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# The economic performance and competitiveness of manufacturing firms in Johannesburg, South Africa

Lauralyn Kaziboni

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## ABSTRACT

South Africa needs to redress premature deindustrialization that has seen the manufacturing sector's contribution to economic growth and development thinning out. In order to chart a path towards reviving the manufacturing sector, understanding the factors that drive the performance and the competitiveness of the manufacturing industry is vital. This paper analyses responses from the City of Johannesburg survey on economic performance, competitiveness and the challenges faced, from over 300 firms. The study suggests that that a significant proportion of firms exhibited growth between 2013 and 2015, depending on sectoral grouping, access to the export market and investment in machinery and equipment, among other factors. The paper offers recommendations to stimulate economic performance and competitiveness in Johannesburg.

**Keywords**: industrial development, industrialization, performance, competitiveness, firm-level survey

**JEL classification:** L2, L6

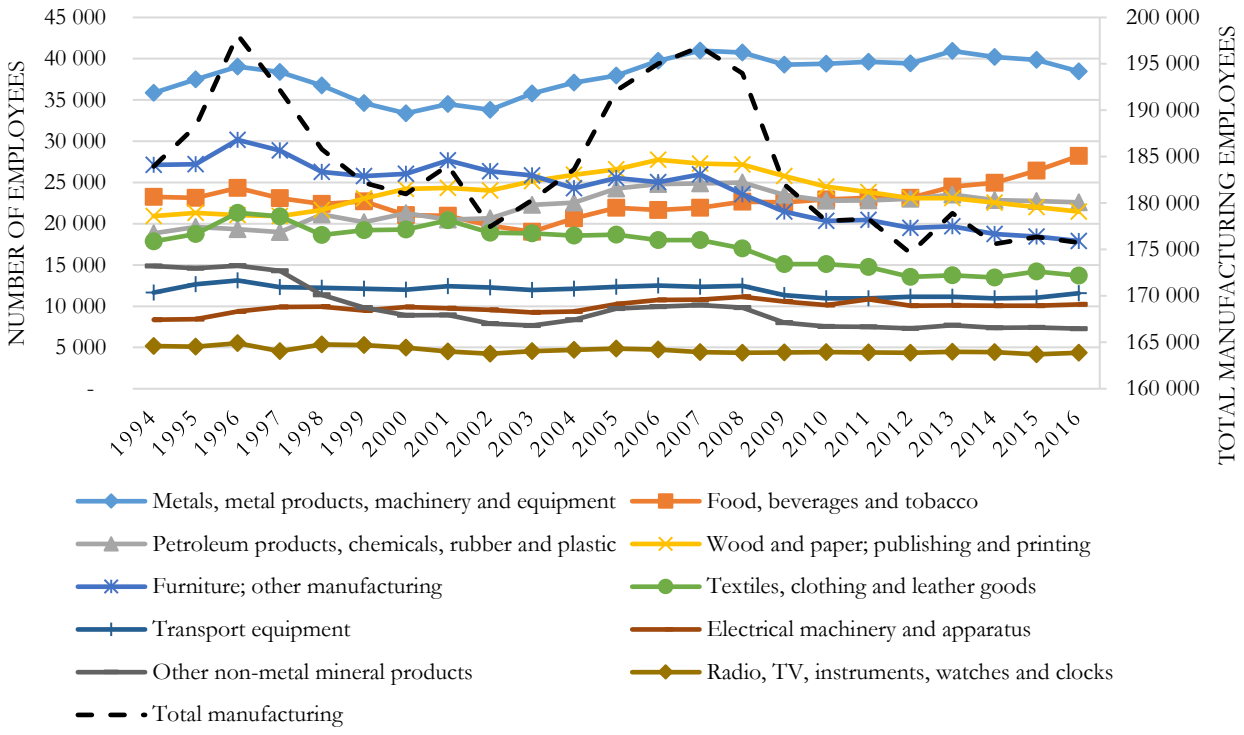
# 1 INTRODUCTION

The City of Johannesburg accounts for 17% of South Africa's economic output and is the leading metropolitan area for most of the country's key sectors (Quantec 2017). However, the population growth of the metro coupled with poor economic performance has resulted in increasing unemployment levels, high crime rates and the sprawl of informal settlements (City of Johannesburg 2016). The character of economic activity in Johannesburg over the years has been skewed by mining industries and the apartheid legacy, and has not been able to adjust to the growing employment demand. With the population expected to grow from 4,9 million in 2016 to 5,4 million by 2021, there is an urgent need to stimulate the city's productive sectors (City of Johannesburg 2016).

Situational analysis indicates that employment losses in the agriculture and mining sectors have not been rapidly and adequately replaced by non-tradable sectors such as manufacturing (DTI 2007). Employment growth and creation in the services industry has grown sporadically, and while services contribute significantly to employment, the role of the manufacturing industry is critical. Manufacturing has strong forward and backward linkages with other sectors and has potential to stimulate employment growth in these supporting services. Despite the manufacturing sector's importance, overall contribution to total employment has not recovered from the 2008 levels (Figure 1).

Yet, some manufacturing sub-sectors have exhibited better growth compare to others. In Johannesburg, the major sub-sector contributing to employment is metal, metal products, machinery and equipment. This is followed by food, beverages and tobacco and petroleum products. With the exception of food, beverages and tobacco, electrical machinery and transport equipment, all sectors are experiencing a decline in the number of employees, with furniture and other manufacturing being affected the most (Figure 1).

***Figure 1: Johannesburg manufacturing sector employment***




*Source: Author's illustration, based on Easy Data by Quantec, (2018)*

The declining contribution of the manufacturing sector to key economic indicators (GDP, gross value added, and employment) is termed deindustrialization. In South Africa, deindustrialization has largely been driven by financial and trade liberalization (Tregenna 2011). Interventions required to reverse this phenomenon need to be tailored to the manufacturing industry and the requisite support services, taking into account that reindustrialization in itself is challenging. Furthermore, various studies (Campbell, Partridge and Soto 2013; European Commission 2011; OECD 2013; Todes and Turok 2015) highlight that the location of firms is key in designing policies and interventions that are specific, because of diverse institutional, physical and socio-political characteristics by area.

