TOWARDS AN UNDERSTANDING OF THE ECONOMY OF JOHANNESBURG

Industrial nodes survey

Final Draft report

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Abbreviations

CAGR	Compound Annual Growth Rate
DTI	Department of Trade and Industry
FET	Further Education and Training
GDP	Gross Domestic Product
ICT	Information and Communications Technology
IDC	Industrial Development Corporation
MCEP	Manufacturing Competitiveness Enhancement Programme
SETA	Skills Education Training Authorities.
SIC	Standard Industrial Classifications

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1 Introduction

By 2030, 71.3% of South Africans will live in urban areas; up from 64.8% in 2015.[1] Nearly 30% of South Africa's total urban population, or 11.6 million people, will live in the City of Johannesburg. This is 2.6 times more than Johannesburg's current population.[2] The City of Johannesburg will face increasing pressure to create sustainable employment, build competitive businesses, and provide social and economic infrastructure for a rapidly rising urban population. At the same time, it is imperative that the City reverses the legacy of the Apartheid-era's spatial planning that places black workers far from places of work and reproduces divided communities.

As the City plans for the 'Johannesburg of the future', it is important to understand the economic structure of the City, how it has changed, and the implications of this for growth, job creation, and the competitiveness of the City. This requires a deeper understanding of Johannesburg's manufacturing base and the challenges faced by firms that drive productive activity within the City.

The Centre for Competition, Regulation and Economic Development (CCRED), at the University of Johannesburg, was commissioned by the Department of Economic Development (DED) at the City of Johannesburg to review manufacturing activity in 26 of the City's industrial nodes. The review follows on a pilot study conducted by CCRED in two industrial nodes, Aeroton and Industria West, in 2014. The pilot study mapped industrial activity in the two nodes and identified the challenges to growth and competitiveness of manufacturing firms within them.

The main findings from the pilot study suggest that only a few firms reported strong sales volume growth between 2011 and 2014, with the majority having performed poorly due to low levels of demand in the domestic economy and difficulty in accessing regional markets. A small number of firms invest in research and development or hold licensed technology or patents, indicating that there is little innovation taking place. Most firms also face difficulties recruiting employees with the required skills and experience and often leave positions vacant. To ease skills constraints, most firms have set up in-house training facilities to provide basic training (Kaziboni, Mondliwa and Robb, 2014).

Alongside the pilot study, CCRED also conducted a review of the state of ICT within the City and proposed ways to build world-class, high-speed and affordable IT infrastructure through developing technology hubs. The review recommend that the City focus on three main areas:

1) ensuring city-wide access to reliable infrastructure, particularly broadband;
2) investing in developing transport links to and from technology and media hubs to ensure that the hubs are inclusive and accessible spaces, and
3) facilitating information-sharing in the ICT space through hackathons and conferences that build connections between skilled workers, entrepreneurs, investors and consumers/customers.

The current review extends the work done in the pilot study in the following ways:

1) CCRED conducted a census to identify businesses in 26 industrial nodes across the City.
2) The manufacturing firms and those providing manufacturing related services (in transport, storage and logistics, engineering services, packaging, plant hire and business services) were surveyed to assess firm growth, performance and competitiveness. Firms were also asked to identify key challenges that the City should address.
3) In-depth interviews were conducted in 7 industrial nodes across all regions in the City of Johannesburg to supplement the survey findings, to explore the issues in more depth, and to suggest node-specific interventions.

[1] United Nations. 2014. World Urbanization Prospects: The 2014 Revision. Available at http://esa.un.org/unpd/wup/CD-ROM/

[2] Statistics South Africa. 2011. Available at http://www.statssa.gov.za/?page_id=993&id=city-of-johannesburg-municipality

4) The possibility of developing industrial clusters in three labour-absorbing sectors (machinery and equipment, plastic products, and food processing) were explored and separate proposals are being developed by CCRED to assess possibilities for cluster development in these sectors. The survey supports the rationale for focusing on these sectors.

This report proceeds in five parts. Section 2 discusses the economics of cities and focuses on the changing nature of economic activity of the City of Johannesburg. It also reviews the City's economic plans and provides a brief overview of what other major cities are doing to drive a reindustrialisation agenda. Section 3 discusses the methodology and approach followed in the scoping exercise, survey, and in-depth interviews. Section 4 analyses the survey results. Section 5 describes the 7 nodes identified for in-depth interviews. The final section suggests recommendations.

2 The economics of cities and the changing economic structure of Johannesburg

2.1 Overview of industrial development in Johannesburg

There are two main forces that are generally used to explain the existence of cities: economies of scale and agglomeration economies. Scale economies favour the development of large enterprises that produce at lower unit costs and these larger firms result in greater spatial concentration of employment. While scale economies are internal to the firm, agglomeration economies are external and capture the idea that there are positive externalities to locating close to other firms. These include pecuniary benefits such as lower transport costs as well as less tangible benefits such as the faster spread of information and the rapid transmission of ideas and innovations (Lucas, 1988).

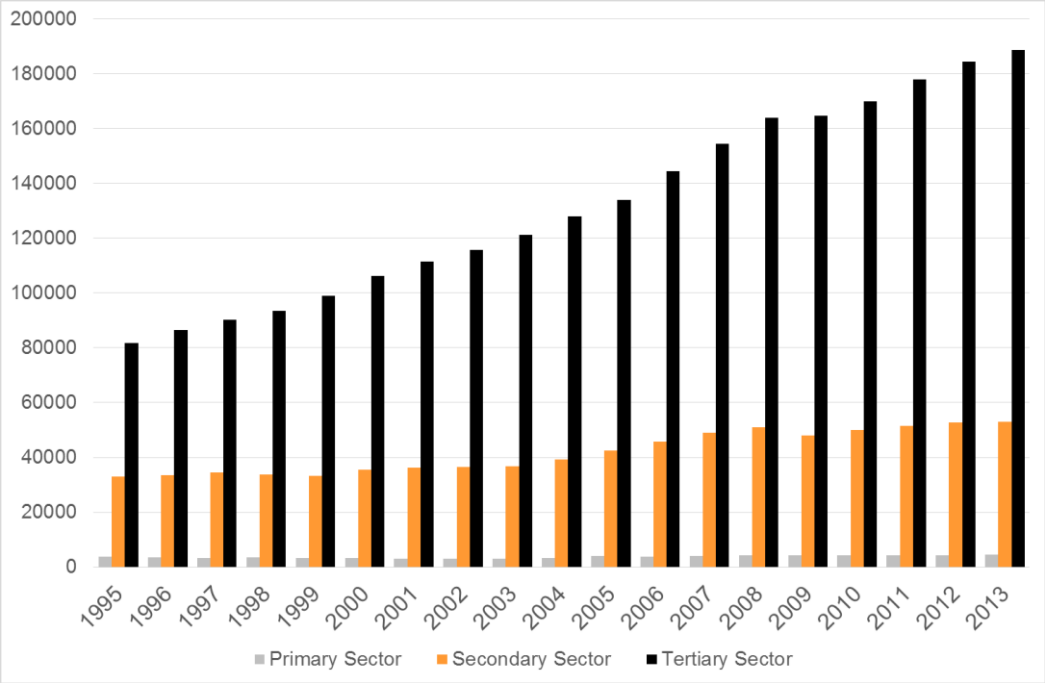
The literature on the economics of agglomeration also extends to industrial activity where it emphasises the benefits of 'clustering' in manufacturing. Proximity between input suppliers and manufacturers of final goods, as well as the presence of a large pool of workers with the right skills, increases firms' flexibility and facilitates leaner supply chains. Clustering also facilitates technological spill-overs as firms are able to improve their products and production process through learning from others. These benefits seem to be even stronger within, rather than between different industries, supporting the idea of sectoral clusters (Breuckner, 2011).

Though there is a relatively large expanse of literature on economies of scale and benefits of agglomeration, there is generally much less information on intra-city economic structure and the changing nature of economic activity at a city level. It is particularly difficult to trace the pattern and location of manufacturing activity in the City of Johannesburg at a granular enough level to understand the activities that firms are involved in. The last available study seems to be a 1995 paper by Rogerson and Rogerson that explores the decline of manufacturing in the Johannesburg CBD. The authors find that the main manufacturing activities in Johannesburg remained relatively stable from 1980 to 1994 (Rogerson and Rogerson, 1995). The largest manufacturing sectors (in employment terms) were clothing, printing and publishing, food processing, and 'other manufacturing' which mainly included jewellery and diamond cutting (with food becoming less important than 'other manufacturing' from 1989 to 1994) (Rogerson and Rogerson, 1995).

In the late 1980s, however, Johannesburg repositioned itself as the "gateway to southern Africa", emphasising its locational advantage on a sub-continental and Africa-wide scale (Rogerson and Rogerson, 1995). The move to reposition Johannesburg as a centre for doing business across the African continent coincided with steady growth in the services sector (

Figure 1). Over a period of 18 years (1995 to 2013), primary sector activities grew at a compound annual growth rate of 0.94%, the secondary sector at 2.68% and the tertiary sector at 4.77%.

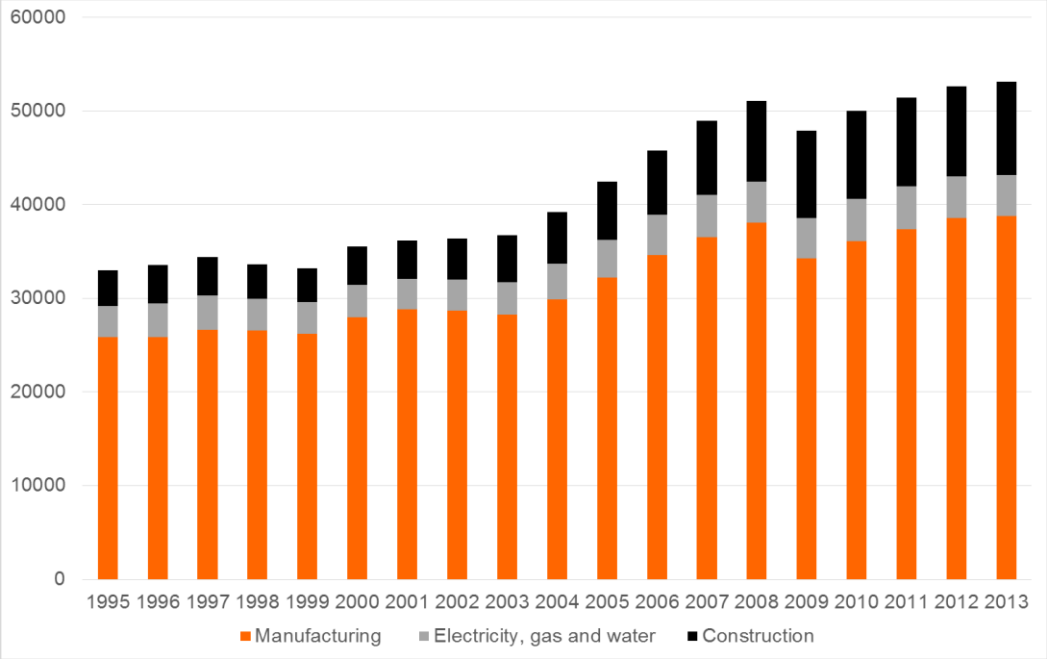
Figure 1: Sectoral GVA, City of Johannesburg (1995 - 2013)



Source: Quantec, last accessed 16 May 2016

On average manufacturing accounts for about 76% of secondary sector gross value added (GVA) over the period 1995 to 2013, ranging from a high of 79.7% in 2001 to a low of 71.6% in 2009. Electricity, water and gas accounts for about 9.4% of secondary sector GVA and construction accounts for 14.6%. The contribution of the construction sector to total GVA increases in the five years preceding the 2010 Soccer World Cup and remains relatively stable after 2010 (Figure 2).

Figure 2: Breakdown of secondary sector GVA, City of Johannesburg (1995 – 2013), Rmn, constant 2005 prices

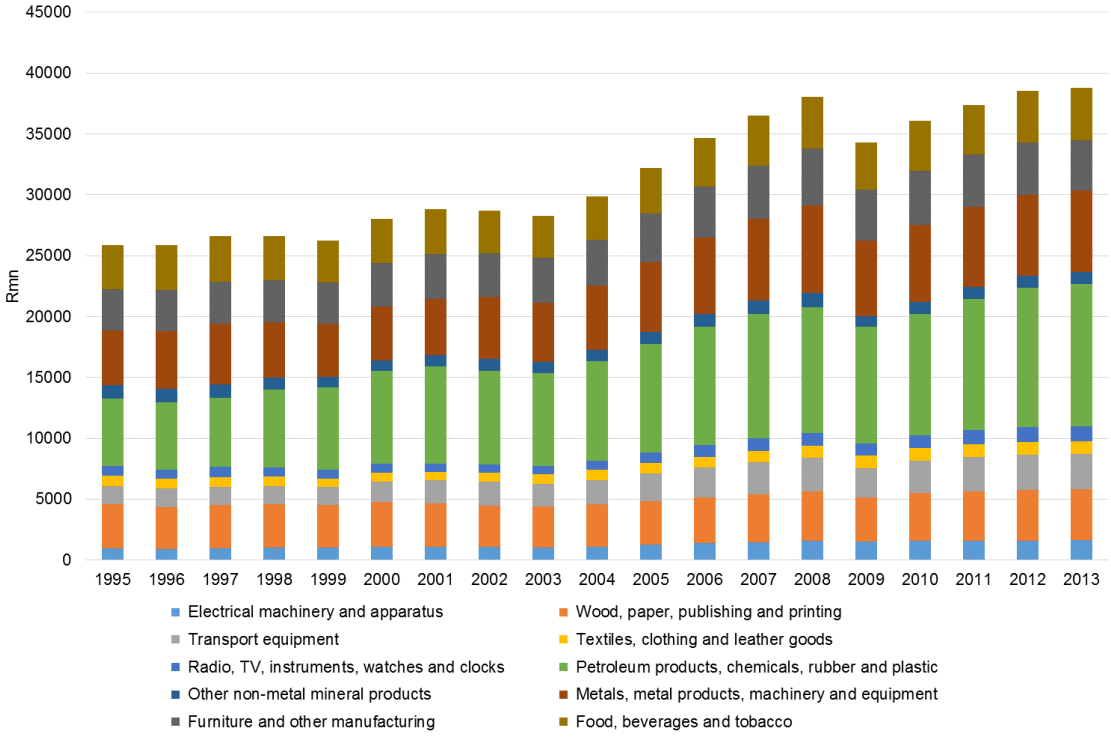


Source: Quantec, last accessed 16 May 2016

Over the period 1995 to 2013, the largest manufacturing sector within the City is petroleum products, chemicals, rubber and plastics.[3] Metals, metal products, and machinery and equipment is the second largest grouping. The third largest grouping varies over the time period between wood, paper, publishing, and printing;[4] food, beverages, and tobacco products; and furniture and other manufacturing (Figure 3).

