors, which he generally referred to as physical conditions, that is, climate, soil type, and resources such as mineral deposits. Industry location followed easy access to water and mineral deposits (iron industry close to coal deposits). Once industry has become localised, it tends to remain in that locality for a considerable time period, argues Marshall (1920). The localisation of industries is affected by external factors such as improvements in the means of communication, be it in technical terms or through reduced transportation and freight costs. This would obviate the need for many different industries to

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concentrate and enable them to rather remain localised some distance from centres of demand (Naude, 2006).

Furthermore, Marshal (1920) fronted three reasons for spatial concentration of industries: firstly, localisation provides a pooled market for workers with specialised skills; secondly, localisation facilitates the development of specialised inputs and skills; and thirdly, localisation enables firms to benefit from technological spill-overs, as observed by Naude (2006). It is appropriate to stress that in terms of regional economics, locational factors were categorised according to whether they bestowed a relative advantage to industries locating in the area through the availability, price and quality of local or non-transferable inputs (supply-side factors). These would be local inputs that are present in the area and cannot feasibly be imported into the area from outside nor transferred to another region. Examples of these would be climate, topography and local services such as police services, administrative resources and infrastructure (Hoover & Giarratani, 1984).

In his paper, Andersen (1996) asserts that Marshall (1949) points out that when an industry has chosen a locality for itself, it is likely to stay there for a long period. To explain this, he develops a theory of *industrial districts*, which should be a special case of an overall theory of growth and development. According to this theory, the reason for the long-term localisation of an industry is not the primary resources that might originally have caused the localisation. The firm basis of the industry's competitiveness is rather the set of related skills, the networks of interdependent firms and the supporting institutions. These are the factors central to Marshall's theory of industrial districts. Marshall's theory of industrial evolution and industrial districts has especially emphasised that development is primarily knowledge–based and only secondarily natural-resource based. It has also helped to divert focus to the role of localised labour markets and networks of firms.

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Enright (1994, as cited in Maskell and Malmberg 1999, p. 10) posits that firms of a certain kind find some localised skills more valuable than others. The originally chosen location of an industry might have been basically accidental; but once in place, the specialised locational demands from the firms will influence the future development of the localised skills, making it advantageous for the industry to remain in the province, and for distant firms to relocate. The market selection mechanisms ensure that firms, located in areas where the localised skills are especially suited to accommodate and satisfy their needs, will have a better chance of survival and growth than similar firms located elsewhere. When firms of a certain kind gradually concentrate in provinces with localised capabilities which they find valuable, the demand for future changes in these capabilities usually becomes rather manifest and unconfused. Modifications in the built structures, the skills and competencies of the workforce, or the institutional endowment of the province will all tend to make the new localised skills even more valuable for the firms located there (Maskell & Malmberg,1999).

According to Karlsson et al. (2009), some location attributes are gifts of nature, while others are created by investments in physical and human capital with low spatial mobility. Still, others are the result of the behaviour of economic agents with spatial preferences.

The location advantages offered by a region's economic background may also determine its specialisation. The location advantages may arise from differences in a country's natural endowments, government regulations, transport costs, macroeconomic stability, and cultural factors (Anyanwu, 2012). Location advantages are relative characteristics of provinces. It is only possible to evaluate a province by comparing the location advantages offered by different provinces. Every functional province's profile of location advantages has its basis in the province's relative supply of resources. Furthermore, a starting point for examining how location advantages influence regional specialisation is that, at each point in time, the various types of trapped resources are unequally distributed

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over functional regions. Likewise, certain trapped resources are highly concentrated in functional regions with specific characteristics, such as their positions in networks for communication and transportation (Karlsson et al., 2009).

A cursory look at the theories discussed above suffices to buttress the supposition that one theory may not be adequate in terms of satisfactorily engaging the research topic in this thesis. The filtering-down theory for instance, offers explanations of the location behaviour of firms, in a system of functional urban provinces, employing a central place system or the concept of location advantage. The growth pole model is a situation where an area's population or employment grows in a rate that is faster than that of the regional economy. Location theory, on the one hand, seeks to explain the distribution of activities, in space, the aim being to identify the factors that influence the location of individual activities, the allocation of different types of production, the division of a spatial market among producers, and the functional distribution of activities in space; it entails a combination of theories. Accordingly, an interfacing of the location theory serves as the theoretical base for this research. In this context, the study examines variables that enable employment to concentrate in certain firms.

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In an attempt to link location theory to functionality, it has become necessary in this study to argue that the notion of function has certain limitations and a province may perform either a specific function or more than one function. Depending on the location factors, such as economic activities (both formal and informal sectors) found in the province, or urban functions that influence the location of economic activities, the allocation of different portions of territory among different types of production, the dividing of a spatial market among producers and the functional distribution of activities in space.

It is worthy of mention that one major determinant of the localisation of any economic activity in the province is the value of the land and its location (which is invariably tied to the

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location theory) or its functionality. The function of a particular province is intrinsically connected to the space and it could be tracked temporally. This space can be seen as the location or the physical site. Both location and physical site are linked to the different functions that led to the introduction of the province such as the discovery of a mine, proximity to maritime waters and so on; this underscores the interface between location theory and functionality. In essence, functionality is linked to the urban space, inasmuch as a province, particularly a major province, exacts varying functions that are not necessarily aligned with the same criteria of localisation.

2.7 Review of Empirical Literature

From the researcher's analysis of prior studies, it could be seen that there is a gap in scholarship with regard to *How Functionality relates to Location Quotient* in this field of study; this is conspicuously evident from the work of Naude (2006), who examined the determinants of manufacturing industry concentration in South Africa. The principal objective of Naude's study (2006) was to identify the determinants of the concentration of the manufacturing industry in South Africa; a secondary objective of the study was to determine what implications this has for industrial policy in the country. This involved a cross section econometric analysis across the nine provinces of South Africa, deployed to test whether there was a significant relationship between the concentrations of the manufacturing sector, measured in terms of manufacturing establishments. Variables such as level of education of the population, skills level of the workforce, average household incomes, urbanisation level, and road transport infrastructure density were used in the study. The results showed that certain variables are strong determinants of industry concentration in different provinces. This implies that industry concentration should be approached almost on a *case by case* basis, in terms of the nature of the manufacturing industry and its demand for labour. A key finding

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of the study was that innovations tend to occur in certain industries more than others, for example, the more technology-driven sectors; and that propensity for industry and innovation concentrations also vary across industries. The study concludes that the attributes of the models can explain differences in industry concentration between Gauteng province, on the one hand, and the remaining provinces on the other. Attributes such as education and skill levels are shown to be important in the case of provinces such as Gauteng, KwaZulu-Natal and the Western Cape. Attributes such as incomes and population density are identified as important in provinces such as the Northern Cape and North West. Road transport infrastructure density is significant in Gauteng and KwaZulu-Natal. The decentralisation programme was found to be important in influencing industry location in the Eastern Cape Province.

Ramuhashi (2007), in his MA dissertation entitled *Development and Disparity among Provinces in South Africa: A Comparative Analysis*, compared the nine provinces in the light of development disparities amongst them. The methodology used consisted of both quantitative and qualitative approaches. He used literature from journals, newspaper articles, and published and unpublished articles as the foundation for the research. Ramuhashi (2007) mainly used theories relating to economic development as the foundation for his investigation. The research conveyed an exploratory analysis of the development gap (whether the South African provincial development disparity is exhibiting a pattern of convergence or divergence and possible causes of this pattern) existing in South Africa and provided comparisons of the developmental gap among the nine provinces. This approach enabled Ramuhashi (2007) to study various variables – such as Gross Domestic Product, budget allocation, and income – and compare South Africa's economic development with those of other countries, such as China, Canada and Indonesia, in order to gain knowledge of how they deal with economic developmental imbalances. In conclusion, Ramuhashi's

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research (2007) shows that Gauteng, KwaZulu-Natal and Western Cape are more developed than the other provinces: these findings are attributed to Gauteng's mineral resource endowment and KwaZulu-Natal and Western Cape's strategic locations along the shoreline. On the other hand, the Northern Cape and Limpopo provinces were found to be least developed; characterised by minimal economic activity, they also exhibit high transport costs as a consequence of market distance.

Fedderke and Szalontai (2009) extend the analytical exploration of the link between market structure and industry performance a step further. They assessed the impact of industry concentration, on both employment and investment performance, with a special focus on the South African manufacturing industry over the period 1972-1996. Using the three digits industry classification approach, they tested the consistency of their findings as contrasted with those reported for output growth. They found that increased concentration lowers employment in the South African manufacturing industry. They made use of data from the South African manufacturing sector at the three digits Standard Industrial Classification (SIC) level. Their results showed that increased concentration unambiguously lowers employment. They also found that increased inequality of market share serves to raise investment rates, while falling firm numbers, for any given inequality of market share, lowers investment rates. The difference was consistent with a disciplining effect of a competitive fringe of firms on the behaviour of large firms in a market. Lessmann's study (2014) – entitled Spatial Inequality and Development: Is there an Inverted-U Relationship? – used a unique panel data set of spatial inequalities in 56 countries at different stages of economic development, covering the period 1980-2009, to test the hypothesis of an inverted-U-shaped relationship between spatial inequality and economic development. The results provided strong support for the existence of an inverted-U. The study found some evidence that spatial inequalities increased at very high

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levels of economic development, which may be related to tertiarisation, that is, a shift from manufacturing industries to modern service sectors. Szirmai and Verspagen (2015), in a recent study, investigated the role of manufacturing in economic growth and development by testing, econometrically, whether manufacturing has led to economic growth in a large panel of countries during the post war period. The proposition tested was that manufacturing had a significant positive effect on growth in developing countries, and that this effect of manufacturing was stronger than that of other sectors, in particular the services sector. This they referred to as the engine of growth hypothesis. They employed a regression framework using a dataset of 88 countries, including 21 advanced economies and 67 developing countries, covering the period 1950 to 2005. Among other things, they investigated whether the role of manufacturing in growth has changed over time in favour of services. The novelty of their paper lies in their application of state-of-the-art panel data regression methods to a new large dataset with data on manufacturing shared as far back as the 1950s. They found a moderate positive impact of manufacturing on growth. They also found interesting interaction effects of manufacturing with education and income gaps. They concluded that manufacturing is becoming a more difficult route to growth than before.

Costinot (2009), Gupta (2009), Deardorff (2013), Gaubert and Itskhoki (2018), and Bahar and Rapoport (2018), among others, have focussed on aspects other than functionality. None of the foregoing has carried out a study on the relationship between functionality and LQ; this stresses the need for this particular research, which looks at functionality and comparative advantage among the provinces in South Africa, with a special focus on LQ analysis of employment distribution. Apart from drawing heavily on other resource materials – such as Statistic South Africa: Statistical Release PO211 3 Quarterly Labour Force Survey data of 2013 and 2017 – this study has also found

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Naude's (2006) thesis on Industry Concentration in South Africa extremely useful. Equally important was Prestwich and Taylor's Introduction to Regional and Urban Policy in the United Kingdom (1990), which served as the main theoretical base for this study; hence, theories such as the location theory, growth pole model and the filtering-down theory, elucidated impeccably in the latter's work, became the theoretical framework for this study.

2.8 Conceptual Framework

This section of the study presents the conceptual framework that guided this research. Several theories have been formulated to discuss regional development. Some of the few selected theories discussed in this study include the filtering-down theory, the growth pool model and the location theory. Generally, a function is not static in time and can change or be replaced by others; informed by this reality, this study is underpinned by the Theory of Location of Firms. Regions are not homogenous, that is, they are different according to socio-economic attributes such as occupation, employment status, and economic sector. Accordingly, participation in the labour market is often associated with these attributes, which are further discussed below.

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2.8.1 Occupation

Occupation refers to the job/profession/business that a person does as a form of being employed and a means of earning a living. The South African Standard Classification of Occupations (SASCO) defines occupation as a set of jobs with tasks which a person does irrespective of the sector they are in (StatsSA, 2007).

2.8.2 Employment status

This is the total number of individuals between the ages 15 and 64 years who are economically active, that is, those who are employed and unemployed. For the purpose of

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this study, this definition only includes individuals who participated in any economic activity in during the survey (StatsSA, 2017b).

2.8.3 Economic sector

This is the general industry wherein a working age population is employed and is characterised by jobs that are different in nature. The economic sector is classified further into three sub-categories, viz.: primary, secondary, and tertiary. The primary sector involves industries such as mining and agriculture, while the secondary sector involves manufacturing, utilities, construction, and the tertiary sector involves trade, transport and communication, finance and business services, community service, and government service. The South African Standard Industrial Classification of all Economic Activities (SIC) defines the nine economic sub-sectors as expressed below.

2.8.3.1 Agriculture. The agricultural sector incorporates establishments that are primarily engaged in farming activities, but also includes establishments focussing on commercial hunting and game propagation, and forestry, logging and fishing.

2.8.3.2 Mining. This sector includes the extraction and beneficiation of minerals occurring naturally, including solids, liquids, crude petroleum, and gases. It also includes underground and surface mines, quarries, and the operation of oil and gas wells and all supplemental activities for the dressing and beneficiation of ores and other crude materials.

2.8.3.3 Manufacturing. This sector is broadly characterised by the physical or chemical transformation of materials or compounds into new products and can be classified into 10 sub-groups of which the most relevant are as follows:

- Fuel, petroleum, chemical and rubber products;
- other non-metallic mineral products, e.g. glass;
- metal products, machinery and household appliances; and,
- electrical machinery and apparatus.

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2.8.3.4 Utilities (generally referred to as *electricity* and *water*). This sector includes the supply of electricity, gas and hot water; the production, collection and distribution of electricity; the manufacture of gas and distribution of gaseous fuels through mains; supply of steam and hot water; and the collection, purification and distribution of water.

2.8.3.5 Construction. This sector includes site preparation, the building of complete constructions or parts thereof, civil engineering, building installation, building completion, and the renting of construction or demolition equipment with operators.

2.8.3.6 Trade. The trade sector entails the following: wholesale and commission trade; retail trade; repair of personal household goods; sale, maintenance and repair of motor vehicles and motor cycles; hotels, restaurants, bars, canteens, camping sites and other provisions of short-stay accommodation.

2.8.3.7 Transport, storage and communication. Transport, as an economic sector, refers to activities concerned with the following: land transport; railway transport; water transport; transport via pipelines; air transport; activities of travel agencies; post and telecommunications; courier activities; and, storage and warehousing activities.

2.8.3.8 Financial and business services. This sector includes, inter alia, financial intermediation; insurance and pension funding; real estate activities; renting or transport equipment; computer and related activities; research and development; the legal profession; accounting; bookkeeping and auditing activities; architectural, engineering and other technical activities; and, business activities not classified elsewhere.

2.8.3.9 Social and community services. This sector includes public administration and defence activities; activities of government, government departments and agencies; education, public and private; health and social work; sewage and refuse disposal, sanitation and similar activities; activities of membership organisations; recreational, cultural and

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sporting activities; washing and dry-cleaning of textiles and fur products; hairdressing and other beauty treatment; and, funeral and related activities.

2.9 Chapter Conclusion

In this chapter the term functionality, comparative advantage and LQ has been defined and a number of different theories which are related to regional development have been discussed. This chapter has also outlined different theories which explained the notion of economic development. The theories that were outlined are the filtering-down theory, the growth pole model and the location theory.

The filtering-down theory provides a dynamic description of the location behaviour of firms, in a system of functional urban provinces, employing a central place system or the concept of location advantage. According to this theory, industries filter down through the system of functional urban provinces in a hierarchical manner from provinces with larger market areas to provinces with smaller market areas.

The growth pole model enhanced the discussion of the filtering-down theory and gave a different perspective on the concept of regional development. Growth pole in a national economy is an industry, or a group of interrelated industries, which grows more quickly to a larger size than other industries. Because of its strong linkages with other industries and sectors of the economy, it has a propulsive impact on national growth. This propulsive impact is a business unit (a company, industry) and these units are the main force of the economic development as they generate growth through the impact of strong input-output linkages.

Since the filtering-down theory and the growth pole model did not outline all the answers to the question that the research has posed, the location theory is examined to improve the possibility of finding solutions. The location theory gives a different perspective to the discussion. The location theory analyses the economic and spatial mechanisms that

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regulate the size of territorial agglomerations, their functional specialisation and their territorial distribution.

The chapter also expounded on the South African Standard Industrial Classification of all Economic Activities (SIC) which is the conceptual framework used in this study. Drawing on these frameworks, the specific features that will be included in the economic dimension of this research include the following:

i. A discussion on how functionality relates to location quotient
ii. An indication of the sectoral performance
iii. A review of the trends in the formal sectoral employment
iv. A review of the comparative advantages.

The next chapter provides a detailed explanation of the methodology adopted for the research.

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CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the research methods employed in this study. It also describes the sources of data and how the data was collected. This methodology chapter of the thesis narrates and explains the manner in which the research hypotheses stated in Chapter One were tested to provide answers to the research questions and to solve the research problem. More specifically, the chapter explains how the participants were selected, looks at the approaches and tools used to collect the data, and explains how the data were analysed.

3.2 Purpose

The purpose of this study was to examine the functions of provinces in South Africa and their respective comparative advantages from 2013 to 2017 in terms of employment absorption, and to establish a relationship between the functionality and the concentration of firms. There are considerable spatial disparities in the functions and comparative advantage profiles among South Africa's provinces. Nevertheless, there is a dearth of evidence on the different types of function that characterise the provinces. Consequently, it is hoped, this research will yield a better, more comprehensive understanding of the functions and inherent comparative advantage specifics among the provinces of South Africa. The outcome could be used for regional development planning, and it will also aid the government in its quest to allocate resources evenly as it strides towards a healthier equilibrium of spatial patterns across the country. Also, the study's findings could prove useful in informing the design of suitable policy interventions that will propel a balanced spatial development across the country.

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The 2013 and 2017 third Quarterly Labour Force Survey (QLFS) datasets were chosen because of the time constraints associated with the study programme, which is limited to a period of two years. Notwithstanding this apparent limitation, the time period of five years covered in this study, is adequate to capture functional trajectories and the resulting comparative differences that arise.

3.3 Research Perspective

This study employed a cross-sectional design as it used data from Labour Force Surveys which were conducted by Statistics South Africa. The Labour Force Surveys were conducted in the form of face-to-face personal interviews and the same questionnaire was used to gather information on the branches of activity that individuals are professionally engaged in, throughout South Africa. This study is quantitative in nature and draws upon Labour Force Survey questionnaire data. The measurements of variables have been defined and the relationships between variables tested using statistical methods such as frequencies. Descriptive and inferential analyses have been performed to measure the relationships between the dependent and independent variables in order to answer the research questions and to test the research hypotheses. Hence, the significance of this study is that it contributes to the regional localisation of firms' theory by indicating whether the chosen variables perform in accordance with the framework of the location of firms. Additionally, the study provides a reference point for evaluating proficiency with regard to functions among the provinces, which could result in divergent or convergent comparative advantage in the labour market dynamics; this it does by highlighting some innovations in the participation of employment within the South African labour market.

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The Quarter Labour Force Survey was conducted by Statistics South Africa (StatsSA), from July to September, in 2013 as well as in the year 2017 – the information collected was about individuals in the labour market who are either employed, unemployed or economically active.

However, this study focusses exclusively on employed persons between the ages of 15 and 64 years, since it is these people who make up the labour force. Additionally, the study captures the comparative advantage among South African provinces by comparing results from the function of industry with the LQ of employment distribution.

3.4 Context

Research, be it in the field of social or natural sciences, employs two major traditions: quantitative and qualitative methods (Firestone, 2007). As alluded to above, this study has exclusively utilised the quantitative approach to guide the research process. It has made use of secondary data from the Quarterly Labour Force Survey, conducted by StatSA in 2013 and 2017. The reason for this approach lies in the ease and convenience offered by the data resulting from the surveys that profiled the function of each province. The data was used to compute statistical indicators of employment distribution in order to quantify diverse functions and the comparative advantages of provinces between 2013 and 2017. The statistics were obtained with very little effort since Statistics South Africa, a governmental institution, has made the data readily available and accessible to the public. As already stated, the focus of this study was on the functionality and comparative advantage of employment distribution throughout the nine provinces of South Africa. Its aim was to investigate the disparities in South Africa's nine provinces in terms of their functions, using the LQ approach, which assessed the structural changes occurring in these provinces.

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3.5 Methods and Instruments Used to Collect Data

Data was collected in all the nine provinces of South Africa, including urban and rural areas, by Statistics South Africa (StatsSA). To ensure a successful data collection exercise, StatsSA recruited 332 permanent field staff (233 Survey Officers, 27 Provincial Quality Monitors, 54 District Survey Coordinators, 9 Administrative Support Officers, and 9 Provincial Survey Coordinators) and 95 contract staff (listers and data capturers).

The sample data was weighed to make statistical inferences for the whole population. Both the sample data for 2013 and 2017 were sought and obtained by request from Statistics South Africa. Based on this information, the study was able to identify if there was a relationship between the function of a province and the comparative advantage in terms of employment for both years under study.

3.6 Sampling Weights

Since the QLFS 2013 and 2017 are stratified multi-stage cluster samples consisting of observations that are not necessarily independent and identically distributed, it was necessary to include sampling weights in the analyses conducted using this data. Sampling weights are the inverse of sampling fractions and they encompass the design according to which the sample was selected. When different sampling fractions have been applied to particular sub-groups within the population studied, sampling weights are used to reinstate the original importance of each group within the population (Luus, 2016).

Ideally, a selected sample is a miniature version of the population it came from. This should be reflected in the sample being representative with respect to all variables measured in the survey. The resultant samples are not always representative of the target population due to occurrences of non-response, non-coverage and under-representation of certain population groups. These imperfections can be corrected through the

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benchmarking of sampling weights to known totals of certain population auxiliary variables, i.e. employment totals, branch of activity totals, etc., to meet the following objectives: a) compensate for unequal probabilities of selections; b) compensate for (unit) non-response; and, c) adjust the weighted sample distribution for branch of activity of individuals to make it conform to a known population distribution. Therefore, weights are used to restore the representativeness of the sample such that the total sample distribution looks like the country's actual population distribution (Bethlehem, 2009).

3.7 Variables of Interest

Since the QLFS of 2013 and 2017 are the data sources for this study, the number of variables that could be used were somewhat limited. The focus of the study was to see if there was convergence between the functions and the comparative advantage of a province in terms of employment distribution. The variables of interest identified from the two data sources were as follows: i) province of enumeration; ii) main work; iii) reason for not working; and iv) the branch of activity of an individual. From these variables, the dependent (branch of activity) and independent (province of enumeration) variables were selected for the study; these two variables are discussed below.

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3.7.1 Province of enumeration

The province of enumeration is the unit of analysis in this study. In South Africa, the Western Cape, Gauteng and KwaZulu-Natal provinces are more advanced than the rest. People have a tendency to relocate to areas where there are more prospects. The province of enumeration in the Labour Force Survey was categorised and recoded as follows: 1=Western Cape, 2=Eastern Cape, 3=Northern Cape, 4=Free State, 5=KwaZulu-Natal, 6=North West, 7=Gauteng, 8=Mpumalanga, and, 9=Limpopo. This particular variable is used in this study to ascertain the province(s) that has/have additional

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absorption of employment and the industry in which this employment concentrated. The variable has aided the study in tracking the employment distribution indicators at the provincial level for all the nine provinces in South Africa. Also, the variable assisted in the tracking of provinces that are highly or moderately industrialised through the cross tabulation of province of enumeration with the variable branch of activity, the latter being discussed next.

3.7.2 Branch of activity

The study characterises disparities in terms of sectorial concentration, to determine the branch of activity that dominates each province. The question about type of activity in the labour force survey conducted by StatsSA reads as follows: What is the name of the establishment / institution / business / organisation that you work for (the one that pays your salary)? This variable, branch of activity, is used to recognise the type of industry located across the different provinces; that is, the share of industry across the South African provinces and also to know the branch of activity wherein an individual works. The industry was coded to three digits on the basis of the Standard Industrial Classification of all Economic Activities (SIC) in South Africa (see Table 2, below).

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Table 2 Standard industrial classification

Sector of activity	Description
Primary Sectors	
Agriculture; hunting; forestry and fishing	Growing of crops Farming of animals Growing of crops combined with farming of animals (mixed farming) Agricultural and animal husbandry services, except veterinary activities Game hunting, trapping and game propagation, including related services Forestry and related services Logging and related services Ocean and coastal fishing Fish hatcheries and fish farms
Mining	Mining of coal and lignite Mining of gold and uranium ore Mining of iron ore Mining of non-ferrous metal ores
Quarrying	Stone quarrying, clay and sandpits Mining of diamonds (including alluvial diamonds) Mining and quarrying N.E.C.
Secondary Sectors	
Manufacturing	Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats Manufacture of dairy products Manufacture of grain mill products, starches and starch products and prepared animal feeds Manufacture of other food products Manufacture of beverages Manufacture of tobacco products Spinning, weaving and finishing of textiles Manufacture of other textiles

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Table 2 Cont.

	Manufacture of knitted and crocheted fabrics and articles
	Manufacture of wearing apparel, except fur apparel
	Tanning and dressing of leather; manufacture of luggage, handbag,
	Manufacture of footwear
	Sawmilling and planing of wood
	Manufacture of products of wood, cork, straw and plaiting material
	Manufacture of paper and paper products
	Publishing
	Printing and service activities related to printing
	Reproduction of recorded media
	Manufacture of coke oven products
	Petroleum refineries / synthesisers
	Processing of nuclear fuel
	Manufacture of basic chemicals
	Manufacture of other chemical products
	Manufacture of rubber products
	Manufacture of plastic products
	Manufacture of glass and glass products
	Manufacture of non-metallic mineral products N.E.C.
	Manufacture of basic iron and steel
	Manufacture of basic precious and non-ferrous metals
	Casting of metals
	Manufacture of structural metal products, tanks, reservoirs and steam generators
	Manufacture of other fabricated metal products; metalwork service activities
	Manufacture of general purpose machinery
	Manufacture of special purpose machinery
	Manufacture of household appliances N.E.C.
	Manufacture of office, accounting and computing machinery
	Manufacture of electric motors, generators and transformers
	Manufacture of electricity distribution and control apparatus
	Manufacture of insulated wire and cable

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Table 2 Cont.

	Manufacture of accumulators, primary cells and primary batteries Manufacture of electric lamps and lighting equipment Manufacture of other electrical equipment N.E.C. Manufacture of electronic valves and tubes and other electronic components Manufacture of television and radio transmitters and apparatus for line telephony Manufacture of television and radio receivers, sound/video recording/reproducing apparatus Manufacture of medical appliances and instruments and appliances for measuring etc Manufacture of optical instruments and photographic equipment Manufacture of motor vehicles Manufacture of bodies (coachwork) for motor vehicles; Manufacture of parts and accessories for motor vehicles and their engines Building and repairing of ships and boats Manufacture of railway and tramway locomotives and rolling stock Manufacture of aircraft and spacecraft Manufacturing of transport equipment N.E.C. Manufacture of furniture Manufacturing N.E.C... Recycling N.E.C.
Electricity; gas and water supply	Production of electricity Collection of electricity Distribution of electricity
Construction	Site preparation Building of complete constructions or parts thereof; civil engineering Building installation Building completion

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Table 2 Cont.

Tertiary Sectors	
Wholesale	Wholesale trade on a fee or contract basis Wholesale trade in agricultural raw materials, livestock, food, beverages and tobacco Wholesale trade in house-hold goods Wholesale trade in non-agricultural intermediate products, waste and scrap Wholesale trade in machinery, equipment and supplies Other wholesale trade
Retail	Non-specialised retail trade in stores Retail trade in food, beverages and tobacco in specialised stores Other retail trade in new goods in specialised stores Retail trade in second-hand goods in stores Retail trade not in stores Repair of personal and household goods Sale of motor vehicles Maintenance and re-pair of motor vehicles Sale of motor vehicle parts and accessories Sale, maintenance and repair of motor cycles and related parts and accessories Retail sale of automotive fuel Hotels, camping sites and other provision of short stay accommodation Restaurants, bars and canteens Shebeen.
Transportation	Railway transport Other land transport Sea and coastal water transport Air transport
Storage and communication	Supporting and auxiliary transport activities; activities of travel agencies Postal and related courier activities Telecommunication

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Table 2 Cont.

Financial intermediation	Monetary intermediation Cash loans Other financial intermediation N.E.C.
Insurance	Insurance and pension funding, except compulsory social security Activities auxiliary to financial intermediation, except insurance and pension funding
Real estate	Real estate activities with own or leased property Real estate activities on a fee or contract basis
Business services / administrative and support activities	Renting of transport equipment Renting of other machinery and equipment Renting of personal and household goods N.E.C.
	Hardware consultancy Software consultancy and supply Data processing Data base activities Maintenance and repair of office, accounting and computing machinery Other computer related activities Research and experimental development on natural sciences and engineering Legal, accounting, bookkeeping and auditing activities; tax consultancy; market research and public pinion research; bus Architectural, engineering and other technical activities Advertising Business activities N.E.C.

