

**-RESEARCH ARTICLE-**

**THE IDENTIFICATION OF THE KEY SUB-INDUSTRIES AMONG COASTAL METROPOLITAN CITIES OF SOUTH AFRICA: AN APPLICATION OF THE LOCATION QUOTIENT TECHNIQUE**

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**–Abstract–**

The future of a stable and viable economy within South African Metropolitan cities will depend on the strengthening of key industries coupled with technological advancement. The aim of this paper is to identify key industry clusters in all four coastal metropolitan cities of South Africa namely Cape Town, eThekweni, Buffalo city, and Nelson Mandela Bay. Location quotient analysis is employed as a method to determine the industries that are playing key roles in the

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economic development and growth of the metropolitan cities. This paper uses a four-point 2002, 2007, 2012 and 2017 as the latest employment data available and a five-year interval is used as optimal data in terms of capturing potential structure change in the local economy of the coastal metropolitan cities in South Africa. Findings of this paper show that sub-industries in the manufacturing and service sectors have been the main drivers of the economic development in these metropolitan cities. Despite the creation of new technology, new business and new jobs to spearhead economic development in South Africa, the results obtained from this study indicate that some of these metropolitan cities are actually characterised by economic stagnation in some of their sub-industries that are supposed to be the key role players in economic growth.

**Key Words:** Location quotient, industry cluster, metropolitan cities, South Africa.

**JEL Classification:** O1, P25, P52, R10

## 1. INTRODUCTION AND BACKGROUND

The South African economy is based on natural resources in the primary sector. In 2017, the South Africa's economic growth has been driven by the primary sector particularly, agriculture and mining. The momentum in the other sectors has been weak. South Africa should transform its economy based on industrial skills that establish a domestic and international comparative advantage, which requires high productivity and innovation (World Bank, 2018).

Innovation has been regarded as the engine or driver of economic growth and development, especially during the past 30 to 40 years when the neo-Schumpeterian theories of economic growth became more popular (Ray, 1980; Van Duijn, 1983). Schumpeter (1939, 1961), seen as the "founder of innovation theory", made a crucial contribution to the study of the role of innovation in development. The neo-Schumpeterian theories expand on Schumpeter's growth theory, by not only focusing on innovation by the individual entrepreneur but viewing innovation as a process that takes place in a complex system (Hanusch & Pyka, 2007; Carlsson, 2007). Although the studies, since the 1980s to the 1990s in the different schools of thought are mostly in agreement about innovation being important for economic development, they differ in the degree of importance of innovation as well as how innovation contributes to economic development. Empirical evidence of the correlation between innovation and economic development is supplied by studies from a neo-Schumpeterian view, such as those

proposed by Howells (2005), Archibugi and Coco (2004), and Fagerberg and Srholec (2008).

The innovation system includes interaction among all the different actors or participants such as enterprises (producers, suppliers, competitors, etc.), academic and research institutions, the public sector and other institutions, who contribute to innovation (Paterson, Adam & Mullin, 2003 & OECD, 1997). These actors or participants do not necessarily interact consciously with one another. According to Nelson (1996), *“There is no presumption that the system was, in some sense, consciously designed, or even that the set of institutions involved works together smoothly and coherently. Rather, the ‘systems’ concept is that of a set of institutional actors that, together, play the major role in influencing innovative performance.”*

Carlsson (2007) distinguishes between national, regional, sectoral and technological innovation systems. According to Carlsson, national systems of innovation (NSI) refer to innovation activities within national boundaries where regional systems of innovation (RSI) refer to innovation activities within regional boundaries. Sectoral innovation systems focus on individual sectors or industries and technological innovation systems is about a particular technology or set of technologies, not bound by a specific geographical area. Metropolitan cities are typical examples of regional innovation systems. These regional innovation systems are often referred to as clusters. Different definitions are used for clusters, but most of these definitions include that clusters are localised networks of specialised organisations, whose products or services are closely linked through the exchange of goods, services and knowledge (Van den Berg, Braun & Van Winden, 2001).