Johannesburg has a number of industrial nodes with potential to contribute towards revitalizing the economy. There is limited research with regards to the nature of economic activity and the challenges faced by firms at a node-level. Yet, to improve economic activity there is a strong need to implement evidence-based interventions to address challenges faced by firms and spur economic growth. Absent these interventions, there is a high likelihood that the level of unemployment will continue to increase, especially impacting the youth. Like most parts of the country, the challenges of poverty and inequality remain acute. A sound understanding of industrial activity allows policy makers to leverage resources in the direction of greatest potential return. There is, therefore, a need to increase competitive local production as a basis for job creation, exports and sustainable firm growth. The research questions that this paper aims to address are:

1. Which factors influence economic performance and competitiveness?
2. How can economic performance be improved in Johannesburg's industrial nodes?

This paper draws on the data collected from the City of Johannesburg firm-level survey that was undertaken by the University of Johannesburg's Centre for Competition, Regulation and Economic Development in 2015/16. The paper also draws from insights from interviews conducted in selected nodes to better understand the challenges faced by firms, as part of the survey data collection process.

Section 2 provides an overview of the current literature on the role of manufacturing; and economic performance and competitiveness. Section 3 sets out the methodology that was used for the study and provides rationale for the proxies employed to assess economic performance and competitiveness. Section 4 provides an overview of the nature and spread of manufacturing activity in Johannesburg. The penultimate section explores the findings from the survey data, analysing the state of performance and competitiveness. Section 6 concludes and suggests policy recommendations.

## 2 THE IMPORTANCE OF DEVELOPING PRODUCTIVE CAPABILITIES

Industrial development plays a key role in the growth and sustainability of the manufacturing sector. The manufacturing sector is the driver for economic growth, due to its spill-over and multiplier effects across the economy. This statement is derived from one of the Kaldorian laws, which states that the faster the growth of the manufacturing sector, the faster the economy grows in relation to other sectors (Dasgupta and Singh 2007:4). The contribution of manufacturing sector to the overall economy is not perpetual and starts to decline at a certain level of GDP per capital. At this stage, the growth of tertiary services begins to grow at a faster rate as demand for research and development, engineering services, technology advancements becomes key. However, when GDP per capita reaches a certain level, the growth of the manufacturing sector begins to fall, while other sectors start to grow, particularly the services sector. In other words, the movement of labour from secondary services to the tertiary industry is deindustrialization (Dasgupta and Singh 2007:6).

## *2.1* Deindustrialization of the economy?

Tregenna (2011) notes that industrialization, deindustrialization and reindustrialization denote the changes in the proportion of the manufacturing sector in the GDP and/or employment levels. McCormick (1998) also refers to industrialization as building up a country's capacity to transform raw materials to new products, including the system that enables this transformation to occur. Simply, Green (2009) states that industrialization describes the development of industry. Hence, an increase in the contribution of manufacturing to GDP and/or employment levels implies industrialization (and in some cases reindustrialization). Decrease, however, may simply indicate retarded growth during that time period. Since the 1980s, developing countries have experienced deindustrialization and its effects are evidenced by high unemployment rates, low GDP per capita and high inequality rates (Tregenna, 2009). In an in-depth study, Tregenna (2011) analyses deindustrialization in South Africa and internationally through disaggregated changes in the share and level of manufacturing employment with respect to GDP. The study finds that deindustrialization in South Africa was associated with policy changes such as trade and financial liberalization. Trade liberalization had a negative impact on Latin American countries that industrialized under the import substitution industrialization model: Argentina, Brazil, Chile, Costa Rica, Mexico, Uruguay, and Venezuela (Bogliaccini 2013:80). Even though trade liberalization assisted in the integration of local companies into the global economy, it had negative impacts on the economy, resulting in increased inequality.

In South Africa, deindustrialization occurred at income per capita levels that are significantly lower than those at which deindustrialization occurred in developed countries, and is thus termed premature deindustrialization (Rodrik 2016; Tregenna 2011). Premature deindustrialization can have severe negative effects on the economy, as the benefits from industrialization are foregone. These include specialization, division of labour, mechanization, increasing returns to scale, learning-by-doing, and superior potential for cumulative productivity increases. Absent of these, an economy may undergo retarded growth, high unemployment levels and declining international competitiveness. As such, reindustrialization plays a key role in economic growth, which will lead to the resuscitation of an inclusive, resilient and competitive economy (Palma 2014).

Industrial development through the development of industrial clusters and maximizing the benefits of industrial clusters plays a particularly important role in addressing deindustrialization. The manufacturing sector is a key driver of economic growth, and targeted interventions can go a long way in improving the manufacturing sector. Assessing the level of skills, technological state, level of performance, and access to the market, among other factors, will likely draw out the areas that require intervention. Increased firm performance and competitiveness will likely lead to firm growth, export competitiveness, and employment creation (Industrial Development Corporation, 2013). These are all the facets that reindustrialization is trying to address, and analysing firm experiences may therefore be useful.

Industrial clustering plays an important role in determining how industries influence economic growth and employment creation as industries are the driving force behind these. Industries' well-being hinges on access to labour, technological spill-overs, and backward and forward linkages (Kleynhans and Drewes 2008:140).

## *2.2* New economic geography

In the 1990s, Krugman (1998) postulated the relevance of understanding the study of the location of factors of production in space. Subsequently, industrial clustering theory was developed, following Alfred Weber's location model. Distance, transport cost, and space were initially not considered in trade theory; however, location tends to be a function of access to raw materials and reliable transport and historical reasons, and tends to be specific to a location (Schmutzler, 1999:355). For example, despite the expansive surface area of the United States of America, most of the population is located in a few clusters of metropolitan areas. It is

important to understand the location of industries, more so manufacturing, as these reasons can be the foundation to model the trade-off between dispersion and agglomeration forces (Neary 2001:536).

The new economic geography proposes that the clustering of industries within a nation is a key determinant of the country's competitiveness (Martin 1999). Clusters can develop from networks of small and medium-sized companies to larger companies and tertiary institutes. Munnich *et al.* (1999:5) stated that clusters develop around firms that are competitive and tend to be exporting companies, which achieve mass production, economies of scale, and lower production costs. A firm's competitiveness and ability to export are influenced by a number of factors, including proximity to technology and innovation, labour, raw materials and the market (Kleynhans and Drewes 2008). The new economic geography model is based on the assumption that increasing returns to scale, economies of scale, and imperfect competition are important determinants of trade and specialization, as opposed to constant returns, perfect competition, and comparative advantage (Schmutzler 1999:373). Increasing returns to scale emerge due to market, technological, and other externalities that are inherent in regional and local economic integration. In addition, concentration and access to markets are equally important as they limit, if not remove, transport costs. According to neo-classical assumptions, firms minimise cost and maximise profit, which implies that the prospects of removing transport costs are welcomed because they reduce the final price of the product. Subsequently, location may give rise to backward and forward linkages, whereby people are more inclined to live and produce near a place where manufacturing is located and limit their living costs, particularly transport (Chen *et al* 2008).

