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## GEOGRAPHY | RESEARCH ARTICLE

# Economic value addition, employment, and enterprise profiles of local authorities in the Free State, South Africa

Danie Francois Toerien<sup>1\*</sup>

**Abstract:** A strong underlying structure in the economic, demographic, and entrepreneurial domains of local authorities (municipalities) in the Free State, South Africa was detected through cluster and other analyses. The structure is indicative of a system in which economic value addition, population size, employment creation, and entrepreneurial domains are dynamically linked. The agriculture, mining, and fuel and chemicals sectors dominate the economic value addition in some municipalities, whereas others are without a single dominating economic sector (i.e. they have well-balanced economies). The agriculture and households sectors are significant sources of employment in all municipalities. Cluster sequence analyses of the municipalities revealed statistically significant recurring patterns of value addition, employment, and entrepreneurship, further strengthening the detection of orderliness, which can promote mutual learning. The Metsimaholo municipality with a significant manufacturing base is an atypical Free State municipality and provides an outstanding example of the economic, demographic, and entrepreneurial impacts of value addition to local or external primary products.

**Subjects:** Development Studies; Economics, Finance, Business & Industry; Geography

### ABOUT THE AUTHOR

An early career as researcher/academic specializing in ecological and water research was followed by involvement in science management and in the business world. Attendance of a Senior Executive Program at the Massachusetts Institute of Technology stimulated an interest in the links between natural sciences and economics. The “anti-entropy” nature of living organisms and enterprises (both convert lower order inputs into higher order outputs, but with increased entropy elsewhere) prompted research on questions such as: are South African towns enterprise ecosystems; can South African towns be considered to be “islands in a sea of farms”; is enterprise richness as useful a concept in geographic economics as species richness is in ecology. The research proved to be valuable in regional studies and this essay examines the creation of economic value and employment as well as enterprise development dynamics in the municipalities of the Free State, South Africa.

### PUBLIC INTEREST STATEMENT

South Africa, a developing nation, is plagued by unemployment and poverty, and the hope is that municipalities can help to deal with these problems. This requires knowledge about where and how economic value, employment, and enterprises are created. I studied these issues in the municipalities of the Free State, one of South Africa’s nine provinces. Various statistical techniques were used to provide important information. Five types of municipalities were identified: two primarily dependent on agriculture, one on mining, one on the fuels and chemicals sector, and the last with a well-balanced economy. Similarities were not due to chance and specific types of value addition, employment creation, and enterprise development manifested together. The strong orderliness could be important in development planning.

**Keywords: Free State; local authorities; gross value added; employment; enterprise dynamics; cluster analysis; cluster sequences**

### 1. Introduction

Economic geography has changed much in the past two and a half decades. On the one hand, economic geographers sought new insights from various forms of heterodox economics and from social sciences, and on the other hand, economists “have discovered geography, and argued for the importance of a geographical perspective for understanding the dynamics and competitiveness of the economy” (Boschma & Martin, 2010). Why is this important in a developing country such as South Africa?

Poverty, unemployment, and inequality are continually identified as the most serious problems of South Africa. Terblanche (2002) remarked:

When, in 1994, a democratically elected government came to power, it inherited a contradictory legacy: the most developed economy in Africa on the one hand, and major socio-economic problems on the other. The most serious of these are high rates of unemployment; abject poverty among more than 50% of the population; sharp inequalities in the distribution of opportunities; and high levels of crime and violence.

Cyril Ramaphosa, Deputy President of South Africa, recently stated that if South Africa is to pursue the vision of a better life for all, it must tackle poverty, unemployment, and inequality (Ramaphosa, 2014). Clearly, South Africans need to develop a deep understanding of the economic geography of the country and its regions in order to address these problems.

Since 2000, South Africa has seen a dramatic rise in scholarship on small town geographies, with an eclectic mix of perspectives and a large number of empirical case studies (Donaldson & Marais, 2012). Many small towns have rearticulated their roles relative to the national and even the global economy since the 1970s, acquiring a range of new functions, and at times radically altered economic activities (Hoogendoorn & Nel, 2012). There appears to be more up front clarity about the problems at a small town level (e.g. Donaldson & Marais, 2012; Nel, Taylor, Hill, & Atkinson, 2011). In addition, the National Development Plan [NDP] (National Planning Commission [NPC], 2012) focuses *inter alia* on small towns.

From a theoretical perspective, two broad strands of inquiry related to small towns in South Africa seem to have dominated recent contributions: one that related small town growth and development potential to the core theme of local economic development, and the other that examined various small town activities relative to debates on post-productivist landscapes (Hoogendoorn & Nel, 2012). Not surprisingly, the research demonstrated large differences between South African towns, a conclusion further strengthened by comparisons of the enterprise structures of South African towns (e.g. Toerien & Seaman, 2010, 2011).

One of the major innovations of the new (1996) democratic Constitution of South Africa was the elevation of local government (hereafter called municipalities) to a sphere of government, firmly establishing the autonomy of municipalities (South African Local Government Association, 2014). Municipalities now had the right to govern, on their own initiative, the local government affairs of their communities. Municipalities have, however, not received the same research attention as towns and most municipalities host multiple towns, often distinctly different from one another. Yet, municipal development planning guidelines provided by government (The Education and Training Unit, n.d.) gives no attention to differences between towns; single integrated development plans for municipalities are called for as if all towns are equal.

Donaldson and Marais (2012) remarked that appropriate policy responses toward small towns are crucial and one-size-fits-all policies for urban areas could be problematic. There is, therefore, a need to identify socioeconomic similarities and differences between different local municipalities in South Africa.

To provide insight for dealing with the poverty/unemployment conundrum, three aspects and their correspondences are especially important: (i) where is economic value added, (ii) where is employment created, and (iii) where is entrepreneurship expressed. These aspects with relation to local municipalities have received scant research attention in South Africa; yet, insight is urgently needed.

In this essay, use is made of a regional approach and its prime purpose is to examine the above aspects and their correspondences for one of South Africa's nine provinces, the Free State. The specific goals are: (i) to examine if there are groupings of Free State municipalities based on their gross value added (GVA), employment, and enterprise profiles, (ii) to assess if there are statistically significant correspondences between these profiles, and (iii) to consider the implications of the results obtained. The essay is organized as follows: in the next section, additional background information is provided before the approach of the study and methods used are presented. The results then follow, their implications are discussed, and conclusions drawn.

## 2. Additional background information

### 2.1. The Free State

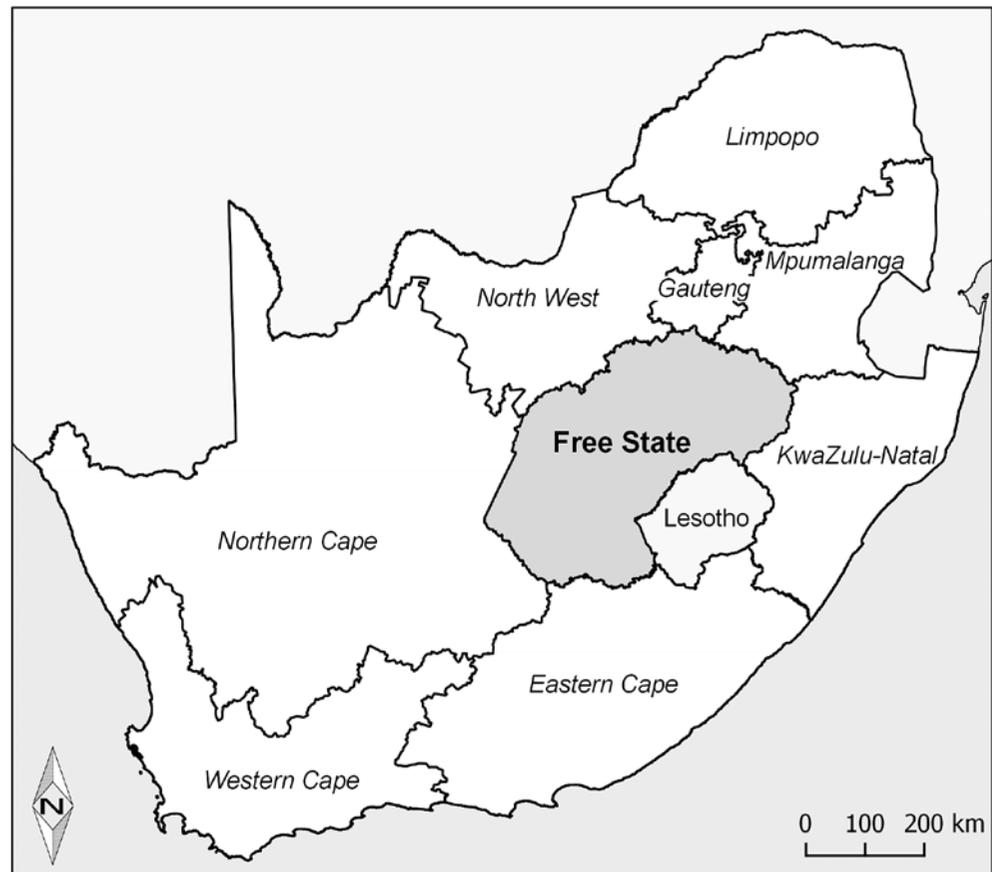
In the nineteenth century, the Orange Free State Boer republic included the area between the Orange and Vaal rivers in South Africa. In 1902, after the Anglo-Boer War, this area became the Orange River Colony; in 1910, it became a province in the Union of South Africa and after 1961, a province in the Republic of South Africa. Following the democratic elections in 1994, abolishment of the "Bantustans" and their reincorporation into South Africa, the Free State became one of nine provinces in the "new" democratic South Africa (Giliomee & Mbenga, 2007) (Figure 1). Despite these political transitions, the Free State has for a long time always been managed as a single regional unit, which makes it an attractive candidate to examine on a regional scale the similarities/differences between municipalities.