The advantages of clustering that are experienced by firms include, inter alia, economies of scale and economies of scope, shared inputs of production, reduction in transport costs, reduction in production cost, knowledge spill-over, shared technology, labour pooling, shared research and support services. Furthermore more benefits also embrace competitive advantage, increased access to capital, firm infrastructure and technology infrastructure (Mattoon & Wang, 2014; Dewally & Shao, 2015; Baker, 2015; Hsu & Lai, 2013; Van den berg *et al.*, 2001). There are also positive outcomes for the innovation system in its entirety, such as higher employment, higher wages, increased patenting, firm growth and performance, enhanced growth in other industries and clusters. In addition, there are increased innovation, increased production and diffusion of knowledge and

technology, increased competitiveness, and increased opportunities for entrepreneurial activity (Mattoon & Wang, 2014; Hsu & Lai, 2013; Garanti & Zvirbule-Berzina, 2014; Slaper & Ortuzar, 2015; Webster, 2014).

To stimulate urban economic development and employment creation, identification of high potential clusters is important in order to determine where to concentrate support and allocate investment (Garanti & Zvirbule-Berzina, 2014). Once identified, it is important to know what kind of support is needed to stimulate and enhance cluster forming and functioning. Van den berg *et al.* (2001) identify three elements that are needed for the growth of a cluster:

(a) Spatial-economic conditions such as a strong regional demand, the accessibility of the cluster, rail, road and air connections, and the quality of life in the urban area (skilled people, living environment and attitudes to innovate and co-operate);

(b) Cluster-specific conditions such as the size and development level of the cluster (the presence of one or more cluster engines, the degree of strategic interaction among companies and institutions of education and research and the level of new firm creation); and

(c) Organising capacity such as the presence of a strategy in the cluster, quality of public-private networks, and the level of societal and political support for cluster development.

Webster (2014) reasons that not all clusters need the same factors or support in order to grow. Technologically advanced industries may need large markets, well-developed infrastructure, risk-taking entrepreneurial cultures, and strong linkages between producers and consumers. Webster opined that countries that do not have an advanced infrastructure should focus on clusters of basic or emerging technologies. Yet he emphasised that support should be in terms of a stable social, political, and cultural environment that stimulates initiative, entrepreneurship, unrestrained markets, as well as an environment that ensures personal safety, protection of property rights, producer and consumer confidence, and a market that efficiently allocates resources. Martin and Coenen (2015) confirm through an empirical study, that institutions, by means of policy programmes, play an important role in the forming or growing of clusters.

South Africa is in dire need of economic development and employment creation. To improve economic growth and employment creation, the regional innovation systems and clusters need to function more successfully. The research problem is,

therefore, the improvement of cluster performance in South Africa and ultimately economic development and employment creation. In order to achieve cluster performance, it is needed to identify key industry clusters. The aim of this paper is therefore to identify key industry clusters in the metropolitan cities of South Africa. The identification of key industries plays a role in the direction of resources to industries with high growth and employment potential. The significance of this paper lies firstly in the contribution to innovation system literature, secondly in the recommendations to policy formulation, and ultimately to the enhancement of innovation systems and economic development.

## **2. DATA SOURCE AND METHODS**

To analyse a regional economy, different methods could be used. This paper uses economic base analysis, which has as its goal to uncover and reveal the characteristics, strengths, weaknesses, and trends that describe a regional economy (Niyimbanira, 2018; Mpumalanga Department of Economic Development and Tourism, 2017). According to Froeschle (2005), economic base analysis techniques aim to *“identify the major sources of income and employment in the local area, and to anticipate the changes in the local economic structure, both those that tend to occur naturally and those that should be encouraged in the development of the diversified industrial base.”* Therefore, by applying these techniques, which use economic indicators or data, this paper reveals the characteristics that differentiate the economies of the coastal metropolitan cities and describes the uniqueness of each.

There are many different economic base analysis techniques, but this paper applies the most well-known, namely the location quotient analysis and dynamic location quotient analysis (Niyimbanira, 2018). These analysis techniques estimate the comparative advantage, competitive advantage, and competitiveness of the four coastal metropolitan cities in South Africa. This paper presents the findings of an economic base analysis applying location quotient and shift-share analysis over the period of 2002 to 2017. The data used was selected from the Quarterly Labour Force Survey (QLFS) conducted by Statistics SA (STATSSA).