There are different forms of increasing returns when considering spatial agglomeration. The agglomeration (centripetal) forces are based on externalities, which are derived from labour market pooling, technology spill-overs, and intermediate goods supply and demand linkages. These factors are inter-related to a certain extent (Krugman 1998:8). In order for technology spill-overs to be realised, the pool of labour must be skilled so as to identify technology spill-overs and incorporate them into their own business models (Lall 1992). As such, in order for companies to perform well, the three factors need to be incorporated so that they complement one another. In relation to the manufacturing firms, the externalities that may determine the development of a cluster may be pecuniary externalities and not necessarily technological ones (Sunley 2003). Pecuniary externalities consist of direct interdependence among producers. In these, interdependence takes place via the effects on the price system. Pecuniary externalities exert an effect on the price of production factors and the price of products. Positive pecuniary effects are found when the prices of products are below the equilibrium level and the price of production factors are due to external forces (Sunley 2003).

Kleynhans and Drewes (2008) agreed with Chen *et al*. (2008), arguing that, other than the proximity of labour, production costs (linked to technology spill-overs), and access to raw materials, there are a number of additional factors that should also be taken into account, namely the power of trade unions, market costs, local institutions, state spending and intervention, regulatory arrangements, foreign investment, global competition, and the number of products determined by the market. Together, these factors influence businesses' location decisions and ultimately lead to the local clustering of economic activity (Chen *et al* 2008).

Path dependence is another aspect that is in favour of these locational agglomeration models where past events can have long-term effects on regional and urban development. The initial pattern may not be the most suitable or optimal location, but rather a coincidence. After it has occurred, it may create forward and backward linkages that may instil lock-in effects where suppliers, producers, and consumers develop agglomeration economies and benefit from increasing returns to scale. However, path dependence in most cases tends to be a sub-optimal economic decision and may often result in underperformance by firms as

they have incurred huge sunk costs and are unable to relocate. Nationally, this leads to uneven development, where urban regions are more developed than the rural ones (Martin and Sunley 2006).

Since the 1980s, interest in industrial agglomeration and externalities has resurfaced in an extensive body of geographical work on industrial areas, new successful areas, resurfaced areas, and old, declining ones. Likewise, economic geographers have long recognised the importance of history in shaping the process and patterns of uneven regional development and the consequences of lock-in effects on the rise and decline of urban and extensive research programmes on the key importance of labour and technology in regional development (Porter 2000).

## *2.3* Review of firm-level surveys

In South Africa, numerous surveys, with differing objectives, have been carried out (Daniels 2007; Edwards 2002; Phele, Roberts and Steuart 2014). To understand the variables that influence trade, technology, and employment in South Africa, Edwards analysed previous survey data by means of cross-tabulations and estimated labour demand functions following trade liberalization. In this study, two relationships, not causality, were tested: firstly, the relationship between trade and technology preference; and, secondly, the impact of increased exporting and foreign direct investment on employment. Large firms were affected by trade liberalization as they faced increased competition, which led to reduced employment levels. Furthermore, less skills-intensive firms were negatively affected by trade liberalization as firms that employ more unskilled labour faced increased competition from imports (Edwards 2002:23). On the other hand, access to raw materials, foreign investment, and computers improved the use of skills in production, which ultimately improved export competitiveness. However, this did not translate into high employment creation (Edwards 2002:50).

The study by Daniels (2007) reviewed the status of skills in South Africa by examining the National Enterprise Survey (1998), the World Bank Survey (1999), and the Human Science Research Council Report of 2013. Daniels' study established that there was a shortage of skills in South Africa at all tiers: high, intermediate, and low. This was attributed to colonial education policies, exacerbated by the poor coordination of skills efforts between government departments, mainly the Department of Labour and the Department of Education, as well as the Department of Home Affairs to some extent. The curricula employed by further education and training (FET) colleges are not aligned with employers' needs, especially for intermediate skills, and greater coordination would be useful for revitalizing firm performance (Daniels 2007).

Previous studies of the manufacturing sector in South Africa also highlighted the key role of skills and training development (Daniels, 2007; Edwards 2002; Phele *et al*., 2014). Skills development has been reported to be lagging, especially in terms of technical and artisanal skills in South Africa at large. Appropriately trained employees are not only able to carry out tasks but show initiative in improving the production process and products themselves. In the process of adopting and adapting technology, skills play a pivotal role. The state of skills and education continues to be weak, and a number of interventions have been implemented to redress this situation. FET colleges, a skills development initiative, were developed to address this issue, but the role of this initiative and the needs of the industry appear disconnected, which has the shortage of skills and inadequately trained staff (Daniels 2007).

In a separate study, Phele *et al*. (2014) sought to understand technological capabilities and skills development and training at a city level through firm-level analysis and a literature review. The study focused on reviewing firms in the foundry industry (the manufacture of metal cast products) in the city of Ekurhuleni. Of the 200 firms contacted, 34% responded, mostly small and medium-sized businesses. The main challenges identified were weak production capabilities and poor skills development coordination. The study recommended better coordination between industry and the research arena in order to drive technology advancements, as well as the need to encourage coordination between the industry and

municipalities to ensure that firms' requirements are understood and addressed. If skills development, production capabilities, and technology are not dealt with at the local level, it may affect South Africa's economic development.

International studies also indicate that access to markets and reliable infrastructure are vital to a firm's performance. In addition to these factors, the South African studies discussed above indicate that skills shortage is an issue that needs to be reckoned with at national as well as local level. There also seems to be poor coordination between the government departments, municipalities, and the industry, which worsened the state of skills and hampered any efforts to address the issue. All the studies employed firm-level analysis and reviewed data from past surveys, with the exception of Phele *et al*. (2014), who utilised survey and key-informant interviews.