Figure 3: Sectoral GVA in the City of Johannesburg (1995 – 2013), Rmn in basic prices

[3] A large proportion of the GVA for petroleum and chemical products can be attributed to production allocated against the head offices of Sasol, Total SA, Engen and Shell SA, despite production occurring in other provinces. This 'head office effect', which allocates production to head offices rather than to production sites, skews the picture of manufacturing in Gauteng and is a significant shortcoming of the GVA data available from Statistics SA/Quantec.
[4] The wood, paper, publishing and printing sector has been one of the largest manufacturing sectors since at least 1980 (see Rogerson and Rogerson, 1995).



Source: Quantec, last accessed 16 May 2016

In addition to being the largest subsector, petroleum products, chemicals, plastics and rubber have grown faster than any other grouping at a compound annual growth rate (CAGR) of 4.2%. The transport equipment subsector recorded the next largest CAGR of 3.7% while electrical machinery and equipment grew third fastest at a CAGR of 3.2%. The only subsector that recorded a negative CAGR over this period was 'other non-metal mineral products', which includes products such as cement, ceramics, glass and lime (Table 1).

Table 1: Manufacturing sector CAGRs

Subsector	CAGR (1995 – 2013)
Electrical machinery and apparatus	3.2%
Wood, paper, publishing and printing	0.8%
Transport equipment	3.7%
Textiles, clothing and leather goods	1.0%
Radio, TV, instruments, watches and clocks	2.5%
Petroleum products, chemicals, rubber and plastic	4.2%
Other non-metal mineral products	-0.4%
Metals, metal products, machinery and equipment	2.3%
Furniture and other manufacturing	1.1%
Food, beverages and tobacco	0.9%

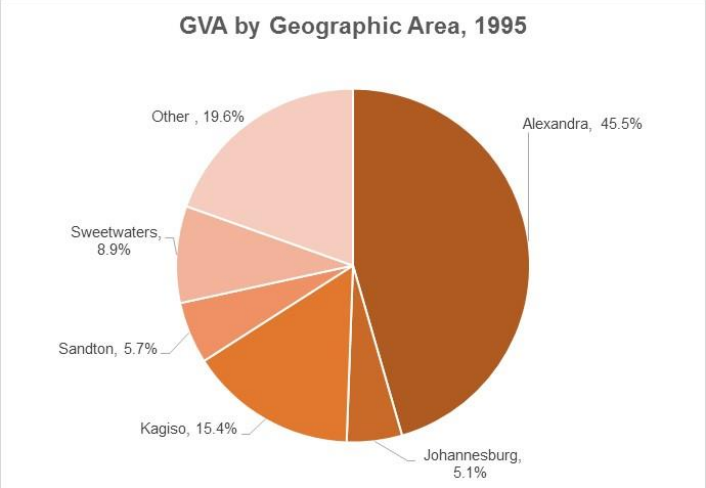
Source: Quantec, last accessed 16 May 2016

According to Quantec data on the historical location of manufacturing businesses in the City of Johannesburg, manufacturing activity has predominantly been located in the Alexandra area (about 46% of total manufacturing), followed by Kagiso in the west of Johannesburg (about 16% of total manufacturing) and Sweetwaters in the south (about 8% of total manufacturing) (Figure 4). These shares have essentially not changed, which points to the fact that reliable data simply do not exist on

manufacturing activity by location since the last proper manufacturing census was conducted in the mid-1990s. The census of establishments and the firm survey is thus very important simply to be able to map manufacturing activity.

The spatial distribution of manufacturing activity from the Quantec database (Figure 4) paints a very different picture to that obtained from the census conducted as part of this project. This may be because the census did not cover all industrial areas within the City (for example, it did not cover areas in which there may be industrial activity, but which are not classified as industrial nodes) or that the door-to-door census identified businesses not reflected in more aggregated, larger scale datasets, possibly small business and new start-ups.[5]

Figure 4: Snapshots of the spatial distribution of manufacturing activity in the City in 1995



Source: Quantec, last accessed 16 May 2016

2.2 The City of Johannesburg's economic development strategy

The City of Johannesburg's 2015/16 integrated development plan sets out the four main pillars for the economic development of the City. These are:

- 'Jozi@work', which aims to create micro-work packages for local communities,
- 'Corridors of Freedom', which aims to improve inclusivity and accessibility in the interest of building communities and taking advantage of the benefits of agglomeration;
- 'Smart City', which aims to improve telecommunications infrastructure and access to IT services across Johannesburg, and
- 'Green/Blue Economy' which aims to increase the efficiency of resource use within the city.

Underlying these strategies is an explicit understanding that any plans to grow industrial activity must start with 'getting the basics right'. This includes ensuring that manufacturers have quick and easy access to commercially zoned land for expansion, that utilities are provided with minimal interruptions and that there are transport links that facilitate the swift movement of both workers and goods within the City and beyond.

There are also longer-term plans to expand access to high speed broadband across the City, to establish science and technology hubs to spur innovation and sharing of ideas, and to invest in

[5] This underscores the importance of conducting frequent on-the-ground reviews of industrial activity to get a clearer sense of the nature and spread of businesses in the City.

renewable energy. This is similar to recent plans for reindustrialising New York and Newark (see Box 1 and 2). However, there are no specific plans targeted at industrialisation, such as to build the shared facilities and support for industrial clusters in terms of skills development, design and testing services, and marketing and logistics.

Taking Johannesburg's economic development strategy forwards requires contextualising its reindustrialisation agenda within an understanding of the nature of manufacturing activity currently characterising the City. This includes the size and sectoral distribution of firms in order to identify the strengths, weaknesses, challenges, and likely support that these firms may require. Along with the geographic location of activity, this will allow the City to identify the trends shaping industrial activity across the City and to identify opportunities for more targeted interventions.

The census and survey conducted by CCRED lays the foundation for such an understanding of the micro-foundations of industrial activity within the City. It is the first census of manufacturing activity across the industrial nodes in the City of Johannesburg since the mid-1990s and provides a useful snapshot of the nature and types of manufacturing firms across the City. The electronic survey supplements the census to provide a clearer picture of the type of activity in Johannesburg's industrial nodes, what investment decisions firms are making or struggling with and the challenges firms face.

This first iteration of the survey provides useful context for the economic development work of the City. Subsequent iterations will allow the City to assess the changing nature of industrial activity across the City and any inter-sectoral differences in competitiveness, performance, and prospects for growth.

Box 1: Reindustrializing New York City

In November 2015 the Mayor of New York City (NYC) announced a $115mn action plan to boost manufacturing in NYC. The planned investment is focused on '21st century' manufacturing (high-tech, small batch, computer aided, and green manufacturing) and will create an estimated 20 000 new jobs, most of which will absorb workers without a post-high school qualification.

The plan has three core pillars: zoning interventions to protect core industrial areas, building a state-of-the-art advanced manufacturing center; and providing loans, grants and training to equip New Yorkers for a career in manufacturing.

The range of interventions aimed at protecting core industrial areas addresses NYC's most pressing challenge, namely severe space constraints for industrial expansion and excessively high land values. The re-industrialisation plan will address this is in three ways. First, it prohibits alternative land use in industrial areas and specifies that land zoned for industrial use can no longer be used for storage facilities, residential use, or for hotels. Secondly, real estate taxes will be used to discourage land speculation and encourage industrial land use. Finally, the governance of industrial land will be realigned with the incentives of tenants (as opposed to land owners) by creating local development corporations to drive decision-making about land use, infrastructure requirements, and interventions in local areas. The end-goal is to transfer ownership of industrial land to non-profit entities that are committed to retaining and expanding NYC's industrial base. These entities will take control of land sales within industrial areas to ensure that any property traded retains its industrial character.

In addition to the joint management of industrial land, these local entities will also review the regulatory framework in which industrial zones operate. A cursory review of local regulations ('bye-laws') showed that most regulations are designed for residential areas and that standards can be relaxed in industrial zones without compromising health and safety.

NYC's reindustrialisation strategy offers some useful insights for thinking about the reindustrialisation of the City of Joburg:

1. **Identify the most basic and binding constraints:** the main constraint to expansion of industrial activity in NYC is, unsurprisingly, lack of affordable and available land for industrial land use. Manufacturing activity was competing against services and residential demand for land that increased property prices significantly.
2. **Involve business owners in decision-making:** NYC's approach to industrial land use and local governance rests on devolving governance to local areas and ensuring that business owners are central to making decisions about the future of industrial activities. This ensures that business owners take ownership of change programmes and creates commitment to the reindustrialisation agenda
3. **Create jobs for the type of workers that are currently unemployed, while building a workforce for 'the future':** though the NYC reindustrialisation initiative will create a high-tech manufacturing centre of excellence, it is also focused on creating employment for workers without a post-high school qualification while making money available to educate, train, and support workers to gain more advanced manufacturing skills. The reindustrialisation strategy is thus aimed at working with the current skills and to re-skill workers once they are employed.

Source: The Official Website of New York City.

Box 2: Reindustrialising the city of Newark

Newark, New Jersey, has a long history as a manufacturing hub in a number of sectors including food, clothing, chemical production and metal fabrication. Recently; local, regional and global economic forces have generated a number of challenges that have changed the face of Newark's manufacturing sector which is now dominated by small and medium-sized businesses. Though smaller businesses are often able to be more responsive to the changing preferences of consumers, they have entered a period of slow growth. Investment in innovation is limited, manufacturers have been slow to invest in green technology and flexible supply chains; and they lack the resources to access regional and global markets. Manufacturers also face the challenges of an ageing workforce and a general lack of basic math and literacy skills for manufacturing employment amongst the existing workforce. This is further exacerbated by a lack of accessible and credible training options that respond to manufacturers' needs. As we will see when we review the census results, both the size profile and challenges of manufacturers in Newark are very similar to that of the City of Joburg.

To address these challenges, the City of Newark will focus on four main areas:

1. **Accelerating innovation to improve productivity, processes and product development:** this includes making Newark a hub for open innovation strategies and encouraging co-location of ideas, design, production, R&D, business development and technical assistance functions.
2. **Promoting resource efficiency, sustainable supply chains and connecting manufacturers to new markets:** this includes creating a "one-stop" shop where businesses can access information on greening their supply chains, developing platforms for engagement between businesses to identify opportunities for supply chain improvement or joint exploration of new markets, and developing a food sector strategy that focuses on growing food processing sectors and related sectors (including distribution, packaging and hospitality).
3. **Creating a 21st Century workforce**: resolving math and literacy gaps and developing accredited training courses that support the development of industry-recognised manufacturing skills and experiential learning.
4. **Aligning physical and economic transformation**: zoning and planning rules, public services and local incentive should all be aligned with the reindustrialisation objective.

Source: Brookings Institute.

3 Approach and methodology

There were two parts to this study: (1) an establishment census of all industrial nodes and a survey of manufacturing and related services; and, (2) a series of in-depth interviews in seven industrial nodes across the City. The aim of the establishment census and survey was to identify economic activity across the City and to get a broad understanding of firm performance, competitiveness, location decisions and the key challenges facing firms. The in-depth interviews looked more closely at issues in seven industrial nodes with the aim of developing detailed economic profiles of the nodes and identifying node-specific action plans for development.

3.1 Identifying the firms

A street-by-street field investigation of all business activity in 26 industrial nodes selected by DED was conducted between 24 August and 29 September 2015.[6] The census of establishments identified a total of 5 345 formal and informal businesses across 26 nodes, 2 174 of which were categorised as manufacturing or manufacturing-related services firms.

The exercise was conducted by a team of specialist fieldworkers who identified and described all businesses in the industrial nodes and captured firms' contact details.

The following additional steps were taken to verify the accuracy of firms' details:

1. Information was cross-checked against business cards, where available.
2. Desktop research was conducted to double-check categorisation that appeared incorrect or where data was missing, and
3. Follow-up calls were made to firms to double-check information or to obtain missing data.