### **2.1. Location Quotient**

Location quotient (LQ) is a metric for gauging the relative concentration or specialisation of one or more industries, industry sectors or industry clusters in an area which can be a cluster, town, region or a province. The location quotient is a valuable way of quantifying how concentrated a particular industry, cluster, occupation, or demographic group is in a region (metropolitan city in this case) as

compared to the nation. A metropolitan city's uniqueness vis-à-vis national average can be revealed by LQ analysis. Location quotients are very important techniques, because they indicate areas that have an existing concentration of workers with transferrable skills, interconnected businesses, suppliers, and related industries, or growing industry areas where employment in that sector is weak but growing (Niyimbanira, 2018).

*The formula of Location quotient:*

$$LQ = \frac{(X/Y)}{(X'/Y')}$$

Where: X stands for employment in the metropolitan city in industry A, Y for the city total employment, X' is South Africa's employment in industry A, Y' is the South African total employment and LQ is the location quotient.

In order to understand the formula above, let us use one of the selected metropolitan cities (Cape Town) and one industry (called A); then the equation 1 for the Cape Town City (CPT) would be re-written as follows:

$$LQ = \frac{(CPT \text{ employment in the industry A}) / (CPT \text{ total employment})}{(SA \text{ employment in the industry A}) / (SA \text{ total employment})}$$

Therefore, "the employment LQ is the ratio of the percentage of regional employment in a particular industry to the comparable percentage in a benchmark area which is usually the national" (Blair & Carroll, 2009). After estimating the LQ, the Dynamic Location Quotient ( $\Delta LQ$ ) is also calculated to understand what is happening in a particular industry. This is because, when interpreting the LQ, the following two things should be looked at: (a) a particular industry may have a high LQ with a very small number of jobs which may not be important to a province's economy; (b) a high LQ industry may be experiencing a decline in the LQ over a period of time. Furthermore, this could suggest a high risk of many jobs being lost in the province. Therefore, to confirm the dynamic changes in employment,  $\Delta LQ$  is estimated as a percentage change in the LQ over time and size of the industry in terms of jobs.

According to Niyimbanira (2018:101) by combining the dynamic location quotient (employment growth) and the LQ, industries in a given city could be grouped into four categories:

- Competitive or standout, also known as growing base industries;
- Emerging or pre-emergent industries;

- At-Risk or industries that require intensive care
- Declining or industries that hold a “little promise” in terms of relative employment size and labour growth.

### 3. RESULTS ANALYSIS

Looking at the geographic location of the metropolitan cities studied in this paper, one may expect similar results, however, they are different in some instances. The results from the LQ equation are presented in Table 1, 2, 3 and 4 for Cape Town city, eThekweni metropolitan city, Buffalo city and Nelson Mandela Bay, respectively, and all four tables are the authors’ own compilation. The results show similarity in all four metropolitan cities in terms of comparative advantage. All four have a comparative advantage in the following sub-industries: wholesale and commission trade; retail trade and repairs of goods, and health and social work. Three metropolitan cities do have a comparative advantage in food, beverages and tobacco products; textiles, clothing and leather goods; wood and wood products; transport equipment; and fuel, petroleum, chemical and rubber products. Cape Town city and eThekweni city do have a comparative advantage in the hotel and restaurant industry as well.

**Table 3.1: Location Quotient of Sub-Industries in CPT, 2002-2017**

INDUSTRY	CPT			
	LQ			
	2002	2007	2012	2017
Agriculture and hunting	0.38	0.50	0.73	0.95
Forestry and logging	0.20	0.17	0.22	0.22
Fishing and operation of fish farms	<b>2.77</b>	<b>3.29</b>	<b>4.81</b>	<b>4.21</b>
Food, beverages and tobacco products	<b>1.25</b>	<b>1.47</b>	<b>1.64</b>	<b>1.83</b>
Textiles, clothing and leather goods	<b>2.31</b>	<b>1.97</b>	<b>1.97</b>	<b>1.42</b>
Wood and wood products	<b>1.61</b>	<b>1.72</b>	<b>1.51</b>	<b>1.60</b>
Fuel, petroleum, chemical, and rubber products	<b>1.14</b>	<b>1.06</b>	<b>1.23</b>	<b>1.02</b>
Other non-metallic mineral products	0.91	0.88	0.92	1.02
Metal products, machinery and household appliances	0.97	0.83	0.71	0.85
Electrical machinery and apparatus	0.81	0.55	0.79	0.33
Electronic, sound/vision, medical and other appliances	<b>1.94</b>	<b>1.51</b>	<b>1.43</b>	<b>1.44</b>