# 3 RESEARCH METHODOLOGY

The paper draws from the City of Johannesburg Firm-level Survey conducted in 2015/16 for the City of Johannesburg Metropolitan Municipality by the Centre for Competition, Regulation and Economic Development. The survey covers the period between 2013 and 2015. Prior to the survey, a pilot study was undertaken in order to ensure its efficacy. Of the 28 industrial nodes in Johannesburg, the pilot study was conducted in two – Aeroton and Industria West – while the firm-level survey was conducted in the remaining 26 industrial nodes. SThis paper analyses the data that was collected in the firm-level survey of the 26 industrial nodes. It should be noted that the industrial nodes are spread across the seven regions in Johannesburg, that is, regions A to F.

The firms in the industrial nodes were identified by street-by-street investigation, and classified according to their primary activity. In order to verify the information collected, follow-up calls, internet searches and business cards were used. A sample of 2 064 manufacturing firms' was identified. Due to various challenges such as blocked email addresses, incorrect email addresses, and refusal to participate in the survey, the questionnaire was subsequently administered to 1 287 manufacturing firms. Of the 1 287 manufacturing firms, 105 were selected to participate in in-depth interviews due to budget and time constraints. The interviewees were randomly selected in each region, such that 15 firms were identified in each industrial node.

The survey was administered online and the face-to-face in-depth interviews were conducted (in English) only to substantiate the findings from the survey. The survey and interviews were conducted with personnel at managerial level, or individuals with an intimate understanding of the operations of the company.

## 3.1 Instrument structure and variables

The themes covered in the survey and analysed in this paper include general background information, performance and capacity utilization, investment patterns, skills and training, and research and development. General background information included the firm's primary activity (manufacturing and/or wholesale and retail – and the manufacturing subsector. Firm size was determined through the number of employees and annual turnover estimates. Economic performance was captured through changes in annual turnover in the past two years and the level of capacity utilization. Whether the firms had invested between 2013 and 2015 was also a key indicator used to assess performance. Firm competitiveness was analysed through technology advancements and whether or not the firm exported. The state of skills was examined, in order to understand how this impacts a firm's performance.

With the exception of the final open-ended questions on recommendations, the survey was composed of multiple-choice questions. Realistic ranges were made possible by using secondary sources, such as the threshold for micro, small and medium enterprises, to avoid false responses as ranges minimize the likelihood of the respondent to overstate or understate their response. The complexity of the questions in

the survey was minimized and multiple choice questions were utilized, in addition to the realistic ranges. Firms were able to answer 'other' or 'not applicable' wherever relevant. The mixed method approach – open ended and multiple choice questions – was utilized to ensure that the responses were measurable and accurate as well as to remove possible ambiguity that was picked up on the pilot study. The structure of the interviews was based on the survey themes, but allowed for deeper understanding on the issues that the firms were facing.

### *3.2* Possible sources of bias in the survey

Whilst efforts were made to ensure that all manufacturing firms were given the opportunity to participate in the survey, two potential sources of bias were identified. Firstly, because the survey was administered online, firms without stable/reliable internet access may have chosen not to participate. Secondly, self-selection bias may have occurred. In other words, firms that are generally unhappy with the current state of infrastructure or service provision by the City are more likely to participate in a survey than those who are generally satisfied. However, the evidence did not suggest this to be the case. In fact, in follow-up calls, researchers experienced resistance from a number of firms that were unhappy with the services provided in their area. These firms often believed that the survey was a waste of time and that there would be no benefit from completing it. There does not seem to be any reason to believe that dissatisfied firms would be more predisposed to completing the survey than firms that are generally satisfied with prevailing conditions.

### *3.3* Verification of survey data: industry classification

Once all the survey data was collected, each firm's manufacturing subsector was verified. This was done by using firms' description of their business activity and matching these with the standard industrial classification codes. The response rate was 27%, with 343 firms responding including 45 in-depth interviews. Despite the measures implemented above, there were incomplete responses, ranging from missing one question, to those who had started the questionnaire but given up after only a few questions. In the survey analysis, the total responses per question will be used. The online survey instrument used captured the data in Excel and the analysis was conducted in Stata. Cross-tabulations were the main form of analysis, in order to understand the relationship between variables, and not causation.

## 4 OVERVIEW OF THE NATURE OF FIRMS IN JOHANNESBURG

The data indicates that there is a strong presence of factories for fabricated metal products, furniture and jewellery, machinery and equipment, plastic, and chemicals and chemical products in Johannesburg (Table 1). Of the firms that responded, 21% are manufacturers of fabricated metal products, excluding machinery and equipment. These products include display units, doors, fencing and machine components, spindles, pulleys, bolts and nuts, rail components, automotive and transformer industries. The manufacturing categories were broadened in the analysis to ensure that the groupings were well represented, such that there would not be sector-bias as illustrated in Table 1. Since information pertaining to firm size was not collected, bias could not be assessed using firm size. Nonetheless, there is evidence suggesting that there is a high concentration of small- and medium-sized firms in Johannesburg, compared to Ekurhuleni.

***Table 1: Sample and response rate***

| Group | Sectoral grouping | Sample | Responses | Sample proportion | Responses proportion |
|---|---|---|---|---|---|
| 1 | Food and beverages | 162 | 19 | 0.08 | 0.06 |
| 2 | Textiles and clothing | 130 | 19 | 0.06 | 0.06 |
| 3 | Wood and wood products | 206 | 11 | 0.10 | 0.03 |
| | Paper and paper products | 84 | 9 | 0.04 | 0.03 |
| 4 | Coke and refined petroleum products | 2 | 2 | 0.00 | 0.01 |
| | Chemicals and chemical products | 129 | 21 | 0.06 | 0.06 |
| | Plastic products | 155 | 32 | 0.08 | 0.09 |
| | Rubber products | 24 | 7 | 0.01 | 0.02 |
| | Basic pharmaceutical prods and preparations | 12 | 7 | 0.01 | 0.02 |
| 5 | Non-metal mineral products | 92 | 7 | 0.04 | 0.02 |
| 6 | Basic iron and steel | 247 | 1 | 0.12 | 0.00 |
| | Basic non-ferrous metals | 97 | - | 0.05 | - |
| | Fabricated metal products | 45 | 66 | 0.02 | 0.19 |
| | Machinery and equipment | 257 | 42 | 0.12 | 0.12 |
| 7 | Electrical machinery and equipment | 198 | 26 | 0.10 | 0.08 |
| 8 | Transport equipment | 35 | 7 | 0.02 | 0.02 |
| 9 | Furniture and jewellery | 187 | 44 | 0.09 | 0.13 |
| 10 | Other | 2 | 23 | 0.00 | 0.07 |
| | | **2 064** | **343** | | |