The province is centrally located on the high central plains of South Africa (Figure 1). It represents 10.6% of the total land area of the country, boasts wide horizons, blue skies, mountains and gold-fields, covers an area of 129,825 km<sup>2</sup>, and had a population of 2,745,590 in 2011 (Free State Provincial Government [FSPG], 2013). It borders on all of the other South African provinces except Limpopo and the Western Cape. The Maluti Mountains form part of the eastern international border with Lesotho. The Orange and Vaal rivers form the southern, western, and most of the northern border. The southern part is more arid and mostly grassland with some Karoo vegetation whilst the western part consists of plains, with pans as primary hydrological feature. The eastern part is mountainous and more lush.

The Free State has four district municipalities, 19 local municipalities, and one metropolitan municipality (Mangaung) (Table 1, Figure 2). Each of the municipalities contains multiple towns (Table 2). The latest Free State Growth and Development Strategy [FSGDS] (FSPG, 2013) identified unemployment as the most serious problem confronting the provincial economy. The unemployment rate increased from 25.5% in the third quarter of 2011 to 32% in the third quarter of 2012, an increase of 6.5%. Youth and women are mostly affected by unemployment.

Over the past decades, the Free State economy has been largely supported by primary sectors, particularly agriculture and mining (FSPG, 2013). The 2011 provincial economic distribution indicated that agriculture still dominated and accounted for 10.3% of the provincial economy. It was followed by the services sector at 10.1% and mining at 7.9%. The decline in the economic contribution of mining led to a decline in employment by this sector from 180,000 in 1980 to 33,000 in 2010. While

**Figure 1. The Free State in relation to the other provinces of South Africa.**



mining, agriculture, and manufacturing lost a substantial number of formal jobs (about 200,000 over a fifteen-year period), community services, finance, and trade gained in terms of employment. The FSGDS (FSPG, 2013) does not remark on similarities or differences between the different municipalities, the prime focus of this essay.

## **2.2. The importance of towns in regional economies**

The size of Free State towns is much skewed and there are more small towns than large towns (Toerien, 2014a). This is not unique because low-density, dispersed populations are characteristic of many rural and small town places (Halseth & Ryser, 2004). All Free State local municipalities contain more than one village or town (Table 2). The role of towns in regional development must, therefore, be considered.

Bell and Jyane (2006) cautioned that the role of small towns within national urban systems remain a poorly researched area of inquiry. Hinderink and Titus (2002) were of the opinion that lower order urban centers are important in regional development, and this is also true for South Africa (Donaldson & Marais, 2012). Small towns worldwide have over the past decades been subject to increasing pressures. For instance, an increasingly global economy has exerted pressure on small towns in Canada. As a result, some have been experiencing population declines and in addition, geography has resulted in higher service delivery costs per capita (Halseth & Ryser, 2004). Small town Australia also reached crossroads. Many small inland and remote rural communities hemorrhaged in terms of population and business loss (Kenyon et al., 2001). Many small South African towns and rural areas have stagnated or declined as agriculture and mining have gone through structural changes, while others have developed dramatically as other and new economic activities have increased (NPC, 2012). The NDP placed a renewed emphasis on the developmental role of small towns as centers of job creation in rural South Africa (NPC, 2012). This essay focuses on aggregate economic, demographic, and enterprise data of the towns of Free State municipalities (Table 2).

**Table 1. The district and local municipalities of the Free State and their populations**

No.	Local municipality	District municipality	Population
1	Naledi	Xhariep	24,314
2	Mohokare	Xhariep	34,146
3	Kopanong	Xhariep	49,171
4	Letsemeng	Xhariep	38,628
5	Tokologo	Lejweleputswa	28,986
6	Tswelopele	Lejweleputswa	47,625
7	Nala	Lejweleputswa	81,220
8	Masilonyana	Lejweleputswa	63,334
9	Matjhabeng	Lejweleputswa	406,461
10	Moqhaka	Fezile Dabi	160,532
11	Ngwathe	Fezile Dabi	120,520
12	Metsimaholo	Fezile Dabi	149,108
13	Mafube	Fezile Dabi	57,876
14	Phumelela	Thabo Mofutsanyana	47,772
15	Maluti-a-Phofung	Thabo Mofutsanyana	335,784
16	Nketoana	Thabo Mofutsanyana	60,324
17	Dihlabeng	Thabo Mofutsanyana	128,704
18	Setsoto	Thabo Mofutsanyana	112,597
19	Mantsopa	Thabo Mofutsanyana	51,056
20	Mangaung*	Mangaung*	747,431

\*Metropolitan municipality.

### 3. Methods

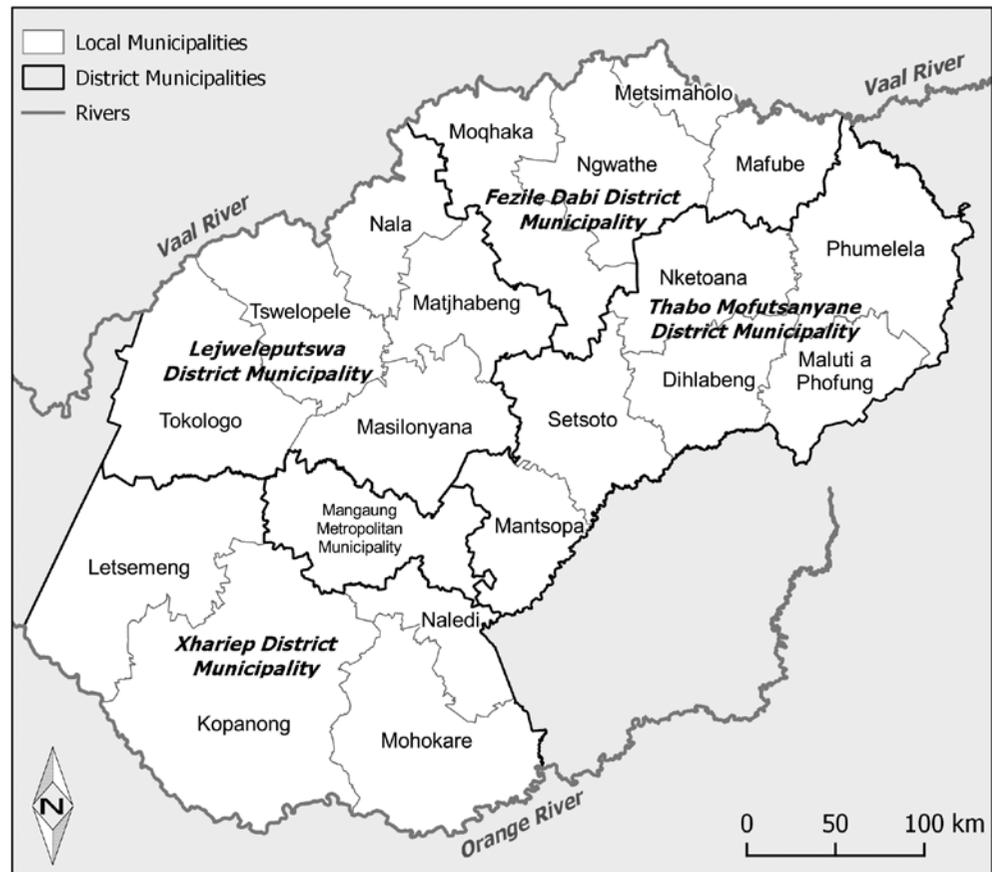
#### 3.1. Proportionality as a characteristic of municipalities

Proportionalities or regularities in the form of statistically significant correlations have been recorded for selections of South African towns between: (i) GVA, (ii) population numbers, (iii) employment numbers, and (iv) enterprise numbers (total as well as those of specific business sectors, Table 3) (Toerien & Seaman, 2010, 2011, 2012a, 2012b, 2012c, 2012d, 2014). At the onset of this study, it was not known if such proportionalities would still be present if the respective characteristics of towns located in a specific municipality were combined to obtain estimates for that municipality. This issue had to be resolved before proceeding with the study.