Transport equipment	0.78	0.71	0.83	0.77
Furniture and other items NEC and recycling	<b>1.49</b>	<b>1.30</b>	<b>1.14</b>	<b>1.26</b>
Electricity, gas, steam and hot water supply	0.84	1.26	0.83	0.45
Collection, purification and distribution of water	0.35	0.42	0.36	0.31
Construction	<b>1.41</b>	<b>1.25</b>	<b>1.02</b>	<b>1.14</b>
Wholesale and commission trade	<b>1.57</b>	<b>1.68</b>	<b>1.33</b>	<b>1.22</b>
Retail trade and repairs of goods	<b>1.19</b>	<b>1.11</b>	<b>1.05</b>	<b>1.04</b>
Sale and repairs of motor vehicles, sale of fuel	0.98	0.93	0.90	0.87
Hotels and restaurants	<b>1.41</b>	<b>1.38</b>	<b>1.40</b>	<b>1.39</b>
Land and water transport	1.15	0.87	0.93	0.90
Air transport and transport supporting activities	<b>1.84</b>	<b>1.61</b>	<b>1.68</b>	<b>1.52</b>
Post and telecommunication	<b>1.20</b>	<b>1.13</b>	<b>1.24</b>	<b>1.21</b>
Finance and insurance	<b>1.23</b>	<b>1.27</b>	<b>1.32</b>	<b>1.12</b>
Real estate activities	<b>1.55</b>	<b>1.39</b>	<b>1.44</b>	<b>1.31</b>
Other business activities	<b>1.43</b>	<b>1.19</b>	<b>1.18</b>	<b>1.21</b>
Public administration and defence activities	1.07	1.01	0.98	0.91
Education	0.66	0.68	0.71	0.70
Health and social work	<b>1.16</b>	<b>1.09</b>	<b>1.09</b>	<b>1.02</b>
Households	0.58	0.73	0.73	0.82

**Source:** *Own compilation*

**Table 3.2: Location Quotient of Sub-Industries in EThekwini, 2002-2017**

INDUSTRY	ETHEKWINI			
	LQ			
	2002	2007	2012	2017
Agriculture and hunting	0.43	0.47	0.30	0.34
Forestry and logging	0.25	0.69	1.39	1.13
Fishing and operation of fish farms	0.36	0.24	0.11	0.12
Mining of coal and lignite	0.06	0.07	0.08	0.06
Mining of gold and uranium ore	0.00	0.01	0.00	0.00
Mining of metal ores	0.01	0.02	0.00	0.00
Other mining and quarrying	0.11	0.09	0.13	0.29
Food, beverages and tobacco products	1.33	1.11	0.99	0.84
Textiles, clothing and leather goods	<b>3.14</b>	<b>2.88</b>	<b>3.06</b>	<b>3.66</b>
Wood and wood products	<b>1.67</b>	<b>1.40</b>	<b>1.35</b>	<b>1.32</b>
Fuel, petroleum, chemical and rubber products	<b>1.64</b>	<b>1.52</b>	<b>1.44</b>	<b>1.10</b>
Other non-metallic mineral products	0.88	0.88	0.58	0.85
Metal products, machinery and household appliances	0.97	0.88	1.03	0.99
Electrical machinery and apparatus	1.03	0.88	0.65	0.14
Electronic, sound/vision, medical and other appliances	1.60	1.18	0.71	1.03
Transport equipment	<b>1.78</b>	<b>1.73</b>	<b>1.44</b>	<b>1.19</b>
Furniture and other items NEC and recycling	<b>1.34</b>	<b>1.28</b>	<b>1.32</b>	<b>1.08</b>
Electricity, gas, steam and hot water supply	0.87	0.70	0.55	0.53
Collection, purification and distribution of water	1.18	0.88	0.87	0.65
Construction	1.10	0.95	1.17	0.91
Wholesale and commission trade	1.17	1.25	0.84	0.89
Retail trade and repairs of goods	1.08	1.09	0.96	1.08
Sale and repairs of motor vehicles, sale of fuel	<b>1.33</b>	<b>1.21</b>	<b>1.14</b>	<b>1.23</b>
Hotels and restaurants	1.30	1.06	1.14	0.97
Land and water transport	<b>1.63</b>	<b>1.57</b>	<b>1.78</b>	<b>1.59</b>