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Table 2 Cont.

Community; social and personal services / public administration and defence	Central government activities Local authority activities Provincial administrations S A Defence force S A Police service Correctional service Education Human health activities Veterinary activities Social work activities Other community, social and personal service activities Activities of business, employers and professional organisations Activities of trade unions Activities of other member-ship organisations Motion picture, radio, television and other entertainment activities News agency activities
Private households	Private households with employed persons
Other	Representatives of foreign governments
Commercial	Electricity, gas and water supply
	Construction Wholesale trade Retail trade Transportation, storage and communication Financial intermediation, insurance and real estate Business services Community; social and personal services Private households Other services.

Adopted from standard industrial classification of all economic activities in South Africa, (SIC, 2012, p. 27-40).

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3.8 Literature Review

Mouton and Babbie, (2011) contends that through a review of literature, the existing body of knowledge can be built upon and researchers can avoid duplication. The review of relevant literature was, certainly, an important part of this study as it enabled the researcher to contextualise the research, to formulate and adopt appropriate theoretical and conceptual frameworks, and also to address the issues and concepts surrounding the topic of research. The review focussed on literature drawn from academic sources.

3.9 Data Analysis and Procedures

According to Kultar (2007), data analysis is important because it offers the platform for the movement of data to information, reducing the size of the data to controllable proportions and helping to identify diverse themes and patterns in the data (see also, Majesky, 2008). The 2013 and 2017 Labour Force Survey data have been analysed using the Statistical Package for the Social Sciences (SPSS) Version 20.0. SPSS statistical software was the preferred statistical package in this study because it is a quantitative data analysis tool. Accordingly, it is easily able to perform both parametric and non-parametric comparison analyses using the software programme. SPSS also enables the researcher to test assumptions, through features such as the normality and outliers tests. Besides that, this statistical package enables a frequency analysis to be perfectly conducted (Ong & Puteh, 2017). Both descriptive and inferential statistics were obtained and used in this study. Descriptive statistics are used to describe, summarise or explain a given set of data, while inferential statistics uses results derived from a sample to make inferences about the population from whence the sample derives (Singh, 2007). The descriptive statistics have been presented using frequency distributions, tables, charts, graphical representations. Furthermore, a statistical approach, the model of analysing functionality, was utilised in the computation of index scores to measure

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the function of provinces with regard to certain phenomena. Also, LQ analysis of employment distribution was done among the branch of activities and provinces of South Africa, using the third quarterly labour force surveys of 2013 and 2017.

3.10 Calculated Indicators

The indicators applied in this study were in accordance with the South African labour force system. Employment distribution in South Africa was analysed at the provincial levels. All statistical indicators were calculated using Excel and SPSS software.

3.10.1 Percentage change

Percentage change is the measure of increase or decrease of individuals employed during the time of the survey within and across the provinces. It is expressed mathematically thus:

$$Percentage\ change = \left(\frac{Xn - X0}{X0}\right) * 100 \quad [2]$$

Where,

X_n = Employment in final year

X_0 = Employment in initial year

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3.10.2 Annual average growth rate

The Annual Average Growth Rate (AAGR) measures the average growth over a series of equally spaced time periods. Below is the formula to calculate the (AAGR):

$$Annual\ average\ growth\ rate = \frac{1}{n} * \ln\left(\frac{Xn}{X0}\right) * 100 \quad [3]$$

Where,

n is the number of years/periods, from 2013 to 2017, which the growth rate was calculated for

ln is the natural logarithm.

Nevertheless, it is important to note that the percentage change and AAGR have been used to calculate employment by province and branch of activity.

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3.10.3 Percentage distribution

Percentage distribution is the number of people employed in an activity (a) in province (i) divided by total employment across the activities in province (i). In this study, there is a calculation of percentage distribution of employment across and within provinces. It is expressed mathematically thus:

$$\text{Percentage distribution} = \left(\frac{\text{Employed in an activity}}{\text{Total employment across the activities}}\right) * 100 \quad [4]$$

3.10.4 Location quotient

LQ is a ratio of economic measures used to determine the concentration or dominance of a particular branch of activity in a province in comparison to South Africa in general. It is traditionally used to compare an industry share of regional employment. It is expressed mathematically thus:

$$LQijt = \frac{\text{Industry quotient (INDQijt)}}{\text{Employment quotient (EMPQit)}} \quad [5]$$

with

$$INDQijt = \frac{\text{Employment in industry j in province i at t}}{\text{All employment in industry j in South Africa at t}} \quad [6]$$

and

$$EMPQit = \frac{\text{Employment in province 1 at t}}{\text{Employment in South Africa at t}} \quad [7]$$

The first component of the LQijt is the Industry quotient (INDQijt), which shows the distribution of employment with industry j within South Africa. It holds:

$$\sum_i \text{INDQijt} = 1 \quad [8]$$

However, simply using these shares would not correctly indicate the size of the provincial entity or its corresponding labour market. Therefore, the INDQ is divided by the

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second component: the employment quotient (EMPQit). The EMPQit reveals the distribution of employed persons across South Africa provinces; this quotient is invariant to the industry. It also holds:

$$\sum_i \text{EMPQijt} = 1 \qquad [9]$$

The LQijt is basically the share of employees in a specific province, weighted by the relative size of the local labour market; LQijt is a comparable measure across industries. It is defined between zero and infinity, with zero meaning that there is no employment whatsoever in industry j in that province. LQijt = 1 indicates that the distribution of employment matches the total South African representation. Consequently, LQijt > 1 indicates over-representation and RQijt < 1 under-representation compared with the South African average.

3.10.5 Province function indices

A province may have one or more dominant functions, and it can be highly or moderately industrialised. This study utilises the technique developed by wizard. The model of functions is applicable to cities in literature, but this study applies the model to provinces. According to Tati, et al. (2017), the economy of a function can be divided into these different categories of sectors as depicted in Table 3 below:

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Table 3. Classification of province by their function, method of calculation and scaling

Function determined by the index measured	Method of calculation and data required for the index	Formula	Threshold for scaling and classification
Highly industrialised province	**Eind. / (Eind. + Ecom.)** **Eind. / Esal.**	**(a)** **(b)**	**≥ 0.74** **and ≥ 0.45**
Moderately industrialised province	**Eind. / (Eind. + Ecom.)** **Eind. / Esal.**	**(a)** **(b)**	**≥ 0.60** **and ≥ 0.30**
Mining province	**Emin. / Esal.**	**(a)**	**>0.15**
Retailing province	**Ert. / (Eind. + Ecom.)** **Ert. / Ewhs.**	**(a)** **(b)**	**≥ 0.50** **≥ 2.20**
Wholesale province	**Ewhs. / (Eind. + Ecom.)** **Ewhs. / Ert.**	**(a)** **(b)**	**≥ 0.20** **≥ 0.45**
Transportation province	**Et. / Esal.** **Et. / Eind.** **Et. / Ecom.**	**(a)** **(b)** **(c)**	**≥ 0.11** **≥ 0.33** **≥ 0.67**
University province	**Std. / Esal.**	**(a)**	**>0.15**
Hospitality/ retirement province	**E / P**	**(a)**	**Value below a threshold varying by the type of national economy**

Adopted from Tati, et al. (2017, p. 19)

Where,

Eind. = Employment in industry

Ecom. = Employment in the commercial sector

Emin. = Employment in the mining sector

Ewhs. = Employment in wholesales sector

Ert. = Employment in the retailing sector

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Et. = Employment in the transportation sector

Esal. = Salaried employment

Std. = Total number of students

E = Total employment

P = Total population

3.10.5.1 Interpretation of the province function indices

Table 3 above is interpreted as follows: when the indicator does not meet the threshold, it means that that particular function is not dominant. Therefore, it is a multimodal function. If the indicator is greater than or equal to the threshold, it means that the function is dominant. If the indicator does not meet the threshold, it means that the function exists, but not in a dominant fashion. However, it is important to note that the formulae for calculating the functions of indices measured are not calculated in the same way. Some of the indices can be assessed using various formulae. Different results are, therefore, expected for each formula. Sectors used in calculating the indices measured include the following:

a) **Employment in industry** – comprises the manufacturing, electricity, gas and water supply, and construction sectors.

b) **Employment in the commercial sector** – comprises all sectors except the manufacturing, mining, quarrying, agriculture, hunting, forestry and fishing sectors.

c) **Employment in the mining sector** – comprises the mining and quarrying sectors.

d) **Employment in wholesales sector** – consists of only the wholesale sector.

e) **Employment in the retailing sector** – consists of only the retail sector.

f) **Employment in the transportation sector** – comprises only the transportation sector.

g) **Salaried employment** – comprises the population working for wages or for someone for purposes of getting paid; this population was derived from the variable *main work*, which gives information on people who are working for wages. The following

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categorical elements assisted in analysing the number of people working for a salary (computed by dividing employment in industry, mining, transportation and education by salaried employment): 1 = Working for someone else for pay; 2 = An employer (employing one or more employees); 3 = Own account worker (not employing any employees); and 4 = Helping without pay in a household business. However, it is important to note that only the values from the four categories – *1 = Working for someone else for pay* – were used in this study.

h) **Total number of students** – comprises the population of scholars or students, and was derived from the variable *reason for not working*. This variable gives information on people who are not looking for work, such as the following: 1 = Scholar or student; 2 = Housewife/homemaker (family considerations/child care); 3 = Health reasons; 4 = Retired or too old for work; 5 = No desire to work; 6 = Too young to work; 7 = Pregnancy; 8 = Disabled or unable to work; and, 9 = Unspecified. The responses were grouped and recoded into the aforementioned categories as has been highlighted above.

With regard to scholars or students, who fell under the category of those not looking for work as stated above, the student population within the educational province was further sub-divided by salaried employment. Where the threshold scaling and classification is greater than 15%, the inference is that the province under study is a university province. The variable, such as reason for not working is hinged on the premise, where the students' population is derived, for instance, to see whether the provincial function related to educational province, the function of education is important such that the students' population must be greater than 50% of the salaried population. Cross tabulating the variable *reason for not working* with the variable *province of enumeration*, allowed the researcher to identify the total number of scholars or students in a particular province.

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i) Total employment – comprises the total number of individuals who are employed. According to StatsSA (2013, 2017b), those who participated in the labour force are those that were economically active, that is, they were available for work, and were either employed, or unemployed, but have taken active steps to try and find work in the reference period.

The variable *employment status* is fundamental to this study as it is derived from a logical series of questions put to persons aged 15 to 64 years. By cross tabulating employment status with the variables *sector of activity* and *province of enumeration*, the researcher was able to identify the total number of people who are employed in a particular province. The responses were grouped and recoded into the following categories: 1 = Employed; 2 = Unemployed; 3 = Discouraged job-seeker; and, 4 = Others not economically active. However, it is important to note that only the value from the category *1 = Employed* was used in this study.

J) Total population – comprises the total population of all age-groups. For example, the age-group of individuals surveyed in 2013 ranges from those aged 0 to 65; in 2017, the total population surveyed was aged 0 to 75. Age is the interval of time between the day, month and year of birth expressed as the number of years lived by an individual, that is, a person's age at their last birthday (StatsSA, 2018). Age was recorded in completed years. To determine the age of the participants, the following question was asked: *what is the age in completed years?* Thereafter, the age was captured and re-coded into groups of five year intervals using SPSS, as follows: 1=0-4, 2=5-9, 3=10-14, 4=15-19, 5=20-24, 6=25-29, 7=30-34, 8=35-39, 9=40-44, 10=45-49, 11=50-54, 12=55-59, 13=60-64.

Furthermore, to gain more insight from the data, inferential statistics were used to see if there were differences in employment distributions within and across provinces and to determine the extent these differences stay alive when being generalised.

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3.10.6 Inferential statistics

Many statistical inference methods assume that the population, or populations, from which the samples are selected, is/are normally distributed. As such, the data from the QLFS involves the selection of a random sample of individuals who are asked to answer questions regarding their past experiences, backgrounds, etc. Therefore, the work done by QLFS comprises a normally distributed set of data. The T-test was used in this study, to analyse data and to answer the following research questions: *Which provinces have dominant functions in the distributions of employment? Which provinces have dominant comparative advantage in the distribution of employment?*

A significance level of 0.05 (5%) is used for the One Sample T-test and the Independent T-test. As a rule, the acceptance of the null hypothesis is premised on the significance value being greater than the given level of significance. Otherwise, the null hypothesis is rejected in favour of the alternative hypothesis if the significance value is less than or equal to the given level of significance.

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3.11 Measures Used to Minimise Errors

The quality of the data used is very important in any study, since the quality of the results depends on how representative the sample is with regard to the population being studied, as well as how reliable and accurate the sample data are. The Quarterly Labour Force Survey (QLFS) is an instrument used by Statistics South Africa's experienced statisticians. The variables are those in line with the measurements of employment and are appropriate for seeing whether there are inequalities or not. The questionnaire of the LFS contains all the variables required for the measurement of employment including employment distribution. It is a representative sample, which implies that a generalisation can be made from it. Reliability of a research instrument refers to the consistency of the instrument. In this study,

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it is not possible to ascertain the reliability of the research instrument. Since the study is using a cross-sectional design, meaning questionnaires are used to collect data, it is uncertain whether the same results will be found when the survey is done repeatedly. It is uncertain because, even though the questionnaires might remain the same over time, people are unpredictable, and the sample can change over time. This implies that different people will be answering the questionnaires each time, which can make the likelihood of obtaining the same result, repeatedly, very small (Krosnick, 2018)

3.12 Ethical Issues

Ethics in research deals with the ways of ensuring the rights and welfare of the participants and communities involved in the research process. Therefore, it is important to follow the guidelines of ethics in research. It is of importance to establish any ethical issues that might relate to one's study beforehand, so that one is able to deal with them. The data used in this study derives from the QLFS (2013/2017); the data was collected by means of surveys. The data from Statistics South Africa (Stats SA) follow the rules in terms of ethics; the names of individuals are not indicated in the data. Stats SA gave permission to use the secondary data with no names indicated on the data.

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3.13 Chapter Conclusion

The chapter has provided a thorough elucidation of the research methodology used for the research. A combination of both descriptive and inferential statistics was used in the analysis of the quantitative data derived from the Quarterly Labour Force Survey. The chapter ends with a provision of an ethics statement which is an important requirement for conducting research.

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Based upon the foregoing methodological approach and tools of analyses, Chapter Four presents results on data analysis on the assessment of functionality and comparative advantages across South Africa provinces, as well the relationship that may exist between the two phenomena.

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CHAPTER FOUR

DATA ANALYSIS

4.1 Introduction

This chapter provides an analysis of the statistical indicators that were calculated using data collected from the third Quarterly Labour Force Surveys of 2013 and 2017. The statistical indicators included LQ and function indices. Function is an activity that is natural to various institutions (Lubell, 2013; Nord, 2014; Veblen, 2017). In this study institutions were referred to the nine provinces in South Africa. The analysis is at the provincial levels, which includes all nine provinces in South Africa. Statistical indicators for each of the nine provinces were evaluated at the national level to establish the specificities at provincial level and to test the hypotheses and find answers to the research questions advanced in the introductory chapter of the study.

As alluded to in the previous chapters, the main purpose of the research was to compare the functions of provinces in South Africa and their respective comparative advantages in terms of employment absorption, for years 2013 and 2017. The research questions and hypotheses have been answered through the examination of the dominant activities within and across the provinces between the years under study (but including 2013 and 2017 as well), using the third Quarterly Labour Force Survey data. This study uses statistical tools such as frequency distribution, one sample T-test for each function across the provinces and independent T-testing between the years under study to analyse the relationship between variables. Besides the tables and graphs in this chapter, some tables are also presented in the appendices.

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The chapter thus focusses on exploring the foregoing based on the theoretical and conceptual frameworks presented earlier.

The chapter is organised as follows: section 4.2 examines provincial contribution to the national economy (2013 and 2017); section 4.3 discusses the national, provincial as well as sectorial employment distribution; section 4.4 presents the percentage distribution of employment by branch of activity and by provinces; section 4.5 presents a classification of provinces by function by highlighting the major functions within and across the provinces, with the objective of assessing the emergent structural changes in terms of functions; and section 4.6 outlines the LQs of individual occupation across provinces.

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4.2 Provincial Contribution to National Economy (2013 and 2017)

Figure 3, below highlights the contribution of each of the provinces to the South African economy for the years 2013 and 2017 (Statistics South Africa, 2018). The Western Cape (WC) contributed approximately 14% to the national GDP with Cape Town accounting for 9.9% of South Africa's total GDP in 2016. In 2018 the number of unemployed people declined by 38,000 with employment rates increasing by 3.9% since 2017. Between 2013 and 2017 the province generated a disproportionately huge number of jobs relative to the region's size, and as compared to the rest of the country's regions; indeed, the Western Cape created 23.6% of all new jobs in the country in this period. The province's economy is dominated by the city of Cape Town, in which 72% of the Western Cape's economic activity took place in 2016. The single biggest contributor to the region's economy is the financial and business services sector, followed by manufacturing. Close to 30% of the gross regional product comes from foreign trade with

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agricultural products and wine dominating exports. Agriculture makes a total contribution of roughly 4% to the GDP of the Western Cape

The Eastern Cape (EC) contributed approximately 8% to the national GDP, the fourth-highest contribution in the country. The provincial economy is dominated by general government services. In 2015 the province accounted for 9% of total employment in South Africa, which accounted for 28% of total provincial employment.

On the other hand, the Northern Cape (NC) contributed approximately 2% to the national GDP, the lowest contribution in the country. The provincial economy is dominated by mining. Similarly, the Northern Cape economy still made the smallest contribution to national GDP in 2016. Community services and mining were the largest two industries in the province.

The Free State (FS) contributed 5% towards the national GDP. Its real economy is dominated by gold mining and agriculture, with limited manufacturing. Its largest real economy sector is mining.

KwaZulu-Natal (KZN) contributed 16% towards the national GDP. Its real economy is dominated by manufacturing, which happens to be the province's largest real economy sector as well.

The North West (NW) contributes approximately 6% towards the national GDP. The provincial economy is dominated by mining. By stark contrast, Gauteng (GT) has contributed approximately 34% to the national GDP of South Africa, between 2013 and 2017, the highest percentage contribution of any province. It dominates the national economy. It contributes the highest percentage towards eight of the ten main industries in the country. Gauteng has consistently been the most populous province in the country.

Mpumalanga (MP), on the other hand, contributed approximately 8% towards the national GDP. Its real economy sector is dominated by mining. In 2013 and 2017, it made

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the third-highest percentage contribution towards mining and quarry in the national economy, at 21.6%.

Last but not least, Limpopo (LP) contributed approximately 7% towards the national GDP. Its economy is dominated by mining and quarrying sector, and general government services. Mining dominated the real economy, at 25% of the provincial economy. Gauteng (34 per cent), KwaZulu-Natal (16 percent) and Western Cape (14 percent) were the main contributors to the national economy in 2013 and 2017.

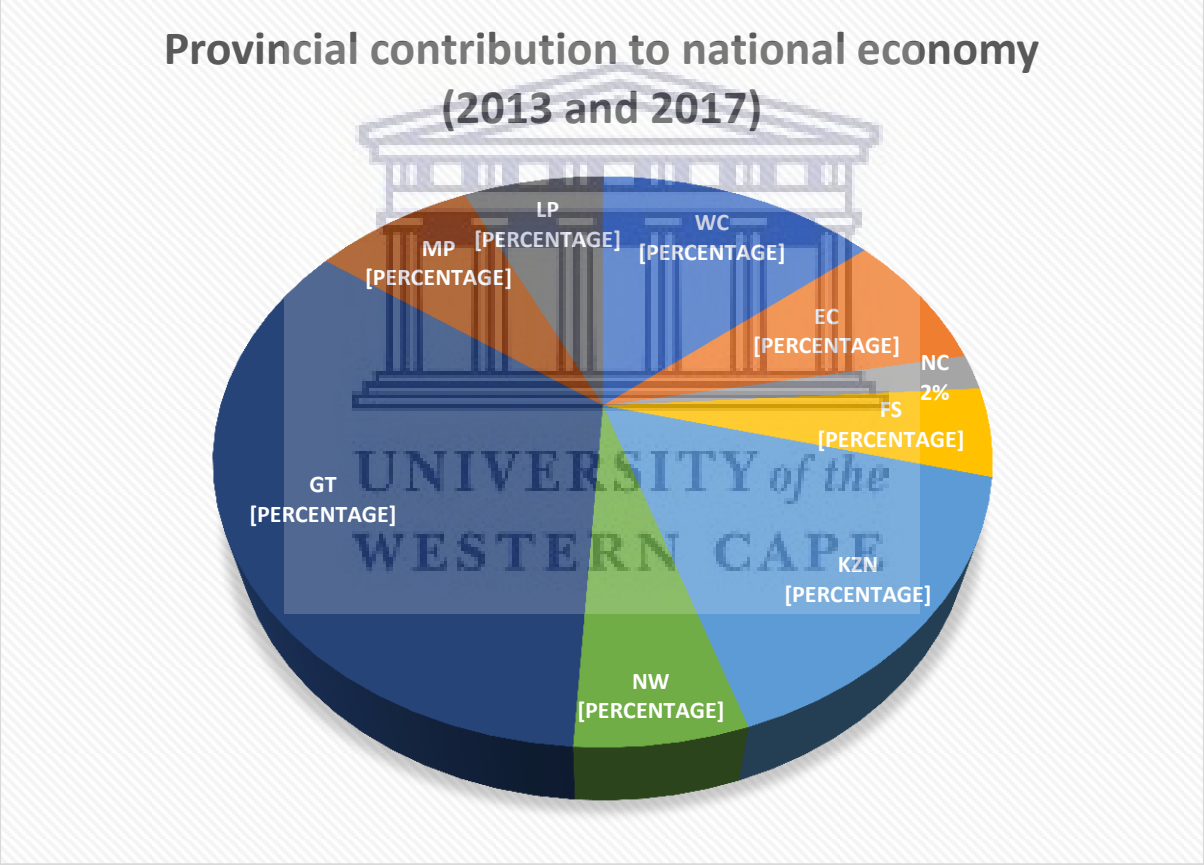

Figure 3: Provincial contribution to national economy (2013 and 2017)

Adopted from Statistics South Africa, Gross Domestic Product, annual estimates per region, (2018).

4.3 National and Provincial Employment Distribution.

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The employment distribution of individuals in South Africa was analysed using the provincial figures and comparisons drawn between the 2013 and 2017 Quarterly Labour Force Survey. Table 4 below provides trends for the working age population of individuals who live in South Africa based on the third Quarter Labour Force Survey data. The number of economically active individuals in South Africa in 2017 is estimated at 16,387,483. A comparison of the two periods, shows that the employed population increased from 15,210,399 (2013) to 16,387,483 (2017) with an annual average growth rate of 1.86%.

In 2017, 31.276% of residents were employed in Gauteng, while the figure in the Northern Cape stood at 1.90%; clearly, while Gauteng had the highest employment in industry, the Northern Cape had the lowest. The percentage of employment in industry increased slightly in the Western Cape from 14.25% to 14.82%, in the Eastern Cape 8.61% to 8.78%, FS 4.88% to 5.07%, in the North West 5.62% to 6.04%, and in Limpopo from 7.72% to 9.00%. Conversely, there were decreases in Northern Cape, KwaZulu-Natal, Gauteng, and Mpumalanga. In both 2013 and 2017, the province with the highest employment was Gauteng, followed by KwaZulu-Natal. Similarly, in 2017, Gauteng had the biggest employment in industry (5,124,052) compared to other provinces, followed by KwaZulu-Natal (2,570,922). The Western Cape had an employment distribution of 2,428,393.

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Table 4 Employment distribution, percentage change and annual average growth rate by province, QLFS of 2013 and 2017

Province	2013		2017			
	N	%	N	%	% change (2013-2017)	Annual average growth rate
Western Cape	2166901	14,25	2428393	14,82	12,07	2,85
Eastern Cape	1309838	8,61	1438042	8,78	9,79	2,33
Northern Cape	319135	2,10	311388	1,90	-2,43	-0,61
Free State	742165	4,88	830196	5,07	11,86	2,80
KwaZulu-Natal	2593279	17,05	2570922	15,69	-0,86	-0,22
North West	854227	5,62	990604	6,04	15,96	3,70
Gauteng	4890013	32,15	5124052	31,27	4,79	1,17
Mpumalanga	1161293	7,63	1219193	7,44	4,99	1,22
Limpopo	1173548	7,72	1474693	9,00	25,66	5,71
South Africa	15210399	100	16387483	100	7,74	1,86

Computed from StatsSA 2013 and 2017 QLFS data

4.4 National and Sectorial Employment Distribution

The employment distribution of individuals in South Africa was analysed using the various branches of activity and comparisons drawn between the 2013 and 2017 Quarterly Labour Force Survey. Table 5 below tabulates the branch of activity distribution of individuals for the year 2013 and 2017. The figures show that the most employers were situated in the community, social and personal services sectors, representing 22.35% and 22.29% of the total employment in 2013 and 2017 respectively. The statistics in Table 5 below reveal that the proportion of employment in industry increased between the two periods (in agriculture, 4.92 to 5.01, transportation 4.46 to 4.62, finance intermediation 1.71 to 1.82, real estate 0.87 to 0.90 and business services, 10.05 to 11.50). Evidence also suggests that employment in the business services sector grew at a faster annual average growth rate (5.23%) than the rest of the sectors. The

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possible reason for this high rate of employments is that the business services industry is one of the largest in South Africa, and it has increasingly been contributing to the country's economy as the years go by.

Table 5 Employment distribution, percentage change and annual average growth rate by branch of activity, QLFS of 2013 and 2017

Branch of activity	2013		2017			
	N	%	N	%	% change 2013/2017	Annual average growth rate
Agriculture; hunting; forestry and fishing	748880	4,92	821469	5,01	9,69	2,31
Mining and quarrying	422943	2,78	445981	2,72	5,45	1,33
Manufacturing	3099274	20,38	3294783	20,11	6,31	1,53
Wholesale	192792	1,27	173840	1,06	-9,83	-2,59
Retail trade	3039640	19,99	3158251	19,28	3,90	0,96
Transport	678871	4,46	756928	4,62	11,50	2,72
Storage/communication	261209	1,72	245929	1,50	-5,85	-1,51
Financial intermediation	260065	1,71	298341	1,82	14,72	3,43
Insurance	170055	1,12	172413	1,05	1,39	0,34
Real estate	131839	0,87	146731	0,90	11,30	2,68
Business services	1528547	10,05	1884329	11,50	23,28	5,23
Community; social and personal services	3399299	22,35	3651339	22,29	7,41	1,79
Private households	1274167	8,38	1334357	8,14	4,72	1,15
Total	15207581	100	16384691	100	7,74	1,86

Computed from StatsSA 2013 and 2017 QLFS data.

4.5 Percentage Distribution of Employment by Branch of Activity and by Provinces

This section focusses on the distribution of employment within and across the provinces of South Africa using the 2013 and 2017 QLFS data from StatSA. The figures within the provinces were derived by dividing the number of people employed in a particular

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branch of activity in a particular province by the total number of persons employed across all the branches of activity in that same province; on the other hand, figures across the provinces were derived by dividing the number of people employed in a branch of activity in a particular province divided by the total number of persons employment in the same branch of activity across the provinces. Thus, the results depict the branch of activity that has more workers and the province that is dominated by the various branches of activity. Figure 4 below presents the percentage distribution of employment by agriculture within and across the nine provinces of South Africa.

4.5.1 Agriculture

Throughout the provinces for the year 2013 as well as 2017, agriculture was found to have become more foremost in the Western Cape compared to the other provinces. This was largely due to the fact that the province is well known for its commercial agriculture. The city of Cape Town is the home of wine production which is a lead way for international market. Therefore, Appendices One and Two showed that the Western Cape has the highest number of workers in the crop-growing sector across all the provinces. Agriculture also showed a dominance in the provinces of Limpopo, KwaZulu-Natal, as well as Mpumalanga. Agriculture was least dominant in Gauteng, compared to the other provinces. From the subsequent analyses (see Appendices One and Two), it was evident that the two main sub-sectors of agriculture across the provinces were growing of crops and farming of animals.

Within the provinces agriculture as a function dropped in percentage from 2013 to 2017 in the Western Cape, the Northern Cape, Mpumalanga and Limpopo. There was an increase in percentage in other provinces during the same period. Figure 4 below presents the percentage distribution of employment by mining and quarrying within and across the nine provinces of South Africa.