Different data-sets were used in seeking answers. The first data-set contained population numbers based on the 2011 South African Census for the local and metropolitan municipalities of the Free State (Frith, 2014). Data-sets listing the 2010 GVA and employment data of Free State local municipalities (including the metropolitan municipality of Mangaung) were obtained from the firm IHS Global Insight. These data-sets covered 27 different business sectors (Table 4). Lastly, a data-set of the 2012/2013 formal enterprises classified into 19 business sectors (Table 3) of the 78 villages, towns and metropolitan area of the Free State (Table 2, Toerien, 2014a) was used to compile a list of enterprises of each of the Free State local municipalities as well as the metropolitan municipality.

Pearson correlation coefficients and ordinary linear regression equations were calculated with Microsoft Excel software for the different pairings of the variables (GVA, population numbers, enterprise numbers, and employment numbers) of the municipalities listed in Table 2. Because GVA was considered by Toerien and Seaman (2012a) to be a primary driver of the dynamic economic system operative in South African towns, it was used as the independent variable in all calculations where it was involved. On similar grounds, population numbers were used as independent variable against

**Figure 2. The metropolitan, district, and local municipalities of the Free State.**



enterprise numbers and employment numbers, and enterprise numbers were used as independent variable against employment numbers. The resultant correlation coefficients were tested for statistical significance.

### 3.2. Clustering of municipalities

Cluster analysis has been used for the grouping of entities in ecological studies (e.g. Clarke & Warwick, 2001; Finnie, Preston, Hill, Uotila, & Crawley, 2007; Masese et al., 2014; Podani & Schmera, 2006) as well as in studies of finances (Gupta & Huefner, 1972), economy (e.g. Forni, Hallin, Lippi, & Reichlin, 2001), food analyses (Lin, Ho, Zhao, & Chang, 2015), and detection of wave patterns (Romeu, Fontoura, & Melo, 2015) and cyclone tracks (Daloz et al., 2015). It was also used to study the role of small towns in rural development in Europe (Mayfield, Courtney, Tranter, & Jones, 2005) and the enterprise dynamics of South African towns (Toerien & Seaman, 2010, 2011, 2012b, 2012c, 2012d, 2014).

Cluster analysis is a multivariate method characterized by the fact that comparison of two or more entities is based on the extent to which the entities share particular characteristics at comparable levels of abundance (Clarke & Warwick, 2001). Similarity coefficients calculated between every pair of entities, therefore, enables clustering of the entities into “natural” groups that are generally more similar to each other than to entities in different groups.

Cluster analysis was, therefore, selected to group the Free State municipalities. To enable the clustering of municipalities of different sizes, the GVA, employment, and enterprise profiles of each municipality were normalized by expressing each characteristic’s contribution as a percentage of the total. Correlation coefficients were used to determine the similarity (for each of these characteristics) between each possible pairing of the 20 municipalities (listed in Table 2). The resulting matrices of correlation coefficients

**Table 2. The Free State district municipalities, their local municipalities, and their towns**

Fezile Dabi DM		Thabo Mofutsanyana DM		Lejweleputswa DM		Xhariep DM		Mangaung Metropolitan*	
LM	Town	LM	Town	LM	Town	LM	Town	Metro	Town
Metsimaholo	Deneysville	Dihlabeng	Bethlehem	Matjhabeng	Allanridge	Kopanong	Bethulie	Mangaung Metro	Botshabelo
	Kragbron		Clarens		Hennenman		Edenburg		Thaba Nchu
	Oranjeville		Fouriesburg		Odendaalsrus		Fauresmith		
	Sasolburg		Paul Roux		Ventersburg		Gariep Dam		
	Viljoensdrif		Rosendal		Virginia		Jagersfontein		
Moghaka	Kroonstad	Mantsopa	Excelsior	Masilonyana	Welkom		Philippolis		
	Steynsrus		Hobhouse		Brandfort		Reddersburg		
	Vierfontein		Ladybrand		Soutpan		Springfontein		
	Viljoenskroon		Tweespruit		Theunissen		Trompsburg		
Mafube	Frankfort	Nketoana	Arlington	Nala	Winburg	Letsemeng	Jacobsdal		
	Cornelia		Lindley				Koffiefontein		
	Tweeling		Petrus Steyn		Bothaville		Luckhoff		
	Villiers		Reitz		Wesselsbron		Petrusburg		
Ngwathe	Edenville	Phumelela	Memel	Tokologo	Boshof	Mohokare	Rouxville		
	Heilbron		Vrede		Dealesville		Smithfield		
	Koppies		Warden		Hertzogville		Zastron		
	Parys	Setsoto	Clocolan	Tswelopele	Bultfontein	Naledi	Dewetsdorp		
	Vredefort		Ficksburg		Hoopstad		Wepener		
			Marquard				Van Stadensrus		
		Maluti-a-Phofung	Senekal						
			Harrismith						
			Phuthaditjaba						
			Kestell						

Note: DM = District municipality; LM = Local municipality.

\*Mangaung is a metropolitan municipality.

formed the inputs into hierarchical agglomerative cluster analyses of each of the above variables. Total linkage clustering strategies (Clarke & Warwick, 2001) were used and a dendrogram was prepared for each of the analyses. PRIMER 6 software was used for all of the calculations.

### 3.3. Characterization of the clusters

It was necessary to develop the typical profiles for each cluster and for each of the 27 business sectors (listed in Table 4) and for the 19 business sectors in the case of enterprise data (Table 3) to understand the differences in GVA, employment, and enterprise profiles between clusters. The GVA values, employment numbers, and enterprise numbers for municipalities in the same cluster were combined and normalized as a percentage of the total of each cluster.

To be able to focus on the important business sectors that contributed to GVA and employment, filters were used to screen each cluster for contributions of at least 5% or more of these elements. In the case of the enterprise data and because the enterprise analyses covered only 19 different business sectors (as opposed to 27 sectors in the GVA and employment analyses), a 3.5% filter was used to identify significant contributions to the enterprise architectures. This was numerically the equivalent of the 5% filter used in the GVA and employment analyses.

**Table 3. Business sectors used to create profiles of gross value addition and employment in the local municipalities of the Free State**

No.	Business sector
1	Agriculture, fishing, and forestry
2	Mining
3	Food, beverages, and tobacco products
4	Textiles, clothing, and leather goods
5	Wood and wood products
6	Fuel, petroleum, chemical, and rubber products
7	Other non-metallic mineral products
8	Metal products, machinery, and household appliances
9	Electrical machinery and apparatus
10	Transport equipment
11	Furniture and other items NEC and recycling
12	Electricity, gas, steam, and hot water supply
13	Collection, purification, and distribution of water
14	Construction
15	Trade (retail and wholesale)
16	Vehicle services
17	Tourism
18	Transport
19	Post and telecommunication
20	Financial services
21	Real estate
22	Other business activities
23	Public administration and defense activities
24	Education
25	Health and social work
26	Other services
27	Households

### 3.4. Correspondences between the clusters

From an economic development point of view, it is necessary to understand if a specific municipal profile of GVA, employment, and enterprises corresponds with those of other municipalities. The degree of municipal correspondences in cluster compositions was therefore calculated by investigating the cluster sequence patterns of each municipality. For instance, say municipality A was a member of cluster 1 in the GVA analysis, cluster 2 of the employment analysis, and cluster 3 in the enterprise analysis, its sequence would be 1–2–3. The sequences of all municipalities were then examined for correspondences and the statistical likelihood of such correspondences was calculated.

## 4. Results

### 4.1. Proportionalities (regularities)

Free State municipalities have statistically significant ( $p < 0.01$ ) correlations between: (i) value addition, (ii) population size, (iii) employment numbers, and (iv) enterprise numbers (Table 5). There is, therefore, significant orderliness in the economic, demographic, and entrepreneurial characteristics of Free State municipalities, as there is for towns.

**Table 4. A list of the business sectors used by Toerien and Seaman (2010) to classify the enterprises of South African towns. The same procedure was followed in this study**

No.	Economic drivers
1	Agricultural products & Services sector
2	Processing sector
3	Factory sector
4	Construction sector
5	Mining sector
6	Tourism & hospitality sector
	<b>Service sectors</b>
7	Engineering & technical services sector
8	Financial services sector
9	Legal services sector
10	Telecommunication services sector
11	News & advertising services sector
12	Trade services sector
13	Vehicle services sector
14	General services sector
15	Professional services sector
16	Personal services sector
17	Health services sector
18	Transport & earthworks sector
19	Real estate services sector

**Table 5. Proportionalities between GVA\*, population numbers, employment numbers, and enterprise numbers of Free State local municipalities\*\***

	Correlation	Slope	Intercept	n	Variance explained (%)
GVA population	0.86	21.688	48,582.9	20	74.7
GVA employment	0.91	4.634	9,431.1	20	82.6
GVA enterprises	0.89	0.196	62.2	20	78.8
Population enterprises	0.95	0.0084	-287.2	20	90.7
Population employment	0.97	0.198	1,249.3	20	94.6
Enterprises employment	0.98	22.52	8,906.3	20	95.4

Note: All correlations are statistically significant at  $p < 0.01$ .