Air transport and transport supporting activities	<b>1.49</b>	<b>1.47</b>	<b>1.36</b>	<b>1.28</b>
Post and telecommunication	0.99	0.99	0.83	0.68
Finance and Insurance	0.89	0.95	0.86	0.66
Real estate activities	1.14	0.91	0.60	0.57
Other business activities	<b>1.22</b>	<b>1.14</b>	<b>1.08</b>	<b>1.07</b>
Public administration and defence activities	0.67	0.77	0.78	0.93
Education	0.85	0.93	1.01	1.02
Health and social work	<b>1.00</b>	<b>1.08</b>	<b>1.06</b>	<b>1.03</b>
Households	0.92	0.99	1.13	1.16

**Source:** *Own compilation*

**Table 3.3: Location Quotient of Sub-Industries in NMB, 2002-2017**

INDUSTRY	NELSON MANDELA BAY			
	LQ			
	2002	2007	2012	2017
Agriculture and hunting	0.77	0.58	0.35	0.41
Forestry and logging	0.65	0.72	0.42	0.46
Fishing and operation of fish farms	<b>1.49</b>	<b>1.91</b>	<b>1.07</b>	<b>3.21</b>
Food, beverages and tobacco products	<b>1.11</b>	<b>1.26</b>	<b>1.35</b>	<b>1.22</b>
Textiles, clothing and leather goods	<b>1.58</b>	<b>1.68</b>	<b>1.23</b>	<b>1.31</b>
Wood and wood products	0.93	1.01	1.16	0.95
Fuel, petroleum, chemical, and rubber products	<b>1.93</b>	<b>2.23</b>	<b>2.14</b>	<b>1.90</b>
Other non-metallic mineral products	<b>1.47</b>	<b>1.40</b>	<b>1.21</b>	<b>1.93</b>
Metal products, machinery and household appliances	0.61	1.07	0.91	0.62
Electrical machinery and apparatus	<b>2.48</b>	<b>2.44</b>	<b>3.02</b>	<b>3.17</b>
Electronic, sound/vision, medical and other appliances	0.64	1.28	0.93	0.64
Transport equipment	<b>6.07</b>	<b>6.30</b>	<b>8.17</b>	<b>8.73</b>
Furniture and other items NEC and recycling	0.61	0.86	0.52	0.80
Electricity, gas, steam and hot water supply	0.54	0.37	0.36	0.34
Collection, purification and distribution of water	0.26	0.55	0.50	0.45
Construction	1.21	0.93	0.95	1.02
Wholesale and commission trade	<b>1.47</b>	<b>1.14</b>	<b>1.06</b>	<b>1.13</b>
Retail trade and repairs of goods	<b>1.14</b>	<b>1.06</b>	<b>1.06</b>	<b>1.11</b>
Sale and repairs of motor vehicles, sale of fuel	<b>1.12</b>	<b>1.33</b>	<b>1.41</b>	<b>1.46</b>
Hotels and restaurants	0.81	0.79	0.89	0.83
Land and water transport	1.08	1.22	1.14	0.98
Air transport and transport supporting activities	0.76	0.67	0.81	0.58
Post and telecommunication	1.25	1.29	1.18	1.26
Finance and insurance	0.81	1.06	0.75	1.01
Real estate activities	0.43	0.71	0.56	0.87

Public administration and defense activities	0.97	1.02	0.95	1.11
Education	0.94	0.89	0.93	0.85
Health and social work	<b>1.09</b>	<b>1.10</b>	<b>1.15</b>	<b>1.08</b>
Other service activities	<b>1.04</b>	<b>1.10</b>	<b>1.07</b>	<b>1.33</b>
Households	0.85	0.72	0.85	0.91