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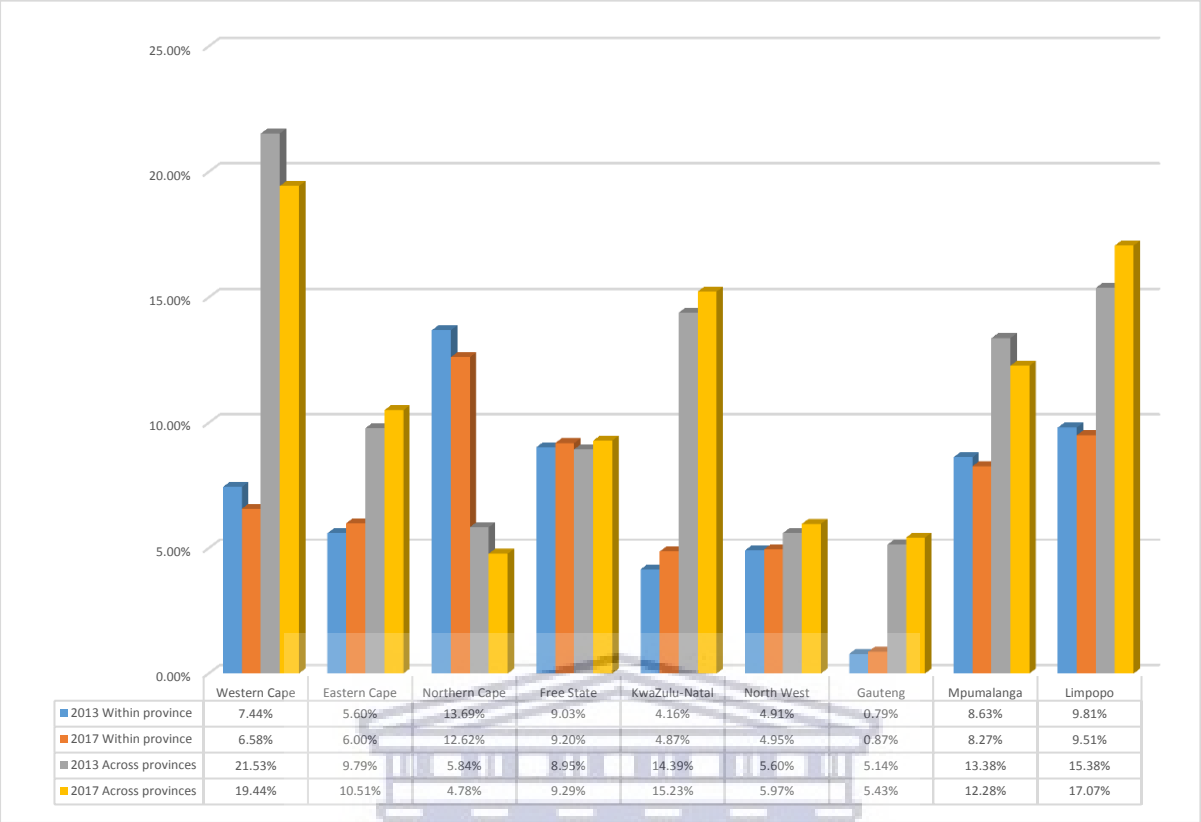

	Western Cape	Eastern Cape	Northern Cape	Free State	KwaZulu-Natal	North West	Gauteng	Mpumalanga	Limpopo
2013 Within province	7.44%	5.60%	13.69%	9.03%	4.16%	4.91%	0.79%	8.63%	9.81%
2017 Within province	6.58%	6.00%	12.62%	9.20%	4.87%	4.95%	0.87%	8.27%	9.51%
2013 Across provinces	21.53%	9.79%	5.84%	8.95%	14.39%	5.60%	5.14%	13.38%	15.38%
2017 Across provinces	19.44%	10.51%	4.78%	9.29%	15.23%	5.97%	5.43%	12.28%	17.07%

Figure 4: % distribution of employment by agriculture and by provinces.

4.5.2 Mining and quarrying

It can be seen across the provinces that the mining and quarrying branch of activity was more dominant as an employer in the North West in 2013 and in 2017. In 2013 mining and quarrying in the North West represented (37.88%) of total employment in this particular sector in South Africa; however, this dropped sharply to (30.66%) in 2017. Subsequently, the dominance of mining and quarrying in Mpumalanga decreased from 20.73% in 2013, to 11.52% in 2017. On the other hand, mining and quarrying in Gauteng considerably increased from 8.40% and 17.75% in 2013, to 20.49% and 23.95%, in 2017 respectively. Other provinces such as the Northern Cape, the Eastern Cape, KwaZulu-Natal and the Western Cape had less function in mining and quarrying.

Mining and quarrying as a function in the provinces saw a decrease in percentage from 2013 to 2017 in the Free State, KwaZulu-Natal, the North West, and Mpumalanga. In addition, there was an increase in percentage from 2013 to 2017 in other provinces except for

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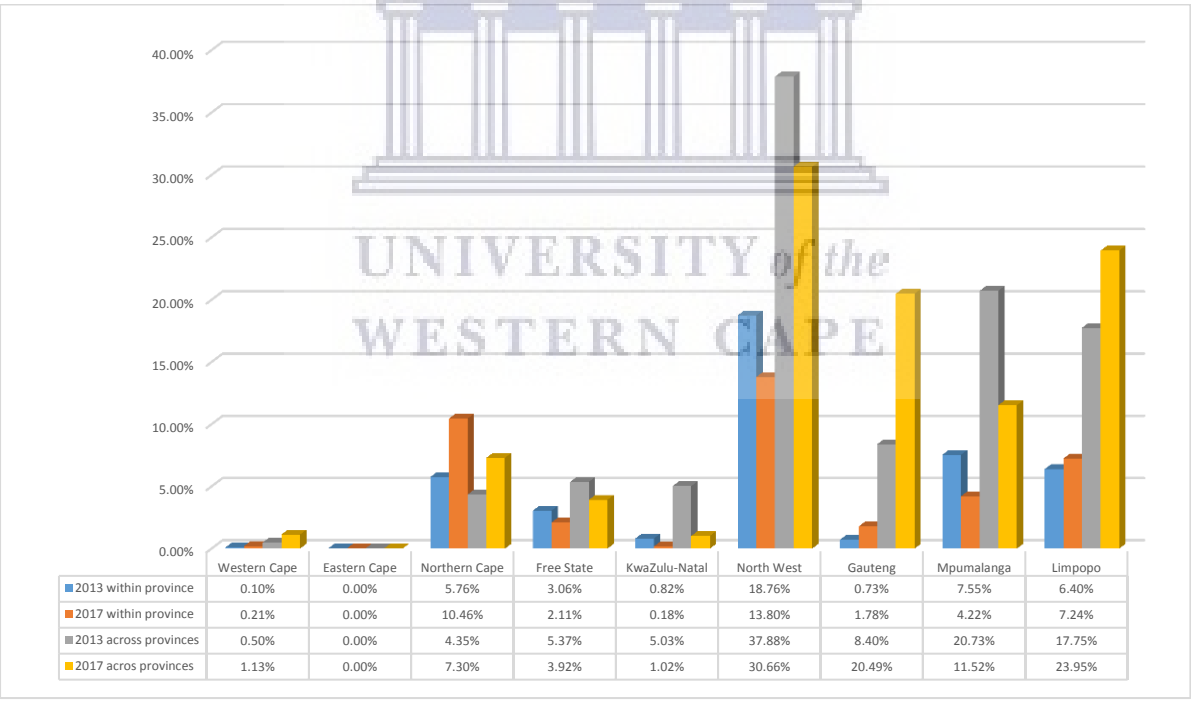
the Eastern Cape, which accounted for zero percent dominance in mining and quarrying across and within the provinces.

Further analysis (see Appendices One and Two), revealed that the contribution of mining and quarrying to the economy of North West was mainly because of the massive platinum deposits (mining of non-ferrous metal ores) found in the province. The mining and quarrying industry is relatively dominant in Mpumalanga, with coal being the main commodity under mining in the province. While coal is the largest contributor to the sector in Mpumalanga, and platinum in North West, the combination of both coal and platinum mines were the major contributors to the sector in Limpopo. Figure 5 below presents the percentage distribution of employment by manufacturing within and across the nine provinces of South Africa.



	Western Cape	Eastern Cape	Northern Cape	Free State	KwaZulu-Natal	North West	Gauteng	Mpumalanga	Limpopo
2013 within province	0.10%	0.00%	5.76%	3.06%	0.82%	18.76%	0.73%	7.55%	6.40%
2017 within province	0.21%	0.00%	10.46%	2.11%	0.18%	13.80%	1.78%	4.22%	7.24%
2013 across provinces	0.50%	0.00%	4.35%	5.37%	5.03%	37.88%	8.40%	20.73%	17.75%
2017 acros provinces	1.13%	0.00%	7.30%	3.92%	1.02%	30.66%	20.49%	11.52%	23.95%

Figure 5: % distribution of employment by mining and quarrying and by provinces.

4.5.3 Manufacturing

In the provinces under study, the manufacturing sector showed the highest dominance in Gauteng in both 2013 and 2017. Manufacturing in Gauteng in 2013,

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comprised 32.46% of the total number of jobs in this sector in South Africa; this reduced slightly to 30.73% in 2017. Gauteng dominated most manufacturing subsectors, some of which included the following: food products, chemical products, iron and steel, electricity, and construction. Interestingly, in both years, the manufacturing sector become the key sector in KwaZulu-Natal and the Western Cape. More analyses confirmed that a large part of this dominance resulted from electricity and water supply especially when compared to the other provinces. Manufacturing as a function in other provinces excluding Gauteng, KwaZulu-Natal and Mpumalanga had less than 10% dominance.

Manufacturing in the above-mentioned provinces as a function saw a decrease in percentage from 2013 to 2017 in the Eastern Cape, KwaZulu-Natal, the North West, Gauteng and Mpumalanga. Consequently, there was an increase in percentage from 2013 to 2017 in other provinces. Figure 6 below presents the percentage distribution of employment by wholesale within and across the nine provinces of South Africa.

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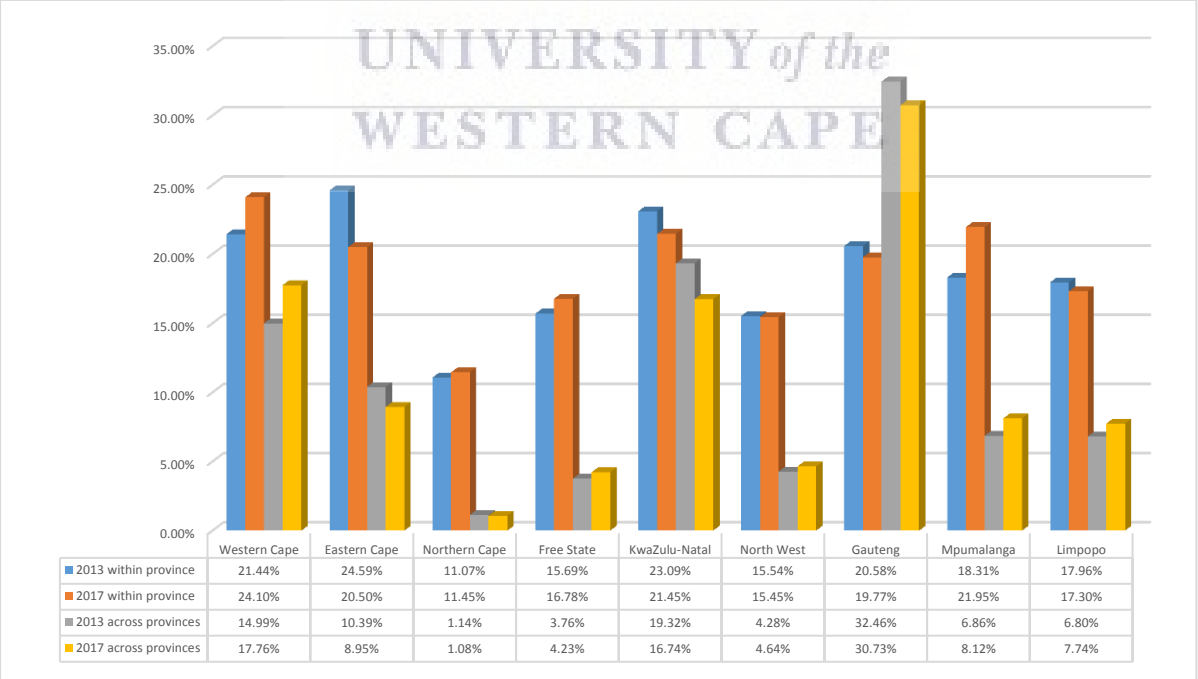

	Western Cape	Eastern Cape	Northern Cape	Free State	KwaZulu-Natal	North West	Gauteng	Mpumalanga	Limpopo
2013 within province	21.44%	24.59%	11.07%	15.69%	23.09%	15.54%	20.58%	18.31%	17.96%
2017 within province	24.10%	20.50%	11.45%	16.78%	21.45%	15.45%	19.77%	21.95%	17.30%
2013 across provinces	14.99%	10.39%	1.14%	3.76%	19.32%	4.28%	32.46%	6.86%	6.80%
2017 across provinces	17.76%	8.95%	1.08%	4.23%	16.74%	4.64%	30.73%	8.12%	7.74%

Figure 6: % distribution of employment by manufacturing and by provinces.

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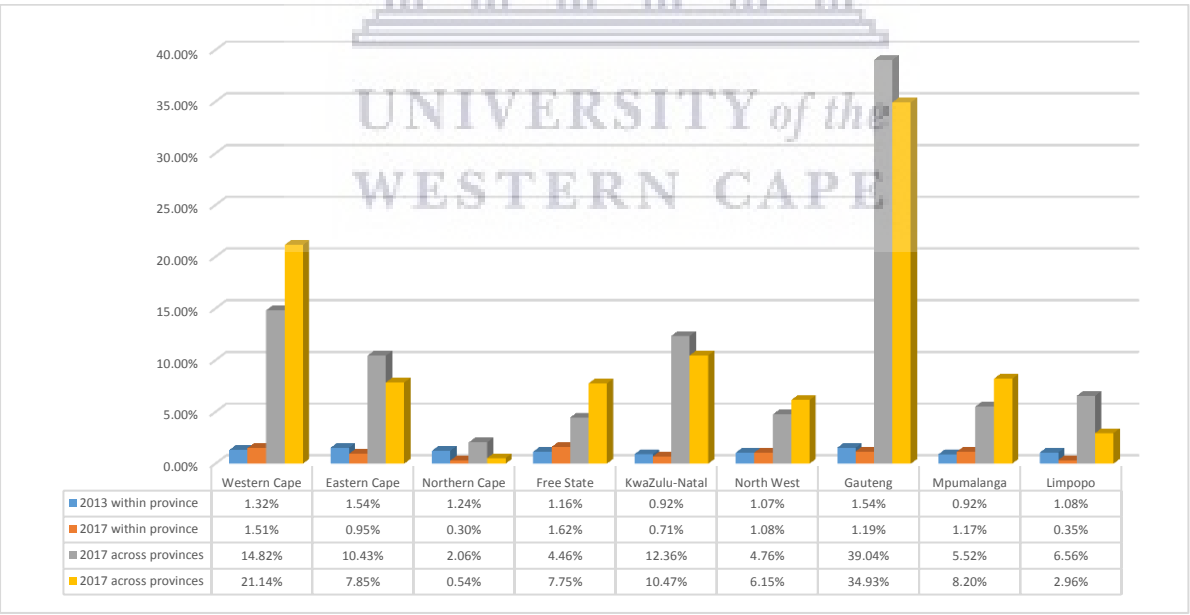
4.5.4 Wholesale

In all the provinces, the wholesale sector had the highest dominance in Gauteng in 2013 as well as in 2017. In 2013 wholesale in Gauteng comprised 39.04% of the total employment figure in this particular function in the whole of South Africa; this eventually decreased to (34.93%) in 2017. Gauteng dominated almost all wholesale sub-sectors. Also, the wholesale sector was leading in the Western Cape and KwaZulu-Natal, and less dominant in the Northern Cape. Appendices One and Two shows that across the provinces, Gauteng had the highest number of workers in the subsectors of wholesale trade, except in the *other wholesale trade* category where KwaZulu-Natal had a dominance.

Wholesale as a function here saw a decrease in percentage from 2013 to 2017 in the Eastern Cape, the Northern Cape, KwaZulu-Natal, Gauteng and Mpumalanga. There was also a rise in percentage from 2013 to 2017 in other provinces. Figure 7 below presented the percentage distribution of employment by retail in the nine provinces of South Africa.



	Western Cape	Eastern Cape	Northern Cape	Free State	KwaZulu-Natal	North West	Gauteng	Mpumalanga	Limpopo
2013 within province	1.32%	1.54%	1.24%	1.16%	0.92%	1.07%	1.54%	0.92%	1.08%
2017 within province	1.51%	0.95%	0.30%	1.62%	0.71%	1.08%	1.19%	1.17%	0.35%
2017 across provinces	14.82%	10.43%	2.06%	4.46%	12.36%	4.76%	39.04%	5.52%	6.56%
2017 across provinces	21.14%	7.85%	0.54%	7.75%	10.47%	6.15%	34.93%	8.20%	2.96%

Figure 7: % distribution of wholesaling employment by provinces.

4.5.5 Retail

It is obvious that the retail sector had the highest dominance in Gauteng in 2013 and 2017. In 2013 retail in Gauteng provided 32.21% of the total number of jobs in this sector in

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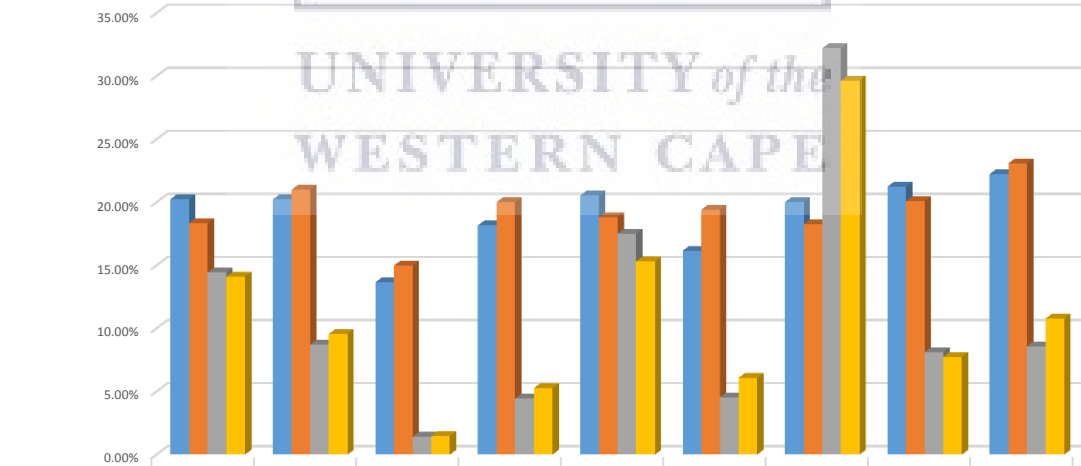
South Africa; and this decreased to 29.63% in 2017. Like the wholesale sector, Gauteng dominated almost all the retail sub-sectors. Appendices One and Two shows that across the provinces, Gauteng had the highest number of workers in the sub-sectors of the retail trade, with the exception of *sale, maintenance and repair of motor cycles and related parts and accessories* category, where only the Western Cape had a first place. The main sub-sector of retail trade, across the provinces with the highest employment is, *other retail trade in new goods in specialised stores*. Therefore, retail as a function in other provinces excluding Gauteng, KwaZulu-Natal and Mpumalanga, had less than 10% dominance.

Within the provinces, retail as a function saw a decrease in percentage from 2013 to 2017 in the Western Cape, KwaZulu-Natal, Gauteng and Mpumalanga. And on the other hand, there was an increase in percentage from 2013 to 2017 in the other provinces. Figure 8 below presents the percentage distribution of employment by transportation throughout the nine provinces of South Africa.



	Western Cape	Eastern Cape	Northern Cape	Free State	KwaZulu-Natal	North West	Gauteng	Mpumalanga	Limpopo
2013 within province	20.24%	20.23%	13.65%	18.17%	20.55%	16.16%	20.03%	21.25%	22.24%
2017 within province	18.35%	21.00%	14.99%	20.01%	18.83%	19.42%	18.27%	20.10%	23.09%
2013 across provinces	14.43%	8.72%	1.43%	4.44%	17.53%	4.54%	32.21%	8.12%	8.59%
2017 across provinces	14.11%	9.56%	1.48%	5.26%	15.33%	6.09%	29.63%	7.76%	10.78%

Figure 8: % distribution of Retail employment by provinces.

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4.5.6 Transportation

In all the provinces, the transportation sector had the uppermost ascendency in Gauteng in 2013 as well as in 2017. In 2013 transportation in Gauteng contributed 35.81% of the total number of jobs in this particular sector in South Africa; this then reduced slightly to 33.46% in 2017. Gauteng dominated the transportation subsectors, notably in road transport, railway transport and air transport. The lack of dominance in sea and coastal water transport can be explained by the fact that Gauteng is located far from water masses. Also, KwaZulu-Natal and the Western Cape exhibited dominance in transportation compared to the other provinces. Further analyses confirmed that land transport had more workers in the transportation sector than the other sub-sectors.

Within the provinces, transportation as a function saw a decrease in percentage from 2013 to 2017 in the Eastern Cape, the Northern Cape, KwaZulu-Natal, and Gauteng. There was an increase in percentage from 2013 to 2017 in other provinces. Figure 9 below presents the percentage distribution of employment by storage and communication through the nine provinces of South Africa.

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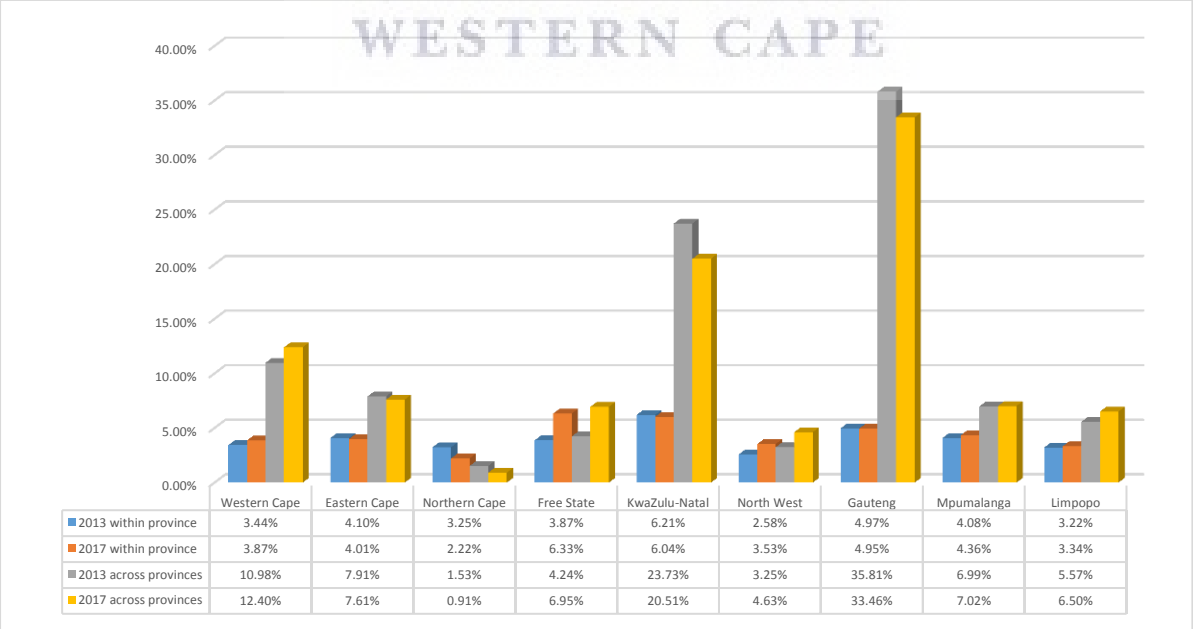

	Western Cape	Eastern Cape	Northern Cape	Free State	KwaZulu-Natal	North West	Gauteng	Mpumalanga	Limpopo
2013 within province	3.44%	4.10%	3.25%	3.87%	6.21%	2.58%	4.97%	4.08%	3.22%
2017 within province	3.87%	4.01%	2.22%	6.33%	6.04%	3.53%	4.95%	4.36%	3.34%
2013 across provinces	10.98%	7.91%	1.53%	4.24%	23.73%	3.25%	35.81%	6.99%	5.57%
2017 across provinces	12.40%	7.61%	0.91%	6.95%	20.51%	4.63%	33.46%	7.02%	6.50%

Figure 9: % distribution of Transportation employment by provinces.

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4.5.7 Storage and communication

Transversely in the provinces, the storage and communication sector exhibited the greatest dominance in the province of Gauteng in 2013 as well as in 2017. The storage and communication sector in Gauteng for 2013, employed 46.29% of the total number of workers in this particular function across South Africa, and this proportion increased further to 54.04% in 2017. Gauteng and the Western Cape dominated all the storage and communication sub-sectors, including the following: supporting and auxiliary transport activities; activities of travel agencies; postal and related courier activities; and telecommunication. Across these subsectors, Gauteng was seen to have more workers especially in telecommunication compared to the other provinces. The storage and communication sector performed dismally in terms of providing employment in the other seven provinces of South Africa.

In each province, storage and communication as a function saw a decrease in percentage from 2013 to 2017 in the Eastern Cape, the Northern Cape, the Free State, KwaZulu-Natal, North West and Limpopo. And there was an increase in percentage from 2013 to 2017 in the other provinces. Figure 10 below presents the percentage distribution of employment by finance intermediation throughout the nine provinces of South Africa.

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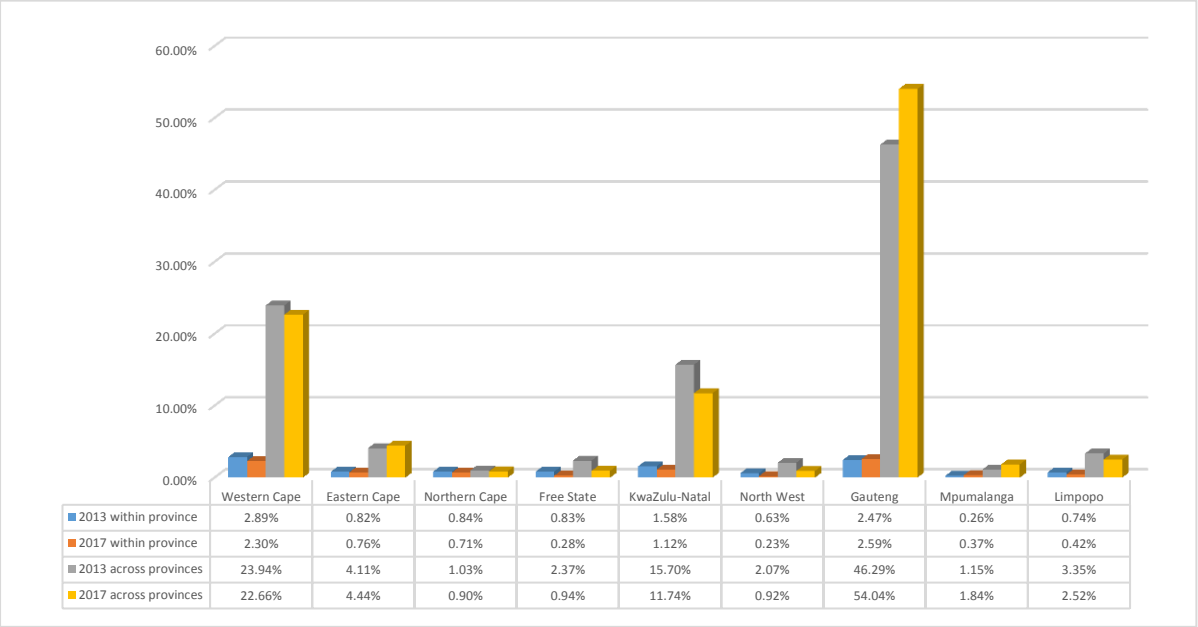

	Western Cape	Eastern Cape	Northern Cape	Free State	KwaZulu-Natal	North West	Gauteng	Mpumalanga	Limpopo
2013 within province	2.89%	0.82%	0.84%	0.83%	1.58%	0.63%	2.47%	0.26%	0.74%
2017 within province	2.30%	0.76%	0.71%	0.28%	1.12%	0.23%	2.59%	0.37%	0.42%
2013 across provinces	23.94%	4.11%	1.03%	2.37%	15.70%	2.07%	46.29%	1.15%	3.35%
2017 across provinces	22.66%	4.44%	0.90%	0.94%	11.74%	0.92%	54.04%	1.84%	2.52%

Figure 10: % distribution of storage and communication employment by provinces.

4.5.8 Financial intermediation

The finance sector in all the provinces was most dominant as an employer in Gauteng in 2013 as well as in 2017. In 2013 Gauteng provided 57.74% of the total number of finance jobs in South Africa, and this increased to 60.92% in 2017. Gauteng dominated the finance sub-sectors. In both years, KwaZulu-Natal together with Western Cape had a higher percentage in finance than the other provinces. Further analyses confirmed that the monetary intermediation has a higher percentage of workers.