\*GVA in 2005 Rand million.

\*\*The first mentioned characteristic was used as the independent variable.

Although correlations do not necessarily indicate causality, it is possible that the dynamic system proposed by Toerien and Seaman (2012a) for South African towns and of which such relationships form part, could operate in Free State municipalities. These authors *inter alia* postulated that value addition helps to determine the amount of money in towns, which in turn helps to determine the population size, which in turn helps to determine the number of enterprises. The results presented in Table 5 are in support of the postulate.

#### 4.2. Similarities between local municipalities

Three sets of municipal clusters were obtained and the cluster analyses are presented in Figures 3, 4, and 5, respectively. Based on GVA profiles, four clusters and one outlier (Metsimaholo) are present at a correlation coefficient level of 0.65 (Figure 3). Based on employment profiles, three clusters and

two outliers (Matjhabeng and Metsimaholo) are present at a correlation coefficient level of 0.85 (Figure 4). Based on enterprise profiles, five clusters are present at a correlation coefficient level of 0.88 (Figure 5).

There are, therefore, significant similarities and differences between the GVA, employment, and enterprise profiles of Free State municipalities. These differences/similarities are not a function of the size of municipalities because small and large municipalities often cluster together (Table 6).

**4.3. The similarities of or differences between clusters**

Table 7 summarizes the economic sectors that generated more than 5% of the GVA of the different clusters and the outlier (Metsimaholo), Table 8 the economic sectors that generated more than 5% of employment in those municipalities, and Table 9 the business sectors that generated more than 3.5% of enterprises.

**4.3.1. Where is value primarily added and employment created?**

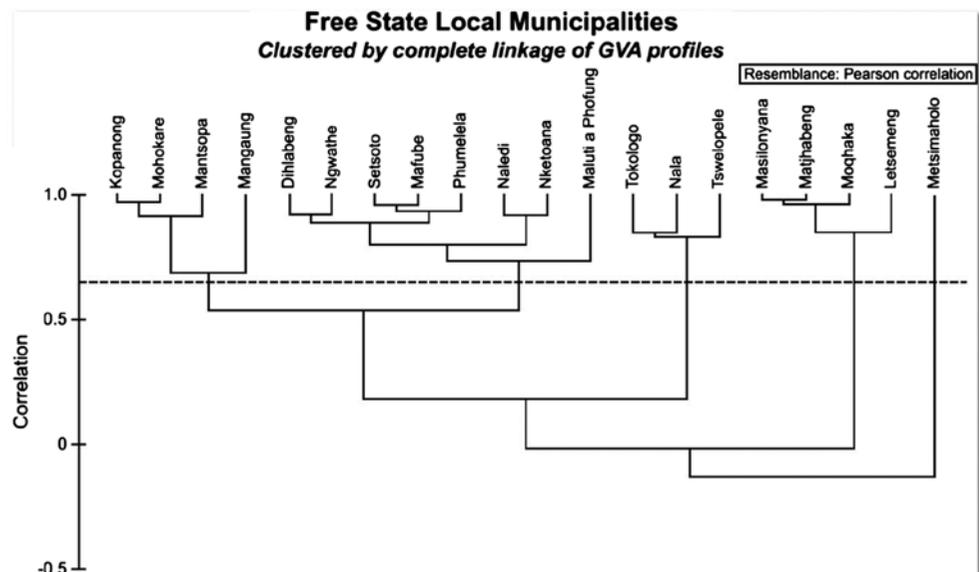
More than 65% of GVA was contributed by only a few economic sectors (Table 7). The GVA profiles of the different clusters had ubiquitous and unique features. The education, public administration, and trade sectors were ubiquitous and important (> 5% contributions to GVA) in all four clusters, but not in the outlier (Table 7). Financial services were important in three of the clusters and in the outlier (Metsimaholo), but not in cluster 3.

Based on uniqueness of GVA profiles, five main types of economic profiles of the Free State local municipalities are evident (Table 7): (i) local municipalities in cluster 1 that have more balanced local economies with a larger number of different sectors contributing to value addition, (ii and iii) municipalities in clusters 2 and 3 are very dependent on agriculture and education for economic value addition. However, municipalities of cluster 2 are also quite dependent (> 10%) on the financial services and public administration sectors whilst those in cluster 3 are less dependent on these sectors but have a dependence on the post and telecommunications sector, (iv) municipalities of cluster 4 are very dependent on mining, and, (v) the municipality of Metsimaholo (the outlier) is very dependent on the fuel and chemical sector.

The household sector, which provides work to domestic workers, is important in all the clusters as well as in the outlier (Metsimaholo). This sector deserves special attention. Because it is difficult to measure the GVA by domestic workers, the sector is generally ignored in value addition analyses.

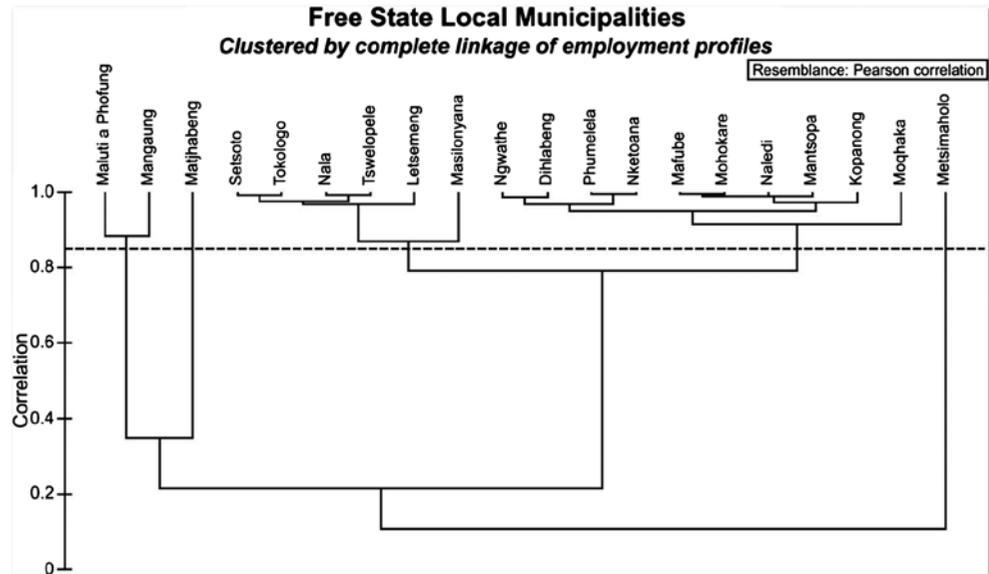
**Figure 3. Clusters of Free State local municipalities based on their GVA profiles.**

Note: Clusters and outlier are defined by the dotted line and their numbers range from left to right.



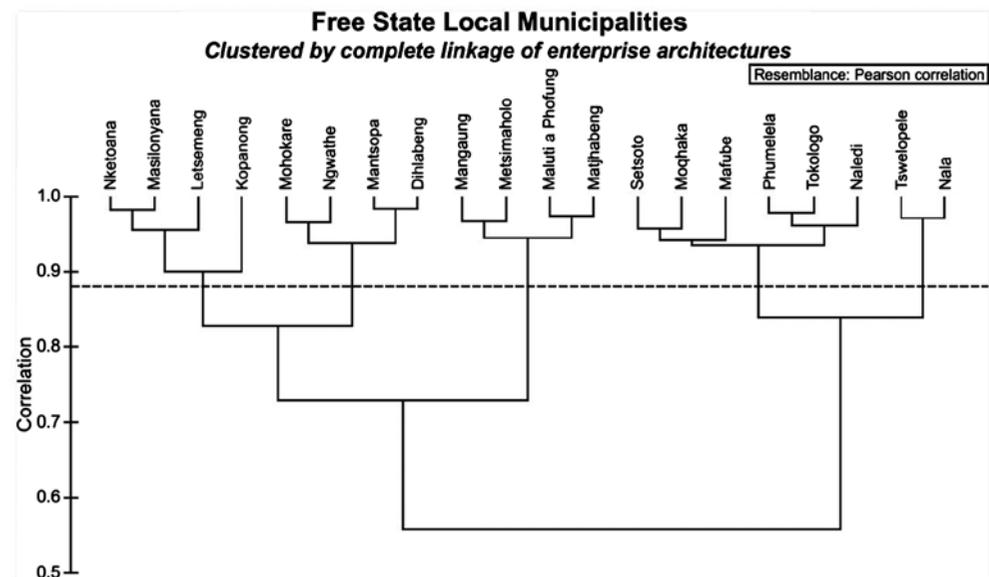
**Figure 4. Clusters of Free State local municipalities based on their employment profiles.**

Note: Clusters and outlier are defined by the dotted line and their numbers range from left to right.