As a result of additional follow-up and verification, less than 2% of businesses in the final database had missing information.[7] However, fieldworkers did encounter a number of challenges that may have affected the comprehensiveness of the final database:

1. Though the official maps of the industrial nodes clearly identified the streets delineating the nodes, the maps did not always correspond to the actual boundaries of industrial activity within the nodes. Fieldworkers limited their work to the streets within the original delineations, which may have led to an underestimate of the total number of manufacturing firms within the City. The City should undertake a process of reviewing and updating the maps of industrial nodes.
2. The fieldworkers found it difficult to enter access-controlled areas. In these cases, fieldwork managers resorted to contacting property management agents to gain access to business parks but they did not manage to gain access in all cases. It is unlikely that there are many manufacturing firms located within business parks so it is unlikely that this challenge had a significant effect on the sample.
3. Firms have become more complex. Many firms operate in multiple sectors (for example, a firm could be present in design, manufacturing, and wholesale/retail). This makes it difficult to categorise firms. Some firms also operate from multiple premises and there may thus be duplicate entries in the scoping study.

[6] A list of the 26 nodes included in the scoping exercise is attached as Annexure A.
[7] The form used for the scoping exercise is included as Annexure B.

4. Lanseria is a National Security Key Point. Fieldworkers were, understandably, denied access to the industrial node. Where possible, data on the firms within the Lanseria industrial node were collected via internet searches and direct contact (email and phone).
5. An estimated 500 businesses were excluded from the Amalgam industrial node. These businesses are located in 'China Mall' where respondents were exclusively Mandarin-speaking inhibiting communication with the fieldwork teams.

3.2 Firm survey

The aim of the survey was to collect primary data on patterns of economic development and performance at the firm level and to understand constraints to growth and employment creation. The manufacturing survey had 45 questions, while the survey of manufacturing-related services firms had 40 questions. Both surveys were administered using an online platform, Survey Monkey, and were administered only in English. [8]

3.2.1 Survey methodology

Questionnaire design

A pilot survey was conducted in Aeroton and Industria West from 6 October to 7 November 2014. The final survey was modified following results from the pilot study to improve the clarity of the questions and to ensure that multiple choice options were mutually exclusive and collectively exhaustive.

The key themes of the final survey were:

1. Basic background information such as firms' main activities, size (in terms of annual sales turnover and number of employees), tenure at their current site and reasons for locating at their present site.
2. Firms' operations and performance over the past three years. This included questions on age of equipment, sales growth, investment and research and development.
3. The availability of skills and training, including questions relating to the workers' skills profile, ease of hiring, and recruitment methods.
4. The quality of local infrastructure available in the area with specific reference to electricity, water and road infrastructure.
5. Firms' experience of interacting with the City and suggestions for interventions that could improve the competitiveness of their business and encourage growth.

3.2.2 Data collection

Electronic survey

The sample frame consisted of all manufacturing and manufacturing-related services firms (a total of 2 174 firms). In cases where it was not clear whether a firm was in the manufacturing sector or not, they were included in the survey to ensure that no manufacturing firms would inadvertently be excluded.

CCRED researchers selected 15 firms per node to contact for in-depth interviews. Prior to the administration of the survey, these 105 firms (15 firms in each of the seven nodes selected by DED) were thus removed from the survey database. Forty-five (45) firms were interviewed and the responses of these firms were subsequently entered into the survey database.

A total of 537 firms did not receive the survey for the following reasons:

[8] The pilot survey is attached as Annexure C. The main changes that were made to the pilot survey are described in Annexure D. The final survey questionnaires are attached as Annexure E (manufacturing survey) and Annexure F (manufacturing-related services survey).

1) No email addresses were recorded on the database.
2) Email addresses could not be recognised.
3) Emails containing the survey link could not be delivered most likely because the recipients blocked off non-contacts and the survey link was listed as 'spam'.

As a result, 1 532 firms received the survey. Of these, 1 287 were classified as manufacturing firms and 245 were classified as manufacturing-related services firms in either transport, engineering services, logistics and storage, or other business services.

The electronic survey was sent out on Friday 23 October 2015 at 08:00 and closed on 31 January 2016 at 17:00. The survey took approximately 30-45 minutes to complete. Three sets of follow-up calls were made to remind non-respondents to complete the survey.

Number of Responses

Five hundred and twenty-one (521) firms responded to the survey in whole or part, a response rate of 34%. If we consider the manufacturing and services firms separately, the response rates are 26% and 18%, respectively.

The number of responses varied per question as respondents either skipped certain questions or may not have completed the entire survey. Leaving aside the questions where responses were filtered (that is, questions that only apply to firms that responded in the affirmative to a preceding question), the average response was 53% for the manufacturing firms and 63% for the services firms.

In the analysis of the survey results that follows, the number of responses per question is specified to account for the variability in responses per question. With the exception of filtered responses, the questions that had low responses related to: estimates of sales in different regions, customer types, average age of equipment, holding a patent/licence technology, and questions related to education and training. This may be because some of the respondents were discouraged by the length of the survey or may not have understood these questions. There should be particular focus on refining these questions and addressing the overall length of the survey in subsequent iterations.

Verification of survey data: industry classification

After the conclusion of the survey, the CCRED team manually verified the categorisation of respondents based on firms' description of their business activity and the products or services produced. This was done to ensure that firms selected the correct activity according the SIC codes.

Possible sources of bias in the survey

Whilst efforts were made to ensure that all manufacturing and services 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 in the survey.[9]

Secondly, there may have been self-selection bias in the sense that firms that are generally unhappy with the current state of infrastructure or service provision by the City are more likely to participate in a

[9] We assume that all firms that received the survey have internet access as the survey was sent via email. The quality of internet access may still vary across firms, and may dissuade some firms from participating.

survey than those who are generally satisfied. However, we conclude that this is unlikely. 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.

3.2.3 In-depth interviews

In-depth interviews were conducted in seven nodes selected by the City of Johannesburg (DED). DED selected one node in each region within the City on the basis of node size (based on number of firms per node according to the Lightstone database),[10] and the presence of manufacturing activity within the node (inferred from the Lightstone database).[11] The nodes that were selected are City Deep, Devland, Kya Sand, Marlboro/Wynberg, Nancefield, Strijdom Park and Robertville.

The interview guide was based on the same themes as the electronic survey.[12] The interview responses added further depth to the survey responses and explored additional questions about the impact of poor quality infrastructure on firms' performance. The interviews also tried to identify the challenges within each of these seven nodes. The data from the in-depth interviews was used to develop detailed node profiles of the seven nodes and to suggest node specific plans for action by the City (see Industrial node review in Section 0).

[10] Lightstone Business Solutions compiles and maintains a database of businesses in South Africa and researched database capturing details like SIC codes, location, and contact details. The data is sourced from desktop research, software crawlers and client databases.

[11] The seven nodes are City Deep, Devland, Kya Sand, Marlboro/Wynberg, Nancefield, Robertville, and Strijdom Park

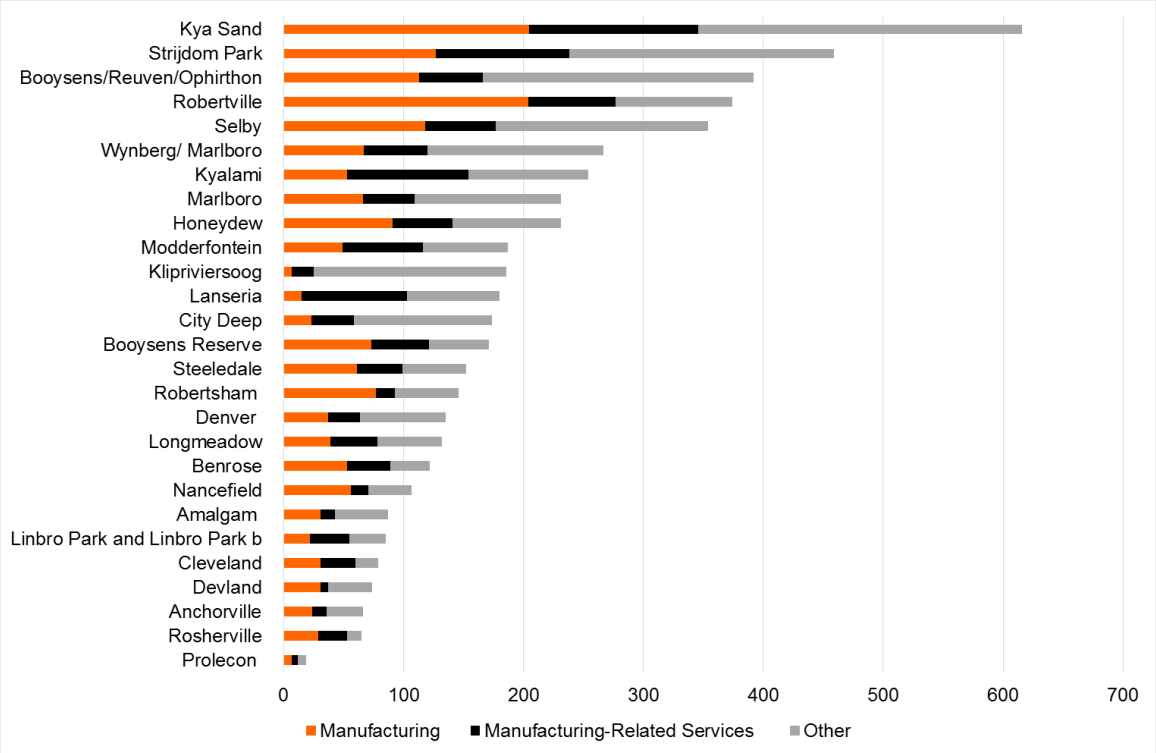
[12] The interview guide is included as Annexure G

4 Findings from the census and the survey

4.1 Findings from the census

The enterprise census shows that Kya Sand has the largest concentration of business activity and the largest number of manufacturing businesses in the City of Johannesburg. Strijdom Park is the second largest node in terms of total number of businesses, but it has fewer manufacturing firms than Robertville (Figure 5). This data confirms that older data (such as the data presented in Figure 4) is not an accurate reflection of current business activity within the City and that an enterprise survey of the nature conducted during this project will give the City a much better understanding of the size and nature of industrial activity within the City.

Figure 5: Number of businesses per nodes, results of enterprise census



Source: Enterprise census

The distribution of firms from the census shows that the five largest categories of manufacturing firms within the city are:

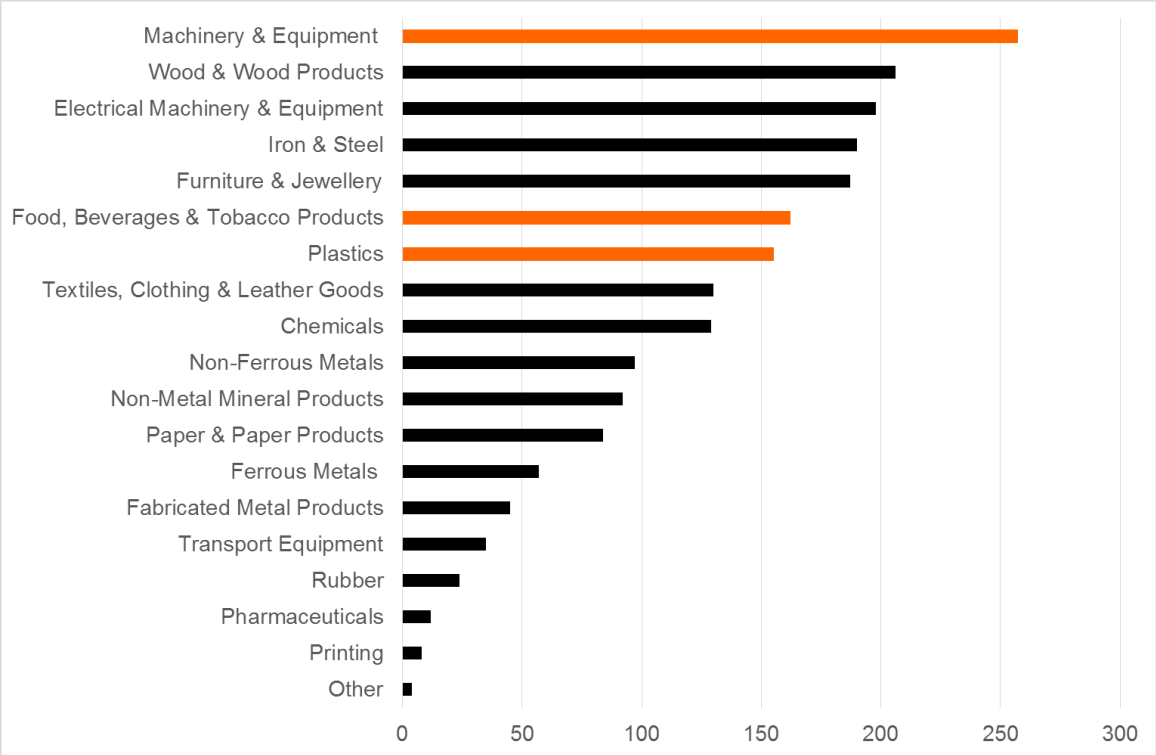
- machinery and equipment
- wood and wood products (possibly includes furniture)
- electrical machinery and equipment
- iron and steel, and
- furniture and jewellery (likely furniture) (Figure 6)

The findings are slightly different to those obtained from the survey where fabricated metal products was the largest manufacturing category followed by furniture and jewellery, machinery and equipment, plastics, and chemical products. While this could indicate that the survey may not be representative of manufacturing firms within the City, it is more likely that this is the result of inconsistencies in the classification of firms between the census and the survey. Fieldworkers may have classified firms that manufacture fabricated metal products as manufacturers of machinery and equipment in their self-

assessment during the census whereas these firms selected the 'fabricated metal products' category in the survey, which preceded the 'machinery and equipment' category on the list of options.