Finance as a function saw a decrease in percentage from 2013 to 2017 in the Eastern Cape, Free State, KwaZulu-Natal, Mpumalanga and Limpopo. Then there was an increase in percentage from 2013 to 2017 in other provinces. Figure 11 below presents the percentage distribution of employment by insurance all over the nine provinces of South Africa.

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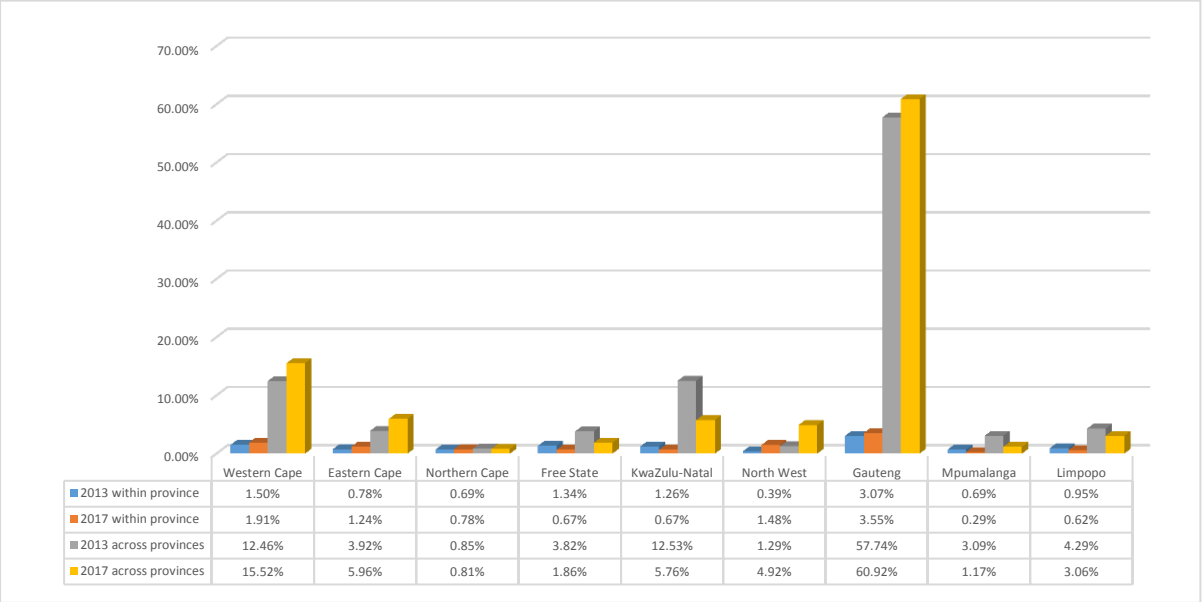

	Western Cape	Eastern Cape	Northern Cape	Free State	KwaZulu-Natal	North West	Gauteng	Mpumalanga	Limpopo
2013 within province	1.50%	0.78%	0.69%	1.34%	1.26%	0.39%	3.07%	0.69%	0.95%
2017 within province	1.91%	1.24%	0.78%	0.67%	0.67%	1.48%	3.55%	0.29%	0.62%
2013 across provinces	12.46%	3.92%	0.85%	3.82%	12.53%	1.29%	57.74%	3.09%	4.29%
2017 across provinces	15.52%	5.96%	0.81%	1.86%	5.76%	4.92%	60.92%	1.17%	3.06%

Figure 11: % distribution of financial intermediation employment by provinces.

4.5.9 Insurance

In 2013, and 2017, the insurance sector exhibited highest dominance in Gauteng. In 2013 Gauteng provided 58.04% of the total number of the country's insurance jobs; this proportion then decreased to 46.21% in 2017. Gauteng dominated the insurance sub-sectors. Further analysis shows that the main insurance sub-sector across the provinces is *insurance and pension funding*. Also, the Western Cape and KwaZulu-Natal had higher percentages in insurance than the other provinces.

Within the provinces, insurance as a function saw a decrease in percentage from 2013 to 2017 in the Northern Cape, KwaZulu-Natal, the North West and Gauteng. There was an increase in percentage from 2013 to 2017 in other Provinces. Figure 12 below presents the percentage distribution of employment by real estate within and across the nine provinces of South Africa.

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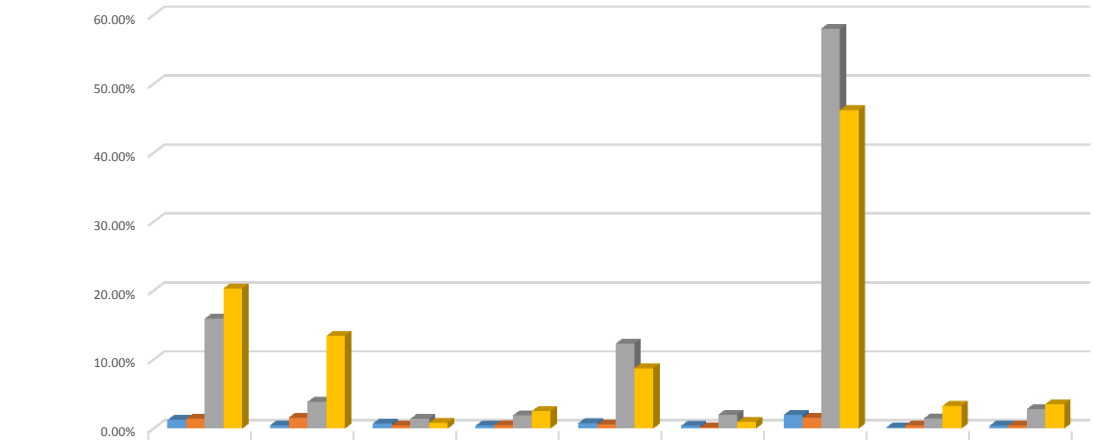

	Western Cape	Eastern Cape	Northern Cape	Free State	KwaZulu-Natal	North West	Gauteng	Mpumalanga	Limpopo
2013 within province	1.25%	0.51%	0.76%	0.44%	0.81%	0.41%	2.02%	0.22%	0.41%
2017 within province	1.45%	1.61%	0.46%	0.53%	0.59%	0.17%	1.56%	0.47%	0.42%
2013 across provines	15.97%	3.89%	1.42%	1.93%	12.35%	2.04%	58.04%	1.50%	2.84%
2017 across provinces	20.36%	13.44%	0.83%	2.53%	8.77%	0.96%	46.21%	3.32%	3.58%

Figure 12: % distribution of insurance employment by provinces.

4.5.10 Real estate

Across the provinces, the real estate sector was most dominant in Gauteng in 2013 and then in 2017. In 2013, real estate in Gauteng provided 57.21% of the sector's employment opportunities to South Africans; this reduced to 45.163% in 2017. Gauteng dominated the real estate sub-sectors. The Western Cape also had a high percentage in real estate compared to other provinces. It was evident from the succeeding analyses that the main sub-sector of real estate category across the provinces was *real estate activities with own or leased property*.

It is worth mentioning that in the provinces, real estate as a function experienced a decline in percentage from 2013 to 2017 in the Northern Cape, North West, Gauteng and Mpumalanga. There was likewise an increase in percentage from 2013 to 2017 in the rest of the other provinces. Figure 13 below presents the percentage distribution of employment by business services across the nine provinces of South Africa.

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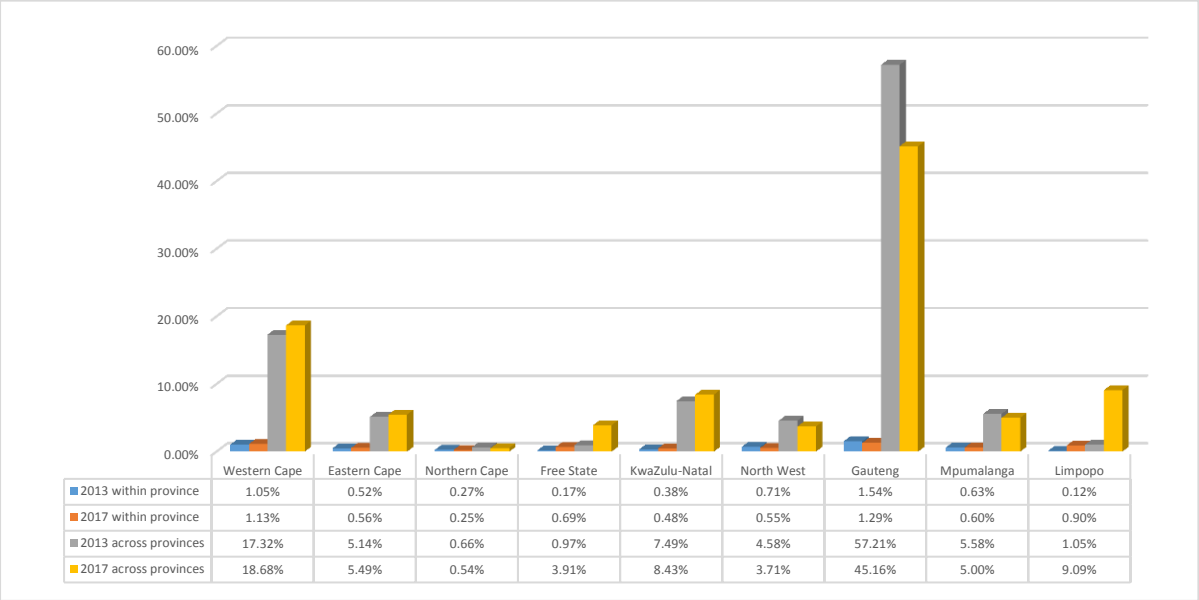

	Western Cape	Eastern Cape	Northern Cape	Free State	KwaZulu-Natal	North West	Gauteng	Mpumalanga	Limpopo
2013 within province	1.05%	0.52%	0.27%	0.17%	0.38%	0.71%	1.54%	0.63%	0.12%
2017 within province	1.13%	0.56%	0.25%	0.69%	0.48%	0.55%	1.29%	0.60%	0.90%
2013 across provinces	17.32%	5.14%	0.66%	0.97%	7.49%	4.58%	57.21%	5.58%	1.05%
2017 across provinces	18.68%	5.49%	0.54%	3.91%	8.43%	3.71%	45.16%	5.00%	9.09%

Figure 13: % distribution of real estate employment by provinces.

4.5.11 Business services

Business service sector throughout the provinces showed the major dominance in Gauteng in 2013 as well as in 2017. In 2013 business services sector in Gauteng Province provided 43.30% of the sector's jobs in South Africa; this would however decrease to 40.63% in 2017. Gauteng also dominated most of the business services sub-sectors. This sector was also dominant in the Western Cape, as well as in KwaZulu-Natal, compared to other provinces.

In all the provinces, business services as a function had a reduction in percentage from 2013 to 2017 only in the Northern Cape. Then there was a growth in percentage from 2013 to 2017 in the other eight provinces. Figure 14 below presents the percentage distribution of employment by community; social and personal services within the nine provinces of South Africa.

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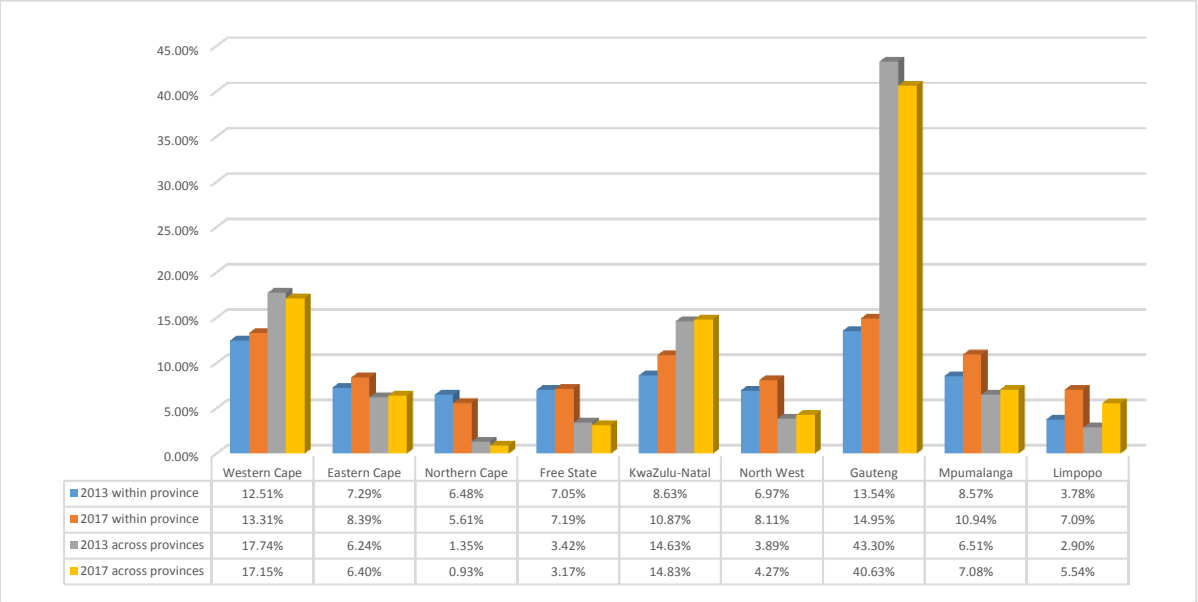

	Western Cape	Eastern Cape	Northern Cape	Free State	KwaZulu-Natal	North West	Gauteng	Mpumalanga	Limpopo
2013 within province	12.51%	7.29%	6.48%	7.05%	8.63%	6.97%	13.54%	8.57%	3.78%
2017 within province	13.31%	8.39%	5.61%	7.19%	10.87%	8.11%	14.95%	10.94%	7.09%
2013 across provinces	17.74%	6.24%	1.35%	3.42%	14.63%	3.89%	43.30%	6.51%	2.90%
2017 across provinces	17.15%	6.40%	0.93%	3.17%	14.83%	4.27%	40.63%	7.08%	5.54%

Figure 14: % distribution of business services employment by provinces.

4.5.12 Community; social and personal services

The community, social and personal services sector reached its zenith in Gauteng in 2013 and equally in 2017. Community, social and personal services in Gauteng employed 28.87% of the sector's workers in the whole of South Africa; in 2013, this increased slightly to 30.25% in 2017. Gauteng dominated most of the community, social and personal services sub-sectors. This sector was dominant in KwaZulu-Natal as well as the Western Cape compared to the other provinces. From further analysis (see Appendices One and Two), it was evident that the sub-sectors with more workers in the community, social and personal services sector were: *central government activities*; *local authority activities*; the South African Police Service; education; human health activities; social work activities; and, *other community, social and personal service activities*.

Community, social and personal services as a function within the provinces therefore, saw a lessening in percentage from 2013 to 2017 in the Western Cape, Northern Cape, North West, Mpumalanga and Limpopo. There was an increase in percentage from 2013 to 2017 in other provinces. Figure 15 below presents the percentage distribution of employment by private households across the nine provinces of South Africa.

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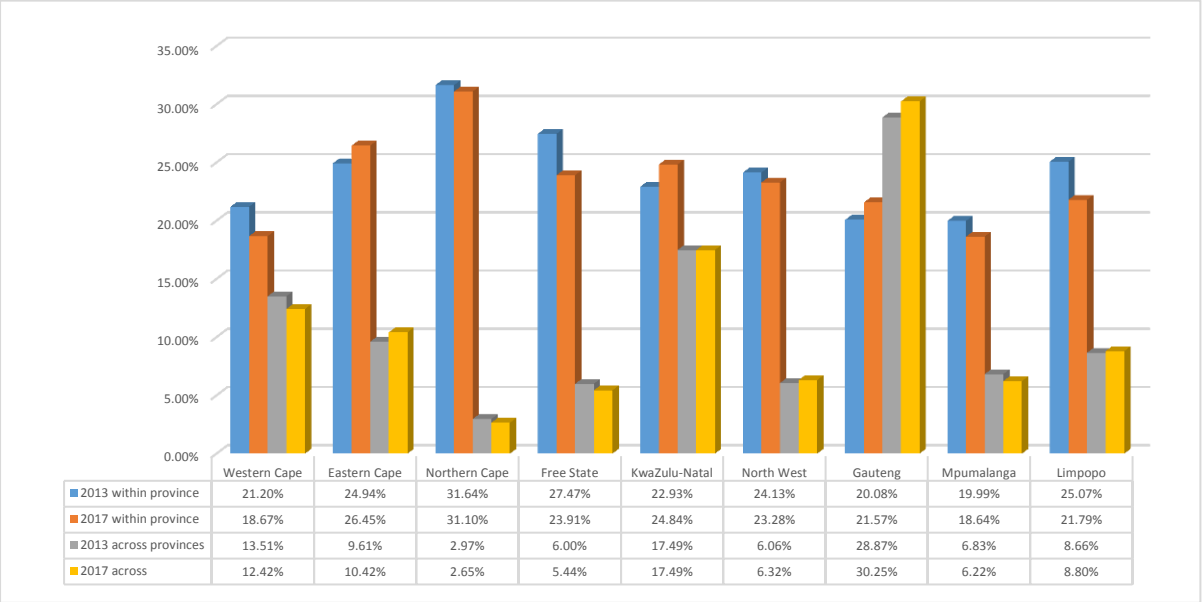

	Western Cape	Eastern Cape	Northern Cape	Free State	KwaZulu-Natal	North West	Gauteng	Mpumalanga	Limpopo
2013 within province	21.20%	24.94%	31.64%	27.47%	22.93%	24.13%	20.08%	19.99%	25.07%
2017 within province	18.67%	26.45%	31.10%	23.91%	24.84%	23.28%	21.57%	18.64%	21.79%
2013 across provinces	13.51%	9.61%	2.97%	6.00%	17.49%	6.06%	28.87%	6.83%	8.66%
2017 across	12.42%	10.42%	2.65%	5.44%	17.49%	6.32%	30.25%	6.22%	8.80%

Figure 15: % distribution of community; social and personal services employment by provinces.

4.5.13 Private households

The private households sector was most dominant in Gauteng in 2013 as well as in 2017. In 2013 private households in Gauteng provided 33.10% of the sector's jobs countrywide; this reduced slightly to 29.39% in 2017. Gauteng had the highest dominance in the private households with employed persons.

In the provinces, the private households sector as a function saw a decrease in percentage from 2013 to 2017 in the Eastern Cape, the Northern Cape, Free State, Gauteng, Mpumalanga and Limpopo. There was an increase in percentage from 2013 to 2017 in other provinces.

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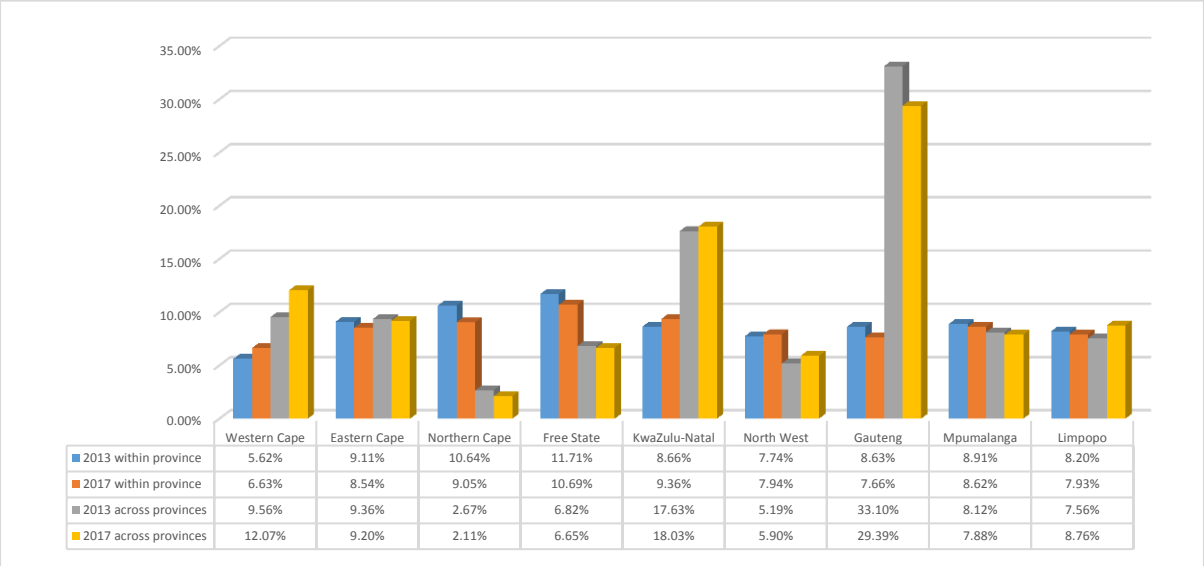

	Western Cape	Eastern Cape	Northern Cape	Free State	KwaZulu-Natal	North West	Gauteng	Mpumalanga	Limpopo
2013 within province	5.62%	9.11%	10.64%	11.71%	8.66%	7.74%	8.63%	8.91%	8.20%
2017 within province	6.63%	8.54%	9.05%	10.69%	9.36%	7.94%	7.66%	8.62%	7.93%
2013 across provinces	9.56%	9.36%	2.67%	6.82%	17.63%	5.19%	33.10%	8.12%	7.56%
2017 across provinces	12.07%	9.20%	2.11%	6.65%	18.03%	5.90%	29.39%	7.88%	8.76%

Figure 16: % distribution of private households' employment by provinces.

4.6 Classification of the Provinces by Function

In its attempt to classify the various provinces by function, this research focussed on the aspect dominance under the following seven key indicators: highly industrialised province; moderately industrialised province; mining province; retail province; wholesale province; transportation province; university province; and retirement province. Out of the aforementioned seven indicators only transportation province has three different formulae for calculation; highly industrialised, moderately industrialised, retail and wholesale provinces have two different formulae for calculation; while mining, university and retirement provinces have only one formula each for calculation. Each formula has its own unique threshold for scaling and classification. Where the indicator does not meet the threshold, it means the function exists, but not in dominant fashion. Therefore, it is classified as a multimodal function. If the indicator is greater than or equal to the threshold, the associated function is considered to be dominant. As a result, it is classified as a dominant function. The results from the calculations were ranked from highest to lowest, by function, with one being the highest rank.

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Classification of province by function is used to answer the question in Chapter One *What are the different functions across South Africa's provinces?* and the objective *To determine the dominant functions in the labour market within the nine provinces of South Africa.*

Table 6 presents the classification of province by function on the indicator highly industrialised province for 2013 and 2017. The formula for F1(formula one) is employment in industry divided by (employment in industry plus employment in the commercial sector). Formula for F2 (formula two) is employment in industry divided by salaried employment.

Table 6. Highly industrialised province

Province	2013				2017			
	F1	Rank	F2	Rank	F1	Rank	F2	Rank
WC	0,20	2	0,24	3	0,22	1	0,27	1
EC	0,21	1	0,29	1	0,18	3	0,24	3
NC	0,10	7	0,12	8	0,12	7	0,12	8
FS	0,14	6	0,18	6	0,16	5	0,19	6
KZN	0,20	2	0,27	2	0,19	2	0,25	2
NW	0,16	5	0,17	7	0,14	6	0,18	7
GT	0,18	3	0,24	3	0,17	4	0,23	4
MP	0,18	3	0,22	5	0,22	1	0,27	1
LP	0,17	4	0,23	4	0,17	4	0,22	5

Computed from StatsSA 2013 and 2017 LFS data

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Table 6 above shows the highly industrialised province computations for 2013 and 2017. Looking at F1, in 2013 the Eastern Cape had the highest ranking with 0.21. The Western Cape and KwaZulu-Natal ranked second with 0.20 each, while Gauteng and Mpumalanga, each with a score of 0.18, ranked third; Northern Cape ranked the lowest with 0.10. The Eastern Cape also ranked highest using F2 in 2013 with 0.29; KwaZulu-Natal ranked second with 0.27, while the Western Cape and Gauteng tied for third with 0.24 each; the Northern Cape was ranked the lowest with 0.12. In 2013, the Northern Cape was the highest ranked entity for the highly industrialised province aspect.

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In the year 2017, F1 and F2 showed that the Western Cape and Mpumalanga had the highest ranking with scores of 0.22 and 0.27, respectively. KwaZulu-Natal ranked second highest with scores of 0.19 and 0.25, respectively, while the Eastern Cape ranked third highest with indices of 0.18 and 0.24 respectively. The Northern Cape ranked lowest with a score of 0.12 for each formula.

The results on function were higher in F2 compared to F1 for both years under study. Using the threshold (F1 ≥ 0.74; F2 ≥ 0.45), it is evident that all the provinces of South Africa have no dominance on sectors that are highly industrialised. Table 7 below presents the moderately industrialised province results for 2013 and 2017. The formula for highly and moderately industrialised province is the same but with different thresholds for scaling and classification.

Table 7 Moderately industrialised province

Province	2013				2017			
	F1	Rank	F2	Rank	F1	Rank	F2	Rank
WC	0,20	2	0,24	3	0,22	1	0,27	1
EC	0,21	1	0,29	1	0,18	3	0,24	3
NC	0,10	7	0,12	8	0,12	7	0,12	8
FS	0,14	6	0,18	6	0,16	5	0,19	6
KZN	0,20	2	0,27	2	0,19	2	0,25	2
NW	0,16	5	0,17	7	0,14	6	0,18	7
GT	0,18	3	0,24	3	0,17	4	0,23	4
MP	0,18	3	0,22	5	0,22	1	0,27	1
LP	0,17	4	0,23	4	0,17	4	0,22	5

Computed from StatsSA 2013 and 2017 LFS data

The results in Table 7 are the same as those in Table 6: this is because the formula for calculating the result for highly industrialised province was the same as the formula for calculating the moderately industrialised province. The only difference was the threshold for scaling and classification. The threshold of (F1 ≥ 0.60 and F2 ≥ 0.30) is greater than the result

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on function for the moderately industrialised province. Therefore, there is no dominance with regard to the *moderately industrialised province* indicator across the provinces of South Africa.

Table 8 below presents the results for the *mining province* indicator for both years under study. The mining province has only one formula for calculation and one threshold for scaling and classification. The formula for F1 is employment in the mining sector divided by salaried employment.

Table 8 Mining province

Province	2013		2017	
	F1	Rank	F1	Rank
WC	0,00	7	0,00	6
EC	0,00	7	0,00	6
NC	0,06	4	0,11	2
FS	0,03	5	0,02	5
KZN	0,01	6	0,00	6
NW	0,21	1	0,16	1
GT	0,01	6	0,02	5
MP	0,09	2	0,05	4
LP	0,08	3	0,09	3

Computed from StatsSA 2013 and 2017 LFS data

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Table 8 above shows that in both 2013 and 2017 the North West Province was ranked the highest with scores of 0.21 and 0.16 respectively.

Mpumalanga was ranked second in 2013 with 0.09; this ranking, however, dropped to fourth in 2017 at 0.05. Also, in 2017, the Northern Cape ranked second with 0.11, which was an increase from the 2013 ranking of fourth with 0.06. Limpopo was ranked third in both years with scores of 0.08 and 0.09, respectively. The lowest ranking was held by the two provinces of the Western Cape and the Eastern Cape with scores of 0.00. This indicates, correctly, that these two provinces are not mining provinces. With the threshold of F1 > 0.15, only North West was found to have dominance in mining. The

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reason behind this result, further analysis revealed, was that the North West is endowed with massive platinum deposits such as non-ferrous metal ores.

Table 9 below presents the results for the retail province indicator for the years 2013 and 2017. The indicator has two formulas (FI and F2) with two different thresholds. The formula for F1 is employment in the retailing sector divided by employment in industry plus employment in the commercial sector. The formula for F2 is employment in the retailing sector divided by employment in the wholesale sector.

Table 9 Retail province

Province	2013				2017			
	F1	Rank	F2	Rank	F1	Rank	F2	Rank
WC	0, 18	2	15,35	5	0,17	5	12,13	9
EC	0, 18	2	13,17	7	0,18	4	22,13	4
NC	0, 13	5	10,99	9	0,15	7	49,82	2
FS	0, 16	4	15,70	4	0,19	3	12,32	8
KZN	0, 18	2	22,36	2	0,16	6	26,59	3
NW	0, 17	3	15,05	6	0,17	5	18,00	5
GT	0, 17	3	13,01	8	0,16	6	15,41	7
MP	0, 21	1	23,20	1	0,20	2	17,19	6
LP	0, 21	1	20,65	3	0,23	1	66,20	1

Computed from StatsSA 2013 and 2017 LFS data

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The F1 results in Table 9 above show that in 2013 the highest ranked provinces were Mpumalanga and Limpopo, with scores of 0.21 apiece. The second highest score of 0.18 was attained by the three provinces of the Western Cape, the Eastern Cape and KwaZulu-Natal. The third highest score (0.17) belonged to the North West and Gauteng provinces; the Free State brought in the rear with the lowest score of 0.16. F2 showed the highest ranking in Mpumalanga, while KwaZulu-Natal emerged second and Limpopo third. The lowest score of 10.99 was recorded in the Northern Cape.