**Figure 5. Clusters of Free State local municipalities based on their enterprise profiles.**

Note: Clusters are defined by the dotted line and their numbers range from left to right.



However, one can argue that employers would not employ domestic workers if they do not add value. This sector is either the most important contributor or second most important contributor to employment in Free State municipalities (Table 8). Its importance in hidden value addition and the creation of employment in the Free State is perhaps underestimated. In addition to the foregoing, the agriculture, education, and public administration sectors are important in the creation of employment in all four clusters but not in the outlier (Table 8).

Uniqueness in employment creation relates to the fact that the main types of employment profiles of the clusters had distinct features (Table 8): cluster 1 depended on six important sectors, whilst clusters 2 and 3 were dominated by agriculture, cluster 4 by mining, and the outlier by the fuel and chemicals sector (Table 8). Comparison of Tables 7 and 8 shows that sectors important in value creation in specific municipalities are often also important in the creation of employment in the same municipalities. This is an additional demonstration of the presence of correspondences

**Table 6. The magnitude of GVA (Rand million), employment, and enterprise numbers in the different local municipalities relative to the different clusters of Figures 3, 4, and 5**

Local municipalities	Cluster No. <sup>a</sup>	GVA (R million)	Cluster No. <sup>b</sup>	Employment	Cluster No. <sup>c</sup>	Enterprises (No.)
Kopanong	1	984.1	3	11,177	1	242
Mangaung	1	27,065.4	1	155,015	3	6,949
Mantsopa	1	872.7	3	11,918	2	307
Mohokare	1	514.6	3	6,946	2	139
Dihlabeng	2	2,894.2	3	35,087	2	1,204
Mafube	2	851.0	3	10,373	4	250
Maluti a Phofung	2	3,993.3	1	36,607	3	928
Naledi	2	267.0	3	5,103	4	66
Ngwathe	2	1,887.0	3	19,176	2	765
Nketoana	2	857.8	3	11,612	1	220
Phumelela	2	510.7	3	10,997	4	213
Setsoto	2	1,699.8	2	28,878	4	529
Nala	3	1,152.9	2	19,310	5	355
Tokologo	3	230.6	2	7,338	4	73
Tswelopele	3	709.7	2	10,780	5	194
Letsemeng	4	872.0	2	10,575	1	127
Masilonyana	4	1,053.5	2	13,027	1	355
Matjhabeng	4	12,124.4	Outlier	90,096	3	2,524
Moqhaka	4	5,639.6	3	34,525	4	894
Metsimaholo	Outlier	17,614.0	Outlier	39,097	3	962

<sup>a</sup>Clusters of Figure 3.

<sup>b</sup>Clusters of Figure 4.

<sup>c</sup>Clusters of Figure 5.

**Table 7. The economic sectors that contribute more than 5% of economic value addition in the clusters and outlier of Free State local municipalities**

Sector	Cluster No.				Outlier
	1	2	3	4	
Agriculture		15.6	27.3		
Education	10.8	13.0	14.7	7.3	
Electricity, gas, steam, and hot water supply					9.4
Financial services	15.5	11.2		8.4	6.9
Fuel, petroleum, chemical, and rubber products					47.4
Health and social work	8.5				
Mining				34.1	
Other business activities					8.8
Other services	6.3	6.1			
Post and telecommunication	6.1		7.1		
Public administration and defense activities	13.6	16.8	6.7	8.8	
Trade	11.4	8.9	9.3	8.2	
Transport	6.1				
Total	78.3	71.6	65.1	66.8	72.5

**Table 8. The economic sectors that contribute more than 5% of employment in the clusters and the outlier of Free State local municipalities (%)**

Sector	Cluster No.				Outlier
	1	2	3	4	
Agriculture	8.7	34.4	41.2	11.5	
Construction					8.8
Education	10.9	8.7	8.9	7.6	
Fuel, petroleum, chemical, and rubber products					22.1
Health and social work	9.9				
Households	17.9	24.8	23.9	18.1	12.2
Mining				22.3	
Other business activities					8.9
Public administration and defense activities	13.3	10.4	6.1	8.5	
Trade	7.5			5.7	8.2
Transport					5.4
Total	68.2	78.3	80.1	73.7	65.6

because the exploitation of certain assets (e.g. gold and/or diamond deposits as in the case of cluster 4) corresponds with specific employment patterns. However, it cannot be inferred from these results that the one causes the other.

#### 4.3.2. Enterprise structures

As far as enterprise dynamics are concerned, eleven out of 19 business sectors contributed each more than 3.5% of enterprises (Table 9). There are also ubiquitous and unique features in the enterprise profiles of the different clusters. The ubiquitous sectors include the following: tourism and hospitality services, financial services, trading services, vehicle services, general services, personal services, and health services. Enterprises of these sectors were present at a level of more than 3.5% in all the clusters and the outlier. One could argue that these business sectors, with the exception of

**Table 9. The business sectors that house more than 3.5% of enterprises in the clusters and outlier of Free State local municipalities**

Business sector	Cluster				Outlier (Metsimaholo)
	1	2	3	4	
Agricultural products and services		7.1	18.3	3.9	
Construction sector	8.4	5.3		6.9	9.5
Tourism & hospitality services	6.7	8.0	4.2	4.6	5.3
Engineering & technical services				3.6	6.7
Financial services	6.6	7.0	10.5	7.8	5.5
Traders	21.4	24.4	21.4	25.5	20.9
Vehicle sector	8.9	9.1	10.5	9.5	7.9
General services	10.1	5.5	5.3	6.5	8.0
Professional services		3.6		3.6	5.7
Personal services	7.1	7.8	8.0	7.5	7.3
Health services	10.3	9.3	6.8	9.3	8.8
Total	79.5	87.1	85.0	88.7	85.6

\*The GVA (Table 8) and employment (Table 9) profiles were based on identification of contributions of more than 5% by 27 different economic sectors. The enterprise analyses covered 19 different business sectors. The use of a 3.5% filter in the case of the enterprise analysis is numerically the equivalent of the 5% filter used in Tables 8 and 9.

the tourism and hospitality sector, cater largely for local needs and wants, which are not determined by the origins of personal income (or employment) but are functions of the desires/needs of local individuals. It is logical to expect much similarity in these because all humans do have many similar basic needs, e.g. for food, clothes, housing, etc.

Enterprise uniqueness is limited to only a few sectors (Table 9). The agricultural sector is unique to clusters 2, 3, and 4. The construction sector is important in all clusters except cluster 3. The engineering and technical services sector is only important in cluster 4 (the mining cluster) and in the outlier, which is dependent on the fuel and chemicals sector. The professional services sector is only important in the larger agricultural towns (cluster 2), the mining (cluster 4), and the outlier. These observations support the contention that the enterprise architectures of Free State local municipalities are mostly determined by the needs and wants of local people rather than the demands of external markets.

#### 4.4. Cluster correspondences

##### 4.4.1. Sequence analysis

Table 10 summarizes the cluster sequences for the different municipalities, i.e. the numbers of the GVA, employment, and enterprise clusters to which a specific municipality belongs. Mokohare and Mantsopa municipalities had a 1–3–2 sequence (referring to the cluster numbers in the three dendrograms of Figures 3, 4, and 5); Ngwathe and Dihlabeng municipalities had a 2–3–2 sequence; Mafube, Phumelela, and Naledi municipalities had a 2–3–4 sequence; Nala and Tswelopele had a 3–2–5 sequence, and Masilonyana and Letsemeng had a 4–2–1 sequence. Thus, the sequences of eleven of the 20 municipalities corresponded with those of other municipalities.