**Source:** *Own compilation*

**Table 3.4: Location Quotient of Sub-Industries in Buffalo City, 2002-2017**

INDUSTRY	BUFFALO CITY			
	LQ			
	2002	2007	2012	2017
Agriculture and hunting	<b>1.39</b>	<b>1.76</b>	<b>1.31</b>	<b>1.42</b>
Forestry and logging	<b>1.94</b>	<b>2.42</b>	<b>1.51</b>	<b>1.55</b>
Fishing, operation of fish farms	0.31	1.05	0.93	2.60
Food, beverages and tobacco products	1.27	1.11	1.04	0.91
Textiles, clothing and leather goods	1.19	0.99	0.61	0.63
Wood and wood products	0.60	0.78	1.10	0.88
Fuel, petroleum, chemical and rubber products	0.79	0.86	0.82	0.70
Other non-metallic mineral products	0.61	0.78	0.89	1.38
Metal products, machinery and household appliances	0.33	0.50	0.40	0.26
Electrical machinery and apparatus	<b>1.69</b>	<b>1.32</b>	<b>1.09</b>	<b>1.11</b>
Electronic, sound/vision, medical and other appliances	0.52	0.65	0.23	0.15
Transport equipment	<b>2.81</b>	<b>2.20</b>	<b>2.02</b>	<b>2.08</b>
Furniture and other items NEC and recycling	0.54	0.70	0.41	0.60
Electricity, gas, steam and hot water supply	0.98	0.55	0.71	0.68
Collection, purification and distribution of water	<b>1.32</b>	<b>1.38</b>	<b>1.59</b>	<b>1.44</b>
Construction	<b>1.14</b>	<b>1.01</b>	<b>1.23</b>	<b>1.28</b>
Wholesale and commission trade	0.98	0.91	1.03	1.09
Retail trade and repairs of goods	<b>1.01</b>	<b>1.09</b>	<b>1.34</b>	<b>1.39</b>
Sale and repairs of motor vehicles, sale of fuel	0.81	0.67	0.60	0.62
Hotels and restaurants	0.67	0.77	1.06	0.99
Land and water transport	0.80	0.74	0.64	0.53
Air transport and transport supporting activities	0.48	0.44	0.59	0.41
Post and telecommunication	0.70	0.68	0.63	0.64
Finance and Insurance	0.67	0.91	0.72	0.95
Real estate activities	0.26	0.56	0.60	0.91

Other business activities	0.75	0.77	0.72	0.67
Public administration and defense activities	<b>1.22</b>	<b>1.21</b>	<b>1.14</b>	<b>1.29</b>
Education	<b>1.32</b>	<b>1.29</b>	<b>1.47</b>	<b>1.29</b>
Health and social work	<b>1.29</b>	<b>1.17</b>	<b>1.20</b>	<b>1.08</b>
Other service activities	0.88	0.96	1.02	1.21
Households	0.97	1.05	1.24	1.09

**Source:** *Own compilation*

One would expect the fishing sub-industry to be one of the key industries in the four coastal metros, but the results indicate that a continuous comparative advantage is only in the Cape Town and Nelson Mandela metropolitan cities. Land and water transport sub-industry's comparative advantage is found in the Buffalo and Cape Town metropolitan cities. Beside Cape Town city, the other three coastal metropolitan cities held a comparative disadvantage in the real estate activities, and finance and insurance sub-industries. Furthermore, the results from post and telecommunication, and air transport and transport supporting activities sub-industries show a comparative advantage only in two metros. Table 3.5 and 3.6 present dynamic LQs and classification of sub-industries respectively. The results from LQs and the dynamic LQ show ten standout sub-industries. These are found in the upper right quadrant in Table 3.6. These are economically important and high-performing sub-industries for those metropolitan cities, which means they should increasingly have a significant contribution to job creation. Furthermore, five sub-industries are regarded as pre-emergent and should be developed further with the aim to get them into the standout stage.