The analysis of firms by subsector shows the surprisingly large concentration of firms that manufacture wood and wood products as well as furniture. As discussed further in the analysis of the survey results below, the furniture sector has emerged as an important feature of the City's manufacturing landscape and requires further in-depth analysis to understand the growth potential of the sector.

Figure 6: Distribution of manufacturing firms per subsector



4.2 Findings from the survey

The findings from the survey will assist the City in designing interventions that respond to node-specific challenges and that more effectively stimulate dynamism and growth in the City economy. The interventions will vary depending on sector and geographic area since interventions that work well in one sector/area may not be appropriate in another due to differences in land use patterns and transport linkages, for example. This highlights the importance of a micro-level understanding of manufacturing activity within particular nodes so that interventions can be more usefully targeted at the specific challenges in each node.

One of the main findings of the survey is that Johannesburg's manufacturing firms are mostly small and medium-sized. The manufacturing firms are mainly concentrated in (Figure 7):

1) fabricated metals;
2) furniture and jewellery;
3) machinery and equipment;
4) plastic products subsectors.

From in-depth interviews, it appears that firms in the furniture and jewellery subsector are actually mostly furniture manufacturers. Transport and logistics is the most common manufactured-related service in the City.

Despite the prevailing economic conditions, a significant proportion of both manufacturing and manufacturing-related services firms have been performing well over the past three years. Firms in food processing, furniture, and the rubber subsectors have largely been growing while plastics, machinery and equipment and fabricated metal products firms have not been performing well (discussed in more detail later). The main reasons for poor performance has been weak customer demand and lost sales to foreign and domestic competitors. The survey findings are explored in more detail below.

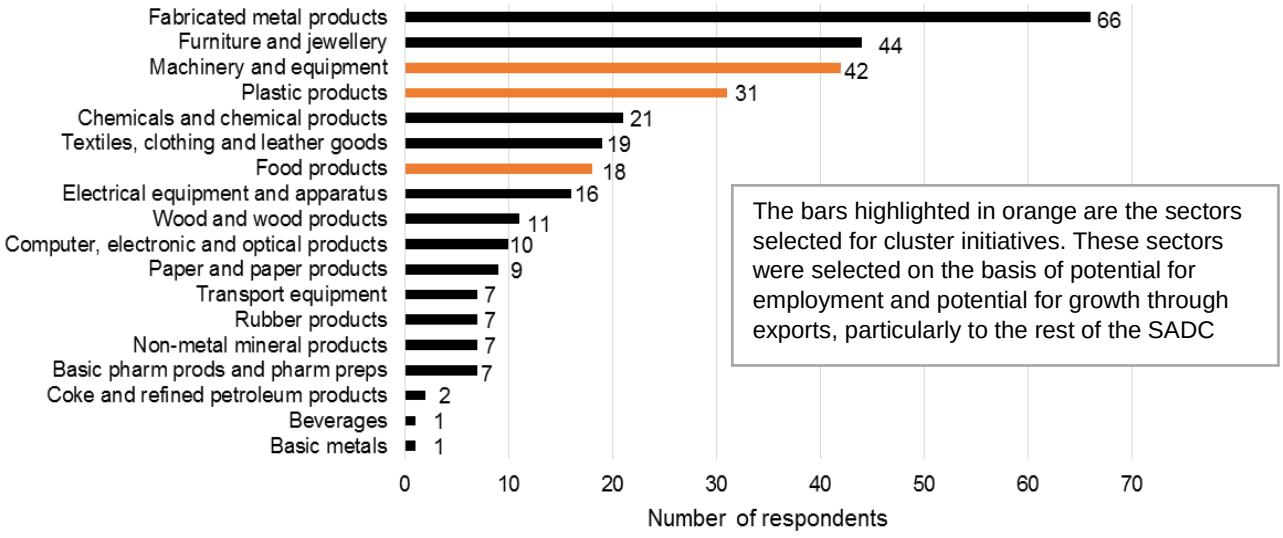
4.3 Overview of the respondents

This section provides an overview of the main characteristics of the firms that responded to the survey including subsector classification, size of firms, and tenure at their current premises.

4.3.1 Manufacturing respondents

The sector distribution of these firms shows a strong presence of firms that produce fabricated metal products, furniture, machinery & equipment and plastic products (Figure 7).

Figure 7: Distribution of manufacturing firms sub-sector, n=319



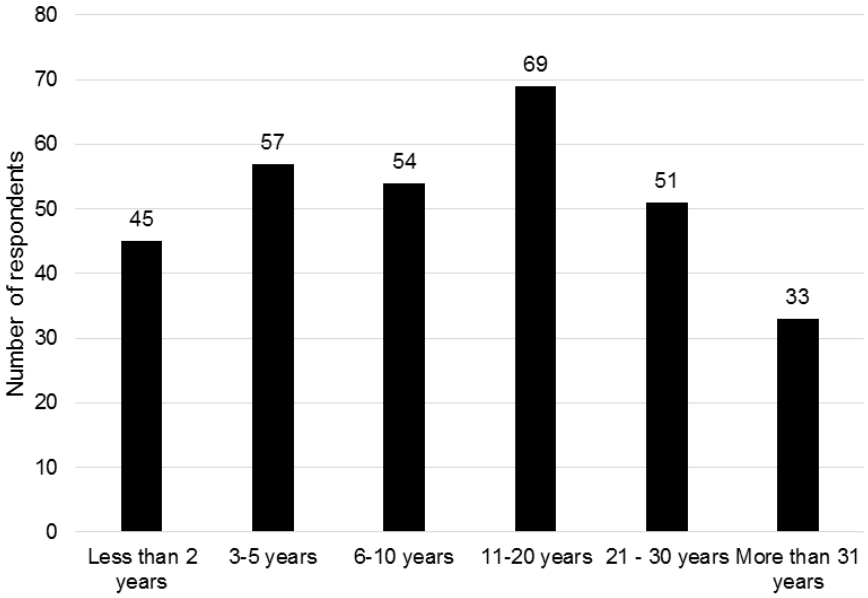
Source: Survey data

The machinery & equipment and food processing sectors have strong opportunities based on growing regional demand, while the plastics subsector has labour absorptive capacity. The aim of the cluster development research is to gain an understanding of the key issues impeding the competitiveness of specific clusters of firms and to identify interventions to enhance the competitiveness of these clusters. The clusters will be discussed in more detail in their respective reports. Sector performance is discussed in Section 4.2.

Tenure at current premises: manufacturing firms

Fifty percent (50%) of firms surveyed have been located at their current premises for less than 10 years. This highlights firms are quite dynamic and that the old data is certainly wrong. Thirty-three percent (33%) of the firms have either relocated recently or are fairly new firms with fewer than 5 years of operation at their current premises (**Error! Reference source not found.**Figure 8).

Figure 8: Years spent at current premises, n=309



Source: Survey data

In terms of sectors, all the firms in the wood and wood products subsector have been at their current premises for fewer than 10 years (Table 4). Food, textiles & clothing, and paper products firms also have a high proportion which have been in their current premises for less than 10 years.

The current iteration of the survey does not allow us to establish whether tenure varies by node and whether certain nodes are thus more “stable” than others. The reasons for relocation to new nodes, or extended tenure in existing nodes are also not explored in the current survey. This should be revised in the next iteration of the survey.

The firms that have been located at their current premises for more than 10 years are predominantly in the rubber products (86% of firms at their current premises for more than 10 years), plastics products (60% of firms at their current premises for more than 10 years), and machinery and equipment subsectors (59% of firms at their current premises for more than 10 years) (**Error! Reference source not found.**). The reasons for this may be that these firms find their existing locations attractive.

Table 2: Indication of years spent at current location by subsector

	Number of years at current premises							
	< 2	3-5	6-10	Subtotal (<10)	11-20	21-30	>31	Subtotal (>10)
Fabricated metal products	10	12	9	31	20	6	7	33
Furniture and jewellery	5	11	6	22	12	7	3	22
Machinery and equipment*	5	8	4	17	11	9	4	24
Plastic products*	-	5	7	12	8	4	6	18
Chemicals and chemical products	1	4	4	9	4	4	3	11
Textiles, clothing and leather goods	4	3	5	12	3	2	1	6
Food products*	5	2	4	11	3	4	-	7
Electrical equipment and apparatus	1	4	3	8	3	1	4	8
Wood and wood products	3	4	1	8	-	-	-	0
Computer, electronic and optical products	4		1	5	-	3	-	3
Paper and paper products	4	1	2	7	1	1	-	2
Basic pharmal prods and pharma preps	-	1	2	3	4	-	-	4
Non-metal mineral products	1	1	2	4	-	2	1	3
Rubber products	-		1	1	-	5	1	6
Transport equipment	1	1	1	3	-	3	1	4
Coke and refined petroleum products	-	-	2	2	-	-	-	0
Beverages	1	-	-	1	-	-	-	0
All firms	45	57	54	156	69	51	33	153

*Sectors that have been selected for cluster initiatives

Source: Survey data

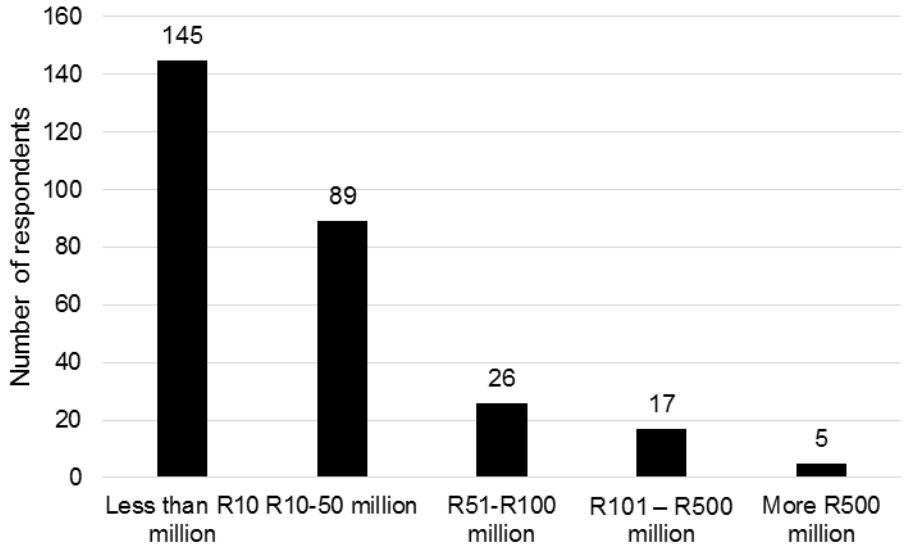
The size of manufacturing firms in the City of Johannesburg

In terms of annual turnover, most firms (83%) can be classified as micro, very small, small and medium sized with a sales value less than R50 million (Figure 9).[13] In terms of employment the vast majority of firms are small, with less than 50 employees (Figure 10).

Only 2% of firms (5 firms) indicated that their sales exceed R500 million in their last financial year. These firms manufacture wood and wood products, non-metal mineral products, and machinery and equipment. In terms of employment, only 3.6% of the firms (11 firms) are identified as large, with more than 200 employees. These large firms manufacture textiles, clothing and leather goods, computer, electronic and optical products and non-metal mineral products.

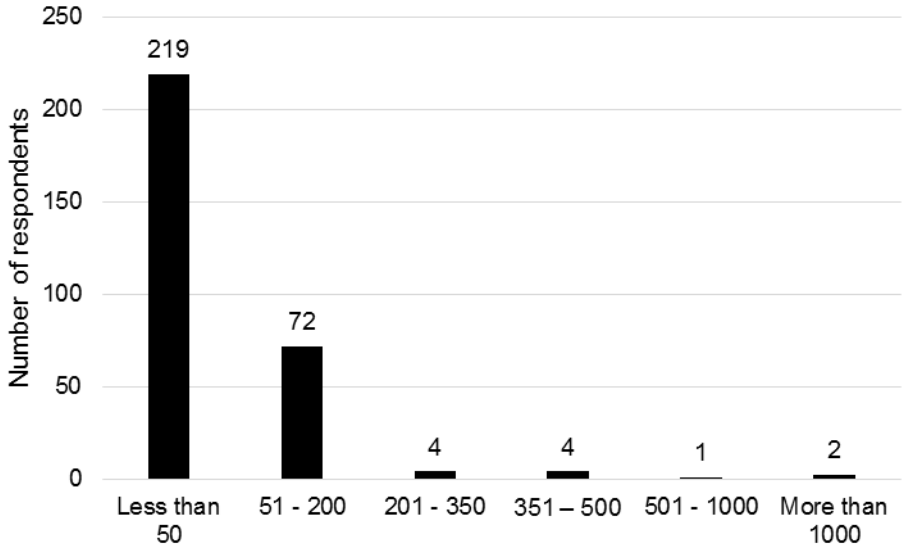
[13] According to the National Small Business Act of 2003 (as amended), manufacturing firms are classified as micro, very small and small if they have fewer than 50 employees, an annual turnover of less than R13 million and asset value of less than R5 million. Firms are classified as medium-sized if they have fewer than 200 employees, an annual turnover less than R51 million, and an asset value of less than R19 million. These values were determined in 2003. If inflated to 2015 micro, very small and small manufacturing firms have an annual turnover of less than R23.6 million and asset value of less than R9mn. Medium manufacturing enterprises have an annual turnover of less than R92 million and an asset value of less than R34.5mn. Manufacturing firms with over R94.5 million are defined as large enterprises. We also note that there is a discrepancy between the revenue thresholds used in the survey and those defined in the Small Business Act. This will be corrected in the next survey. For this reason, firms are primarily classified according to number of employees.