Probability calculations show that it is highly unlikely that chance could have produced the correspondences of Table 10. For instance, if the location of a specific municipality in a specific cluster

**Table 10. Location of Free State local municipalities in the different clusters**

Local municipality	GVA cluster	Employment cluster	Enterprise cluster
Mohokare	1	3	2
Mantsopa	1	3	2
Kopanong	1	3	1
Mangaung	1	1	3
Ngwathe	2	3	2
Dihlabeng	2	3	2
Mafube	2	3	4
Phumelela	2	3	4
Setsoto	2	2	4
Naledi	2	3	4
Nketoana	2	3	1
Maluti a Phofung	2	1	3
Nala	3	2	5
Tswelopele	3	2	5
Tokologo	3	2	4
Matjhabeng	4	Outlier	3
Moqhaka	4	3	4
Masilonyana	4	2	1
Letsemeng	4	2	1
Metsimaholo	Outlier	Outlier	3

is a totally random process, then the probability of a 1–3–2 sequence (such as that observed for Mohokare and Mantsopa municipalities in Table 10) for a municipality would be equal to 0.2 (the probability based on GVA to be located in one of clusters 1–4 or to be an outlier; see Table 10) times 0.25 (the probability based on employment to be located in one of clusters 1–3 or to be an outlier; Table 10) times 0.2 (the probability based on enterprise architecture to be located in one of clusters 1–5; Table 10). There is, thus, a 1% ( $p = 0.01$ ) chance of a single municipality having this sequence and a 0.01% chance of two municipalities having the same sequence. The same applies for the other correspondences observed. In four cases, two of the Free State municipalities and in one case three of municipalities (out of 20 municipalities, Table 10) had identical sequences. The chances that this might be due to a random process are minute.

The fact that the GVA and employment profiles were determined over the same 26 business sectors and that employment data is available for a 27th sector (the households sector, which is not measured in GVA determinations) offered an opportunity to examine the GVA (where economic value is created) and employment (where work is created) profiles in greater detail (Tables 10 and 11). Fourteen of the 20 different municipalities were located in only four different cluster sequences: 1–3 (three municipalities); 2–3 (six municipalities); 3–2 (three municipalities) and 4–2 (two municipalities). The chances that all of these sequences could be due to a random process are much lower than 1% ( $p < 0.01$ ).

The agriculture, public administration, and education sectors are prominent in economic value addition and employment creation in virtually all 14 municipalities of the above sequences whilst mining is prominent in the 4–2 sequence (Table 11). The trade and financial services sectors are prominent in economic value addition in most of the 14 municipalities, but do not contribute much to employment creation. Employment in the household sector is a significant factor in all of the municipalities listed in Table 11.

Nine municipalities including the three municipalities with the largest GVAs (Mangaung, Matjhabeng, and Metsimaholo, Table 6) each had a unique sequence (Table 10). Correspondences between GVA, employment, and enterprise profiles are therefore not ubiquitous. Some Free State municipalities appear to have pursued development paths not shared with other municipalities.

## 5. Discussion

There is a strong underlying structure in the economic, demographic, and entrepreneurial domains of Free State municipalities that manifests itself as proportionalities in their economic value addition, demography, employment, and enterprise profiles. This observation is not reported in regional studies from elsewhere. For instance, Courtney, Lépiciér, and Schmitt (2008) examined the spatial economic behavior of firms located in and around 30 towns across five European countries and Baumgartner, Pütz, and Seidl (2013) reviewed how entrepreneurship manifests itself in regional development processes in European non-core regions. Komarek and Loveridge (2015) investigated the role of the business size distribution on income and employment growth in US counties from 1990 to 2000. Not one of these studies identified economic, demographic, or enterprise proportionalities as significant factors in regional development.

Correlations do not indicate causality per se. Yet, the proportionalities (Table 5) are not out of step with a systems model proposed for South African towns by Toerien and Seaman (2012a). In brief, the model postulates that economic value addition in a locality drives the magnitude of employment, which helps to determine the attractiveness/unattractiveness of the locality as a place for people to reside and make a living. Population size is correlated with the number of enterprises in local municipalities, and the needs and wants of local populations determine to a large extent the magnitude and composition of the enterprise structure of the locality. The model, should it exist, would explain why there are proportionalities in the towns and municipalities of the Free State.

No dynamic system can yield results that are incompatible with its characteristics (Senge, 1990). Development plans for the Free State, e.g. the FSGDS (FSPG, 2013) or for South Africa, e.g. the NDP

**Table 11. Comparison of GVA and employment profiles (in % of total) for sectors that contribute at least 5% to each profile in specific cluster sequences (sequence numbers relate to GVA and employment cluster numbers, respectively)**

Sequence	Municipality	Item	Business sectors													
			1	2	3	4	5	6	7	8	9	10	11	12	13	
1-3	Mohokare	GVA	11.4		6.0			15.2			24.0	13.0		6.8		
		Employment	31.1								13.7	8.9			25.6	
	Mantsopa	GVA	20.8		7.3			16.1			21.2	9.4	5.2			
		Employment	32.8		5.3						12.9	7.9			22.1	
	Kopanong	GVA	10.9		5.2	5.6		13.3			24.0	9.8	5.2	5.3		
		Employment	26.7								16.7	8.7			24.7	
2-3	Ngwathe	GVA	8.9		11.8	6.6		11.8	5.1		8.0	14.5	5.6	10.2		
		Employment	24.0		6.5						7.3	10.4			23.8	
	Dihlabeng	GVA	10.1		12.8			13.0			12.3	9.9	8.8	6.8		
		Employment	26.1		6.7						9.5	7.5	5.9		21.6	
	Mafube	GVA	15.9		13.3			9.3			11.9	15.8		8.4		
		Employment	31.7								10.3	10.0			26.1	
	Phumelela	GVA	14.6		6.8			10.9			12.3	14.3		10.4		
		Employment	27.2								8.6	8.9			31.7	
	Naledi	GVA	16.6	5.5	8.7			10.2			16.2	20.5				
		Employment	35.0								12.7	12.3			24.4	
	Nketoana	GVA	20.2				5.1	6.5		5.6	11.8	16.8		5.6		
		Employment	31.6								7.9	9.6			30.9	
	3-2	Nala	GVA	18.9	5.6	12.1	6.5	8.6	5.4			5.5	13.5		6.9	
			Employment	37.3								5.9	8.8			22.0
Tswelopele		GVA	42.5		6.0		5.2	5.6			7.4	15.3				
		Employment	41.6								7.6	9.6			28.4	
Tokologo		GVA	22.6	10.2	5.4		5.3		7.7	5.8	10.4	18.8				
		Employment	50.8									8.2			22.3	
4-2	Masilonyana	GVA	5.4	40.7	7.8			6.4			10.4	6.8				
		Employment	28.7	16.9							9.7	6.5			20.4	
	Letsemeng	GVA	10.1	27.4			12.0	5.1			7.1	11.7				
		Employment	34.3	8.0							7.0	8.5			22.0	

Note: 1: Agriculture, 2: Mining, 3: Trade, 4: Transport, 5: Post & telecommunication, 6: Financial services, 7: Real estate, 8: Other business, 9: Public administration, 10: Education, 11: Health & social work, 12: Other services, 13: Households.

(NPC, 2012) should take proportionalities such as those reported here into account. Addressing the regional development of and the unemployment/poverty problems in the Free State must start with a focus on how and where economic value is added in municipalities and how this relates to populations, employment, and entrepreneurship. Strategies of hope that entrepreneurs will be successful and employment will be created, are likely to fail if these relationships are ignored.

Regional industrial structure concentration has not been investigated systematically across geographic regions, primarily because of the lack of appropriate data (Drucker, 2011). The Free State is the only South African province for which GVA, employment, and enterprise profiles have been compared with each other. This could prove to be a valuable asset for the province.

The FSGDS (FSPG, 2013) mentions the importance of the agricultural, mining, and fuels and chemicals sectors. This study has reconfirmed the importance of these sectors and has also indicated that a number of Free State municipalities have developed more balanced economies without domination

by single sectors (Table 11). The Free State is nonetheless economically uneven (Table 7) as are many other geographical landscapes (Harvey, 2006).

The functions, localities, spacing, hierarchies, and influence zones of South African towns are indivisibly connected in an integrated system (Van der Merwe & Nel, 1975). Patterns of trade, extraction of diamonds, gold and minerals, variations in climate, and cultural differences are important contributors to differences (Feinstein, 2005). Spatial distribution of people and wealth in South Africa over the period 1911–2011 shows that economic development is typically characterized by agglomeration (Krugell, 2014). He mentioned that earlier interventions by the apartheid government could not stop it and inefficient land use, high transport costs, and segmented markets contributed to economic unevenness. In addition, high costs of connective infrastructure and problems with the delivery of basic services necessary to ensure inclusive development probably contribute to the phenomenon of many small towns and villages.

The phenomenon of regional industrial dominance is especially important for evaluating economic performance and formulating economic development policy (Drucker, 2011). Dominance might lead to regional industry “lock in” to a particular set of competencies, which may eventually become a liability. Only three business sectors contributed at least 5% of GVA and employment of all the municipalities listed in Table 11. These sectors are agriculture, public administration (with the exception of employment in Tokologo municipality), and education. The fact that agriculture is the only sector of the three that generates external commercial income for the municipalities is important.

The African National Congress, the ruling political party in South Africa, has recently proposed a maximum limit on farm sizes in South Africa. This proposal has generated heated discussion and concerns have been expressed about future food security (e.g. Jeffrey, 2015). Given the statistically significant relationships between GVA and, respectively, population, employment, and enterprise numbers (Table 5), it is clear that government policy interventions that may impact on the ability of these sectors to add economic value in the Free State, have to be pursued with great care because municipalities and towns could be negatively affected.