*Source: Author's calculation based on City of Johannesburg Survey data, 2016*

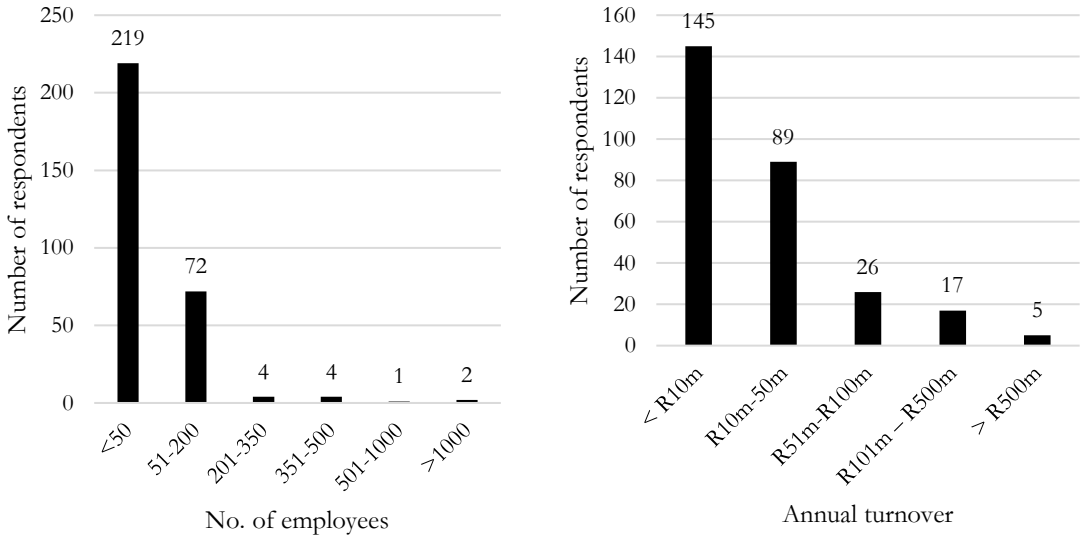
The size of the firms were classified according to the thresholds in the National Small Business Amendment Act of 2003, which indicates that micro, very small and small manufacturing firms have fewer than 50 employees and earn an annual turnover of less than R13 million. Medium manufacturing enterprises earn less than R51 million and have fewer than 200 employees. Manufacturing firms with over 200 employees and earn more than R52 million are defined as large enterprises. These two measures (number of employees and turnover) were evaluated in the survey to understand the size of the firms (Figure 2).

The firms that responded to the survey were mostly small- to medium-sized; 80% of them reported less than R200 million annual turnover, with 20% earning above that. Of the latter group, five earn over R500 million and manufacture fabricated metal products, plastic products, furniture and jewellery, non-metal mineral products and machinery and equipment.

The number of employees metric corroborated the size of firms, as more firms were willing to divulge information regarding number of employees than annual turnover. This was also cited in the interviews where firms provided an estimate for turnover, and an accurate figure for the number of employees. There were fewer than 200 employees at 96% of the firms. Only three had more than 500 employees, those firms manufacturing computer, electronic and optical products, non-metal mineral products and plastic products.

The firm overview indicates that a greater proportion of the firms that responded to the survey are well established, as they have been at their current premises for more than ten years. The firms are largely small- and medium-scale enterprises, going by annual turnover and number of employees and mostly manufacture fabricated metal products, furniture and jewellery and machinery and equipment. There were also firms that manufacture rubber products, non-metal mineral products, beverages and basic metals.

*Figure 2: Size of firms by number of employees and annual turnover*




*Source: Author's illustration based on City of Johannesburg Survey data, 2016*

## 5 STATE OF PERFORMANCE AND COMPETITIVENESS

Economic performance is analysed through changes in annual turnover between 2013 and 2015 and the state of capacity utilization in 2015. Capacity utilization was employed as a control variable since firms that are growing are likely to be utilizing higher capacity. Firms that exhibited growth between 2013 and 2015 are the ones utilizing capacity levels higher than 75%. However, these firms may face challenges when they increase capacity utilization, due to limited spare capacity. In the event that demand increases, these firms will need additional capacity to meet increased demand and maintain growth. A significant proportion of the firms (43%) indicated that they were growing, while 24% were declining and the remaining 33% were stable (Table 2). The test for statistical significance cannot be rejected at 5%, which shows that there is no relationship between sector orientation and performance. As such, there data shows that the performance of firms differs by sector-orientation. Firms whose growth is linked to commodity price cycles exhibited poor performance. Such sectors included metals, machinery and equipment, and coke, chemicals, rubber and plastic. Other sectors (textiles and clothing and transport equipment) were also not performing well on the back of a weak economy. The drop in commodity prices had a knock-on effect on firms that supply products, particularly machinery and equipment, to mining houses.

On the other hand, growth in the food and beverages, and furniture and jewellery sectors has mainly been propelled by urbanization in neighbouring countries (Zambia, Mozambique and Botswana). Urbanization drives demand in food and furniture, which subsequently promotes the growth of supermarkets in the region and propels the construction industry. The spread of South African supermarkets into SADC drives the growth of the food and beverages processing industry as local supermarkets procure from local food-processing companies.