Figure 9: Company's approximate total value of sales in 2014, n=282



Source: Survey data

Figure 10: Number of part-time and full-time employees currently at the site, n=302



Source: Survey data

Employment contribution of each manufacturing subsector

The employment contribution of each manufacturing subsector has been imputed from the survey responses by assuming that the response rate is uniform across sectors. The largest manufacturing employers in the City of Johannesburg (Table 5) are:

1) furniture and jewellery,
2) machinery and equipment, and
3) fabricated metal products

The importance of furniture is somewhat unexpected and points to the need to consider interventions to support this, in addition to the cluster initiatives for machinery & equipment, food products and plastic

products. In addition, consideration should be given to fabricated metal products although the performance of this sector has been poor, as is also the case for plastic products.

Table 3: Imputed employee numbers for manufacturing firms

Sector	<50	51-200	201-350	351-500	501-1000	>1000	Estimated employment (sample)[a]	Total employment by sector [b]
Furniture and jewellery	27	15	-	1	-	-	2975	12 763
Fabricated metal products	51	10	1		-	-	2800	12 012
Machinery and equipment	30	7	1	2	-	-	2750	11 798
Plastic products	22	6	-	-		1	2300	9 867
Non-metal mineral products	4	2	-	-	-	1	1350	5 792
Textiles, clothing and leather goods	11	6	1	-	-	-	1300	5 577
Electrical equipment and apparatus	11	4	-	1	-	-	1200	5 148
Food products	11	5	1	-	-	-	1175	5 041
Chemicals and chemical products	14	6	-	-		-	1100	4 719
Computer, electronic and optical products	7	-	-	-	1	-	925	3 968
Rubber products	4	3	-	-	-	-	475	2 038
Wood and wood products	6	2	-	-	-	-	400	1 716
Transport equipment	5	2	-	-	-	-	375	1 609
Paper and paper products	8	1	-	-	-	-	325	1 394
Basic pharma products and pharma preps	5	1	-	-	-	-	250	1 073
Coke and refined petroleum products	1	1	-	-	-	-	150	644
Beverages	1	-	-	-	-	-	25	107
Grand Total	**218**	**71**	**4**	**4**	**1**	**2**	**19 875**	**85 264**

Source: Survey data, own calculations

a: The 'estimated employment' for respondent firms is calculated by multiplying the number of firms in each range by the mid-point of the range and adding these together. Note that for firms at the upper limit (>1000 employees), employment is assumed to be equal to 1000.
b: Total employment is calculated by multiplying (a) by the inverted response rate to the employment question. 300 firms responded to this question. This is a response rate of 23.3% (300 responses out of 1287 manufacturing firms). The inverse is 4.29.

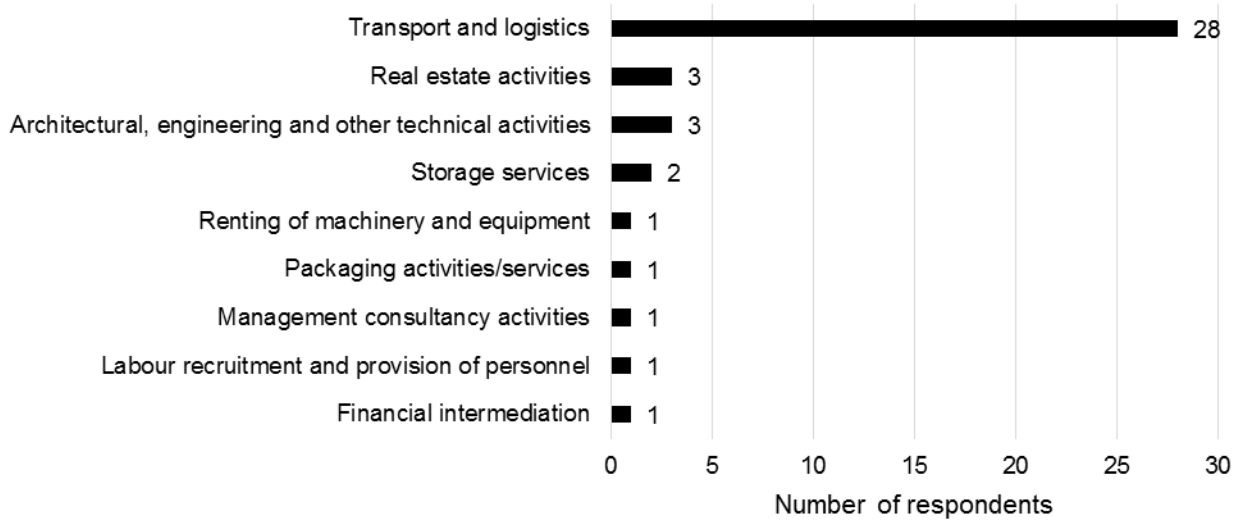
The sub-sectors selected for the cluster initiatives are highlighted in Table 3. Both machinery and equipment and the plastics subsector are relatively large employers. Even though the food processing subsector is not one of the larger employers, it is a growing sector with significant export potential.

4.3.2 Manufacturing-related services firms

The response rate for manufacturing-related services firms ("services firms") was 27% (41 out of 152 firms). There is a strong presence of transport and logistics firms relative to the other subsectors (Figure 11). This is unsurprising as we expected that there would be a large presence of third party transport and logistics providers operating particularly out of City Deep.

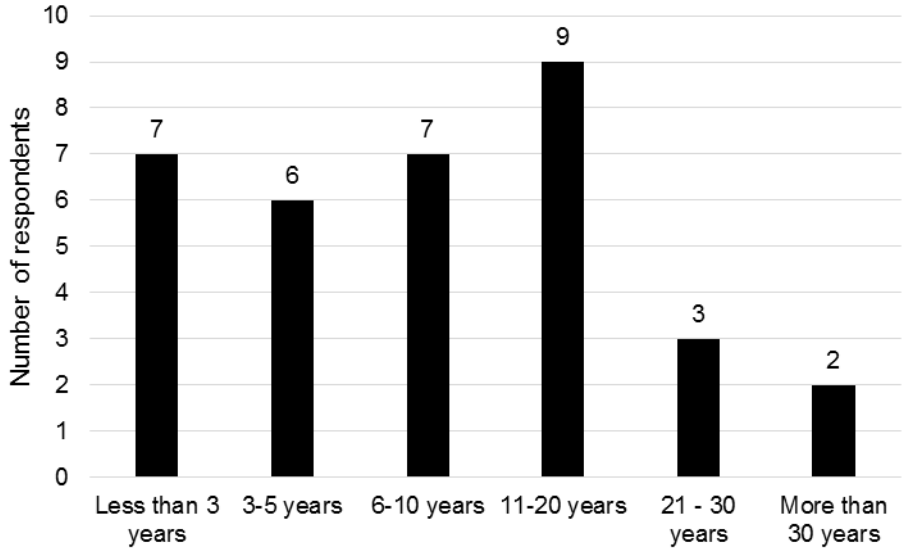
Most services firms have been located at their premises for less than 20 years, while only 15% have been located at their current premises for more than 20 years as shown in Figure 12.

Figure 11: Manufacturing-related services sub-sector distribution, n=41



Survey data

Figure 12: Years spent at current premises, n=34



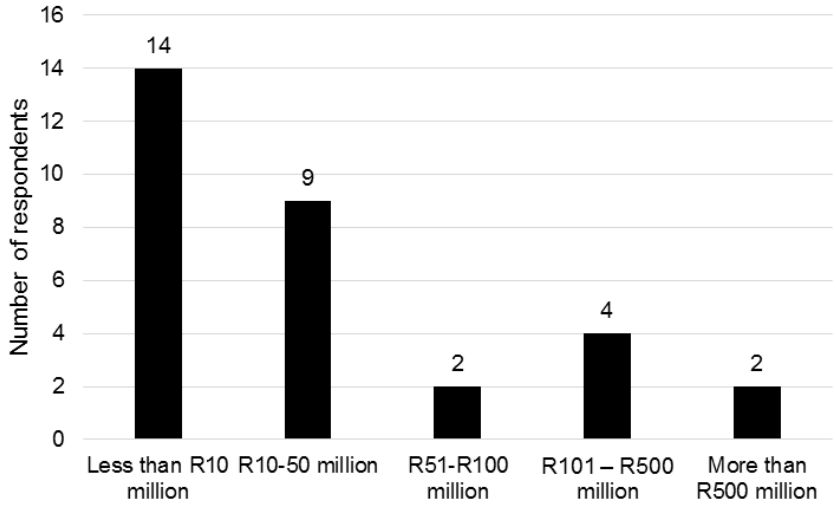
Source: Survey data

The size of manufacturing-related services firms

The thresholds in the Small Business Amendment Act of 2003 stipulate that micro, very small and small firms in the transport, storage and communications sector have fewer than 50 employees, an annual turnover of less than R13 million and an asset value of R3 million. Medium-sized firms are those with

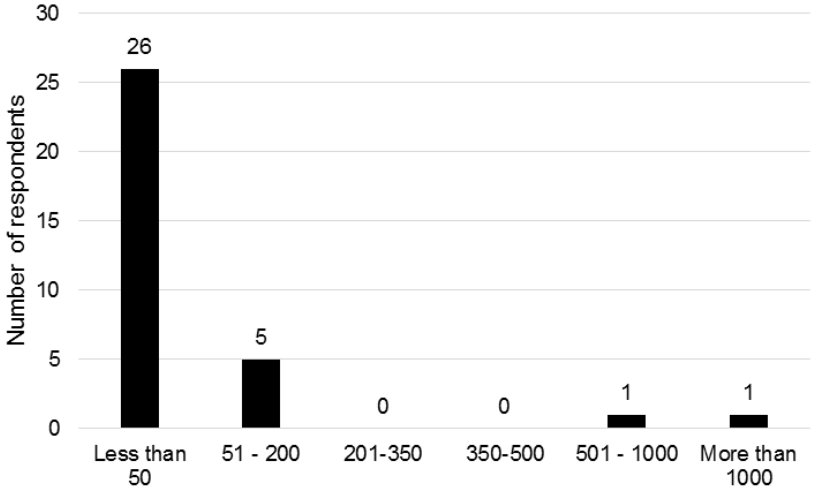
fewer than 200 employees, and annual turnover of less than R26 million and asset value of less than R6 million.[14]

Figure 13: Company's approximate total value of sales in 2014, n=31



Source: Survey data

Figure 14: Number of part-time and full-time employees currently at the site, n=33



Source: Survey data

[14] There is a discrepancy in terms of the classification where the survey ranges do not match with the thresholds. This will be corrected for in the next survey. We also note that these thresholds were determined in 2003. If inflated to 2015 micro, very small and small transport, storage and communications firms have an annual turnover of less than R23.6 million and asset value of less than R5.5mn. Medium transport, storage and communications enterprises have an annual turnover of less than R47.2 million and an asset value of less than R11mn. Transport, storage and communications firms with over R47.2 million are defined as large enterprises.

Similar to manufacturing firms, the majority of the services firms are small to medium enterprises (**Error! Reference source not found.** and Figure 14). The firms that employ more than 500 employees are in the passenger transport and labour solutions subsectors.

Table 4: Imputed employee numbers for manufacturing related services' firms*

	< 50	51-200	201-350	351-500	501 - 1000	> 1000	Estimated employment (sample)a	Total employment by sector
Transport and logistics	19	4	-	-	-	1	1 975	14 663
Labour recruitment and provision of personnel	-	-	-	-	1	-	750	5 568
Architectural, engineering and other technical activities	2	1	-	-	-	-	175	1 299
Storage services	2	-	-	-	-	-	50	371
Management consultancy activities	1	-	-	-	-	-	25	186
Packaging activities/services	1	-	-	-	-	-	25	186
Renting of machinery and equipment	1	-	-	-	-	-	25	186
Financial intermediationFood services	-	-	-	-	-	-	-	-
Real estate activities	-	-	-	-	-	-	-	-
Grand total	26	5	0	0	1	1	3 025	22 458

Source: Survey data, own calculations

a: The 'estimated emplyment' for respondent firms is calculated by multiplying the number of firms in each range by the mid-point of the range and adding these together. Note that for firms at the upper limit (>1000 employees), employment is assumed to be equal to 1000.
b: Total employment is calculated by multiplying (a) by the inverted response rate to the employment question. 33 firms responded to this question. This is a response rate of 13.5% (33 responses out of 245 manufacturing-related service firms). The inverse is 7.424.

Services firms employ an estimated 22 458 employees. This shows the importance of the manufacturing sector in creating employment in other, related, sectors. As regional demand for products grow, services firms are also likely to benefit from this growth, absorbing higher skilled workers in the tertiary sector.

4.3.3 Conclusion on characteristics of manufacturing and services firms

Both the manufacturing and manufacturing-related services sectors are largely made up of small and medium sized firms. In manufacturing, most of the firms are in the fabricated metal products, furniture, machinery and equipment, and plastics subsectors. Most services firms offer transport and logistics services.