Vrey (1974) stated that the outmigration of white people contributed to the degeneration of Karoo towns in South Africa, a contention challenged by Toerien (2014b). He found that the economic success of larger towns relative to the smaller towns in the Eastern Cape Karoo was not due to different ratios of white people relative to brown and black people in the towns. However, Krugell (2014) reported a relationship between traditionally white residential areas and the wealth status of South African towns. Whether white outmigration plays a role in the fate of Free State towns still needs to be investigated.

Brown, Lambert, and Florax (2013) analyzed the dynamics of the US manufacturing sector in the beginning of the twenty-first century. They reported that manufacturing enterprises contributed on average 15.19% of all employment opportunities. The outlier Metsimaholo municipality is by far the only Free State municipality to exceed this figure in a manufacturing sector (see fuel, petroleum, chemical, and rubber products sector in Table 8). It is, thus, an atypical Free State local municipality that vividly illustrates the significant employment impact of manufacturing that adds value to primary products (in this case coal and gas) (Table 8). Development plans should consider how the lessons about value addition and employment creation by the coal to chemicals conversion technologies of the Sasol and other companies (Collings, n.d.) could be applied elsewhere in the Free State.

Cluster analysis, useful in ecological (e.g. Clarke & Warwick, 2001) and other studies, also proved to be useful in the regional comparison of Free State municipalities. On the basis of similarities of their GVA, employment, and enterprise patterns, it clearly identified five types of municipalities: i.e. four clusters as well as an outlier (the Metsimaholo local municipality) (Figures 3, 4 and 5). This allowed characterization of their typical economic profiles (Table 7).

Cluster analysis also promoted an investigation of the correspondences between the economic value addition, employment, and enterprise profiles of Free State municipalities (Tables 10 and 11). The correspondences in the cluster sequences of municipalities (Table 10) and the infinitely small chance that these are due to randomness, provide further manifestation of the orderliness that prevails in the economic, demographic, and entrepreneurial patterns of the majority of Free State municipalities.

The correspondences between GVA, employment, and enterprise profiles of Free State municipalities (Tables 10 and 11) are important because they suggest that specific patterns of value addition goes hand in hand with specific employment and enterprise patterns. In other words, there might be limits to the choices available for the creation of employment or the founding of enterprises. These correspondences (Tables 10 and 11) raise the possible presence of path dependence (e.g. Martin & Sunley, 2010) in the Free State. According to Walker (2000), path dependence describes the phenomenon that choices made in the past influence subsequent choices. Path dependence might explain the origin of the observed correspondences in the Free State, but this study does not prove its occurrence, which would require longitudinal rather than the cross-sectional studies reported on here. Cross-sectional cluster and correspondence analyses, however, proved to be very useful in this investigation.

Metsimaholo municipality's strong dependence on the fuel and chemicals sector and Matjhabeng municipality's dependence on mining for economic value addition and employment (Tables 7 and 8) produced unique cluster sequences (Table 10). Markusen and Schrock (2009) proposed that local consumption activity can be a source of distinctiveness and of long-term growth and stability of urban areas, and that specialization does not reflect export activity alone. Measuring skewness across metropolitan regions in the US showed that some occupations are more lopsided in their distribution than others. Because some highly skewed occupations like health care support workers and artists, media, entertainment, and sports workers are known to be chiefly local-serving, their regional significance can be attributed to variations in residents' local consumption spending rather than export demand (Markusen & Schrock, 2009).

Local consumption plays an important role in Free State municipalities (Table 7), but special entrepreneurship such as the development of mines following the discovery of diamonds and gold (Giliomee & Mbenga, 2007) or the founding of a new industry such as Sasol's conversion of coal to fuel (Collings, n.d.) that is dependent on external markets, initiated export-led development. This started totally new development dynamics decades ago in some Free State municipalities. The relative roles of consumer-led and export-led activities in Free State municipalities need further investigation.

Finally, the orderliness in the GVA, population, employment, and enterprise domains of Free State municipalities offers an opportunity for municipalities to learn from one another about development and employment successes and failures. Such sharing should be promoted.

## 6. Conclusions

There is a strong underlying structure in the economic, demographic, and entrepreneurial domains of Free State municipalities. In addition, there are distinct similarities and differences between municipalities based on recurring profiles of these domains. These observations should be heeded in development plans for the Free State province as well as for individual municipalities. This also provides an opportunity for municipalities to learn from others' successes and failures, an issue that should be pursued.

The observed structure is probably part of a system in which economic value addition, population size, employment creation, and entrepreneurial spaces are linked to one another. This structure is most likely driven to a large degree by the magnitude of money in a local economy.

Based on economic value addition, there are five types of municipalities in the Free State. Two are primarily dependent on agriculture, one on mining and another on the fuel and chemicals sectors. The last group has developed more balanced local economies where no single sector dominates. The development evolution of the latter group needs to be elucidated further.

The agriculture and households sectors are ubiquitous and significant sources of employment in the Free State. Management and developing policies impacting on these sectors have to be handled circumspectly in order to prevent unintended consequences.

The use of cluster analyses and the determination of cluster sequences proved that there are statistically significant repeated patterns of economic value addition, employment, and entrepreneurship in Free State municipalities. Municipal officials should be aware of these and take them into account in economic development planning. Their links to path dependencies have to be investigated further.

Significant manufacturing activities provide the reason why the Metsimaholo municipality is unique in the Free State. This municipality presents an outstanding example of the economic, demographic, and entrepreneurial impacts of economic value addition to local or external primary products, a practice that should in general be pursued more strongly in the Free State.

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#### References

- Baumgartner, D., Pütz, M., & Seidl, I. (2013). What kind of entrepreneurship drives regional development in European non-core regions? A literature review on empirical entrepreneurship research. *European Planning Studies*, 21, 1095–1127. <http://dx.doi.org/10.1080/09654313.2012.722937>
- Bell, D., & Jayne, M. (2006). *Small cities*. London: Routledge.
- Boschma, R., & Martin, R. (2010). The aims and scope of evolutionary economic geography. In R. Boschma & R. Martin (Eds.), *The handbook of evolutionary economic geography* (pp. 3–39). Cheltenham: Edward Elgar. <http://dx.doi.org/10.4337/9781849806497>
- Brown, J. P., Lambert, D. M., & Florax, R. J. G. M. (2013). The birth, death, and persistence of firms: Creative destruction and the spatial distribution of US manufacturing establishments, 2000–2006. *Economic Geography*, 89, 203–226. <http://dx.doi.org/10.1111/ecge.2013.89.issue-3>
- Clarke, K. R., & Warwick, R. M. (2001). *Change in marine communities: An approach to statistical analysis and interpretation* (2nd ed.). (pp. 3.1–3.6). Plymouth: Plymouth Marine Laboratory.
- Collings, J. (n.d.). *Mind over matter: The Sasol story: A half-century of technological innovation*. Retrieved from [http://www.sasol.com/sites/default/files/content/files/mind\\_over\\_matter\\_07\\_1178173866476\\_0.pdf](http://www.sasol.com/sites/default/files/content/files/mind_over_matter_07_1178173866476_0.pdf)
- Courtney, P., Lépicier, D., & Schmitt, B. (2008). Spatial patterns of production linkages in the context of Europe's small towns: How are rural firms linked to the local economy? *Regional Studies*, 42, 355–374. <http://dx.doi.org/10.1080/00343400701291542>
- Daloz, A. S., Camargo, S. J., Kossin, J. P., Emanuel, K., Horn, M., Jonas, J. A., ... Zhao, M. (2015). Cluster analysis of downscaled and explicitly simulated North Atlantic tropical cyclone tracks. *Journal of Climate*, 28, 1333–1361. <http://dx.doi.org/10.1175/JCLI-D-13-00646.1>
- Donaldson, R., & Marais, L. (2012). Preface: Small town geographies. In R. Donaldson & L. Marais (Eds.) *Small town geographies in Africa: Experiences from South Africa and elsewhere* (pp. ix–xviii). New York, NY: Nova Science.
- Drucker, J. (2011). Regional industrial structure concentration in the United States: Trends and implications. *Economic Geography*, 87, 421–452. <http://dx.doi.org/10.1111/ecge.2011.87.issue-4>
- The Education and Training Unit. (n.d.). *Integrated development planning for local government*. Retrieved from <http://www.etu.org.za/toolbox/docs/localgov/webidp.html>
- Feinstein, C. (2005). *An economic history of South Africa*. Cambridge: Cambridge University Press. <http://dx.doi.org/10.1017/CBO9781139165457>
- Finnie, T. J. R., Preston, C. D., Hill, M. O., Uotila, P., & Crawley, M. J. (2007). Floristic elements in European vascular plants: An analysis based on Atlas Florae Europaeae. *Journal of Biogeography*, 34, 1848–1872. <http://dx.doi.org/10.1111/jbi.2007.34.issue-11>
- Forni, M., Hallin, M., Lippi, M., & Reichlin, L. (2001). Coincident and leading indicators for the Euro area. *The Economic Journal*, 111, 62–85. <http://dx.doi.org/10.1111/econj.2001.111.issue-471>