The rankings in 2017 show Limpopo as the highest ranked province with respective scores of 0.23 and 66.20 for both F1 and F2. Mpumalanga emerged second highest in 2013

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but was relegated to position six in 2017; on the other hand, the Free State, which was third in the rankings, in 2013, brought up the rear in 2017. The results from F2 are way higher than those derived using F1 for both years 2013 and 2017, when comparing the results to the threshold (F1 ≥ 0.50 and F2 ≥ 2.20). This increase in the F2 results shows dominance across all the provinces; it also shows that South African provinces are more into retailing; by contrast, the reverse was the case when F1 was used.

Table 10 below presents the results for the *wholesale province* indicator for the years 2013 and 2017. This indicator also has two formulas (FI and F2) with two different thresholds. The formula for F1 is employment in the wholesales sector divided by employment in industry plus employment in the commercial sector. The formula for F2 is employment in the wholesales sector divided by employment in the retail sector.

Table 10 Wholesale province

Province	2013				2017			
	F1	Rank	F2	Rank	F1	Rank	F2	Rank
WC	0,01	1	0,07	3	0,01	2	0,08	1
EC	0,01	1	0,08	2	0,01	2	0,05	3
NC	0,01	1	0,09	1	0,00	3	0,02	5
FS	0,01	1	0,06	4	0,02	1	0,08	1
KZN	0,01	1	0,04	6	0,01	2	0,04	4
NW	0,01	1	0,07	3	0,01	2	0,06	2
GT	0,01	1	0,08	2	0,01	2	0,06	2
MP	0,01	1	0,04	6	0,01	2	0,06	2
LP	0,01	1	0,05	5	0,00	3	0,02	5

Computed from StatsSA 2013 and 2017 LFS data

From the *wholesale provinces* results on Table 10, it can be seen that all the nine provinces had the same ranking in 2013 with a score of 0.01 when F1 was applied. The result was too low to suggest a dominance of wholesale as a function. In 2017, F1 results also suggest non-dominance of wholesale as a function. Results from F2 in both years were higher

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than results from F1. Despite this increase, none of the provinces showed dominance in wholesale with the threshold F1 ≥ 0.20 and F2 ≥ 0.45.

Table 11 below presents scores from the *transportation province* indicator for both years under study. The transportation province is the only indicator which was calculated with three formulas (FI, F2 and F3) and three different thresholds for scaling and classification. The formula for F1 is employment in the transportation sector divided by salaried employment. The formula for F2 is employment in the transportation sector divided by employment in industry, and the formula for F3 is employment in the transportation sector divided by employment in the commercial sector.

Table 11 Transportation province

Prov.	2013						2017					
	F1	Rank	F2	Rank	F3	Rank	F1	Rank	F2	Rank	F3	Rank
WC	0,04	4	0,16	8	0,04	3	0,04	4	0,16	7	0,05	3
EC	0,05	3	0,17	7	0,05	2	0,05	3	0,20	5	0,04	4
NC	0,04	4	0,29	1	0,03	4	0,02	5	0,19	6	0,03	5
FS	0,04	4	0,25	3	0,04	3	0,07	1	0,38	1	0,07	1
KZN	0,07	1	0,27	2	0,07	1	0,07	1	0,28	2	0,06	2
NW	0,03	5	0,17	7	0,03	4	0,04	4	0,23	4	0,04	4
GT	0,06	2	0,24	4	0,05	2	0,06	2	0,25	3	0,05	3
MP	0,05	3	0,22	5	0,05	2	0,05	3	0,20	5	0,05	3
LP	0,04	4	0,18	6	0,04	3	0,04	4	0,19	6	0,04	4

Computed from StatsSA 2013 and 2017 LFS data

In 2013, KwaZulu-Natal was the highest ranked using F1; this dropped to second when F2 was used and rose to the top again under F3. The second ranked provinces under the 3 different formulae were as follows: Gauteng (F1); KwaZulu-Natal (F2); and the Eastern Cape, Gauteng and Mpumalanga (F3). In 2017, the Free State ranked highest under all the three formulae; KwaZulu-Natal, which tied for first under F1, dropped to the second position when F2 and F3 were applied. On applying the threshold (F1 ≥ 0.11 and F2 ≥ 0.33 and F3 ≥ 0.67) for

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scaling and classification, only FS showed a dominance in transportation and this was in 2017 with the application of F2 (FS, 0.38 > 0.33).

Table 12 presents the *university (educational/student) province* indicator for both 2013 and 2017. The university province has only one formula for calculation and one threshold for scaling and classification. The formula for F1 is total number of student population divided by salaried employment.

Table 12 University province

Province	2013		2017	
	F1	Rank	F1	Rank
WC	0,28	9	0,26	9
EC	0,81	2	0,66	2
NC	0,38	7	0,35	7
FS	0,49	5	0,44	6
KZN	0,53	3	0,58	3
NW	0,52	4	0,47	5
GT	0,30	8	0,30	8
MP	0,46	6	0,48	4
LP	0,88	1	0,68	1

Computed from StatsSA 2013 and 2017 LFS data

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From the results in Table 12 above we can make the inference that all the provinces of South Africa have dominance in education. With the threshold (F1 > 0.15), the scores for both 2013 and 2017 were greater than 0.15. Therefore, the nine provinces have dominance in the educational function. In both years, the highest ranked province was Limpopo (0.88 and 0.68, respectively); the second highest ranking province was the Eastern Cape (0.81 and 0.66, respectively); and the third highest ranking province was KwaZulu-Natal (0.53 and 0.58, respectively). The lowest ranked province was the Western Cape with scores of 0.28 and 0.26, respectively.

Table 13 below presents the retirement (hospitality) province indicator results for both 2013 and 2017. Just like the mining and university provinces, the retirement

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province also has only one formula for calculation and one threshold for scaling and classification. The formula for F1 is total number of employment divided by total population of 0 to 65 years.

Table 13 Retirement province

Province	2013		2017	
	F1	Rank	F1	Rank
WC	0,19	7	0,22	7
EC	0,38	1	0,36	1
NC	0,27	4	0,33	2
FS	0,27	4	0,27	5
KZN	0,25	5	0,28	4
NW	0,31	3	0,29	3
GT	0,16	8	0,20	8
MP	0,20	6	0,24	6
LP	0,32	2	0,28	4

Computed from StatsSA 2013 and 2017 LFS data

As depicted in Table 13 above, the Eastern Cape ranked the highest in 2013 (0.38) as well as in 2017 (0.36). Limpopo, which was ranked second in 2013 with a score of 0.32, dropped to fourth position in 2017 with a diminished score of 0.28. The North West was ranked third with scores of 0.31and 0.29 in both years. The lowest ranked province was Gauteng with respective scores of 0.16 and 0.20. The results show that retirees prefer to settle in the Eastern Cape than in Gauteng Province.

Conclusively, from Table 6 to 13, it can be seen that there is an element or mix of multi-functionality; that is, there is no dominant function across the provinces for the retail and university province. There are no huge disparities in terms of the functions because retailing and university were well represented across the provinces. The retailing province, with a threshold greater than 2.20, indicates that South African provinces have a major function in retailing. Retailing emerged highest in Mpumalanga when compared to other provinces. Also, the student province indicator, with a threshold greater than 15%, showed

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that all the nine provinces have large populations attending university in particular, and schooling, generally (respondents indicated that they were unemployed due to *schooling* but for those from ages 15 to 18 this may well have meant they were attending middle or high school and not necessarily a tertiary institution). From an examination of the threshold in each province, the percentage of students or people attending university is greater than 15%. It is an indication of large populations attending tertiary institutions. It is the dominance of the educational function that qualifies the province as student province. University province has highest dominant function in Limpopo across the provinces. The mining province, with a threshold of 15%, has a dominant function only in North West Province. Transportation province, with a threshold greater or equal to 33% has a dominant function only in the Free State, indicating that there is more than one individual in transportation for every 3 persons in the province. With respect to the structural changes in terms of functions, none of the provinces is highly or moderately industrialised. Also, none of the provinces has a dominant function in wholesale, transportation and hospitality.

Based on the classification of a function, when a function is dominant, this does not indicate the importance of an activity compared to the function of a province. Location is directly linked to decisions that industries/companies make in terms of where to locate themselves. Sometimes this may be when the function is either the government or the private sector.

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4.7 Location Quotient

The Location Quotient (LQ) provides an indication as to the concentration of industrial activities. This indication arises as a result of comparing the share of local employment in a cluster to the share of national employment in that cluster. This will indicate the most important branch of activity on a provincial level compared to the nation (South Africa) as a whole. Some branches of activity include agriculture, mining, and manufacturing. The LQ determines the

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comparative advantage of a province; it has helped, in this study, to determine the levels of functional concentration within South Africa. Indeed, the LQ has been employed to find the answer to one of the questions posed in this study: *What are the different functions across South Africa's provinces?* It has also been employed in meeting the following objective of the study: *To establish the comparative advantages of South African provinces.* The LQ was calculated by dividing provincial industry concentration by national industry concentration. An LQ greater than 1 indicates that the regional market has a higher concentration of employment in a particular industry compared to the national average, while an LQ equal to 1 indicates that regional employment matches the proportion of national employment in that industry, and an LQ less than 1 indicates that the regional employment in a particular industry is lower than the national average. Table 14 below highlights the comparative advantages of provinces with reference to the LQ for 2013.

Table 14 Location quotient, 2013.

Branch of activity	Province								
	WC	EC	NC	FS	KZN	NW	GT	MP	LP
Agriculture	**1,51**	**1,14**	**2,78**	**1,83**	**0,84**	**1,00**	**0,16**	**1,75**	**1,99**
Mining & quarrying	**0,03**	**0,00**	**2,07**	**1,10**	**0,29**	**6,74**	**0,26**	**2,71**	**2,30**
Manufacturing	**1,05**	**1,21**	**0,54**	**0,77**	**1,13**	**0,76**	**1,01**	**0,90**	**0,88**
Wholesale	**1,04**	**1,21**	**0,98**	**0,91**	**0,72**	**0,85**	**1,21**	**0,72**	**0,85**
Retail trade	**1,01**	**1,01**	**0,68**	**0,91**	**1,03**	**0,81**	**1,00**	**1,06**	**1,11**
Transportation	**0,77**	**0,92**	**0,73**	**0,87**	**1,39**	**0,58**	**1,11**	**0,91**	**0,72**
Storage and communication	**1,68**	**0,48**	**0,49**	**0,49**	**0,92**	**0,37**	**1,44**	**0,15**	**0,43**
Financial intermediation	**0,87**	**0,46**	**0,40**	**0,78**	**0,73**	**0,23**	**1,80**	**0,40**	**0,56**
Insurance	**1,12**	**0,45**	**0,68**	**0,40**	**0,72**	**0,36**	**1,81**	**0,20**	**0,37**
Real estate	**1,22**	**0,60**	**0,32**	**0,20**	**0,44**	**0,82**	**1,78**	**0,73**	**0,14**
Business services	**1,25**	**0,72**	**0,64**	**0,70**	**0,86**	**0,69**	**1,35**	**0,85**	**0,38**
Community; social and personal services	**0,95**	**1,11**	**1,41**	**1,23**	**1,03**	**1,08**	**0,90**	**0,89**	**1,12**
Private households	**0,67**	**1,09**	**1,27**	**1,40**	**1,03**	**0,92**	**1,03**	**1,06**	**0,98**

Computation from StatsSA 2013 LFS data

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Table 14 above which shows the LQs of the provinces in relation to different branches of activity of individual occupations, highlights the comparative advantages of provinces. It shows that the **Western Cape** had comparative advantages in most sectors except for mining and quarrying, transportation, financial intermediation, ; community, social and personal services, and, private households.

The **Eastern Cape** had comparative advantages in eight industries, viz.: agriculture, 1.14; manufacturing, 1.03; construction, 1.52; wholesale, 1.21; retail trade, 1.01; community, social and personal services, 1.11; and, private households, 1.09.

The **Northern Cape** had comparative advantages in agriculture (2.78); mining and quarrying (2.07); community, social and personal services (1.41); and, private households (1.27). The province had no comparative advantage in mining and quarrying.

The **Free State** had comparative advantages in the following functions: agriculture (1.83); mining and quarrying (1.10); community, social and personal services (1.23); and, private households (1.40).

KwaZulu-Natal had comparative advantages in five industries, with the highest LQ in transportation at 1.39.

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The **North West** had comparative advantages in three sectors, with the highest LQ in mining and quarrying at 6.74; it had an LQ of 1.00 in agriculture which indicates that the distribution of employment matches the total South Africa representation.

Gauteng had comparative advantages in most sectors except for the following functions: agriculture (0.16); mining and quarrying (0.26); electricity (0.91); construction (0.77); community, social and personal services (0.90)

Mpumalanga had comparative advantages in four sectors, with the highest LQ in mining and quarrying (2.71).

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Limpopo had comparative advantages in four sectors, with the highest LQ also in mining and quarrying (2.30).

Mining and quarrying in the North West province had the highest LQ across all the provinces.

Table 15 below highlights the comparative advantages of provinces with reference to the location quotient for 2017.

Table 15 Location quotient, 2017

Branch of activity	Province								
	WC	EC	NC	FS	KZN	NW	GT	MP	LP
Agriculture	1,31	1,20	2,52	1,83	0,97	0,99	0,17	1,65	1,90
Mining & quarrying	0,08	0,00	3,84	0,77	0,06	5,07	0,66	1,55	2,66
Manufacturing	1,20	1,02	0,57	0,83	1,07	0,77	0,98	1,09	0,86
Wholesale	1,43	0,89	0,28	1,53	0,67	1,02	1,12	1,10	0,33
Retail trade	0,95	1,09	0,78	1,04	0,98	1,01	0,95	1,04	1,20
Transportation	0,84	0,87	0,48	1,37	1,31	0,77	1,07	0,94	0,72
Storage and communication	1,53	0,51	0,47	0,19	0,75	0,15	1,73	0,25	0,28
Financial service	1,05	0,68	0,43	0,37	0,37	0,81	1,95	0,16	0,34
Insurance	1,37	1,53	0,44	0,50	0,56	0,16	1,48	0,45	0,40
Real estate	1,26	0,63	0,28	0,77	0,54	0,61	1,44	0,67	1,01
Business services	1,16	0,73	0,49	0,63	0,95	0,71	1,30	0,95	0,62
Community; social & personal services	0,84	1,19	1,39	1,07	1,11	1,04	0,97	0,85	0,98
Private households	0,81	1,05	1,11	1,31	1,15	0,98	0,94	1,06	0,97

Computation from StatsSA 2017 LFS data

It can be seen in Table 15 above that the **Western Cape** had comparative advantages in most sectors except for mining and quarrying, retail trade, transportation, community, social and personal services, and private households.

The **Eastern Cape** had comparative advantages in six industries: agriculture (1.20); manufacturing (1.02); retail trade (1.09); insurance (1.53); community, social and personal services (1.19); and, private households (1.05).

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The **Northern Cape** had comparative advantages in agriculture (2.52); mining and quarrying (3.84); electricity (1.76); community, social and personal services (1.39); and, private households (1.11).

The **Free State** had comparative advantages in agriculture (1.83); wholesale (1.53); retail trade (1.04); transportation (1.37); community, social and personal services (1.07); and, private households (1.31).

KwaZulu-Natal had comparative advantages within four sectors, with the highest location quotient in transportation at 1.31.

North West Province had comparative advantages in four sectors, with the highest location quotient in mining and quarrying at 5.07.

Gauteng had comparative advantages in most sectors except for agriculture, 0.17; mining and quarrying, 0.66; manufacturing, 0.98; retail trade, 0.95; community, social and personal services, 0.97; and, private households, 0.94.

Mpumalanga had comparative advantages in six sectors, with the highest LQ in agriculture at 1.65.

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Limpopo had comparative advantages in four sectors, with the highest LQ in mining and quarrying at 2.66.

Mining and quarrying in the North West had the highest LQ across all the provinces.

In conclusion, from Tables 14 and 15 above, the LQ for the years under study show that agriculture was more concentrated in the provinces of Western Cape, Eastern Cape, Northern Cape, Free State, Mpumalanga and Limpopo, compared to South Africa as a whole. Among these provinces, the Northern Cape had the highest concentration in agriculture. North West showed the greatest concentration in terms of mining activities, especially in platinum mining, across the provinces and also when compared to South Africa as an entity. Other provinces wherein mining activities were concentrated, included the Northern Cape,

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Mpumalanga and Limpopo. Evidently, while manufacturing was the highest concentration in Eastern Cape in 2013 with 1.21, it became highly concentrated in Eastern Cape in 2017 with 1.20. this showed that the concentration of manufacturing reduced in Eastern Cape from 2013 to 2017 and increased in the Western Cape within these years. Manufacturing was highly concentrated in the three provinces of the Western Cape, the Eastern Cape, and KwaZulu-Natal, for both years. Wholesale, storage and communication, insurance, real estate, and business services were highly concentrated only in the Western Cape and Gauteng, while other provinces showed less concentration in these sectors for both years. Looking at retail trade, in 2013 three provinces, the Eastern Cape, Mpumalanga, as well as Limpopo, were highly concentrated with retail trade; this concentration did not drop in the year 2017. There was more concentration of transportation in KwaZulu-Natal and Gauteng. Considering South African transportation, which constitutes water, road and rail, the country as a whole is less concentrated with transportation when compared to KwaZulu-Natal and Gauteng. Across all the provinces, finance is more concentrated in Gauteng. This shows that Gauteng has more workers employed in the finance sector compared to the country as a whole. Five provinces, the Eastern Cape, the Northern Cape, Free State, KwaZulu-Natal and the North West, when compared with the entire country, are more concentrated with community, social and personal services. Also, the private households function is more concentrated in the five provinces of the Eastern Cape, the Northern Cape, Free State, KwaZulu-Natal and Mpumalanga, when compared to the country.

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4.8 Determining Dominance in Functions

Many statistical inference methods assume that the population, or populations, from which the samples are selected, is/are normally distributed. As such, the third Quarter Labour Force Survey data comes from a random survey (randomly selected sample) and the

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assumption is that the data is representative. There are two variables in this study, that is, branch of activity (dependent variable) and province of enumeration (independent variable). These two variables are classified as nominal variables.

To carry out inferential statistics, the results of the classification of the provinces by function and LQ were analysed because the values were interval measurements; T-test assessments were carried out on the result to determine dominance in function.

The importance of examining any difference that may exist in function cannot be overemphasised. This helped in answering the following question: *What sectors have more dominance in the distributions of employment in South Africa?*

In order to answer this question, the one sample T test and the Independent T test were used. The one sample T test was carried out to assess the dominance of functions in 2013 and 2017, while the Independent T test was carried out to ascertain the dominance patterns between the year 2013 and 2017. These tests were found to be appropriate because they assume normality (being parametric tests). Furthermore, it is suitable when the test variable is interval and the grouping variable (population to be compared) is two for the Independent T test. The test was computed at a 5% level of significance for each of the years and the results were as summarised in Tables 16 to 21. The results of the one sample test on functions were derived by using the threshold for scaling and classification for the test value on SPSS for each indicator. All the function indicators have different thresholds for scaling.

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Table 16 One sample test on functions 2013

	T	f	Sig. (2-tailed)	Mean	Std. Deviation
Test Value = 0.74					
Highly industrialised province 1	**-49,555**	**8**	**,000**	**,1711**	**,03444**
Test Value = 0.45					
Highly industrialised province 2	**-13,179**	**8**	**,000**	**,2178**	**,05286**
Test Value = 0.60					
Moderately industrialised province 1	**-37,360**	**8**	**,000**	**,1711**	**,03444**
Test Value = 0.30					
Moderately industrialised province 2	**-4,666**	**8**	**,002**	**,2178**	**,05286**
Test Value = 0.15					
Mining province	**-4,237**	**8**	**,003**	**,0544**	**,06766**
Test Value = 0.50					
Retail province 1	**-39,600**	**8**	**,000**	**,1767**	**,02449**
Test Value = 2.20					
Retail province 2	**9,851**	**8**	**,000**	**16,6089**	**4,38804**
Test Value = 0.20					
Wholesale province 1	**-1522E+18**	**8**	**,000**	**,0100**	**,00000**
Test Value = 0.45					
Wholesale province 2	**-63,888**	**8**	**,000**	**,0644**	**,01810**
Test Value = 0.11					
Transportation province 1	**-15,513**	**8**	**,000**	**,0467**	**,01225**
Test Value = 0.33					
Transportation province 2	**-8,054**	**8**	**,000**	**,2111**	**,04428**
Test Value = 0.67					
Transportation province 3	**-151,830**	**8**	**,000**	**,0444**	**,01236**
Test Value = 0.15					
University province	**5,306**	**8**	**,001**	**,5167**	**,20730**
Test Value = 0					
Retirement province	**11,178**	**8**	**,000**	**,2611**	**,07008**

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Table 17 One-Sample Test on Functions 2017

	T	df	Sig. (2-tailed)	Mean	Std. Deviation
Test Value = 0.74					
Highly industrialised province 1	**-51,092**	**8**	**,000**	**,1744**	**,01107**
Test Value = 0.45					
Highly industrialised province 2	**-14,269**	**8**	**,000**	**,2189**	**,04859**
Test Value = 0.60					
Moderately industrialised province 1	**-38,444**	**8**	**,000**	**,1744**	**,03321**
Test Value = 0.30					
Moderately industrialised province 2	**-5,008**	**8**	**,001**	**,2189**	**,04859**
Test Value = 0.15					
Mining province	**-5,203**	**8**	**,001**	**,0500**	**,05766**
Test Value = 0.50					
Retail province 1	**-38,969**	**8**	**,000**	**,1789**	**,02472**
Test Value = 2.20					
Retail province 2	**3,900**	**8**	**,000**	**26,6433**	**18,80265**
Test Value = 0.20					
Wholesale province 1	**-95,408**	**8**	**,000**	**,0089**	**,00601**
Test Value = 0.45					
Wholesale province 2	**-53,666**	**8**	**,000**	**,0522**	**,02224**
Test Value = 0.11					
Transportation province 1	**-11,346**	**8**	**,000**	**,0489**	**,01616**
Test Value = 0.33					
Transportation province 2	**-4,467**	**8**	**,002**	**,2311**	**,06642**
Test Value = 0.67					
Transportation province 3	**-155,316**	**8**	**,000**	**,0478**	**,01202**
Test Value = 0.15					
University province	**6,366**	**8**	**,000**	**,4689**	**,15029**
Test Value = 0					
Retirement province	**16,296**	**8**	**,000**	**,2744**	**,05053**

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In Tables 16 and 17 above the Sig. (2-tailed) were less than 0.05 for all the functions in 2013 and 2017. Therefore, it can be concluded that a significant difference exists in South Africa with respect to their functions.

Despite the fact that there is no dominance in functions due to the absence of huge disparities in terms of their functions using the threshold, there is still a difference when it comes to comparing the functions. This shows that some provinces are performing more than others, and this is why some provinces are more urbanised than others.

The mean value of the different functions for both years under study are significantly lower than the threshold number for scaling except for the retirement province, university province and retail provinces where the mean value showed a higher significance than the threshold number. It is, therefore, evident that these three sectors have more dominance in the distribution of employment in South Africa.

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Table 18 T test on overall variation of functions between 2013 and 2017

	Levene's Test for Equality of Variances		t-test for Equality of Means			
	F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference
Highly industrialised province 1	,003	,960	-,209	16	,837	-,00333
Highly industrialised province 2	,071	,794	-,046	16	,964	-,00111
Moderately industrialised province 1	,003	,960	-,209	16	,837	-,00333
Moderately industrialised province 2	,071	,794	-,046	16	,964	-,00111
Mining province	,025	,878	,150	16	,883	,00444
Retail province 1	,055	,817	-,192	16	,850	-,00222
Retail province 2	6,857	,019	-1,559	16	,139	-10,03444
Wholesale province 1	7,571	,014	,555	16	,587	,00111
Wholesale province 2	,248	,625	1,279	16	,219	,01222
Transportation province 1	,491	,494	-,329	16	,747	-,00222
Transportation province 2	,536	,475	-,752	16	,463	-,02000
Transportation province 3	,005	,943	-,580	16	,570	-,00333
University province	,388	,542	,560	16	,583	,04778
Retirement province	1,012	,329	-,463	16	,650	-,01333

In Table 18 above the Sig. (2-tailed) is greater than 0.05 within the province between 2013 and 2017 for all the functions. Therefore, it can be concluded that there is no significant difference with regard to their functions. This shows that dominance in function in 2013 is not different from the 2017 scenario. There was little or no difference from the results on function between 2013 and 2017.

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Table 19 One sample test on comparative advantage 2013

	Test Value = 1				
	T	df	Sig. (2-tailed)	Mean	Standard deviation
Agriculture	1,752	8	,118	,76100	,25367
Mining and quarrying	1,007	8	,343	2,15101	,71700
Manufacturing	1,987	8	,790	,31636	,10545
Wholesale	-1,183	8	,271	,21977	,07326
Retail trade	-,933	8	,378	,13572	,04524
Transportation	-1,382	8	,204	,24111	,08037
Storage and communication	-1,630	8	,142	,52139	,17380
Finance intermediation	-1,989	8	,082	,46419	,15473
Insurance	-1,911	8	,092	,50402	,16801
Real estate	-1,733	8	,121	,52885	,17628
Business service	-1,715	8	,125	,30315	,10105
Community; Social & Personal service	1,507	8	,385	,27866	,09289
Private households	,728	8	,487	,20603	,06868

Table 20. One sample test on comparative advantage 2017

Branch of activity	Test Value = 1				
	T	df	Sig. (2-tailed)	Mean	Standard deviation
Agriculture	1,743	8	,119	1,3933	,67689
Mining and quarrying	1,033	8	,332	1,6322	1,83677
Manufacturing	-1,537	8	,517	,8289	,33401
Wholesale	-,479	8	,644	,9300	,43801
Retail	,116	8	,910	1,0044	,11458
Transport	-,742	8	,480	,9300	,28320
Storage and communication	-1,782	8	,113	,6511	,58750
Finance intermediation	-1,726	8	,123	,6844	,54855
Insurance	-1,318	8	,224	,7656	,53372
Real estate	-1,619	8	,144	,8011	,36846
Business service	-1,804	8	,109	,8378	,26976
Community; Social & personal service	1,896	8	,875	1,2744	,63220
Private households	,891	8	,399	1,0422	,14220

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In Tables 19 and 20 above the Sig. (2-tailed) is less than 0.05 for all the functions in 2013 and 2017. Therefore, it can be concluded that a significant difference exists with regard to their comparative advantage.

In 2013, the mean value of the different functions was significantly lower than the cut off number except for the mining and quarrying where the mean value showed a higher significance than the cut off number. On the other hand, in 2017, the mean value was highly significant for agriculture, mining and quarrying, retail, community, social and personal service, and private household. The highly significant sectors show comparative advantages in the distribution of employment in South Africa.

Table 21 T test on overall variation of comparative advantage between 2013 & 2017

	Levene's Test for Equality of Variances		**t-test for Equality of Means**			
	F	**Sig.**	**t**	**df**	**Sig. (2-tailed)**	**Mean Difference**
Agriculture	**,123**	**,730**	**,151**	**16**	**,882**	**,05111**
Mining and quarrying	**,010**	**,920**	**,095**	**16**	**,925**	**,09000**
Manufacturing	**,372**	**,934**	**-,282**	**16**	**,960**	**-,12112**
Wholesale	**3,582**	**,077**	**-,102**	**16**	**,920**	**-,01667**
Retail trade	**,495**	**,492**	**-,788**	**16**	**,442**	**-,04667**
Transportation	**,322**	**,578**	**-,332**	**16**	**,744**	**-,04111**
Storage & communication	**,067**	**,799**	**,250**	**16**	**,805**	**,06556**
Finance intermediation	**,226**	**,641**	**,032**	**16**	**,974**	**,00778**
Insurance	**,639**	**,436**	**-,354**	**16**	**,728**	**-,08667**
Real estate	**,659**	**,429**	**-,496**	**16**	**,626**	**-,10667**
Business service	**,000**	**,987**	**-,082**	**16**	**,936**	**-,01111**
Community; Social & Personal service	**4,125**	**,982**	**,705**	**16**	**,662**	**,01334**
Private households	**,349**	**,563**	**,093**	**16**	**,927**	**,00778**

In Table 21 above the Sig. (2-tailed) is greater than 0.05 between 2013 and 2017 for all the functions. Therefore, it can be concluded that there is no significant difference in function with regard to their comparative advantage. This shows that dominance in function

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in 2013 is not different in 2017. There was no difference from the results on function between 2013 and 2017. Chapter Five discusses these results in greater detail, vis-à-vis the theoretical and conceptual frameworks advanced in Chapter Two.