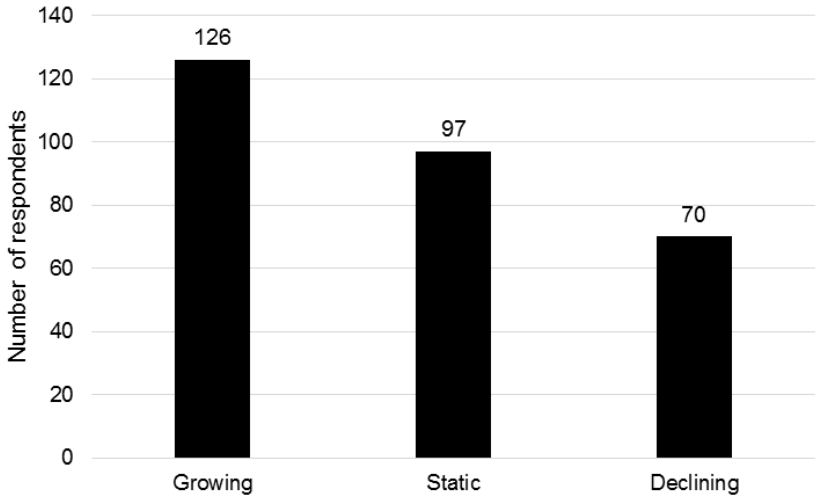
Plans for development and reindustrialisation in the City of Johannesburg must be cognisant of the fact that Johannesburg is predominantly made up of smaller firms. Unlike more established large firms, smaller firms are likely to be less sophisticated or to operate in niche markets and may not have the benefits of scale that would allow them to invest sufficiently in training, applications for government incentives and other such initiatives. Smaller firms may thus need assistance with more basic issues like finding new markets (whether through trade facilitation or public procurement) and addressing basic service interruptions (specifically electricity) as they are not able to absorb the costs of investing in generators or sustainable energy.

4.4 Performance in the prevailing environment conditions

Economic conditions have been challenging over the past 3 years. Firms have faced erratic power supply coupled with a volatile exchange rate and have had to devise methods to remain competitive. Within this context, we aim to understand firms' performance and competitiveness over the past three years (2013 – 2015). The proxies used to interpret firm performance include size of the company, turnover, capacity utilisation and revenue.

Despite weak economic conditions, 43% (126) of firms have grown their annual turnover, in nominal terms, over the past three years. In contrast, 70 firms have faced a decline in annual turnover (Figure 15).

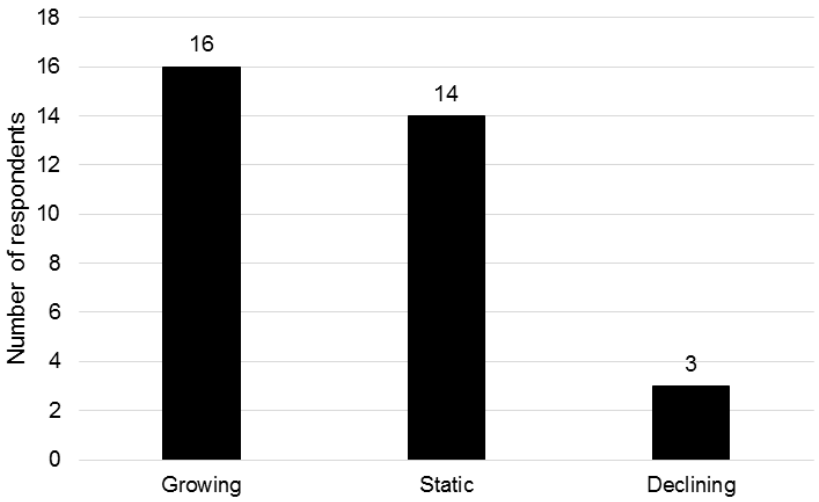
Figure 15: Manufacturing firm's change in annual turnover, over 2013 to 2015, n=293



Source: Survey data

Service firms seem to be performing better than manufacturing firms, with only 3 firms (9%) citing declining annual turnover versus 33% in the manufacturing sector (Figure 16). All 3 firms cited decline in customer demand as the only reason for lack of growth.[15]

Figure 16: Manufacturing-related service firm's change in annual turnover 2014-2015, n=33



Source: Survey data

[15] Comparing the results from the manufacturing survey to the manufacturing-related services survey is challenging because of the significantly different responses of 315 and 44 respectively.

4.4.1 Determinants of manufacturing firms' performance

The relationship between the likelihood of firm growth and various characteristics is tested using cross tabulations. The results indicate that there is no relationship between size, whether in terms of turnover or employees, and firm performance (Tables 5 and 6).

Table 5: The relationship between size (turnover) and change in growth for manufacturing firms in 2014, n=267[16]

Size (Turnover)	Frequency type	Growing	Not growing	Total
Less than R10 mn	Actual	61	81	142
	Expected	61.3	80.7	142
R10-50 mn	Actual	39	49	87
	Expected	38.00	50.00	87
More than R50 mn	Actual	20	28	46
	Expected	20.7	27.3	46
Total	Actual	118	157	275
	Expected	118	157	275
		Pearson chi2(2) = 0.0941		Pr = 0.954

Source: Survey data, own calculations

Table 6: The relationship between size (number of employees) and change in growth, n=281

Number of employees	Frequency type	Growing	Not growing	Total
Less than 50	Actual	91	124	215
	Expected	92.0	122.6	215
50-200	Actual	30	38	68
	Expected	29.2	38.8	68
More than 200	Actual	4	4	8
	Expected	3.4	4.6	8
Total	Actual	123.00	166.00	289
	Expected	123	166	289
		Fisher's exact = 0.883		

Source: Survey data, own calculations

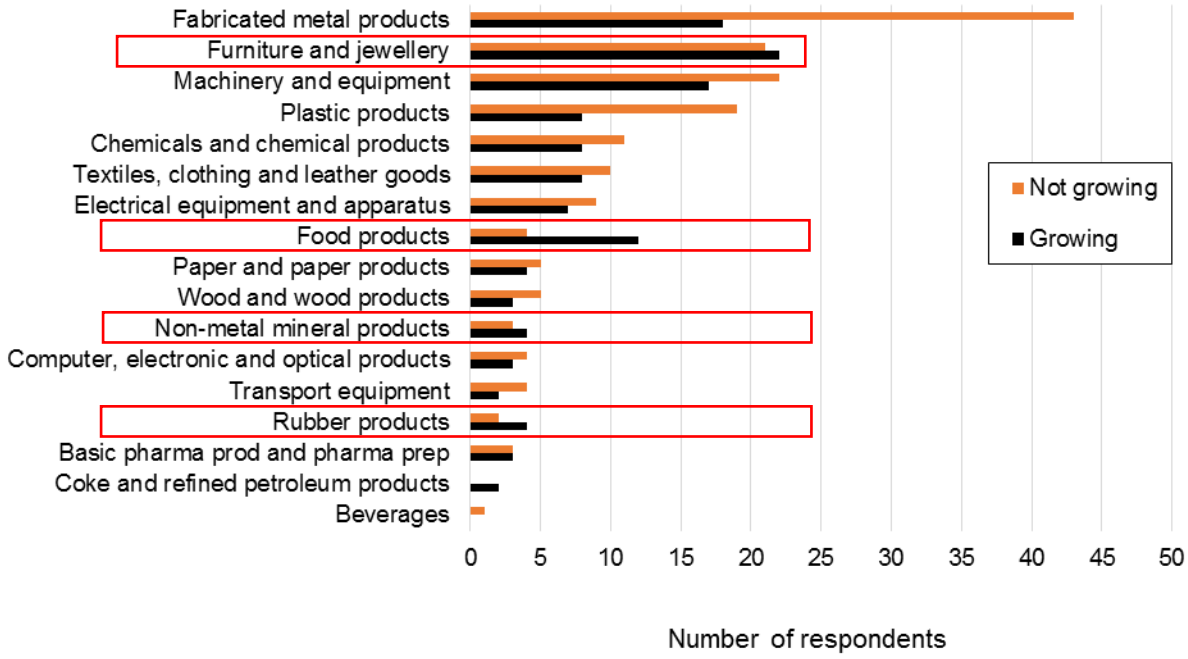
There are very large differences in the firm performance across sectors (Figure 17). We find that there are only 4 sectors in which the majority of firms have recorded growth and are marked in red in the figure below:

1) food products
2) furniture
3) non-metal mineral products
4) rubber products.

[16] The null hypothesis is that there is no relationship between size of firm and their growth. We fail to reject the null hypothesis at 5% confidence level (Table 7). This implies that there is no relationship between the size of the firm (as measured by annual turnover) and growth in this case. Nonetheless, it is worth noting that 27 out of 46 firms that have an annual turnover of more than R50 million have not been growing

The worst performance in terms of the proportion of firms experiencing poor performance (i.e. with their revenue is 'declining' or 'static') is in fabricated metals, machinery and equipment and the plastics subsectors.

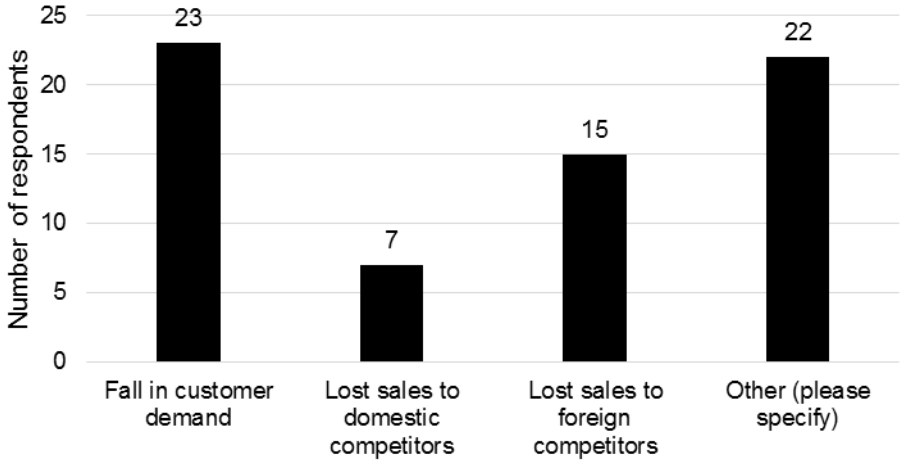
Figure 17: Growth of manufacturing firm by subsector, 2014-2015, n=291



Source: Survey data

The main reasons for poor performance amongst firms that reported contraction or static growth has been weak customer demand and lost sales to foreign and domestic competitors. Thirty-four percent (34%) of firms indicated that a 'fall in customer demand' was the major reason behind declines in sales. Of the 33% of firms that selected 'other' reasons, the weak economic climate was the most cited reason (Figure 18).

Figure 18: Reasons for manufacturing firm's contraction 2014-2015, n=67



Source: Survey data

Increased economic pressure has reduced disposable income and interviews indicate that customers are resorting to cheaper alternatives. Some sectors have thus been adversely impacted by an influx of cheaper imports into the country. Firms also listed strikes in the mining industry, lack of support from the government and the inability to access raw materials as factors that have made things more difficult.

In in-depth interviews, numerous firms indicated that they had applied for funding from national government for machinery and equipment (probably via *the dti's* MCEP programme), but had failed to secure funding because they did not meet some of the criteria. Firms raised concerns about the complexity of application processes and a lack of clarity in decision-making as they often had no idea why their applications had been turned down or what they should do to access funding.

In terms of accessing raw materials, some firms found it difficult to secure raw materials (notably steel) because suppliers give 'larger' customers preferential service, often failing to fulfil the orders of smaller competitors. Some firms also lamented the fact that inputs such as steel are priced at import parity levels, which became more costly after the currency depreciation.

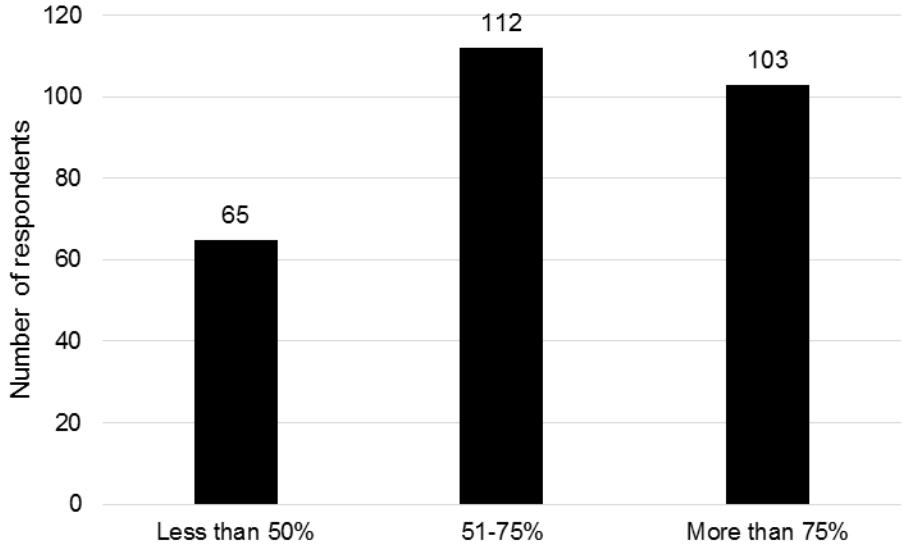
These challenges in accessing inputs point to larger structural constraints and significant barriers to entry in the South African economy, which is still dominated by oligopolies and monopolies in many sectors. Some of these challenges, notably import parity pricing of steel and polymers, have been investigated by the competition authorities with little success, at least partly due to the high threshold in the Competition Act for proving that an abuse of dominance has occurred. Competition law may not be enough, and other forms of economic regulation must be considered to ensure that small and medium-sized manufacturers have access to inputs at fair and reasonable rates.