***Table 2: Proportion of firms growing or not***

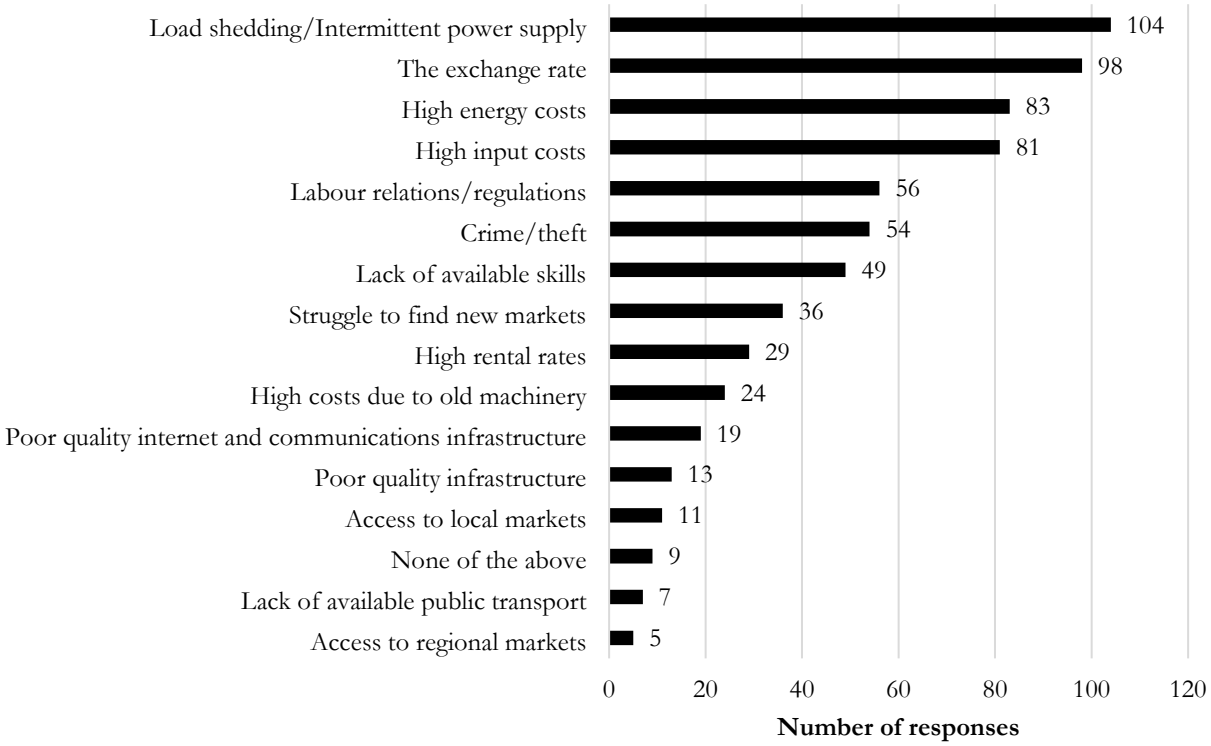
| | | Growing | Not growing | Total |
|---|---|---|---|---|
| Food and beverages | Frequency | 12 | 5 | 15 |
| | Row percentage | 71 | 29 | 100 |
| Textiles and clothing | Frequency | 8 | 10 | 18 |
| | Row percentage | 44 | 56 | 100 |
| Wood and wood products/Paper | Frequency | 7 | 10 | 17 |
| | Row percentage | 41 | 59 | 100 |
| Coke, chemicals, rubber, plastic | Frequency | 29 | 38 | 67 |
| | Row percentage | 43 | 57 | 100 |
| Metals, machinery and equipment | Frequency | 35 | 66 | 101 |
| | Row percentage | 35 | 65 | 100 |
| Electrical machinery and equipment | Frequency | 7 | 9 | 16 |
| | Row percentage | 44 | 56 | 100 |
| Transport equipment | Frequency | 2 | 4 | 6 |
| | Row percentage | 33 | 67 | 100 |
| Furniture and jewellery | Frequency | 22 | 21 | 43 |
| | Row percentage | 51 | 49 | 100 |
| | Total | 122 | 163 | 285 |
| | | 43 | 57 | 100 |
| | Pearson chi2(7)=9.5981 | | Probability = 0.213 | |

*Source: Author's calculation based on City of Johannesburg Survey data, 2016*

## 5.1 Main challenges

The nuanced state of performance can be attributed to a plethora of reasons, as identified by firms. Between 2013 and 2015, energy supply and exchange rate volatility were cited as the modal challenges as they limit the ability of firms to price and cost appropriately. Intermittent power supply also leads to additional costs in some plants that incur costs from stopping and restarting machinery. For example in the plastics industry, when a power outage occurs in the process of molding a product, the polymers cannot be melted and molded again and is deemed wastage. Furthermore, firms would also need to scrap off plastic fragments in the machinery and equipment, adding to production costs (Figure 3). Beyond the prevailing macroeconomic conditions, in order to improve their performance, firms are implementing other strategies to improve their competitiveness in order to regain lost market share. Exploring alternative markets, investments and access to adequately trained employees will be elaborated on in the subsequent section.

***Figure 3: Main challenges faced by firms, n=311***




*Source: Author's illustration based on City of Johannesburg Survey data, 2018*

## 5.2 Access to markets

From the data analysis, it was evident that Gauteng is the largest market for the firms operating in Johannesburg, with a few firms primarily supplying the rest of South Africa or the rest of Africa (see Table 3). 70% of firms sell more than half of their products within Gauteng, whilst 56% firms sell less than 20% of their products in the rest of South Africa. Firms that sell more than 80% of their products to the rest of South Africa manufacture textiles, clothing and leather goods, transport equipment, food products, non-metal mineral products, furniture and jewellery, wood and wood products, fabricated metal products and machinery and equipment subsectors. These also coincide with the firms that were identified as being large, showing the importance of scale.

Just over 53% of the firms export to other African countries or the rest of the world (excluding Africa) as shown in Table 4. Most firms export less than 20% of their output to other African countries. A small proportion of the firms export more than 60% of their product and the four firms that export 90–100% of their products manufacture food products, electrical equipment and apparatus, machinery and equipment, and furniture. This finding also corroborates the assertion made by the Competition Commission (2014) that South African firms were underperforming in the export market. Consequently, increased competition from local and international competitors has a significant impact on performance of local companies, not only in South Africa but in the region as well.