4.9 Chapter Conclusion

This chapter has extensively explored the functions and comparative analysis of South African provinces using the third Quarterly Labour Force Survey data. The study compared the functions of provinces in South Africa and their respective comparative advantages through the quantitative analysis for the year 2013 and 2017. The analysis revealed that provinces such as Gauteng, KwaZulu-Natal and Western Cape performed comparatively better in terms of functions compared to other provinces

Furthermore, while the analysis established a mix of multi-functionality across the provinces for the retail and the student province, none of the provinces is highly or moderately industrialised. Also, none of the provinces has a dominant function in wholesale, transportation and hospitality.

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CHAPTER FIVE

DISCUSSION OF RESULTS

5.1 Introduction

This chapter presents a discussion of the analysed data (and the findings thereof) depicted in Chapter Four. It addresses the research questions and objectives advanced in the first chapter of the study. The purpose of this study was to examine the various functions in South Africa's provinces and to establish their respective comparative advantages, comparing 2013 and 2017, in terms of employment absorption; also, the study sought to establish the relationship between functionality and the concentration of firms. Thus, this chapter focusses on exploring the foregoing based on the theoretical and conceptual frameworks presented in Chapter Two. It aims to interpret and discuss the various characteristics of employment outlined in Chapter Four. To ensure consistency, this chapter is organised as follows: section 5.2 outlines the research design procedures; section 5.3 examines discussion of results and 5.4 presents the chapter conclusion.

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5.2 Research Design Procedures

This is a study on functionality and comparative advantages among the provinces of South Africa: it incorporates a Location Quotient (LQ) analysis of employment distribution as a cross-sectional quantitative research. This study employed an LQ analysis in order to estimate and understand the relationship between different variables. The LQ compares the relative concentration of employment in each industry across the provinces to that of South Africa. An LQ > 1 shows a comparative advantage for a particular sector in the province compared to the same sector in South Africa. Industries that dominate in a province have a higher LQ and industries that are scarce in a province have a lower LQ. Functionality in

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essence, comprises what these provinces provide, the different options they offer their community and the level at which they perform their functions.

The 2013 and 2017 Labour Force Survey obtained from Statistics South Africa was used to achieve the objectives of the study. The aim of this study was to determine whether there was convergence between the functions and the comparative advantage(s) of a province in terms of employment distribution in South Africa within the five-year period (2013-2017). Furthermore, the 2013 and 2017 Quarterly Labour Force Surveys were used to access information on individual socio-economic characteristics on employment. In order to perform the LQ analysis in Chapter Four, the dependent and independent variables were identified. The independent variable is the *province of enumeration* while the dependent variable is the function captured through the different *branch of activity* that an individual works in. These variables were defined and tested using statistical methods to test relationships between them and the significance of those relationships. Labour Force Survey files were obtained from Statistics South Africa in SPSS format, which made it possible to run the necessary statistical analyses. Furthermore, the context of the analyses was of such nature that it incorporated all the nine provinces of South Africa. This study used SPSS software to perform the one sample T-test and the Independent T-test. These tests were performed in an attempt to answer the research questions and to test the hypotheses mentioned in Chapter One of this thesis.

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5.3 Discussion of Results

5.3.1 Distribution of employment by branch of activity and by province

The previous chapter (Chapter Four) outlined the employment distribution by province and branch of activity in South Africa between 2013 and 2017. To ascertain the province that had more dominance in function, the following research question was formulated:

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- **Research question:** *What are the prevailing employment distribution patterns across the various sectors in the nine provinces of South Africa?*
- **Hypothesis:** *The manufacturing sector dominates employment distribution patterns across the various sectors in the nine provinces of South Africa.*

This question made it possible to determine the province that had dominant function within and across South Africa's provinces between the two survey periods. According to the findings of the data analysis in the preceding chapter, the results on percentage distribution of employment by branch of activity and by provinces (see Figures 4 through 16) showed that across the provinces agriculture, manufacture, wholesale, retail, transportation, storage and communication, real estate, business services, community; social and personal services contributed the highest percentage towards employment in (Gauteng, Western Cape, and KwaZulu-Natal). This was evident in the results on employment distribution by province (see Table 4) which revealed that Gauteng, Western Cape, and KwaZulu-Natal contributed the highest percentage towards employment in South Africa between 2013 and 2017. These three provinces experienced a slight decrease in employment in 2017. The two provinces with the lowest contribution to employment, for the 2 survey periods, were the Northern Cape and the Free State, respectively. The Northern Cape had a lower employment contribution than the Free State. The Northern Cape and KwaZulu-Natal had a negative percentage change between 2013 and 2017, as shown in Table 4 in Chapter Four, with negative average annual growth rates of -0.61 and -0.22, respectively. This result corroborates Ramuhashi's research (2007), which shows that Gauteng, KwaZulu-Natal and Western Cape are more developed than the other provinces. Ramuhashi (2007) attributes this to Gauteng's mineral resource endowment and KwaZulu-Natal and Western Cape's strategic locations along the shoreline. On the other hand, the Northern Cape and Limpopo are the least developed provinces; they

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are characterised by minimal economic activity and high transport costs associated with unfavourable market distance.

The results on employment distribution by branches of activity, as shown in Table 5 in the preceding chapter, revealed that community, social and personal services, manufacturing, and retail trade contributed the highest percentage towards employment in South Africa between 2013 and 2017. These three sectors witnessed a slight decrease in employment in 2017 when compared to 2013. Across the branches of activity, community, social and personal services, as a function, contributed the most in employment, while real estate contributed the least during the two survey periods. Wholesale, and storage and communication, had negative percentage changes between 2013 and 2017 with negative average annual growth rates of -2.59 and -1.51, respectively. As South Africa is classified as a developing country, this result affirmed the proposition tested by Szirmai and Verspagen (2015), which stated that manufacturing had a significant positive effect on growth in developing countries, and that this effect was stronger than that of other sectors. They concluded that manufacturing is becoming a more difficult route to growth than before (Szirmai & Verspagen, 2015). The result also confirmed the conclusion made by Szirmai and Verspagen (2015) because community, social and personal services contributed more to employment than the manufacturing sector in the South African context between 2013 and 2017.

The results from the study showed that the hypothesis is not accepted. However, the hypothesis does hold true for community, social and personal services, as they are the sectors with the highest contribution to employment.

To ascertain the different functions across provinces, the following was formulated:

- **Research question:** *What are the different functions across South Africa's provinces?*
- **Hypothesis:** *There are differences among the provinces of South Africa with respect to their functions between 2013 and 2017.*

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Looking at the findings for 2013 and 2017, on Figures 4 through 16 in Chapter Four, it is evident that, within and across provinces, some sectors contribute to employment more than other sectors. For instance, agriculture in South Africa is a crucial sector and an important engine of growth for the rest of the economy. Despite its relatively small share of the total GDP (3%), agriculture remains a significant provider of employment, especially in the rural areas, and a major earner of foreign exchange (Musvoto et al., 2015). The mining sector has directly contributed an average of 8% to the country's GDP over the last decade. The mining industry generates approximately 18% of the economy's activity. The economic impact of the mining industry complex is also acutely felt by the South African labour market, considering that it provides over 1.3 million jobs (Antin, 2013). Manufacturing, on the other hand, is a key catalyst and multiplier for job creation, GDP growth and development in any country. The manufacturing sector provides an opportunity to significantly accelerate the country's growth and development. The sector accounted for 13% of South Africa's GDP as at 2017 (StatsSA, 2017a).

Across the provinces, Gauteng exhibits greater dominance in numerous functions (including manufacturing, wholesale, retail, transportation, storage and communication, finance, insurance, real estate, business services, community, social and personal services, and private households) than other provinces. Likewise, the Western Cape has more dominance in agriculture and the North West has more dominance in mining and quarrying. Agriculture and mining and quarrying are the only two functions in which Gauteng did not dominate. Within the provinces, there was more increase in percentage with respect to dominant functions in 2017 when compared to 2013. A possible reason for these increases could be the fact that there have been various administrative changes between 2013 and 2017.

The results from the study showed that the hypothesis is accepted. The hypothesis holds true for Gauteng, the Western Cape, and KwaZulu-Natal, as they are the provinces with

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the highest contribution of employment and the provinces with highest economic development. Although Kwazulu-Natal had a negative percentage change between 2013 and 2017, it contributed more towards the national GDP as well as employment than all other provinces except Gauteng.

5.3.2 Classification of province by function

The previous chapter (Chapter Four) outlined the classification of provinces by function in South Africa for 2013 and 2017, to ascertain the provinces that have dominant functions in the distributions of employment across the country. This section further addresses the question: *What are the different functions across South African provinces?* and the hypothesis: *There are differences among the provinces of South Africa with respect to their functions between 2013 and 2017.*

Indeed, we see that South African provinces have different functions. This is evident in Table 6 through 13 for the 2013 as well as the 2017 analysis. For both years under study, when formula a in Table 9 was applied, the retail province exhibited a mix of multi-functionality across the provinces. When formula b was applied, the retail province showed a multimodal dominance across the provinces. Formula a indicated that all the provinces have dominance in retail while formula b indicated that South Africa's provinces has no dominance in retail.

To identify the university province (Table 12) as well as the retirement province (Table 13) and mining province (Table 8) in South Africa, only one formula was applied. Across the provinces, in 2013 and 2017, the result for the university province exhibited a mix of multi-functionality like the retail province. This implies that, in each province, there is a large population attending university and school in general. Also, retirement province, like the retail province, exhibited a mix of multi-functionality across the provinces. This means that in each province a large population are retired or are not working. The mining province

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showed dominance only in North West. A possible reason for this dominance could be the fact that over the past years the North West has made the highest percentage contribution towards mining and quarrying in the national economy (StatsSA, 2018).

Two formulas in each case were applied to identify the highly industrialised province (Table 6) as well as moderately industrialised province (Table 7) and the wholesale province (Table 10); regarding transportation province (Table 11), however, three formulas were applied. In 2013 and 2017, when formulae a and b were applied, the highly and moderately industrialised province as well as the wholesale province exhibited a multimodal function across the provinces. Formulae a and b indicated that no province in South Africa is highly or moderately industrialised, and, the provinces had no dominance in wholesale. In identifying the transportation provinces only Free State showed a dominance in transportation using formula c.

The results in Table 6 through 13 confirmed the hypothesis that some provinces have more dominant functions than other provinces in South Africa. The results also confirmed Francois Perroux's concept of the growth pole, which states that economic activity does not necessarily spread evenly or equitably. Instead, activity will naturally cluster together, thus creating a dominance dependency relationship among provinces (Edwards, 2017). The next section on LQ also further addresses the question: *What are the different functions across South African provinces?* and the hypothesis: *There are differences among the provinces of South Africa with respect to their functions between 2013 and 2017.*

5.3.3 Location quotient

Chapter Four highlighted the comparative advantages of provinces with reference to the LQ. The LQs of the provinces, in relation to different branches of activity of individual occupation, for 2013 and 2017, were highlighted in Table 14 and 15. According to Guimarães, et al. (2009), it is assumed by researchers that an industry is concentrated in a

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region if the LQ is above one. Based on this premise, the results from Table 14 and 15 in Chapter Four revealed the sectors that were concentrated in South Africa's provinces for both 2013 and 2017.

All the provinces except Gauteng, North West and KwaZulu-Natal had an LQ that was above one in agriculture. Therefore, more workers are employed in agriculture in these provinces than in South Africa as a whole.

In 2013, North West had an LQ of 1.00 in agriculture, which means that agriculture produces just enough to satisfy local consumption in North West. LQ was less than one in mining and quarrying for Western Cape, Eastern Cape, KwaZulu-Natal and Gauteng. This is an indication that mining and quarrying does not produce enough goods and services for local consumption in these provinces. Western Cape, Eastern Cape, KwaZulu-Natal and Gauteng had an LQ that was above one in manufacturing. This means that manufacturing is more dominant in these provinces compared to other provinces with an LQ that is less than one. In 2013, only three provinces (Western Cape, Eastern Cape and Gauteng) had an LQ that was above one in wholesale. These provinces increased in number, to five (Western Cape, Free State, North West Gauteng and Mpumalanga), in 2017. This indicates that comparative advantage on wholesale increased by province between 2013 and 2017. On the other hand, Northern Cape, Free State and North West had an LQ that was less than one in retail, and Gauteng had an LQ that was equal to one. These results show that Northern Cape, Free State and North West do not produce enough from the retail industry for their local consumption, while Gauteng produces just enough from the retail industry for its local consumption. In 2013, only two provinces (KwaZulu-Natal and Gauteng) had an LQ that was above one in transportation. These provinces increased in number to three (Free State, KwaZulu-Natal and Gauteng) in 2017.

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The value of the Western Cape and Gauteng's LQs were greater than one in storage and communication, real estate, as well as business services. These two provinces had greater concentration of workers employed in these sectors than South Africa.

Also, in 2013, only Gauteng had an LQ index greater than one in financial services; this scenario characterised two provinces (the Western Cape and Gauteng) in 2017. In 2013, the Western Cape and Gauteng had LQ values greater than one in insurance, and this increased to three provinces (the Western Cape, the Eastern Cape and Gauteng) in 2017. This is not surprising, considering the fact that Johannesburg is seen as the commercial hub of not only South Africa, but the entire continent of Africa. A large number of commercial companies are clustered together in the Sandton area of the city. In addition to this, Gauteng is the most densely populated province in South Africa, with the largest number of people living in it per square kilometre (The Real Economy Bulletin, 2016b), leading to a strong business service sector. Similar to Gauteng, a large number of commercial services companies are based in the Western Cape. The province has a strong business service component, but, whereas Gauteng's prominence is largely due to its density, the strength of the Western Cape's business service component is related strongly to its location and the demand for luxury properties in the province (The Real Economy Bulletin, 2016c).

The results in Table 14 and 15 confirmed the hypothesis that some provinces (such as Gauteng, Western Cape and KwaZulu-Natal) have more dominant functions than other provinces in South Africa. It is evident from the analysis in this study that within and across the provinces, there are industries that are doing well in terms of attracting employment. However, these provinces may not have a dominant function in the industries that attract employment. For example, all the industries except agriculture, mining and quarrying contribute the highest percentage towards employment in Gauteng. Despite Gauteng being the most populous province in the country, the Gauteng LQ in Table 15 in the year 2017 showed that the province

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has no dominant function in manufacturing, retail trade, community, social and personal services and private household. To investigate how functionality relates to LQ, and also to know if there is convergence between the functions and comparative advantage in terms of employment, comparisons were made from the results depicted on Table 6 through 15.

The study showed that all the nine provinces were dominated by retail in 2013 and 2017 using formula b. The LQ did not show a comparative advantage in retail for all the nine provinces. In 2013, the provinces with comparative advantage in retail were the Western Cape, the Eastern Cape, KwaZulu-Natal, Gauteng, Mpumalanga and Limpopo. The following provinces did not have comparative advantage in retail trade: the Northern Cape, Free State and the North West. Although these three provinces had dominance in retail, retailing was not their major sector of employment because their respective LQs were less than one. In 2017, the provinces with comparative advantage in retail trade were the Eastern Cape, Free State, the North West, Mpumalanga and Limpopo. On the other hand, the following provinces had no comparative advantage in retail trade in 2017: the Western Cape, Northern Cape, KwaZulu-Natal and Gauteng. Although these four provinces had dominance in retail, the sector was not their major source of employment because their LQ was less than one.

Results in Table 6 through 13 show that all the nine provinces had no dominance in wholesale in 2013 and 2017 using formulae a and b. The LQ in Table 13 showed a comparative advantage in wholesaling for three provinces (the Western Cape, Eastern Cape and Gauteng) in 2013. Although these three provinces had no dominance in wholesale, wholesale was, nonetheless, the major sector of employment because their LQ was greater than one. The following provinces had no comparative advantage in wholesale: the Northern Cape, Free State, KwaZulu-Natal, the North West, Mpumalanga and Limpopo. These six provinces had no dominance in wholesale; wholesale was not their major sector of employment because their LQ was less than one. In 2017, the provinces with comparative

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advantage in wholesale were the Western Cape, Free State, North West, Gauteng and Mpumalanga. These provinces had no dominant function in wholesale, but wholesale was the major sector of employment because their LQ was above one. The provinces that had no comparative advantage in wholesale were the Eastern Cape, Northern Cape, KwaZulu-Natal, and Limpopo. These four provinces had no dominance in wholesale; moreover, from the results, it is evident that wholesale was not the major sector of employment in these provinces because their LQ was not greater or equal to one.

Results from the study also showed that the nine provinces had no dominance in transportation in 2013 and 2017, using formulae a, b and c, except in 2017, where the Free State had dominance in transportation under formula b. The LQ did not show a comparative advantage in transportation for most of the provinces. In 2013, the provinces with comparative advantage in transportation were KwaZulu-Natal and Gauteng: although these two provinces had no dominance in transportation, they nonetheless had higher employment in transportation. The provinces that had no comparative advantage in transportation were the Western Cape, Eastern Cape, Northern Cape, Free State, North West, Mpumalanga and Limpopo. These provinces had no dominance in transportation; also, transportation was not their major sector of employment since their LQ was less than one. In 2017, the provinces with comparative advantage in transportation included the Free State, KwaZulu-Natal and Gauteng. The Free State had dominance in transportation and enjoyed a comparative advantage in transportation over other provinces. KwaZulu-Natal and Gauteng had no dominance in transportation, but they enjoyed a comparative advantage in this function. The provinces that had no comparative advantage in transportation were as follows: the Western Cape, Eastern Cape, Northern Cape, North West, Mpumalanga and Limpopo. In addition, these provinces had no dominance in transportation; transportation was not the major sector

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of employment in these provinces because their LQ in this particular function was less than one (LQ < 1).

Results from the study also showed that, except for the North West, the provinces were not dominated by mining and quarrying in both 2013 and 2017. The LQ did not show a comparative advantage in mining and quarrying for most of the provinces. In 2013, the provinces with comparative advantage in mining and quarrying were the Northern Cape, Free State, North West, Mpumalanga and Limpopo. Among these five provinces, only the North West had dominance in mining and quarrying. The mining and quarrying function had a major employment impact in these provinces compared to South Africa because their LQ > 1. Four provinces had no comparative advantage in mining and quarrying; these were the Western Cape, Eastern Cape, KwaZulu-Natal and Gauteng. These four provinces exhibited no dominance in mining and quarrying, and this shows that the function was not the major sector of employment therefor their LQ < 1. In 2017, the provinces with comparative advantage in mining and quarrying were the Northern Cape, North West, Mpumalanga and Limpopo. Among these four provinces, only the North West had a dominance in mining and quarrying. Therefore, the four provinces had substantial employment impact in mining and quarrying because their LQ > 1. The provinces that had no comparative advantage in mining and quarrying were the Western Cape, Eastern Cape, Free State, KwaZulu-Natal and Gauteng. These five provinces had no dominance in mining and quarrying, and this shows that mining and quarrying was not the major sector of employment in these provinces because their LQ was less than one (LQ < 1).

The foregoing analysis confirms that, within and across provinces, there are industries that are doing well in terms of attracting employment. But these provinces may not have dominant function in the industries that attract employment.

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5.3.4 Determining dominance in functions and comparative advantages between 2013 and 2017

Chapter Four outlined the dominance in functions in South Africa for 2013 and 2017 by using inferential statistics (Independent T-test). To ascertain dominance in functions in the distributions of employment, the following research question was formulated:

- **Research question:** *Which sectors have more dominance in the distributions of employment in South Africa between 2013 and 2017?*
- **Hypothesis:** *There is no dominance in functions in terms of the distribution of employment between the year 2013 and 2017.*

This question made it possible to determine if there is dominance in function in South Africa with respect to employment between the two years under study. In order to establish if there is dominance in function, the Independent T-test was used. The test was conducted at a 5% level of significance (as explained in section 3.10.6).

The Independent T-test in Table 18 reports no significant difference (P>0.05) between 2013 and 2017. Therefore, there is no dominance in functions in terms of the distribution of employment between the year 2013 and 2017.

These results from the study indicate that the hypothesis is accepted. The hypothesis holds true for the Independent T-test, which did not show any significant difference between the year 2013 and 2017. A possible reason for the absence of a statistically significant difference in employment, for the two years could be the fact that there has been little or no difference in the comparison of employment figures across provinces in 2013 and 2017.

Chapter Four also outlined the dominance in comparative advantage in South Africa, between 2013 and 2017, by using inferential statistics (Independent T-test). This

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was done to ascertain the sectors that have comparative advantages in the distributions of employment. The following research question was formulated:

- **Research question**: *Which sectors have more dominance in comparative advantage in terms of employment distribution in South Africa between 2013 and 2017?*
- **Hypothesis**: *There is no dominance in comparative advantage regarding the employment distribution pattern between the year 2013 and 2017.*

This question made it possible to determine if there is dominance in comparative advantage in South Africa with respect to employment between the study years. In order to establish if there is dominance in comparative advantage, the Independent T-test was used. The test was computed at a 5% level of significance (as explained in section 3.10.6). Contrastingly, the Independent T-test in Table 21 reports no significant difference (P>0.05) between 2013 and 2017.

The results from the study showed that the hypothesis is accepted. The hypothesis holds true for the Independent T-test. The Independent T-test did not show any significant difference in the distribution of employment between the year 2013 and 2017.

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5.4 Confirmation of Hypotheses

Some hypotheses were confirmed while others were rejected by way of statistical tests such as frequency distribution, and the independent T-test on functions between the years under study which were performed to test the relationship between variables. These statistical tests helped to answer the research questions and to test the hypotheses presented in Chapter One.

The hypothesis *The manufacturing sector dominates employment distribution patterns across the various sectors in the nine provinces of South Africa* was tested using the

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descriptive analysis technique as the requisite duo of variables needed to test it was not available.

The hypothesis was not accepted because, across the branches of activity, community, social and personal services contributed highest to employment. Therefore, this branch of activity has prevailing employment distributions across the various sectors in the nine provinces of South Africa.

The hypothesis *There are differences amongst the provinces of South Africa with respect to their functions between 2013 and 2017* was tested by conducting descriptive analysis. It was accepted because Gauteng, the Western Cape, and KwaZulu-Natal, which contributed the most to employment, are the most advanced provinces, in terms of economic development. In terms of classification of province by function, some provinces have more dominant functions than their counterparts. Also, in terms of LQ, some provinces had more dominant function than other provinces in South Africa.

In terms of determining dominance in functions and comparative advantages between 2013 and 2017, the following hypothesis was formulated and tested *There is no dominance in comparative advantage regarding the employment distribution pattern between the year 2013 and 2017*. This hypothesis was tested by utilising the Independent T-test to assess dominance in function. The hypothesis was accepted for the Independent T-test, which did not show any significant dominance between the year 2013 and 2017.

The hypothesis *There is no dominance in comparative advantage regarding the employment distribution pattern between the year 2013 and 2017* was also tested using the Independent T-tests to assess dominance in comparative advantage. The hypothesis was accepted for the Independent T-test: the Independent T-test did not show any significant dominance between 2013 and 2017.

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5.5 Chapter Conclusion

The study has taken an intrinsic look at functionality and comparative advantages among South African provinces, by including a location quotient analysis as well examining the relationship between the two phenomena (functions and location quotient).

The study pointed out that there is difference in the distribution of employment across the provinces in both year 2013 and 2017. It also, established that there was no difference in the distribution of employment when both years where compared.

Furthermore, the study ascertained that within and across province there are industries that performed better in terms of attracting employment. However, such a province may not have dominance in function in the industries that attract employment.

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CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

The purpose of this study was to examine the functions of provinces in South Africa and their respective comparative advantages, from 2013 and 2017 in terms of employment absorption, and to establish the nature of the relationship between the functionality and the concentration of firms. This chapter summarises the main findings related to the study, especially with regard to whether the research questions and hypotheses advanced in Chapter One are either accepted or rejected. The overall objective was to investigate how functionality relates to LQ, and to determine if there is convergence between the functions and comparative advantage in terms of employment across the provinces of South Africa in 2013 and 2017. This objective was pursued through socio-economic variables such branch of activity and province of enumeration. These characteristics helped in addressing the research questions and hypotheses set out in Chapter One of this study. This chapter is organised as follows: section 6.2 outlines the general conclusion; section 6.3 examines the confirmation of hypotheses and 6.4 discusses recommendation and areas of future research the chapter conclusion.

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6.2 General Conclusion

Through the analysis of the statistical data, it can be concluded that, during the period 2013-2017, there have been changes in the functions of provinces in South Africa, and their respective comparative advantages, in terms of employment absorption. The findings of the study indicate that Gauteng, KwaZulu-Natal and the Western Cape were the main contributors to the South Africa economy during the years under study. The two

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provinces with the lowest contribution to employment were the Northern Cape and the Free State. The Northern Cape had a lower employment contribution than the Free State. Despite the negative percentage change and negative average annual growth rate in the Northern Cape and KwaZulu-Natal, KwaZulu-Natal still remains one of the main provinces contributing to South Africa's economy; on the other hand, the Northern Cape continues to bring up the rear in terms of employment contribution.

Furthermore, employment in the business services sector grew at a faster annual average growth rate (5.23%) than the rest of the sectors. The possible reason for this high number of jobs is that the business services sector is one of the largest industries in South Africa; it has increasingly been contributing to the country's economy.

The study's results, with respect to function, further indicate that the nine provinces were dominated by retail in 2013 and 2017. Across the provinces, only the North West had dominance in mining and quarrying. There was no dominance in wholesale for both years under study. The results from the study also showed that the nine provinces had no dominance in transportation, in 2013 and 2017, using formulae a, b and c, except in 2017, where the Free State had dominance in transportation when formula b was used. With respect to LQ, there was no comparative advantage across the provinces for each branch of activity. Therefore, this is a confirmation that an industry in a particular province can be attractive in terms of employment despite not being a dominant function in the same province.

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6.3 Recommendations and Areas for Policy Intervention

Given the results obtained and the issues discussed in Chapter Four and Five of this thesis, it is recommended that more research in the area of functionality and comparative advantages among South Africa's provinces be conducted. During the course

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of this study, the dearth of literature on functionality and comparative advantages was also noted. It was difficult to identify the dominant functions that determine the major source of employment among the provinces of South Africa. The results revealed that community, social and personal services, manufacturing, and retail trade, contributed the most towards employment in South Africa between 2013 and 2017. Also, across the provinces, the Western Cape, Gauteng and KwaZulu-Natal, the most economically developed provinces, made the highest contribution to employment in South Africa.

The lesson learnt from this study was that all the provinces displayed variably the same functions. This was as a result of some changes that the functions have invariably represented across the provinces. The provinces provide an environment which is conducive to all types of business to be implemented. Of course, there are provinces that are not well-endowed in terms of natural resources but apparently all the provinces are recipient of hosting investment of all kinds of different economic sectors. Therefore, there should be provision of infrastructure for provinces whose functions are under-represented and funding should be provided to develop those functions. This would possibly encourage the provinces to make the necessary investment in those areas where the functions were not well represented. Also, permission at local and provincial government level to attract investment or to invest in those areas needs to be developed.

Furthermore, it is recommended that the South African government should implement strategies that assist regional development planning that will aid in the government allocating resources evenly towards a healthier equilibrium of spatial patterns across the country and the designing of suitable policy interventions that will propel a balanced spatial development across the country.

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6.4 Future Research

Some problems can be associated with this study: for instance, no demographic variable was used in it. The study was limited to two variables (branch of activity wherein an individual is employed, and province of enumeration). Future research on functionality and comparative advantages among the provinces of South Africa should utilise demographic variables to help policy makers to devise more appropriate and more effective policy instruments to increase employment rates in low employment provinces. Thus, it is suggested that further studies apply this methodology or approach to urban areas', municipalities' or cities' perspectives. That was, in fact, the original idea for this study. However, because the data cannot be obtained at the city level, that was why it was oriented toward the provincial level. Cities are appropriate units of analysis of this kind of research because analysing functionality of cities along their functions for competitiveness, is very important compared to that of provinces. One of the limitations in this study was that the provinces have different levels of urbanisation. Therefore, the influence of cities' levels that need to be captured is implicitly hidden. Some provinces have got advantages because they have big cities – examples of these provinces are Gauteng, KwaZulu-Natal and the Western Cape. Future research should also monitor the misuse of LQ in an analysis of a small area, as the small economy of that region may distort the LQ. If a small city has a specialised business facility, it may very well have a high LQ in that industry.

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http://etd.uwc.ac.za/

References

Albala-Bertrand, J.M. 2009, January. *Economic localization, societal networking & functionality.* A paper prepared for the joint World Bank – UN Assessment of the Economics of Disaster Risk Management' World Bank: Global Facility for Disaster Reduction and Recovery, pp. 1-65. Available at: < https://www.gfdrr.org/sites/gfdrr/files/Economic%20Localization%2C%20Societal%20Networking%20and%20Functionality%20Jan08.pdf> [Accessed 11 Nov. 2019]

Allmendinger, P. and Haughton, G. 2010. 'Spatial planning, devolution, and new planning spaces', *Environment and Planning C: Government and Policy*, *28*(5), pp. 803-818.