4.4.2 Capacity utilisation of manufacturing firms

A significant proportion of firms are operating well below full capacity. 63% of firms across all sectors are operating below 75% of capacity with almost a quarter (23%) operating at below 50% of installed capacity (Figure 19). Some firms were severely affected by low demand and increased competition, and are even operating at below 20% of installed capacity.

Low consumer demand, the inability of firms to secure new markets and unscheduled downtime from power outages have contributed to low capacity utilisation. On the positive side, this implies that there is capacity within firms to meet increased demand when firms enter new markets of find new customers.

Figure 19: Manufacturing firm's capacity utilisation, n=280

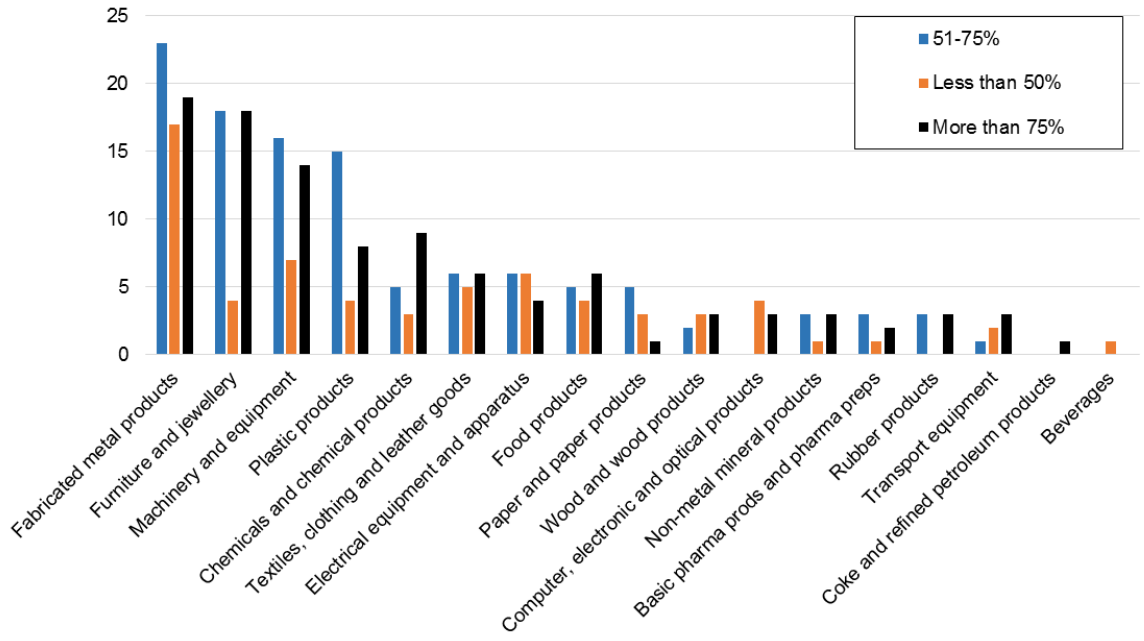


Source: Survey data

A closer look at utilisation per sector shows that furniture, food, and the chemical subsectors have the highest number of firms operating at over 75% capacity utilisation (Figure 20). This is likely due to lower

income elasticity of demand for these products (particularly food, for which consumption is 'recession-proof'). On the opposite end of the scale, manufacturers of fabricated metal products and plastic products are operating at the lower end of the capacity utilisation scale, between 51 and 75%.

Figure 20: Manufacturing firm's capacity utilisation by sector, n=278



Source: Survey data

There is a strong association between growth and capacity utilisation (Table 7). This is unsurprising, however, it does imply that growing firms may run into capacity constraints requiring investment in expanded capacity to maintain their growth. This has implications in terms of access to finance for the investments as well as land and electricity supply, which we explore below.

Table 7: The relationship between growth and capacity utilisation

Capacity utilisation	Frequency type	Growing	Not growing	Total
Less than 50 %	Actual	16	49	65
	Expected	27.9	37.1	65
51-75 %	Actual	44	68	112
	Expected	48.1	63.9	112
More than 75 %	Actual	63	39	102
	Expected	43.8	58.2	102
Total	Actual	123	156	279
	Expected	123	156	279
		Pearson chi2(1) = 27.6493		Pr = 0.000

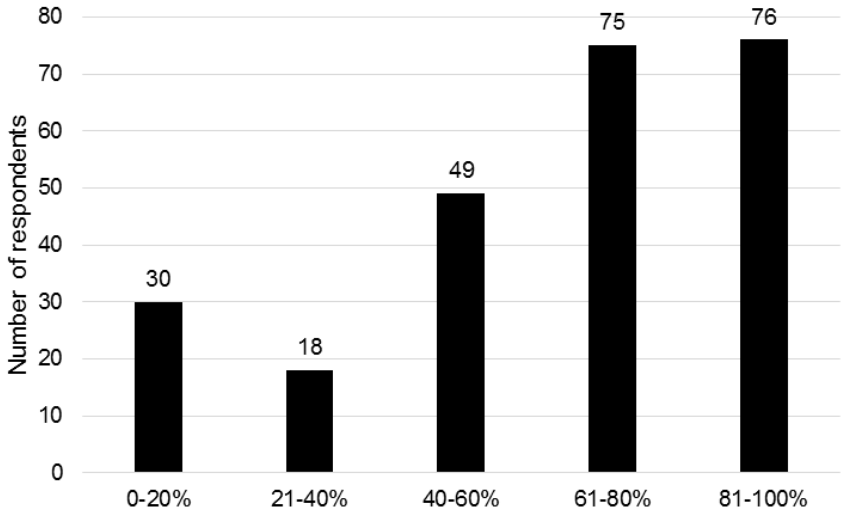
Source: Survey data, own calculations

4.4.3 Access to markets: exports

Due to depressed local demand, firms are starting to export to the rest of southern African. Neighbouring countries have been experiencing high GDP growth with Zambia and Mozambique expected to grow at 6.6% and 8.1% respectively in 2016 while South Africa's GDP is forecast to grow at less than 1% in 2016 (SARB, 2016). Johannesburg's strategic location makes it a gateway into markets across southern Africa.

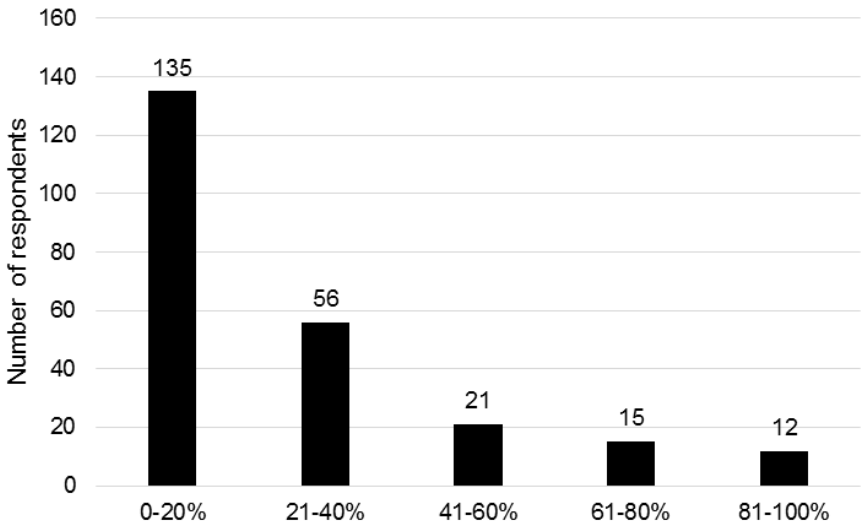
Though many (56%) firms participate in export markets, most firms export only a small proportion of their output (less than 10%). Most firms sell more than 60% of their products within Gauteng and the rest of South Africa (Figure 21 and Figure 22). The high proportion of sales in Gauteng may be partly explained by the fact that Gauteng is the biggest consumer market in South Africa but the high proportion of sales in Gauteng also indicates that manufacturing firms in Gauteng are insufficiently integrated into regional value chains and the growing regional consumer markets. The reasons for this are best explored on a sector-by-sector basis and will be evaluated as part of the cluster initiatives.

Figure 21: The percentage of sales made in Gauteng by manufacturing firms, n=248



Source: Survey data

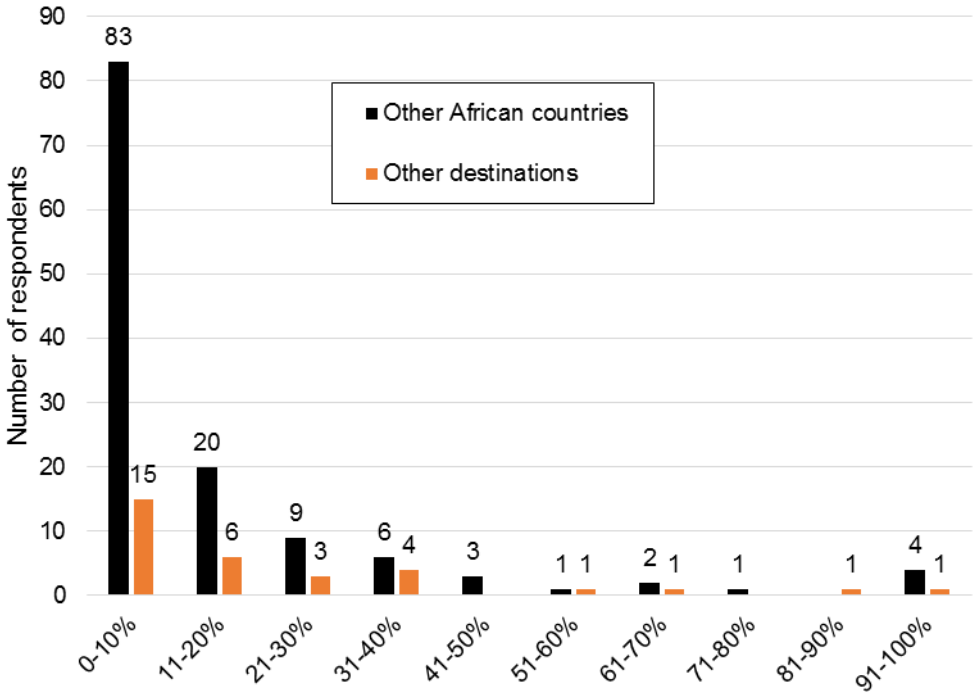
Figure 22: The percentage of sales in South Africa (excluding Gauteng) by manufacturing firms, n=239



Source: Survey data

Firms that do export, export mostly to the rest of Africa (Figure 23). The firms that export a high proportion of output (more than 61% of production) manufacture fabricated metal products, plastics, food products, furniture, electrical equipment, and machinery and equipment.

Figure 23: Proportion of sales made to other African countries and other destinations by manufacturing firms



Source: Survey data, own calculations

When we evaluate a possible relationship between exports and firm growth we find that there is no apparent relationship between exporting and growth (Table 8). This is somewhat unexpected, as we anticipated that firms that do participate in the export market are likely to be more competitive and thus more likely to be growing. However, it could be that exports are simply replacing local demand, and are not linked to overall growth in firm output.

Table 8: The relationship between exporting and change in growth for manufacturing firms

Exporting	Frequency type	Growing	Not growing	Total
Yes	Actual	62	85	147
	Expected	62.9	84.1	147
No	Actual	54	70	124
	Expected	53.1	70.9	124
Total	Actual	116	155	271
	Expected	116	155	271
		Pearson chi2(1) = 0.0517		Pr = 0.820

Source: Survey data, own calculations

The in-depth interviews provided further insights on the effect of exports on firm performance. Firms in the food and furniture subsectors indicated that exports to customers in the regional market have buoyed output in the face of declining local demand. Firms in the machinery and equipment, plastics and fabricated metal products sectors are also facing significant decline in demand from local customers, particularly due to the general downturn in the performance of the mining sector. Only firms that supply mining and construction companies in the region (i.e. outside South Africa) have been able to maintain or grow output.

There is a relationship between firm size and likelihood of exporting, with the cross-tabulation significant at the 5% level. Large firms are relatively more likely to be exporters than small firms are. While 80% of large firms export, less than half of small firms do so.

Table 9: The relationship between exporting and size of manufacturing firms

Exporting	Frequency type	Large[17]	Small	Total
No	Actual	23	101	124
	Expected	33.3	90.7	124
Yes	Actual	50	98	148
	Expected	39.7	108.3	148
Total	Actual	73	199	272
	Expected	73	199	272
Fisher's exact = 0.006		1-sided Fisher's exact = 0.003		

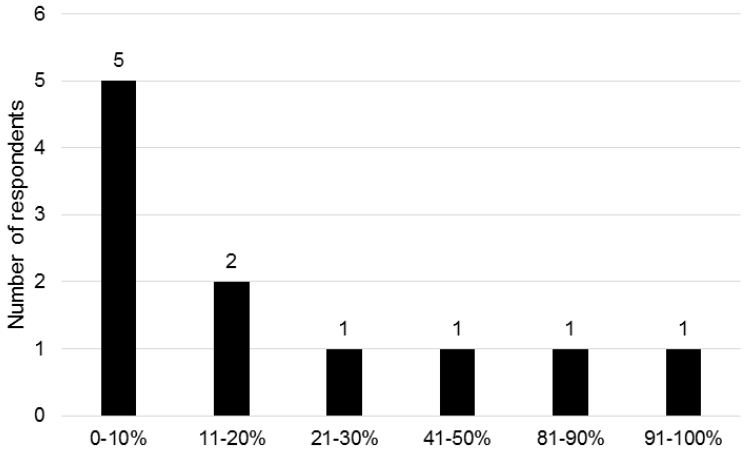
Source: Survey data, own calculations

Firms have reported facing a number of challenges in entering the export market. In the in-depth interviews, firms reported that infrastructure, regulations and a lack of knowledge hamper their ability to compete in export markets. Specifically, the road and railway infrastructure in neighbouring countries is said to be poor which makes it expensive to transport goods and products. Firms are also not fully aware of customs regulations to export products to other countries which has resulted in unexpected costs of meeting requirements for trade.