**Table 3.5. Dynamic location quotient of Sub-industries the four Coastal Metropolitan cities of South Africa**

INDUSTRY	CPT		EThekwini		NMB		BC	
	ΔLQ		ΔLQ		ΔLQ		ΔLQ	
	2007	2017	2007	2017	2007	2017	2007	2017
Agriculture and hunting	33.1	29.5	10.0	12.2	-24	16.1	26.4	8.6
Forestry and logging	-15	-2.1	178	-19	10.7	10.2	25.1	3.1
Fishing, operation of fish farms	18.8	-12	-34.1	11.7	28.3	199	235	180
Food, beverages and tobacco products	17.3	11.5	-16.2	-14.4	13.5	-9.3	-11.9	-12.6
Textiles, clothing and leather goods	-15	-28	-8.3	19.6	6.2	6.5	-16.7	2.7
Wood and wood products	6.6	6.4	-16.2	-2.7	8.7	-17.6	30.4	-20.5
Fuel, petroleum, chemical and rubber products	-6.7	-17	-7.1	-23	15.3	-11.3	8.6	-14.5
Transport equipment	-8.2	-7.1	-3.1	-18	3.8	6.9	-21.8	3.1
Furniture and other items NEC and recycling	-13	10.4	-4.5	-18.6	41.2	54.1	29.4	48.6
Electricity, gas, steam and hot water supply	49.7	-46	-19.9	-3.8	-31	-5.6	-44.4	-4.7
Construction	-11	12.3	-13.7	-22	-23	6.9	-12	4
Wholesale and commission trade	7.0	-8.4	6.9	6.7	-22	6.6	-7.5	6.1
Retail trade and repairs of goods	-6.8	-0.6	1.5	12.2	-6.9	4.6	7.7	4.1
Sale and repairs of motor vehicles, sale of fuel	-5.4	-3.6	-9.2	7.1	19.5	3.9	-17.4	3.3
Hotels and restaurants	-2.3	-0.5	-18.7	-15	-3	-6.2	15.0	-6.7
Land and Water transport	-25	-3.3	-3.6	-11	12.2	-14.4	-7.8	-17.8
Air transport and transport supporting activities	-12	-9.1	-1.3	-6.2	-11	-28.2	-8.7	-31.1
Post and telecommunication	-6.1	-2.7	-0.6	-18	3.2	6.7	-3.0	2.4

Finance and Insurance	3.7	-15	7.6	-23	31.1	35.2	36.0	32.3
Real estate activities	-10	-9.1	-20.8	-5.0	67.6	56.1	119	52.8
Education	3.6	-0.9	9.3	1.9	-5.0	-8.9	-2.2	-12.4
Health and social work	-5.9	-6.2	7.5	-2.8	1.1	-6.1	-8.8	-9.7

Source: *Own compilation*

Table 3.6 shows sub-industries which need intensive care. These are the industries that show a high LQ and negative dynamic LQ. They are also known as transforming industries. The table also indicates the standout sub-industries, which are also known as the growing base. In addition, pre-emergent sub-industries and those with little promise are shown in the lower right and lower left quadrants respectively. As indicated by Niyimbanira (2018), if medium or large industries are found in the upper left quadrant, it is an important warning that the metropolitan city is losing a major part of the contribution to the economic activity and should undertake planning and investment priorities accordingly. Furthermore, the sub-industries found in the lower left quadrant are less important to the city and are also declining in employment. The results show that the tertiary sector plays an important role in the city of Cape Town. According to Cape Town City (2016) “*commercial services encompass the wholesale and retail trade, catering and accommodation, transport, storage and communication and finance, insurance, real estate & business services industries. Commercial services comprised R169.91 billion (or 60.0 per cent) of the Metro’s GDP in 2015 (the largest sector in the region). The industry grew at an average rate of 3.5 per cent per annum over the period 2005 – 2015, which exceeded the overall Metro GDP growth rate over this period, thus placing commercial services among the fastest growing industries in the Metro over the past decade*”.

However, the results indicate that most sub-industries, which need intensive care in the city of Cape Town are under commercial services. This implies that the employment in those sub-industries grew earlier but at a later stage, the growth slowed down. This is confirmed by Cape Town City (2016) that employment growth slowed significantly post-recession to average 1.4 percent per annum over the period 2010 to 2015, which was marginally below the overall metro employment growth rate of 1.5 percent over the same period. The results further show that there is no standout sub-industry from eThekweni metropolitan city. This is a concern as manufacturing peaked in 2000, but is now at its lowest and is still declining (EThekweni Municipality, 2016). The other coastal metropolitan cities have 2, 3 and 5 standout sub-industries for CPT, BC, and NM respectively.