Andersen, E.S., 1996. 'Theories of localised resource-based growth and development – From Marshall to new evolutionary economics', in P. Hyttinen, A. Mononen and P. Pelli (eds.) 1996. *Regional Development Based on Forest Resources – Theories and Practices.* Proceedings of the International Seminar 14-15 December 1995 No. 9. Joensuu (Finland): European Forest Institute. pp. 5-16.

Antin, D. 2013. *The South African mining sector: An industry at a crossroads*. Working Paper. Johannesburg: Hanns-Seidel-Foundation.

Anyanwu, J.C. 2012. 'Why does foreign direct investment go where it goes? New evidence from African Countries', *Annals of Economics & Finance*, *13*(2), pp. 425-462.

Aydalot, P. 1984. 'The reversal of spatial trends in French industry since 1974', in J.G. Lambooy (ed.) *New spatial dynamics and economic crisis*, pp. 41-63. Tampere (Finland): Finnpublishers.

Bahar, D. and Rapoport, H. 2018. 'Migration, knowledge diffusion and the comparative advantage of nations', *The Economic Journal*, *128*(612), pp. F273-F305.

UNIVERSITY of the WESTERN CAPE

http://etd.uwc.ac.za/

Barnes, J., Kaplinsky, R. and Morris, M. 2004. 'Industrial policy in developing economies: Developing dynamic comparative advantage in the South African automobile sector', *Competition & Change*, *8*(2), pp. 153-172.

Bethlehem, J. 2009. *Applied survey methods: A statistical perspective* (Vol. 558 of the Wiley Series in Survey Methodology). New York: Wiley. Available at: < https://pdfs.semanticscholar.org/0b59/baaf74acfc0869e649cc6d2f0e34b5434313.pdf> [Accessed 11 Nov. 2019]

Bhat, C.R., Paleti, R. and Singh, P. 2014. 'A spatial multivariate count model for firm location decisions', *Journal of Regional Science*, *54*(3), pp. 462-502.

Bhorat, H. 2008. 'Unemployment in South Africa: descriptors and determinants', in *Proceedings of the IZA (Institute for the Study of Labour) / World Bank Conference on Employment and Development, 4-5 May, Bonn*, pp. 1970-2000. Available at: < http://conference.iza.org/conference_files/worldb2009/Bhorat_Haroon.pdf> [Accessed 11 Nov. 2019]

Bhorat, H., Naidoo, K., Oosthuizen, M. and Pillay, K. 2015. *Demographic, employment, and wage trends in South Africa.* WIDER Working Paper 2015/141. Helsinki: UNU-WIDER.

Bijak, J., Kupiszewska, D., Kupiszewski, M., Saczuk, K. and Kicinger, A. 2007. 'Population and labour force projections for 27 European countries, 2002-2052: impact of international migration on population ageing', *European Journal of Population/Revue Européenne de Démographie*, *23*(1), pp. 1-31.

Camagni, R., Diappi, L. and Leonardi, G. 1986. 'Urban growth and decline in a hierarchical system: A supply-oriented dynamic approach', *Regional Science and Urban Economics*, *16*(1), pp. 145-160.

UNIVERSITY of the WESTERN CAPE

http://etd.uwc.ac.za/

Capello, R. 2016. *Regional economics.* 2nd edn. London and New York: Routledge.

Capello, R. and Nijkamp, P. (eds.) 2010. *Handbook of regional growth and development theories*. Cheltenham: Edward Elgar.

Casale, D. and Posel, D. 2002. 'The continued feminisation of the labour force in South Africa: An analysis of recent data and trends', *South African Journal of Economics*, *70*(1), pp. 156-184.

Center for Urban and Regional Development Studies. 1984. *Residential Unemployment Rates: regional and urban policy perspectives, Factsheet 8*. Newcastle upon Tyne: CURDS

Chiang, S.H. 2009. 'Location quotient and trade', *The Annals of Regional Science*, *43*(2), pp. 399-414.

Chreneková, M., Melichová, K., Marišová, E. and Moroz, S. 2016. 'Informal employment and quality of life in rural areas of Ukraine', *European Countryside*, *8*(2), pp. 135-146.

Cieślik, A. 2005. 'Location of foreign firms and national border effects: the case of Poland', *Tijdschrift voor Economische en Sociale Geografie*, *96*(3), pp. 287-297.

Combes, P.P., Duranton, G., Gobillon, L., Puga, D. and Roux, S. 2012. 'The productivity advantages of large cities: Distinguishing agglomeration from firm selection', *Econometrica*, *80*(6), pp. 2543-2594.

Cooke, P. and Leydesdorff, L. 2006. 'Regional development in the knowledge-based economy: The construction of advantage', *The Journal of Technology Transfer*, *31*(1), pp. 5-15.

Costinot, A. 2009. 'An elementary theory of comparative advantage', *Econometrica*, *77*(4), pp. 1165-1192.

Costinot, A. and Donaldson, D. 2012. 'Ricardo's theory of comparative advantage: Old idea, new evidence', *American Economic Review*, *102*(3), pp. 453-458.

UNIVERSITY of the WESTERN CAPE

http://etd.uwc.ac.za/

Cottineau, C., Hatna, E., Arcaute, E. and Batty, M. 2017. 'Diverse cities or the systematic paradox of urban scaling laws', *Computers, Environment and Urban Systems*, *63*, pp. 80-94.

Datt, G. and Ravallion, M. 2011. 'Has India's economic growth become more pro-poor in the wake of economic reforms?' *The World Bank Economic Review*, *25*(2), pp. 157-189.

Deardorff, A.V. 2005. 'How robust is comparative advantage?' *Review of International Economics*, *13*(5), pp. 1004-1016.

Deardorff, A.V. 2013. 'Growth or decline of comparative advantage', *Journal of Macroeconomics*, *38*, pp. 12-18.

Desmet, K. and Rossi-Hansberg, E. 2014. 'Spatial development', *American Economic Review*, *104*(4), pp. 1211-1243.

Dobrescu, E.M. and Dobre, E.M. 2014. 'Theories regarding the role of the growth poles in the economic integration', *Procedia Economics and Finance*, *8*(14), pp. 262-267.

Duranton, G. and Overman, H.G. 2008. 'Exploring the detailed location patterns of UK manufacturing industries using microgeographic data', *Journal of Regional Science*, *48*(1), pp. 213-243.

Edwards, M.E. 2017. *Regional and urban economics and economic development: Theory and methods*. New York: Routledge.

Fajgelbaum, P.D., Morales, E., Suárez Serrato, J.C. and Zidar, O. 2018. 'State taxes and spatial misallocation', *The Review of Economic Studies*, *86*(1), pp. 333-376.

Fedderke, J. and Szalontai, G. 2009. 'Industry concentration in South African manufacturing industry: Trends and consequences, 1972-96', *Economic Modelling*, *26*(1), pp. 241-250.

Firestone, W.A., 1987. 'Meaning in method: The rhetoric of quantitative and qualitative research', *Educational Researcher*, *16*(7), pp. 16-21.

UNIVERSITY of the WESTERN CAPE

http://etd.uwc.ac.za/

Flegg, A.T. and Webber, C.D., 1997. 'On the appropriate use of location quotients in generating regional input- output tables: Reply', *Regional studies*, *31*(8), pp. 795-805.

Fluri, T.P. 2009. 'The potential of concentrating solar power in South Africa', *Energy Policy*, *37*(12), pp. 5075-5080.

Fracasso, A. and Vittucci Marzetti, G. 2018. 'Estimating dynamic localization economies: The inadvertent success of the specialization index and the location quotient', *Regional Studies*, *52*(1), pp. 119-132.

Gallardo, J.L. 2005. 'Comparative advantage, economic growth and free trade', *Revista de Economia Contemporânea*, *9*(2), pp. 313-335.

Gaubert, C. and Itskhoki, O. 2018, July. *Granular comparative advantage* (NBER Working Paper No. 24807). Cambridge, MA.: National Bureau of Economic Research. Available at: < https://www.nber.org/papers/w24807> [Accessed 11 Nov. 2019]

Guimarães, P., Figueiredo, O. and Woodward, D. 2009. 'Dartboard tests for the location quotient', *Regional Science and Urban Economics*, *39*(3), pp. 360-364.

Gupta, S.D. 2009, May. 'Comparative advantage and competitive advantage: An economics perspective and a synthesis', *Athens Journal of Business & Economics*, *1*(1), pp. 1-22.

Harriss-White, B. and Heyer, J. (eds.) 2010. *The comparative political economy of development: Africa and South Asia*. London: Routledge.

Healey, P. 2004. 'The treatment of space and place in the new strategic spatial planning in Europe', *International Journal of Urban and Regional Research*, *28*(1), pp. 45-67.

Henderson, V. and Thisse, J.F. (eds.) 2004. *Handbook of regional and urban economics: Cities and geography. Vol. 4*. Netherlands: Elsevier.

Higgins, B. and Savoie, D.J. (eds.) 2017. *Regional economic development: essays in honour of François Perroux*. London and New York: Routledge. Available at: < http://promcomceigeab.tk/1697.html> [Accessed 11 Nov. 2019]

UNIVERSITY of the WESTERN CAPE

http://etd.uwc.ac.za/

Hoover, E.M. and Giarratani, F. 1984. *An introduction to regional economics.* 3rd edn. London: West Virgina University.

Hsieh, C.T. and Moretti, E. 2019. 'Housing constraints and spatial misallocation', *American Economic Journal: Macroeconomics, 11*(2), pp. 1-39.

Hudson, R. 2007. 'Region and place: Rethinking regional development in the context of global environmental change', *Progress in human geography, 31*(6), pp. 827-836.

Jānis, A. 2014. 'EU Region Policy. European Commission Lifelong Learning Programme', *Jean Monnet Programme*, pp. 7-15.

Jofre-Monseny, J., Marín-López, R. and Viladecans-Marsal, E. 2011.' The mechanisms of agglomeration: Evidence from the effect of inter-industry relations on the location of new firms', *Journal of Urban Economics, 70*(2-3), pp. 61-74.

Kaplan, D. 2003. 'Manufacturing performance and policy in South Africa: A review', Paper presented to the TIPS/DPRU Forum, Development Policy Research Unit, School of Economics, University of Cape Town. Available at: < https://www.tips.org.za/research-archive/annual-forum-papers/2003/item/860-manufacturing-performance-and-policy-in-south-africa-a-review> [Accessed 11 Nov. 2019]

Karlsson, C., Andersson, A.E., Cheshire, P.C. and Stough, R.R. (eds.) 2009. *New directions in regional economic development*. Berlin: Springer-Verlag.

Kowalski, P. 2011. 'Comparative advantage and trade performance: Policy implications', *OECD Trade Policy Papers (No. 121)*. Paris: OECD Publishing. Available at: < https://www.oecd-ilibrary.org/docserver/5kg3vwb8g0hl-en.pdf?expires=1573473496&id=id&accname=guest&checksum=8BEF5E23AA4DBEDD26E7F80CE6893CCF> [Accessed 11 Nov. 2019]

UNIVERSITY of the WESTERN CAPE

http://etd.uwc.ac.za/

Krosnick, J.A. 2018. 'Questionnaire design', in D.L. Vannette, J.A. Krosnicke (eds.) *The Palgrave handbook of survey research*, Cham: Palgrave Macmillan, pp. 439-455.

Kultar, S. 2007. *Quantitative social research methods*. New Delhi: Sage Publications.

Lake, L., Shung-King, M., Hendricks, M., Heywood, M., Nannan, N., Laubscher, R., and Ramraj, T. 2019 'Prioritising child and adolescent health: A human rights imperative', *Child and adolescent health, 3*, pp. 148

Lehmann, R. and Nagl, W. 2019. 'Explaining spatial patterns of foreign employment in Germany', *Regional Studies, 53*(7), pp. 991-1003

Leibbrandt, M., Woolard, I., McEwen, H. and Koep, C. 2010. Employment and inequality outcomes in South Africa. *University of Cape Town: Southern Africa Labour and Development Research Unit*. Available at: < https://www.oecd.org/els/emp/45282868.pdf> [Accessed 11 Nov. 2019]

Lessmann, C. 2014. 'Spatial inequality and development – is there an inverted-U relationship?', *Journal of Development Economics, 106*, pp. 35-51.

Lewis, J.D. 2001. *Policies to promote growth and employment in South Africa*. Informal discussion paper on aspects of the economy of South Africa (No. 16). Southern Africa Department. Washington, DC: World Bank.

Liu, L., Wang, Y., Wang, M.Q., Xiao, Y.B. and Gao, M. 2017, June. 'Research on the competitiveness of high-tech industries in northeast China', *IOP Conference Series: Earth and Environmental Science, 69*(1), pp. 12-37.

Lubell, M. 2013. 'Governing institutional complexity: The ecology of games framework', *Policy Studies Journal, 41*(3), pp. 537-559.

Luus, R. 2016. *Statistical inference of the multiple regression analysis of complex survey data.* Ph.D. thesis, Stellenbosch University, Stellenbosch.

UNIVERSITY of the WESTERN CAPE

http://etd.uwc.ac.za/

Mack, R.S. and Jacobson, D.S., 1996. 'Core periphery analysis of the European Union: a location quotient approach', *Journal of Regional Analysis and Policy*, *26*(1100), pp. 3-21.

Majeskey, A.M.T. 2008. *An evaluation of the mentoring program among US Air Force enlisted personnel: A case study*. PhD thesis, School of Business Capella University, Minneapolis pp 1-24.

Manić, E., Popović, S. and Molnar, D. 2012. 'Regional disparities and regional development: The case of Serbia', *Austrian Geographical Society, 154,* pp. 191-211.

Marshall, A. 1920. *Principles of economics.* 8th edn. London: Cambridge.

Marshall, A. 1949. *Principles of economics: An introductory volume*. Reset version of 8th edn. Basingstoke and London: Macmillan.

Maskell, P. and Malmberg, A., 1999. 'The competitiveness of firms and regions: 'Ubiquitification' and the importance of localized learning', *European Urban and Regional Studies*, *6*(1), pp. 9-25.

Mason, G., Williams, G. and Cranmer, S. 2009. 'Employability skills initiatives in higher education: What effects do they have on graduate labour market outcomes?', *Education Economics*, *17*(1), pp. 1-30.

Meintjes, C.J. 2001. 'Guidelines to regional socio-economic analysis', *Development Bank of Southern Africa, Development Information Business Unit Development Paper*, *145*. Available at: < https://www.dbsa.org/EN/About-Us/Publications/Documents/GuidelinestoRegionalAnalysis.pdf> [Accessed 11 Nov. 2019]

Mitchell, S. and Andersson, N. 2011. 'Equity in development and access to health services in the Wild Coast of South Africa: The community view through four linked cross-

UNIVERSITY of the WESTERN CAPE

http://etd.uwc.ac.za/

sectional studies between 1997 and 2007', *BMC Health Services Research, 11*(2), pp. 1-11.

Mkhize, N.I. 2019. 'The sectoral employment intensity of growth in South Africa', *Southern African Business Review, 23*(1), pp. 1-24.

Moriarty, B.M., 1991. 'Urban systems, industrial restructuring, and the spatial-temporal diffusion of manufacturing employment', *Environment and Planning A, 23*(11), pp. 1571-1588.

Mouton, J. and Babbie, E., 2001. *The practice of social research*. Cape Town: Wadsworth Publishing Company, pp. 871-890.

Musvoto, C., Nortje, K., De Wet, B., Mahumani, B.K. and Nahman, A. 2015. 'Imperatives for an agricultural green economy in South Africa', *South African Journal of Science, 111*(1-2), pp. 1-8.

Naude, C.M. 2006. *Industry concentration in South Africa.* Ph.D. thesis, University of Pretoria, Pretoria.

Nel, E. and Rogerson, C.M. 2016. 'The contested trajectory of applied local economic development in South Africa', *Local Economy, 31*(1-2), pp. 109-123.

Nguyen, C.Y., Sano, K., Tran, T.V. and Doan, T.T. 2013. 'Firm relocation patterns incorporating spatial interactions', *The Annals of Regional Science, 50*(3), pp. 685-703.

Nijkamp, P. and Abreu, M.A. 2009. *Regional development theory.* Amsterdam: Faculteit der Economische Wetenschappen en Bedrijfskunde. Available at: < http://degree.ubvu.vu.nl/repec/vua/wpaper/pdf/20090029.pdf> [Accessed 11 Nov. 2019]

Nord, C. 2014. *Translating as a purposeful activity: Functionalist approaches explained*. London and New York: Routledge.

Omolo, J. 2012. 'Regional disparities in employment and human development in Kenya', *Canadian Journal of Business and Economics, 1*(1), pp. 1-17.

UNIVERSITY of the WESTERN CAPE

http://etd.uwc.ac.za/

Ong, M.H.A. and Puteh, F. 2017. 'Quantitative data analysis: Choosing between SPSS, PLS and AMOS in social science research', *International Interdisciplinary Journal of Scientific Research, 3*(1), pp. 14-25.

Oosthuizen, G.A. 2011.' Developments in wear maps as machining optimisation tools', *ISEM 2011 Proceedings, September 21-23, Stellenbosch*. Available at: < https://pdfs.semanticscholar.org/b0ef/bfb8bf5f67e908f3d6cf5a3112deb67517cc.pdf> [Accessed 11 Nov. 2019]

Orhun, A.Y. 2013. 'Spatial differentiation in the supermarket industry: The role of common information', *Quantitative Marketing and Economics*, *11*(1), pp. 3-37.

Parveen, 2016. 'Regional disparities in Indian economic development', *IJARIIE, 2*(6), pp. 1203-1208. Available at: < http://ijariie.com/AdminUploadPdf/Regional_disparities_in_Indian_economic_development_ijariie3512.pdf> [Accessed 11 Nov. 2019]

Pelli, M. and Tschopp, J. 2017. 'Comparative advantage, capital destruction, and hurricanes', *Journal of International Economics, 108*, pp. 315-337.

Petersson, L. 2002. 'The new economic geography and industrial location in SADC', *South African Journal of Economics, 70*(8), pp. 1222-1246.

Pike, A., Rodríguez-Pose, A. and Tomaney, J. 2016. *Local and regional development*, 2nd edn. London: Routledge.

Pratt, G.C. 2019. Limpopo – Socio-economic review and outlook. *Provincial Treasury: Limpopo.* Available at: < http://www.treasury.gov.za/documents/provincial%20budget/2019/4.%20Guide%20to%20the%20Budget/Limpopo%20-%20Socio-Economic%20Review%20and%20Outlook.pdf> [Accessed 11 Nov. 2019]

UNIVERSITY of the WESTERN CAPE

http://etd.uwc.ac.za/

Prestwich, R. and Taylor, P.H. 1990. *Introduction to regional and urban policy in the United Kingdom*. London: Longman.

Rajalakshmi, K. 2013. 'Growing regional disparities in India's development', *International Journal of Educational Research and Technology*, *4*(3), pp. 47-55.

Ramuhashi, L. 2007. *Development and disparities among provinces in South Africa: A comparative analysis.* Ph.D. thesis, University of Johannesburg, Johannesburg.

Riddington, G., Gibson, H. and Anderson, J. 2006. 'Comparison of gravity model, survey and location quotient-based local area tables and multipliers', *Regional Studies, 40*(9), pp. 1069-1081.

Rodrigue, J.P. and Notteboom, T. 2010. 'Comparative North American and European gateway logistics: The regionalism of freight distribution', *Journal of Transport Geography*, *18*(4), pp. 497-507.

Rogerson, C. 2002. 'Knowledge-based Regions in the Global Periphery: The Case of South Africa', in R. Hayter and R. Le Heron. 2002. *Knowledge, Industry and Environment: Institutions and Innovation in Territorial Perspective.* London: Routledge. pp. 313-335. Available at: https://doi.org/10.4324/9781315190327 [Accessed 11 Nov. 2019].

Schaltegger, E. 2013. *Evaluation in rural development: definitions, discourses and lessons from evaluations*, Eschbom: Internationale Zusammenarbeit (GIZ) GmbH Monitoring and Evaluation Unit, pp. 2-45. Available at: < https://www.giz.de/en/downloads/giz2013-en-desk_study_Rural_Development.pdf> [Accessed 11 Nov. 2019]

Scott, A.J. and Storper, M. 2015. 'The nature of cities: The scope and limits of urban theory', *International journal of urban and regional research*, *39*(1), pp. 1-15.

Seekings, J. and Nattrass, N. 2008. *Class, race, and inequality in South Africa*. New Haven: Yale University Press.

Singh, K. 2007. *Quantitative social research methods*. London: Sage.

UNIVERSITY of the WESTERN CAPE

http://etd.uwc.ac.za/

Singh, R. 2015. 'Regional disparities in post reform India', *Modern Geografia, 1*(1), pp. 41-68.

Startienė, G. and Remeikienė, R. 2014. 'Evaluation of revealed comparative advantage of Lithuanian industry in global markets', *Procedia-Social and Behavioral Sciences, 110*, pp. 428-438.

Stats, S.A. 2007. *Using the 2001 Census*: *Approaches to analysing data*. Pretoria: Statistics South Africa.

Stats, S.A. 2012. *Standard industrial classification of all economic activities (SIC).* 7th edn. Pretoria: Statistics South Africa.

Stats, S.A. 2013. *Quarterly labour force survey, quarter 3. Statistical Release P0211*. Pretoria: Statistics South Africa

Stats, S.A. 2017a. *Poverty trends in South Africa: An examination of absolute poverty between 2006 and 2015*. Pretoria: Statistics South Africa.

Stats, S.A. 2017b. *Quarterly labour force survey, quarter 3. Statistical Release P0211*. Pretoria: Statistics South Africa

Stats, S.A. 2018. *Annual quarterly and regional GDP by province, quarter 4. Statistical Release PO441*. Pretoria: Statistics South Africa

Szirmai, A. and Verspagen, B. 2015. 'Manufacturing and economic growth in developing countries, 1950-2005', *Structural Change and Economic Dynamics, 34*, pp. 46-59.

Tati, G., Yemeru, E.A., and Zawedde, S. 2017. *Assessment of urbanization data in Africa*. Adis Ababa: United Nations Economic Commission for Africa. Available at: < https://www.researchgate.net/publication/318589726_Assessment_of_Urbanisation_in_Africa/link/599586944585153b506fe539/download> [Accessed 11 Nov. 2019]

The Real Economy Bulletin, 2016a. *Trend Development and Data*. *Eastern Cape: Provincial Review*, pp. 6-12. Available at: < https://www.tips.org.za/manufacturing-data/the-real-

UNIVERSITY of the WESTERN CAPE

http://etd.uwc.ac.za/

economy-bulletin/provincial-review/item/3172-the-real-economy-bulletin-provincial-review-2016> [Accessed 11 Nov. 2019]

The Real Economy Bulletin, 2016b. *Trend Development and Data*. *Gauteng: Provincial Review*, pp. 20-26. Available at: < https://www.tips.org.za/manufacturing-data/the-real-economy-bulletin/provincial-review/item/3172-the-real-economy-bulletin-provincial-review-2016> [Accessed 11 Nov. 2019]

The Real Economy Bulletin, 2016c. *Trend Development and Data*. *Western Cape: Provincial Review*, pp. 61-66. Available at: < https://www.tips.org.za/manufacturing-data/the-real-economy-bulletin/provincial-review/item/3172-the-real-economy-bulletin-provincial-review-2016> [Accessed 11 Nov. 2019]

Thirlwall, A.P., 1999. *Growth and development: with special reference to developing economies.* 6th edn. London: Macmillan.

Tian, Z. 2013. 'Measuring agglomeration using the standardized location quotient with a bootstrap method', *Journal of Regional Analysis & Policy*, *43*(2), p. 186-197

Todaro, M.P. and Smith, S.C. 2015. *Economic development.* 12th edn. London: Pearson.

Tohmo, T. 2004. 'New developments in the use of location quotients to estimate regional input–output coefficients and multipliers', *Regional Studies*, *38*(1), pp. 43-54.

Verhetsel, A., Kessels, R., Goos, P., Zijlstra, T., Blomme, N. and Cant, J. 2015. 'Location of logistics companies: a stated preference study to disentangle the impact of accessibility', *Journal of Transport Geography*, 42, pp. 110-121.

Weber, A. and C.J. Friedrich (ed.) 1929. *Theory of the location of industries.* Chicago: University of Chicago Press.

Western Cape Provincial Treasury, 2017. *Provincial economic review and outlook.* Available at: < https://www.westerncape.gov.za/assets/departments/treasury/Documents/Research-and-

UNIVERSITY of the WESTERN CAPE

http://etd.uwc.ac.za/

Report/2017/2017_pero_printers_proof_21_september_2017_f.pdf > [Accessed 11 Nov. 2018]

Williamson, J.G., 1965. 'Regional inequality and the process of national development: a description of the patterns', *Economic Development and Cultural Change*, *13*(4), pp. 1-84.

Zeng, L., Proctor, R.W. and Salvendy, G. 2010. 'Creativity in ergonomic design: A supplemental value-adding source for product and service development', *Human Factors*, *52*(4), pp. 503-525.