***Table 3: Sector and export propensity***

| | Exporting | Non-exporting | Total |
|---|---|---|---|
| Food and beverages | 10 | 6 | 16 |
| Textiles and clothing | 11 | 4 | 15 |
| Wood and wood products/Paper | 5 | 10 | 15 |
| Coke, chemicals, rubber, plastic | 36 | 27 | 63 |
| Metals, machinery and equipment | 47 | 50 | 97 |
| Electrical machinery and equipment | 13 | 0 | 13 |
| Transport equipment | 3 | 4 | 7 |
| Furniture and jewellery | 18 | 22 | 40 |
| | 143 | 123 | 266 |

*Source: Author's calculation based on City of Johannesburg Survey data, 2016*

***Table 4: Spread of exports between rest of Africa and other destinations, n=142***

| Percentages | Other African countries | Other destinations | Total |
|---|---|---|---|
| <20% | 99 | 21 | 120 |
| 20-60% | 17 | 9 | 26 |
| >60% | 7 | 2 | 9 |
| Total | 123 | 32 | 155* |

** Some firms selected both 'rest of Africa' and 'other destinations' and appear in both columns.*

*Source: Author's calculation based on City of Johannesburg Survey data, 2016*

Some Southern African Development Community countries, notably Mozambique, Tanzania and Zambia are experiencing large growth rates, averaging at more than 6% per annum (World Bank 2018). The drive towards urbanization in these economies has led to increased demand for food and consumer products. Furthermore, in Zambia and the Democratic Republic of Congo, the growth of the mining industry has resulted in rising demand for machinery and equipment. Furthermore, the middle class in these countries is growing creating demand for consumer goods. The growth of these economies has provided other avenues that South African firms can tap into, especially given suppressed local demand and the weakening of the rand. Even in the subsectors under strain, such as plastics and machinery, firms that have tapped into alternative markets are performing better than firms that have been confined to the domestic market.

Accessing new markets is challenging for firms, particularly in the case of Johannesburg, where there is a large concentration of small- and medium-sized firms. Entering a new market is fraught with sunk costs that such firms can ill afford. Government assistance towards subsidizing exports and access to market information can assist in entering new markets. The Department of Trade and Industry does offer incentives to explore new markets, but firms struggle to access these, and for those that have accessed, there was a consensus that more assistance is required as other challenges still exist. Understanding the demand in export markets requires exploratory studies and product modification, which require additional investment. Competition from global firms which are more competitive is another force that needs to be reckoned with.

Firms also experienced difficulty in entering the South African market due to entrenched incumbents who have secured market share, and have resorted to entering neighbouring countries. Contesting for domestic market share was cited as being too expensive given the required advertising outlay. As a result, smaller firms have resorted to entering other markets in spite of trade barriers and transport costs. The role of the incumbent firms has also been detrimental on the supply-side for these small and medium firms. Some firms

are unable to secure supplies as the 'bigger' customers are given preference over the smaller buyers. Furthermore, the incumbents are price-setters and charge at import parity which is more expensive for firms given the volatile exchange rate. This reiterates the need for competition regulation enforcement.

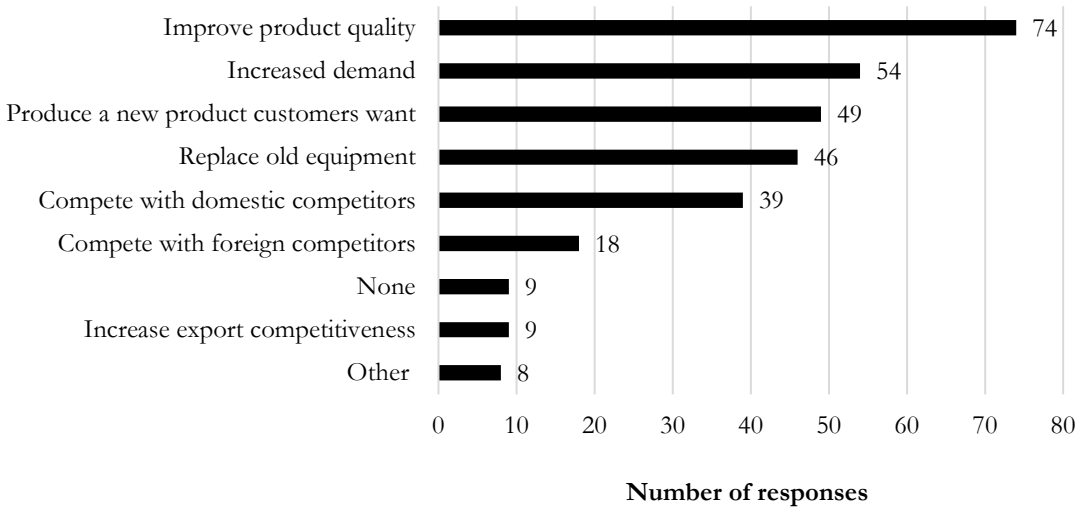
## 5.3 Investment levels

In the survey, 53% of the firms made substantial investments over the time under analysis, 2013-2015. Upgrading efficiency of the plant was ranked the most important reason for investment (78%), followed by expanding the plant (57%), research and development (41%), and initial start-up/setting up new plant (27%). In the in-depth interviews, some firms noted that expansion included expanding existing premises by expanding factories or building new plants. Other than these investments, firms mainly invested in machinery and equipment to improve their product line (Figure 4). Lower demand and competition from other firms may have encouraged the firms to be dynamic and enhance their product offering. Some firms noted that new machinery was not a prerequisite for producing a new product, and modifying their existing machinery could serve well enough. Replacing old equipment was cited as another reason for investment as old machinery tends to be inefficient and highly energy-intensive.

Due to suppressed local demand and limited access to finance, some firms were hesitant to reinvest in new machinery and equipment, resorting to purchasing second-hand machinery and equipment. Even though some firms did mention that their equipment has a long life-span (about 20 years), there is a strong need to upgrade. 11% of the firms indicated that their machinery and equipment on average is older than 20 years. The government can assist firms to purchase new machines and equipment, in the interests of efficiency and enhancing competition.

The hypothesis that there is no relationship between investment and economic performance was tested. The null hypothesis was rejected at 5% significant level, meaning that firms which invest are likely to be growing; 56% of the firms that are growing are investing, while 73% of the firms that are not growing are not investing.

***Figure 4: Motivations for substantial investments in the past two years, n=300***




*Source: Author's illustration based on City of Johannesburg Survey data, 2016*

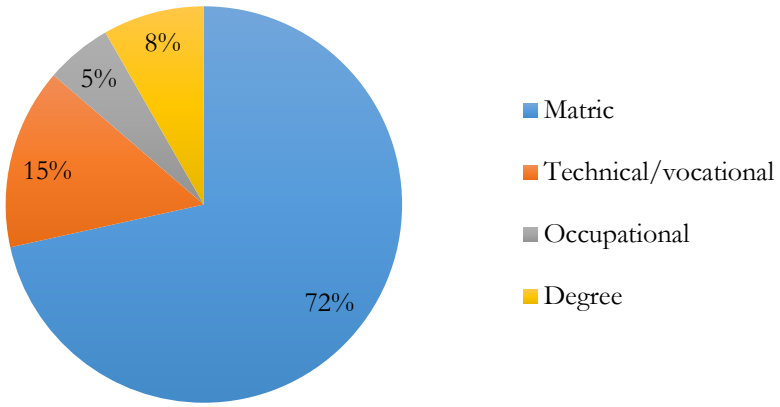
Small and medium firms, the large proportion of the respondents, tend to adopt and adapt technology and have little capacity to develop new technology. This is evident, with 80% of the firms not possessing patents and/or licensing technology. The larger firms interviewed noted that they do not hold patents at the manufacturing site; rather headquarters holds the patent, which may not be located in the industrial area.