- Free State Provincial Government. (2013, January). *Free State Growth and Development Strategy [FSGDS]: Free State vision 2030—the future we want*. Bloemfontein: Author.
- Frith, A. (2014) *Centres of population of South Africa*. Retrieved from <http://adrianfrith.com/2014/11/16/centres-of-population-of-south-africa>
- Giliomee, H., & Mbenga, B. (2007). *New history of South Africa*. Cape Town: Tafelberg.
- Gupta, M. C., & Huefner, R. J. (1972). A Cluster analysis study of financial ratios and industry characteristics. *Journal of Accounting Research*, 10, 77–95. <http://dx.doi.org/10.2307/2490219>
- Halseth, G., & Ryser, L. (2004). *Building rural capacity in the New Economy: Service provision in rural and small town Canada* (Cross-Canada Summary Report). Prince George: University of Northern British Columbia.
- Harvey, D. (2006). *Spaces of global capitalism: Towards a theory of uneven geographical development*. London: Verso.
- Hinderink, J., & Titus, M. (2002). Small towns and regional development: Major findings and policy implications from comparative research. *Urban Studies*, 39, 379–391. <http://dx.doi.org/10.1080/00420980220112748>
- Hoogendoorn, G., & Nel, E. (2012). Exploring small town development dynamics in rural South Africa's post-productivist landscapes. In R. Donaldson & L. Marais (Eds.), *Small town geographies in Africa: Experiences from South Africa and elsewhere* (pp. 21–34). New York, NY: Nova Science.
- Jeffrey, A. (2015). *Unintended consequences of ANC land proposals*. Retrieved from <http://www.fin24.com/BizNews/Unintended-consequences-of-ANC-Land-Proposals-20150206>
- Kenyon, P., Black, A., Cavaye, J., Duff, J., O'Meara, M., & Palmer, P. (2001). *Small town renewal* (Report). Barton: Rural Industries Research and Development Corporation.
- Komarek, T., & Loveridge, S. (2015). Firm sizes and economic development: Estimating long-term effects on US county growth, 1990–2000. *Journal of Regional Science*, 55, 262–279. <http://dx.doi.org/10.1111/jors.2015.55.issue-2>
- Krugell, W. (2014). The spatial persistence of population and wealth during apartheid: Comparing the 1911 and 2011 censuses. *Economic History of Developing Regions*, 29, 336–352. <http://dx.doi.org/10.1080/20780389.2014.957907>
- Lin, Y., Ho, Y., Zhao, Y., & Chang, Y. (2015). Quality assessment of *Fritillariae Thunbergii* Bulbus sold in Taiwan markets using a validated HPLC-UV method combined with hierarchical clustering analysis. *Journal of Food and Drug Analysis*, 23, 130–135. <http://dx.doi.org/10.1016/j.jfda.2014.06.004>
- Markusen, A., & Schrock, G. (2009). Consumption-driven urban development. *Urban Geography*, 30, 344–367. <http://dx.doi.org/10.2747/0272-3638.30.4.344>
- Martin, R., & Sunley, P. (2010). The place of path dependence in an evolutionary perspective on the economic landscape. In R. Boschma & R. Martin (Eds.), *The handbook of evolutionary geography* (pp. 62–92). Cheltenham: Edward Elgar.
- Masese, F. O., Kitaka, N., Kipkemboi, J., Gettel, G., Irvine, K., & McClain, M. E. (2014). Macroinvertebrate functional feeding groups in Kenyan highland streams: Evidence for a diverse shredder guild. *Freshwater Science*, 33, 435–450. <http://dx.doi.org/10.1086/675681>
- Mayfield, L., Courtney, P., Tranter, R., & Jones, P. (2005). *The role of small and medium-sized towns in rural development* (Final Report). Reading: Centre for Agricultural Strategy, The University of Reading.
- National Planning Commission. (2012). *National development plan 2030: Our future make it work*. Pretoria: The Presidency.
- Nel, E., Taylor, B., Hill, T., & Atkinson, D. (2011). Demographic and economic changes in small towns in South Africa's Karoo: Looking from the inside out. *Urban Forum*, 22, 395–410. <http://dx.doi.org/10.1007/s12132-011-9131-z>
- Podani, J., & Schmera, D. (2006). On dendrogram-based measures of functional diversity. *Oikos*, 115, 179–185. <http://dx.doi.org/10.1111/oik.2006.115.issue-1>
- Ramaphosa, C. (2014). *Oliver Tambo left us a rich legacy*. ANC Today 14, 31 Oct–6 Nov 2014. Retrieved from <http://www.anc.org.za>
- Romeu, M. A. R., Fontoura, J. A. S., & Melo, E. (2015). Typical scenarios of wave regimes off Rio Grande do Sul, Southern Brazil. *Journal of Coastal Research*, 299, 61–68. <http://dx.doi.org/10.2112/JCOASTRES-D-12-00085.1>
- Senge, P. M. (1990). *The fifth discipline: The art & practice of the learning organization*. New York, NY: Doubleday.
- South African Local Government Association. (2014). *About local government*. Retrieved from <http://www.salga.org.za/pages/Municipalities/About-Municipalities>
- Terblanche, S. (2002). *A history of inequality in South Africa 1652–2002*. Pietermaritzburg: University of Natal Press.
- Toerien, D. F. (2014a). *The enterprise architecture of Free State towns: Final report*. Retrieved from [https://www.researchgate.net/publication/269362642\\_THE\\_ENTERPRISE\\_ARCHITECTURE\\_OF\\_FREE\\_STATE\\_TOWNS\\_Final\\_Report](https://www.researchgate.net/publication/269362642_THE_ENTERPRISE_ARCHITECTURE_OF_FREE_STATE_TOWNS_Final_Report)
- Toerien, D. F. (2014b). 'n Eeu van orde in sakeondernemings in dorpe van die Oos-Kaapse Karoo [A century of enterprise order in towns of the Eastern Cape Karoo]. *Litnet*, 11, 330–371.
- Toerien, D. F., & Seaman, M. T. (2010). The enterprise ecology of towns in the Karoo, South Africa. *South African Journal of Science*, 106, 24–33.
- Toerien, D. F., & Seaman, M. T. (2011). Ecology, water and enterprise development in selected rural South African towns. *Water SA*, 37, 47–56.
- Toerien, D. F., & Seaman, M. T. (2012a, September 3–7). *Paradoxes, the tyranny of structures and enterprise development in South African towns*. Presented at Towards Carnegie III Conference, Cape Town. Retrieved from [http://carnegie3.org.za/docs/papers/269\\_Toerien\\_Paradoxes,%20the%20tyranny%20of%20structures%20and%20enterprise%20development%20in%20SA%20towns.pdf](http://carnegie3.org.za/docs/papers/269_Toerien_Paradoxes,%20the%20tyranny%20of%20structures%20and%20enterprise%20development%20in%20SA%20towns.pdf)
- Toerien, D. F., & Seaman, M. T. (2012b). Proportionality in enterprise development of South African towns. *South African Journal of Science*, 108, 38–47.
- Toerien, D. F., & Seaman, M. T. (2012c). Evidence of island effects in South African enterprise ecosystems. In A. Mahamane (Ed.), *The functioning of ecosystems* (pp. 229–248). Rijeka: Intech.
- Toerien, D. F., & Seaman, M. T. (2012d). Regional order in the enterprise structures of selected Eastern Cape Karoo towns. *South African Geographical Journal*, 94, 1–15.
- Toerien, D. F., & Seaman, M. T. (2014). Enterprise richness as an important characteristic of South African towns. *South African Journal of Science*, 110, 20140018, 9 p. Retrieved from <http://dx.doi.org/10.1590/sajs.2014/20140018>
- Van der Merwe, I. J., & Nel, A. (1975) *Die stad en sy omgewing: 'n Studie in nedersettingsgeografie* [The city and its environment: A study in settlement geography] (pp. 63–76). Stellenbosch: Universiteitsuitgewers.
- Vrey, W. J. H. (1974). 'n Demografiese sosiologiese studie van die wit bevolking in die Sentraal-Karoo [A demographic sociological study of the white population in the Central Karoo]. Bloemfontein: Institute for Social and Economic Research, University of the Free State.
- Walker, R. (2000). The geography of production. In E. Sheppard & T. Barnes (Eds.), *A companion to economic geography* (pp. 113–132). Oxford: Blackwell.



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