The negative trends in many of the industries are evident mostly, since the period from 2012 to 2017. This decline in growth coincides with the lag effect of the world recession on South Africa. It is especially evident in the industries that depend on tourism, such as hotels and restaurants, and food and beverages. The growth in the Chinese economies may also have had an effect on certain industries such as the textile industry in Cape Town.

**Table 3.6: Classification of Sub-industries in the four Coastal Metropolitan cities in South Africa**

<p><b>High LQ and Negative <math>\Delta</math>LQ</b></p> <p>Textiles, clothing and leather goods (CPT)</p> <p>Wood and wood products (eThekwini)</p> <p>Fuel, petroleum, chemical and rubber products (CPT, eThekwini)</p> <p>Transport equipment (eThekwini)</p> <p>Furniture and other items NEC and recycling (CPT, eThekwini)</p> <p>Hotels and restaurants (CPT, eThekwini, NM)</p> <p>Land and Water transport (eThekwini)</p> <p>Air transport and transport supporting activities (CPT, eThekwini, NM, BC)</p> <p>Post and telecommunication (CPT)</p> <p>Real estate activities (CPT)</p> <p>Health and social work (CPT, BC)</p>	<p><b>High LQ and Positive <math>\Delta</math>LQ</b></p> <p>Agriculture and hunting (BC)</p> <p>Forestry and logging (BC)</p> <p>Fishing, operation of fish farms (NM)</p> <p>Food, beverages and Tobacco products (CPT)</p> <p>Textiles, clothing and leather goods (NM)</p> <p>Wood and wood products (CPT)</p> <p>Transport equipment (NM)</p> <p>Sale and repairs of motor vehicles, sale of fuel (NM)</p> <p>Post and telecommunication (NM)</p> <p>Education (BC)</p>
<p><b>Low LQ and Negative <math>\Delta</math>LQ</b></p> <p>Fuel, petroleum, chemical and rubber products (BC)</p> <p>Transport equipment (CPT)</p> <p>Electricity, gas, steam and hot water supply (eThekwini, BC, NM)</p> <p>Sale and repairs of motor vehicles, sale of fuel (CPT)</p> <p>Land and water transport (CPT)</p> <p>Education (NM)</p>	<p><b>Low LQ and Positive <math>\Delta</math>LQ</b></p> <p>Agriculture and hunting (CPT, eThekwini)</p> <p>Forestry and logging (NM)</p> <p>Furniture and other items NEC and recycling (NM, BC)</p> <p>Land and Water transport (BC)</p> <p>Education (eThekwini)</p>

#### 4. CONCLUSION

South Africa is in dire need of economic development and employment creation. To improve economic growth and employment creation the regional innovation systems and clusters need to function more successfully. Hence, the paper presents the status of the sub-industries in the coastal metropolitan cities, which are Buffalo City; Cape Town; eThekweni and Nelson Mandela Bay. Although, some sub-industries are doing well (standout), there are many other sub-industries that need more attention as they are important and high contributors to those Metropolitan cities' economies. The future of a stable and viable economy within the South African Metropolitan cities will depend on the strengthening of key sub-industries coupled with technological advancement. In other words, in countries such as South Africa where cities remain more economically attractive, local economic development and technology investment need careful of concord to be strategically provided in order to strengthen employment creation opportunities. These metros' capacity to improve where sub-industries are in need of intensive care will depend on sustaining the strong institutions and good governance, which in return depend on political economy. Policies should especially focus on the creation of an environment that is conducive to innovation and the improvement of innovation systems in order to support industries in the third quadrant and to enhance industries with high potential in employment creation. Overall dynamics in sub-industries in the Coastal Metropolitan cities might not be unique to these economic regions only and future research on a similar topic is needed for inland metropolitan cities of South Africa. In addition, there is a need for future studies on causes of industry failure at the micro and macro level in South Africa.

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