The positive relationship between the firm's subsector and its performance, and investment and performance implies that targeted interventions at sectoral levels are important. In addition, firms may require financial assistance so that they can invest in machinery and equipment and research and development in order to improve the competitiveness of their products and their performance in face of increased domestic and international competition.

## 5.4 Skills and training development

Most of the employees have attained a matric qualification, while 23% have tertiary education and the remaining possessing an occupational qualification (see Figure 5). This speaks to the low pass rate levels in South Africa. 77% of firms also stated that they experience difficulty in hiring appropriately trained and/or qualified employees, especially technical and artisanal skills. Firms indicated that employees lack basic arithmetic and literacy skills despite possessing a matric certificate, resulting in a limited ability to learn trades.

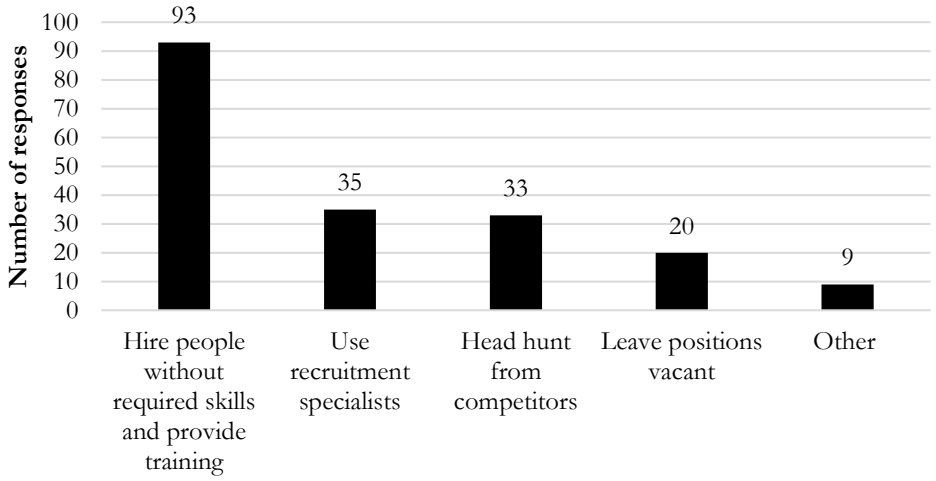
***Figure 5: Educational levels, n = 229***




*Source: Author's illustration based on City of Johannesburg Survey data, 2016*

Given the difficulty in hiring trained and/or qualified employees, the recruitment approaches used generally include (1) hire people without appropriate skills and provide training; (2) use recruitment specialists; or (3) head hunt from competitors. While firms generally do undertake training, it seems as though there is excess training among firms in an attempt to close the gap. Hiring and providing training adds to a firm's expenses and thus detracts from investment in machinery and equipment and R&D, for example. Head-hunting deters the incentive by firms to invest in skills development as firms risk losing trained employees to rival firms. Positions are left vacant by 11% of the firms, which is concerning, given high unemployment rates (Figure 6). The aptitude of staff is important as they should not only be able to think of better ways of performing a task or require high levels of supervision, but also solve problems that arise without requiring external assistance.

*Figure 6: Recruitment approaches, n=191*




*Source: Author's illustration based on City of Johannesburg Survey data, 2016*

Only 4.1% of firms surveyed use FET colleges that provide vocational and technical skills training. The low proportion of firms using this approach was echoed in the in-depth interviews, where firms suggested that FETs are not adequately structured to meet the firms' needs. This means that not only are firms diverting resources from other efficiency-enhancing expenditure, such as new machines and equipment and R&D, government funds are not being appropriately spent.

## 6 CONCLUSIONS AND RECOMMENDATIONS

The South African economy has undergone deindustrialization, with some schools of thought characterizing it as premature. However, the analysis reveals that the performance of the manufacturing sector has been more nuanced, with some sectors performing better than other. In the period 2013–2015, some of the industries even exhibited growth (such as food), while others are in decline (such as fabricated metal products). This shows the importance of understanding the underlying drivers of economic performance by sector. Policies play a key role in correcting market failures and intervening to put in place a conducive operating environment for firms. As mentioned previously, firms are implementing individual efforts in order to redress some of the challenges they are faced with. This results in duplication of effort and ultimately wasting firms' resources.

For a sector to perform well and compete internationally, there are contingencies that need to be in place. Access to a qualified and reliable workforce, continuous innovation, and upgrading of machinery, equipment, production processes, and the product itself are key.

FET colleges and technikons' mandate is to train people in artisanal and technical skills, which can then be injected into different sectors. A very small proportion of employees acquire training from technikons; more undergo in-house training. The interviews alluded to the finding that training at technikons is not tailored to suit the firms' requirements. Correcting this mismatch through coordination and firm engagement can reduce the expenditure by firms on advancing skills and improve firms' performance.

Operating conditions are becoming highly competitive for firms, and continuous investment and upgrades have therefore become mandatory. Small and medium firms, a significant proportion of the respondents in this survey, do not have access to readily available funding for such upgrades. Lack of finance is exacerbated by a lack of knowledge of available incentives and the processes and requirements to acquire them. Dissemination of information on grants and incentives will be of great benefit to firms.

The major concern is the lack of coordination between firms' requirements and the City of Johannesburg's role in meeting these requirements. Even though the city has the 'get-the-basics-right' initiative to address service provision concerns and rehabilitating public infrastructure, delivery of these has been delayed, and, as a result, firms implement individual solutions to meet their challenges, due to a lack of a clear coordinator. If premature deindustrialization is to be overcome, there is a need for much more concerted interventions to improve the environment in which firms operate.

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## About the author

University of Cape Town, Cape Town, South Africa. Email: lauralynk@uj.ac.za.

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