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Appendix 1: Branch of activity by province 2013

Branch of activity 2013	WC	EC	NC	FS	KZN	NW	GT	MP	LP
Agriculture; hunting; forestry and fishing									
Growing of crops	113642	41229	26453	12152	53589	19228	22674	65210	90199
Farming of animals	14284	26959	14567	24060	18555	13750	10683	16095	14389
Growing of crops combined with farming of animals	26440	0	2589	30789	3003	6840	0	8842	686
Agricultural and animal husbandry services	3115	1820	0	0	462	0	2548	413	0
Game hunting, trapping and game propagation	0	0	92	0	0	1590	0	0	614
Forestry and related services	357	3290	0	0	30083	0	1444	8495	8631
Logging and related services	0	0	0	0	2105	564	1116	1148	0
Ocean and coastal fishing	2039	0	0	0	0	0	0	0	0
Fish hatcheries and fish farms	1391	0	0	0	0	0	0	0	656
Mining									
Mining of coal and lignite	0	0	0	1032	17814	0	3809	66787	420
Mining of gold and uranium ore	0	0	0	18614	0	41996	19920	19144	0
Mining of iron ore	0	0	4787	0	0	0	0	0	1005
Mining of non-ferrous metal ores	0	0	3434	0	0	114095	0	1543	62369
Quarrying									
Stone quarrying, clay and sandpits	0	0	2512	0	1328	337	473	181	881
Mining of diamonds (including alluvial diamonds)	0	0	7170	2685	0	256	0	0	4030
Mining and quarrying N.E.C.	2096	0	493	379	2128	3529	11323	0	6373
Manufacturing									

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Production, processing and preservation of meat	26990	3053	1708	6528	11404	6148	15120	7426	3166
Manufacture of dairy products	12927	5720	0	848	2828	1819	20155	1307	0
Manufacture of grain mill products, starches	5548	4780	251	2361	7966	2252	15723	790	4460
Manufacture of other food products	15167	14423	743	4443	26421	5928	41313	3969	2097
Manufacture of beverages	19766	10504	768	4567	4496	3429	11379	2987	15183
MANUFACTURE OF TOBACCO PRODUCTS	1914	0	0	0	1130	0	2919	0	0
Spinning, weaving and finishing of textiles	3280	1101	0	0	3249	0	0	555	
Manufacture of other textiles	6783	2237	327	732	15722	2394	11252	2424	1412
Manufacture of knitted and crocheted fabrics and articles	2564	707	0	0	3918	286	2469	0	122
Manufacture of wearing apparel, except fur apparel	25465	11264	547	9537	39874	3516	21563	5565	8719
Tanning and dressing of leather; manufacture of luggage		1947	0	474	12429	1365	4019	0	0
Manufacture of footwear	1780	0	0	0	17817	0	0	0	459
Sawmilling and planing of wood	2159	3767	0	0	5847	0	976	6099	5130
Manufacture of products of wood, cork, straw and plaiting materials	12366	4677	0	629	18585	3195	15981	1841	4216
Manufacture of paper and paper products	8788	2354	0	388	9443	0	7326	1256	969
Publishing	5548	3571	0	0	849	544	18391	0	0
Printing and service activities related to printing	15274	2137	150	1446	13864	428	17725	461	659
Reproduction of recorded media	0	0	0	0	0	0	943	0	0
Manufacture of coke oven products	0	0	0	0	0	0	2571	162	0
Petroleum refineries / synthesisers	4035	1409	0	3264	9454	0	8789	11527	0
PROCESSING OF NUCLEAR FUEL	0	0	0	0	0	0	1453	0	0
Manufacture of basic chemicals	2438	0	209	1354	7183	930	7825	0	0
Manufacture of other chemical products	10121	10402	175	3114	17179	3746	45453	2196	408

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Manufacture of rubber products	2392	10048	0	0	3588	1352	12240	686	167
Manufacture of plastic products	14941	5474	0	468	17570	543	22825	1011	0
Manufacture of glass and glass products	2386	1883	0	0	2155	0	7249	0	313
Manufacture of non-metallic mineral products N.E.C.	3858	3058	2468	2802	9355	5774	28854	12074	12409
Manufacture of basic iron and steel	14100	5285	690	2125	10133	804	44605	7178	0
Manufacture of basic precious and non-ferrous metals	1670	0	0	0	3896	1740	6950	401	1257
Casting of metals	1963	1534	0	392	0	0	670	0	0
Manufacture of structural metal products, tanks, reservoirs	11179	6663	852	1096	19108	385	23142	9633	7909
Manufacture of other fabricated metal products; metalwork	4661	5755	0	1643	9819	3352	39190	1730	1936
Manufacture of general purpose machinery	8049	705	0	1680	6040	655	13691	829	0
Manufacture of special purpose machinery	2573	2102	485	2827	3437	5066	30746	3493	1202
Manufacture of household appliances N.E.C.	3143	740	0	886	210	1259	6878	451	494
Manufacture of office, accounting and computing machinery	0	0	0	325	0	0	9424	0	0
Manufacture of electric motors, generators and transformers	1186	0	0	0	2193	0	18197	0	480
Manufacture of electricity distribution and control apparatus	0	0	0	0	0	0	2003	0	0
Manufacture of insulated wire and cable	679	0	0	0	0	934	1015	0	0
Manufacture of accumulators, primary cells	0	1294	0	0	0	0	918	0	0
Manufacture of electric lamps and lighting equipment	372	0	0	0	0	0	5262	0	0
Manufacture of other electrical equipment N.E.C.	2637	316	0	0	521	0	3800	0	0
Manufacture of electronic valves and tubes	396	0	0	0	651	0	2799	0	0
Manufacture of television and radio transmitters	0	0	0	0	0	0	4525	0	0
Manufacture of television and radio receivers, sound	388	0	0	0	0	0	0	0	0
Manufacture of medical appliances and instruments	2776	1134	0	0	3309	690	17450	0	0

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Manufacture of optical instruments	470	0	0	0	0	0	10036	0	0
Manufacture of motor vehicles	790	9071	0	0	10106	395	22812	0	0
Manufacture of bodies (coachwork) for motor vehicles;	1722	1987	0	1793	0	1302	1837	0	0
Manufacture of parts and accessories for motor vehicles	2766	15060	0	0	8330	4080	21576	331	1055
Building and repairing of ships and boats	2513	0	0	0	0	0	0	0	0
Manufacture of railway and tramway locomotives	1167	621	0	0	0	0	1801	0	0
Manufacture of aircraft and spacecraft	0	0	0	0	0	0	6090	0	0
MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.	0	0	0	0	964	0	1739	0	0
Manufacture of furniture	3500	0	0	1013	3814	2891	22994	1126	1955
Manufacturing N.E.C...	2652	2846	0	617	5915	1960	6050	1116	5522
Recycling N.E.C.	9825	0	186	859	4061	4102	9024	4916	1699
Electricity; gas and water supply									
Production, collection and distribution of electricity	13254	7537	637	2379	5594	1847	32976	24862	9507
Manufacture of gas; distribution of gaseous fuels	1702	0	0	0	906	0	4580	0	0
COLLECTION, PURIFICATION AND DISTRIBUTION OF WATER	2468	3198	1422	2860	7490	2884	3767	1910	10100
Construction									
Site preparation	457	656	202	0	0	0	0	0	0
Building of complete constructions or parts thereof; civil engineering	97526	129535	19110	43450	178550	38144	165732	71839	95404
Building installation	41246	18265	3477	6608	23658	14468	80839	11949	9772
Building completion	18501	3331	923	2971	27652	2109	38396	8498	2584
Wholesale									
Wholesale trade on a fee or contract basis	14750	1964	0	260	7004	0	30408	0	0
Wholesale trade in agricultural raw materials, livestock, food, beverages	4684	15962	1938	4689	6977	6591	17574	4612	4162

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Wholesale trade in house-hold goods	1842	536	0	0	436	0	5539	1375	0
Wholesale trade in non-agricultural intermediate products, waste and scrap	4465	1654	2026	2973	6323	2580	16145	4400	7914
Wholesale trade in machinery, equipment and supplies	2416	0	0	669	0	0	5605	0	565
Other wholesale trade	417	0	0	0	3088	0	0	249	0
Retail trade									
Non-specialised retail trade in stores	75130	42855	5960	18718	83228	25854	146063	27300	42672
Retail trade in food, beverages and tobacco in specialised stores	28357	12283	2529	11768	25292	14621	52574	11780	13308
Other retail trade in new goods in specialised stores	86571	47178	10679	23265	94444	27315	256594	45255	29258
Retail trade in second-hand goods in stores	1755	589	220	271	0	2072	2331	0	0
Retail trade not in stores	43723	74456	4442	28322	145056	21188	152044	83338	112627
Repair of personal and household goods	6621	4926	571	2326	5975	618	36946	4498	6612
Sale of motor vehicles	15983	2858	665	1509	9008	2325	23776	3842	2359
Maintenance and re-pair of motor vehicles	33290	15974	2569	9180	45223	14747	70360	20716	12909
Sale of motor vehicle parts and accessories	6485	4163	1709	2265	8344	1025	29728	2977	3440
Sale, maintenance and repair of motor cycles and related parts	2471	0	0	0	0	0	0	0	0
Retail sale of automotive fuel	15130	8228	2139	10601	30409	3338	44360	12937	9271
Hotels, camping sites and other provision of short stay	27916	10583	3548	5546	22434	6881	50315	12416	4886
Restaurants, bars and canteens	91003	32495	6877	17125	62565	16116	103204	14184	23079
Shebeen	4193	8357	1668	3948	746	1967	10776	7487	634
Transport									
Railway transport	11172	9670	4729	1439	30219	1633	26490	7313	0
Other land transport	57083	43513	4936	27316	126381	20409	190514	37824	37591
Sea and coastal water transport	458	482	529	0	1985	0	0	0	0

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AIR TRANSPORT	5835	0	162	0	2538	0	26116	2292	242
Storage and communication									
Supporting and auxiliary transport activities	24396	4661	331	531	29766	633	30475	1582	622
Postal and related courier activities	17538	3190	1704	2640	4732	3153	25317	551	5121
Telecommunication	20591	2877	655	3019	6514	1631	65120	860	2999
Financial intermediation									
Monetary intermediation	14983	4751	2072	4767	20830	1856	99589	2002	8622
Cash loans	1186	1833	0	2384	523	1025	3652	2924	987
Other financial intermediation N.E.C.	16246	3619	127	2792	11224	482	46933	3102	1554
Insurance									
Insurance and pension funding	21781	6619	1813	3288	21009	2839	84085	2178	4829
Activities auxiliary to financial intermediation	5375	0	606	0	0	635	14621	377	0
Real estate									
Real estate activities with own or leased property	22830	6772	710	1273	9199	6044	74512	7361	1382
Real estate activities on a fee or contract basis	0	0	164	0	682	0	910	0	0
Business services / administrative and support activities									
Renting of transport equipment	3495	1965	424	437	4209	633	8466	413	0
Renting of other machinery and equipment	0	892	0	224	6900	1431	6509	4323	0
Renting of personal and household goods N.E.C.	2162	0	0	411	2302	0	3562	438	0
HARDWARE CONSULTANCY	0	0	0	0	0	0	513	0	0
Software consultancy and supply	15928	779	305	0	6518	1408	41688	1063	0
Data processing	0	0	0	0	0	0	3080	0	0
Data base activities	440	0	0	0	430	0	1444	0	0

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Maintenance and repair of office, accounting	543	4437	1001	0	805	0	8105	383	404
Other computer related activities	918	0	0	0	3259	0	4504	0	0
Research and experimental development on natural sciences	5429	0	0	2424	1153	1574	15163	959	0
Legal, accounting, bookkeeping and auditing activities	44630	12091	4440	7350	25260	4465	93561	4449	3371
Architectural, engineering and other technical activities	13333	7495	3373	7812	20458	3538	77858	26445	3752
Advertising	11683	1859	469	1184	2436	525	21883	1524	1458
Business activities N.E.C.	172621	65919	10672	32471	149961	45943	375543	59507	35355
Community; social and personal services									
Central government activities	25493	18750	12903	10378	30881	18380	79126	11680	22890
Local authority activities	51727	31789	12373	27815	54708	20024	61457	24744	29972
Provincial administrations	1627	0	391	780	967	751	2599	749	0
S A Defense force	12253	1700	4482	6468	7635	5525	28583	884	1892
S A Police service	34690	12567	10960	17436	32130	30459	59272	12058	14268
Correctional service	12619	3572	3610	4498	6361	1620	25911	1078	3167
EDUCATION	98014	122121	22890	52946	174764	45909	274685	78202	108171
Human health activities	94447	61695	10028	35089	140710	35444	186871	45668	55328
Veterinary activities	1387	690	0	555	618	315	2043	0	0
Social work activities	38254	22288	10438	14277	40901	18502	83790	10643	16202
OTHER COMMUNITY, SOCIAL AND PERSONAL SERVICE ACTIVITIES	14878	16303	6694	16206	29643	12620	16588	17067	8495
Activities of business, employers and professional organisations	0	853	0	580	1573	0	4160	851	2070
Activities of trade unions	753	0	104	387	0	900	9389	0	204
Activities of other member-ship organizations	12692	4997	1283	1662	9182	2286	16858	2100	7934

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Motion picture, radio, television and other entertainment activities	6535	1731	0	962	4053	1427	18935	1888	2075
News agency activities	2561	2478	1781	0	4002	0	6744	0	312
Arts, entertainment and recreation									
Library, archives, museums and other cultural activities	4732	1431	116	1688	9187	975	3844	3732	2610
Sporting and other recreational activities	13170	6369	570	1438	6720	2474	26957	3870	1818
OTHER SERVICE ACTIVITIES	33573	17280	2361	10708	40519	8507	73537	16924	16856
Private households									
PRIVATE HOUSEHOLDS WITH EMPLOYED PERSONS	121749	119290	33962	86905	224619	66113	421785	103463	96281
Other									
REPRESENTATIVES OF FOREIGN GOVERNMENTS	0	0	0	0	511	0	2307	0	0
Total	2166901	1309838	319135	742165	2593279	854227	4890013	1161293	1173548

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Appendix 2: Branch of activity by province 2017

Branch of activity 2017	WC	EC	NC	FS	KZN	NW	GT	MP	LP
Agriculture; hunting; forestry and fishing									
Growing of crops	126356	39512	24306	25545	65787	20614	27586	44313	101956
Farming of animals	24543	41990	14157	22863	28513	24429	8707	23030	18476
Growing of crops combined with farming of animals	3065	4809	833	27286	2679	1991	3456	13482	2654
Agricultural and animal husbandry services	0	0	0	0	0	1206	0	490	0
Game hunting, trapping and game propagation	0	0	0	0	0	807	0	0	5056
Forestry and related services	2015	0	0	657	15156	0	3095	13723	11515
Logging and related services	0	0	0	0	13013	0	0	4434	0
Ocean and coastal fishing	3693	0	0	0	0	0	0	0	0
Fish hatcheries and fish farms	0	0	0	0	0	0	1738	1391	542
Mining									
Mining of coal and lignite	0	0	0	650	1802	0	5778	42535	14591
Mining of gold and uranium ore	1135	0	0	15812	0	5326	55436	1885	0
Mining of iron ore	0	0	21942	0	0	0	0	0	0
Mining of non-ferrous metal ores	0	0	1570	0	0	126074	7553	5370	86492
Quarrying									
Stone quarrying, clay and sandpits	3911	0	414	0	1203	0	0	0	2138
Mining of diamonds (including alluvial diamonds)	0	0	8253	0	0	3593	719	0	1721
Mining and quarrying N.E.C.	0	0	394	1018	1540	1746	21909	1608	1863
Manufacturing									

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Production, processing and preservation of meat	49293	5478	979	3780	7509	9855	11565	9549	829
Manufacture of dairy products	6422	7612	0	2717	5418	950	4408	320	3035
Manufacture of grain mill products, starches	4759	2450	0	2512	753	4026	3813	3280	2465
Manufacture of other food products	24405	9198	1115	4948	20303	2269	54488	7302	10926
Manufacture of beverages	25551	9910	441	2944	10683	1615	16682	1060	8575
MANUFACTURE OF TOBACCO PRODUCTS	932	0	0	0	0	0	0	0	1337
Spinning, weaving and finishing of textiles	1781	1100	0	0	10045	0	0	867	0
Manufacture of other textiles	8807	904	0	0	7036	3020	7428	2600	1969
Manufacture of knitted and crocheted fabrics and articles	4060	0	0	588	3342	733	1512	1008	859
Manufacture of wearing apparel, except fur apparel	28132	6977	1351	6418	83595	4427	13807	4718	7059
Tanning and dressing of leather; manufacture of luggage	5043	71	0	0	536	0	3969	0	0
Manufacture of footwear	1452	0	0	0	3804	2939	0	0	0
Sawmilling and planing of wood	1823	5008	0	0	6793	0	4566	2316	2849
Manufacture of products of wood, cork, straw and plaiting material	14787	6863	0	0	7692	2089	26092	1999	5686
Manufacture of paper and paper products	5384	1485	0	763	10178	1964	11434	1508	0
Publishing	9363	0	363	699	1397	0	7073	0	0
Printing and service activities related to printing	12248	885	0	1412	9794	0	31342	0	197
Reproduction of recorded media	0	0	0	0	1893	0	0	0	0
Manufacture of coke oven products	0	0	0	0	573	0	531	0	0
Petroleum refineries / synthesisers	4752	0	0	8506	3072	0	21833	21092	740
PROCESSING OF NUCLEAR FUEL	0	0	0	0	0	0	3252	0	0
Manufacture of basic chemicals	3501	424	0	1273	2598	728	4519	768	0
Manufacture of other chemical products	15016	5454	0	2751	13790	1182	52071	2643	0

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Manufacture of rubber products	1542	4514	0	0	8701	6321	8774	1778	0
Manufacture of plastic products	10974	0	0	1595	6986	1625	18795	768	2285
Manufacture of glass and glass products	7220	2433	1108	0	698	0	7948	0	0
Manufacture of non-metallic mineral products N.E.C.	14232	9278	615	2590	10595	4445	30633	9635	21434
Manufacture of basic iron and steel	4765	964	331	701	16065	5261	49412	6227	0
Manufacture of basic precious and non-ferrous metals	1169	0	0	0	2311	657	1210	4384	1104
Casting of metals	1234	0	0	0	1053	0	0	0	0
Manufacture of structural metal products, tanks, reservoirs	10081	4484	0	2691	12932	9478	38633	5509	5029
Manufacture of other fabricated metal products; metalwork	14147	3876	1712	1859	9692	4485	43630	5720	5109
Manufacture of general purpose machinery	3240	1695	0	0	5938	0	18949	5039	0
Manufacture of special purpose machinery	5108	0	663	2400	953	3246	19077	2125	1332
Manufacture of household appliances N.E.C.	869	0	0	1454	11813	0	10431	1594	0
Manufacture of office, accounting and computing machinery	2557	0	0	0	0	0	1872	0	0
Manufacture of electric motors, generators and transformers	0	0	0	0	0	0	2576	0	0
Manufacture of electricity distribution and control apparatus	0	0	0	0	0	0	2033	3476	0
Manufacture of insulated wire and cable	0	0	0	0	666	3484	2700	0	0
Manufacture of accumulators, primary cells	0	2102	0	0	0	0	823	0	0
Manufacture of electric lamps and lighting equipment	0	447	0	0	0	0	7560	0	0
Manufacture of other electrical equipment N.E.C.	0	0	0	0	0	0	843	0	0
Manufacture of electronic valves and tubes	0	0	0	0	0	0	1078	0	0
Manufacture of television and radio transmitters	0	0	0	0	577	0	1808	0	0
Manufacture of television and radio receivers, sound	1805	0	0	0	1258	0	711	0	0
Manufacture of medical appliances and instruments	1003	0	0	0	438	0	3142	0	0

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Manufacture of optical instruments	527	0	0	0	0	0	1250	0	0
Manufacture of watches and clocks	0	0	0	0	731	0	1194	0	0
Manufacture of motor vehicles	0	7491	0	0	8939	659	17418	1207	0
Manufacture of bodies (coachwork) for motor vehicles;	1469	629	0	2023	1411	0	2881	0	0
Manufacture of parts and accessories for motor vehicles	1567	18497	0	496	5270	0	16723	0	0
Building and repairing of ships and boats	5699	0	0	0	0	0	0	0	0
Manufacture of railway and tramway locomotives	0	0	0	0	0	0	4338	0	0
Manufacture of aircraft and spacecraft	0	0	0	0	0	0	2891	0	0
MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.	0	0	0	0	0	0	1713	0	0
Manufacture of furniture	11287	3980	0	0	7568	733	10087	900	820
Manufacturing N.E.C...	3428	457	0	0	5189	0	9683	1902	396
Recycling N.E.C.	4699	4235	474	0	1905	1595	8772	2169	2418
Electricity; gas and water supply									
Production, collection and distribution of electricity	9582	4352	728	3855	11049	2511	34808	31227	6991
Manufacture of gas; distribution of gaseous fuels	908	0	0	0	1822	0	0	0	0
COLLECTION, PURIFICATION AND DISTRIBUTION OF WATER	5779	4374	4399	7070	4632	2204	6949	4129	5688
Construction									
Site preparation	1212	0	4267	0	0	980	6989	835	0
Building of complete constructions or parts thereof; civil engineering	133394	130680	14256	51772	147696	49332	190771	72486	113471
Building installation	52302	14831	1875	12641	35321	13151	95391	30253	24041
Building completion	45894	11686	986	8814	18471	7056	47736	15161	18501
Wholesale									
Wholesale trade on a fee or contract basis	12017	1185	0	642	2236	0	12683	0	0

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Wholesale trade in agricultural raw materials, livestock, food, beverages	10639	4253	937	8144	3725	3860	18618	958	1625
Wholesale trade in house-hold goods	4381	0	0	889	3642	0	4284	0	0
Wholesale trade in non-agricultural intermediate products, waste and scrap	9715	7178	0	2817	6996	5681	22915	13302	3519
Wholesale trade in machinery, equipment and supplies	0	1028	0	989	1610	1146	2226	0	0
Retail trade									
Non-specialised retail trade in stores	68976	59136	9625	24028	86545	28532	153060	33542	41567
Retail trade in food, beverages and tobacco in specialised stores	40139	17303	1968	5253	8255	8847	35623	17660	9417
Other retail trade in new goods in specialised stores	96894	54922	7756	28105	94579	26024	197500	20778	50661
Retail trade in second-hand goods in stores	1080	0	0	0	1630	0	3376	0	522
Retail trade not in stores	50755	83271	4574	46872	115779	55708	164942	98901	131170
Repair of personal and household goods	9293	4668	1099	5621	7435	5806	29458	7166	3071
Sale of motor vehicles	7492	8302	0	3447	8707	5787	33146	6482	4348
Maintenance and re-pair of motor vehicles	26324	11105	4425	18196	40525	11636	81684	11352	36808
Sale of motor vehicle parts and accessories	8980	6280	1018	0	9869	3198	31313	2668	2729
Sale, maintenance and repair of motor cycles and related parts	1013	1407	0	0	0	1720	612	0	0
Retail sale of automotive fuel	13922	9186	2371	5259	29777	8728	41793	8381	8272
Hotels, camping sites and other provision of short stay	40437	19205	6621	3256	26522	7447	36011	17658	19521
Restaurants, bars and canteens	80316	23280	6215	21480	51461	28108	115347	16791	31233
Shebeen	0	3893	1010	4622	3079	788	11886	3716	1194
Transport									
Railway transport	5858	4570	2129	5281	15195	1018	24437	5673	0
Other land transport	84353	52429	4796	44573	129157	33994	205820	47484	49230
Sea and coastal water transport	1863	0	0	0	7204	0	0	0	0

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AIR TRANSPORT	1817	605	0	2724	3674	0	23044	0	0
Storage and communication									
Supporting and auxiliary transport activities	24874	2298	0	0	16645	878	53029	0	4509
Postal and related courier activities	15145	5303	1347	745	5561	0	23100	1501	881
Telecommunication	15716	3308	858	1561	6674	1392	56759	3034	811
Financial intermediation									
Monetary intermediation	15244	8724	505	4398	10753	5234	125710	1028	5089
Cash loans	3151	668	428	1139	1877	2790	6203	1034	0
Other financial intermediation N.E.C.	27916	8387	1494	0	4566	6667	49849	1441	4046
Insurance									
Insurance and pension funding	32645	23168	1426	3772	15123	1661	69651	5118	5262
Activities auxiliary to financial intermediation	2451	0	0	588	0	0	10029	612	907
Real estate									
Real estate activities with own or leased property	5888	6611	0	1035	2632	4216	21113	4855	12386
Real estate activities on a fee or contract basis	21517	1438	786	4697	9740	1230	45152	2485	950
Business services / administrative and support activities									
Renting of transport equipment	6736	0	415	0	1636	942	2301	0	3877
Renting of other machinery and equipment	5623	545	0	631	1845	837	1140	3413	842
Renting of personal and household goods N.E.C.	1102	2247	0	1711	553	839	0	0	1466
HARDWARE CONSULTANCY	22691	1552	782	2251	9961	3263	61229	0	854
Software consultancy and supply	0	0	0	0	0	0	0	849	0
Data processing	0	0	0	0	0	759	3830	0	0
Data base activities	5351	0	0	2518	0	0	3976	2597	0

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Maintenance and repair of office, accounting	724	0	0	0	695	0	682	0	0
Other computer related activities	5369	0	0	831	2278	1080	14447	2269	0
Research and experimental development on natural sciences	0	0	0	0	0	0	1198	0	0
Legal, accounting, bookkeeping and auditing activities	33393	11362	0	3592	23252	5155	107874	4792	7884
Architectural, engineering and other technical activities	30426	7716	2007	3136	10592	5056	79809	35127	7640
Advertising	26800	2771	1238	1088	6289	0	38970	2398	1157
Business activities N.E.C.	185034	94475	13012	43933	222340	62437	450165	81907	80765
Community; social and personal services									
Central government activities	21061	25968	3212	12308	39734	12774	68469	7065	33094
Local authority activities	34293	32393	9926	16242	57796	15129	65785	16224	6893
Provincial administrations	771	950	0	0	0	1116	1112	0	0
S A Defence force	7058	3603	4530	6305	3012	1164	36339	0	506
S A Police service	37290	28141	13603	19694	31880	18225	75985	13565	16802
Correctional service	8402	10142	537	3299	3519	0	11440	2189	266
EDUCATION	116250	119438	17154	40067	188440	41986	294052	68830	103883
Human health activities	77120	47987	7528	34275	122924	54340	225543	41386	44294
Veterinary activities	2321	1877	491	0	1214	0	3083	966	0
Social work activities	57396	26170	12268	19527	53311	27855	95160	19862	34390
OTHER COMMUNITY, SOCIAL AND PERSONAL SERVICE ACTIVITIES	17791	43427	21239	25776	68785	30061	29490	31604	39395
Activities of business, employers and professional organisations	425	2745	1554	0	455	2363	5115	0	0
Activities of trade unions	801	644	0	606	377	561	2551	0	0
Activities of other member-ship organizations	7616	3174	717	728	4453	957	28949	3833	1944

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Motion picture, radio, television and other entertainment activities	8596	1661	363	0	3218	2357	22769	739	813
News agency activities	5444	806	0	2582	461	0	17140	785	0
Arts, entertainment and recreation									
Library, archives, museums and other cultural activities	6211	2483	981	1711	8651	1670	8828	2458	600
Sporting and other recreational activities	11247	4327	0	574	9137	4972	26253	0	4666
OTHER SERVICE ACTIVITIES	33323	24389	2728	14809	41137	15114	86397	17773	33831
Private households									
PRIVATE HOUSEHOLDS WITH EMPLOYED PERSONS	160995	122803	28183	88766	240627	78690	392212	105127	116954
Other									
REPRESENTATIVES OF FOREIGN GOVERNMENTS	0	0	0	0	0	0	2792	0	0
Total	2428393	1438042	311388	830196	2570922	990604	5124052	1219193	1474693

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Appendix 3: Branch of activity by province (Figures for calculating LQ 2013)

Branch of activity	WC	EC	NC	FS	KZN	NW	GT	MP	LP	SA
Agriculture	161268	73298	43701	67001	107797	41972	38465	100203	115175	748880
Mining and quarrying	2096	0	18396	22710	21270	160213	35525	87655	75078	422943
Manufacturing	462821	322151	35330	116479	598683	132716	1006027	212598	210765	3099274
Wholesale	28574	20116	3964	8591	23828	9171	75271	10636	12641	192792
Retail	438628	264945	43576	134844	532724	138067	979071	246730	261055	3039640
Transport	74548	53665	10356	28755	161123	22042	243120	47429	37833	678871
Storage and communication	62525	10728	2690	6190	41012	5417	120912	2993	8742	261209
Financial service	32415	10203	2199	9943	32577	3363	150174	8028	11163	260065
Insurance	27156	6619	2419	3288	21009	3474	98706	2555	4829	170055
Real estate	22830	6772	874	1273	9881	6044	75422	7361	1382	131839
Business services	271182	95437	20684	52313	223691	59517	661879	99504	44340	1528547
Community, social and personal services	459405	326614	100984	203873	595065	206118	983656	232138	294264	3402117
Private households	121749	119290	33962	86905	224619	66113	421785	103463	96281	1274167
Total	2166901	1309838	319135	742165	2593279	854227	4890013	1161293	1173548	15210399

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Appendix 4: Branch of activity by province (Figures for calculating LQ 2017)

Branch of activity	WC	EC	NC	FS	KZN	NW	GT	MP	LP	SA
Agriculture	159672	86311	39296	76351	125148	49047	44582	100863	140199	821469
Mining and quarrying	5046	0	32573	17480	4545	136739	91395	51398	106805	445981
Manufacturing	585204	294824	35663	139272	551484	153020	1012617	267554	255145	3294783
Wholesale	36752	13644	937	13481	18209	10687	60726	14260	5144	173840
Retail	445621	301958	46682	166139	484163	192329	935751	245095	340513	3158251
Transport	93891	57604	6925	52578	155230	35012	253301	53157	49230	756928
Storage and communication	55735	10909	2205	2306	28880	2270	132888	4535	6201	245929
Financial service	46311	17779	2427	5537	17196	14691	181762	3503	9135	298341
Insurance	35096	23168	1426	4360	15123	1661	79680	5730	6169	172413
Real estate	27405	8049	786	5732	12372	5446	66265	7340	13336	146731
Business services	323249	120668	17454	59691	279441	80368	765621	133352	104485	1884329
Community; social and personal services	453416	380325	96831	198503	638504	230644	1107252	227279	321377	3654131
Private households	160995	122803	28183	88766	240627	78690	392212	105127	116954	1334357
Total	2428393	1438042	311388	830196	2570922	990604	5124052	1219193	1474693	16387483

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Appendix 5: Figures for calculating province function 2013

Index	WC	EC	NC	FS	KZN	NW	GT	MP	LP	SA
Employment in industry	464525	322151	35330	116479	598683	132716	1006027	212598	210765	3099274
Employment in commerce	1909523	1189561	309783	706217	2355204	696255	4614333	946543	1024420	13751839
Employment in mining	2096	0	18396	22710	21270	160213	35525	87655	75078	422943
Employment in retail	438628	264945	43576	134844	532724	138067	979071	246730	261055	3039640
Employment wholesale	28574	20116	3964	8591	23828	9171	75271	10636	12641	192792
Employment transport	74548	53665	10356	28755	161123	22042	243120	47429	37833	678871
Salaried Employment	1912750	1116525	294857	656716	2214832	760988	4242496	955520	927498	13082182
Student population	537889	905806	111500	318844	1172584	396644	1270976	444283	820823	5979349
Employment	2166901	1309838	319135	742165	2593279	854227	4890013	1161293	1173548	15210399
Population (0-65)	6031237	6624477	1164136	2753715	10471285	3604147	12761957	4134694	5526343	53071991

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Appendix 6: Figures for calculating province function 2013

Index	WC	EC	NC	FS	KZN	NW	GT	MP	LP	SA
Employment in industry	585204	294824	35663	139272	551484	153020	1012617	267554	255145	3294783
Employment in commerce	2040433	1353576	273105	748810	2391575	965425	4852426	969465	1212672	14666449
Employment in mining	5046	0	32573	17480	4545	136739	91395	51398	106805	445981
Employment in retail	445621	301958	46682	166139	484163	192329	935751	245095	340513	3158251
Employment wholesale	36752	13644	937	13481	18209	10687	60726	14260	5144	173840
Employment transport	93891	57604	6925	52578	155230	35012	253301	53157	49230	756928
Salaried Employment	2155922	1243154	296135	716843	2233319	860990	4405251	992486	1149698	14053798
Student population	551938	817390	103331	318483	1296827	404684	1341774	474507	785701	6094635
Employed	2428393	1438042	311388	830196	2570922	990604	5124052	1219193	1474693	16387483
Population 0-75+	6492783	6778430	1204033	2766756	10939170	3815590	13853768	4350583	5797318	55998431

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