Export performance of services firms

The export performance of services firms is largely similar to that of manufacturing firms. The main market for services firms is Gauteng. The majority of firms (52%) do provide services in other countries, but only do so in small amounts (**Error! Reference source not found.**).

Figure 24: Proportion of services firms' sales to other African countries and other destinations



Source: Survey data

The firm that provides over 90% of their sales to other African countries is a transport and logistics firm that also offers clearing and forwarding services.

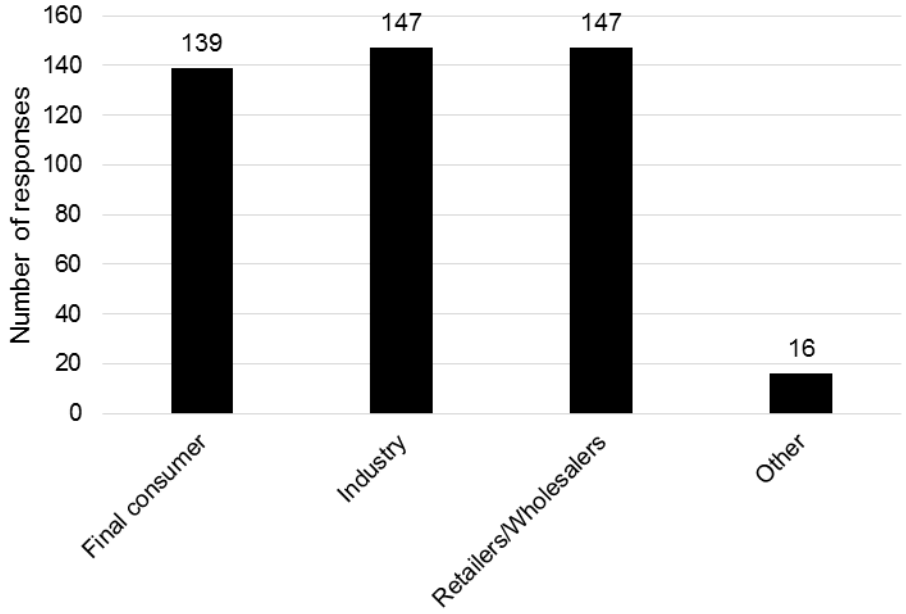
[17] Small firms are defined here as having fewer than 50 employees and large firms have more than 50 employees

4.4.4 Main customer markets

In this question, we evaluate whether firms are manufacturing products that are sold to other industrial sectors (i.e. intermediate products) or if they primarily sell to the final consumer. Firms were asked to select whether they supply industry, final consumers and/or wholesale/retailers and they were able to choose more than one option.

Many firms indicated that they sell their produce to two or all three of these different types of consumers (Figure 25). Fifty-two percent (52%) of firms supply their product to wholesalers and retailers, 50% sell to final consumers and 53% sell to industrial customers. The "other" category includes government and farmers. Only 5% of the firms sell their products only to the final consumers.

Figure 25: The main customers that the manufacturing firms supply, n=279



Source: Survey data

Manufacturing-related services firms offer their services to a wide array of customers. They do not provide services to manufacturing firms alone (Table 10). In fact, 7 firms (24%) provide more than 75% of their services to non-manufacturing firms.

Table 10: The proportions of total sales offered to manufacturing versus non-manufacturing firms by manufacturing-related service firms

Proportions supplied of total sales	Manufacturing	Non-manufacturing*
0%	5	3
Less than 25%	3	5
26-50%	2	2
51-75%	3	2
More than 75%	5	7
Total	18	19

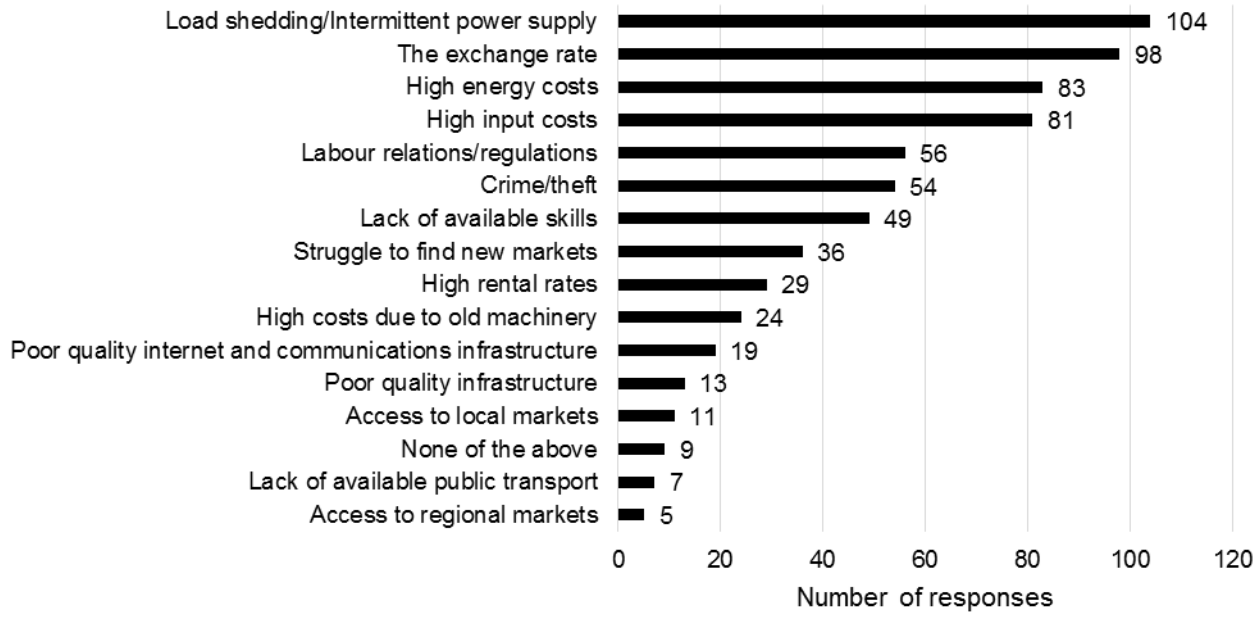
* The "non-manufacturing" category includes agriculture, construction, and wholesale and retail sectors

Source: Survey data

4.4.5 The main challenges faced by firms in the City of Johannesburg

The biggest challenges affecting firms are unreliable energy supply and exchange rate volatility, both of which make it difficult for firms to anticipate costs and to price accordingly. Labour cost/labour regulations, crime and theft, and the lack of available skills are also issues that have negatively affected firm performance (Figure 26). Manufacturing firms are most affected by unreliable and expensive power, while manufacturing-related service firms consider crime and theft as their most problematic challenge after the volatile exchange rate. **Error! Reference source not found.**.

Figure 26: Challenges faced by manufacturing firms, n=311



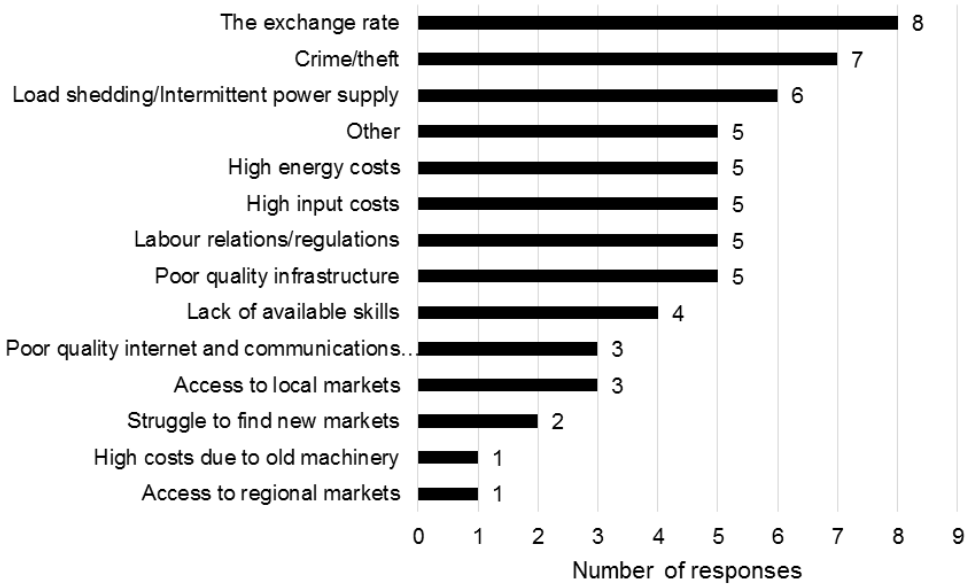
Source: Survey data

In the interviews with transport and logistics firms, crime and theft was cited as a major challenge. This industry is prone to theft of goods as well as syphoning of fuel from vehicles. On-the-road thefts were cited as a major concern by firms that transport goods across the border. Two firms interviewed have had their delivery trucks hijacked and indicated that the Heidelberg/Vosloorus area is a high-risk area for hijacking.

The other challenges mentioned by service firms were access to funding, competition from airlines due to the opening of new routes, customs and duty problems, high levels of competition in the industry, and the state of road infrastructure in other countries.

Firms were asked about the effect of strikes on their operations and some firms were negatively affected by violent industrial action in the past two years. Due to this, one firm has stopped hiring workers and has reduced its number of staff from 75 employees to 50 and intends to reduce this further. Though a number of firms identified 'rigid' labour market regulations as a challenge, concern about violent strikes is a relatively isolated incident.

Figure 27: Challenges faced by manufacturing-related service firms, n=33



Source: Survey data

4.5 Improving competitiveness

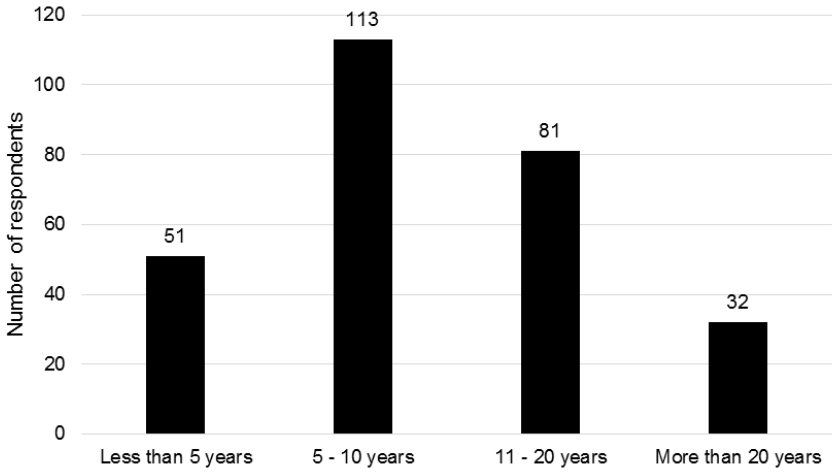
This section discusses the various issues that affect firm-level competitiveness. This includes plant and equipment age, innovation and investment, and skills and training. We also evaluate the state of public services and the impact of government incentives.

4.5.1 Manufacturing firms' equipment and innovativeness

Plant and equipment age

The average age of plant and equipment tends to give an indication of how often firms upgrade their machinery in order to improve efficiency, electricity usage and productivity. Even though there are some sectors where machinery and equipment have a long life span, it is important to upgrade machinery and equipment regularly in order to improve firm efficiency and competitiveness.

Figure 28: Average age of plant and equipment for manufacturing firms, n=277



Source: survey data

Fifty-nine percent (59%) or 164 firms have equipment less than 10 years old (Figure 28). Twelve percent (12%) of firms have equipment that is more than 20 years old. There are 32 firms that have equipment over 20 years old, of which 9 manufacture fabricated metal products. Interviews confirmed that old machinery tends to be highly energy intensive, inefficient, unreliable and limits product variation.

There is a correlation of average age of equipment and firm growth (Table 11). Firms that have newer equipment are more likely to be growing than firms that are using relatively old equipment.

Table 11: Relationship between growth and average age of equipment among manufacturing firms

Age of plant equipment	Frequency type	Growing	Not growing	Total
Less than 5 years	Actual	30	21	51
	Expected	22	29	51
5 - 10 years	Actual	53	60	113
	Expected	48.7	64.3	113
11 - 20 years	Actual	26	54	80
	Expected	34.5	45.5	80
More than 20 years	Actual	10	22	31
	Expected	13.8	18.2	31
Total	Actual	119	157	276
	Expected	119	157	276
	Pearson chi2(3) = 11.3043			Pr = 0.010

Source: Survey data, own calculations

An analysis at sub-sector level confirms that the majority of the firms with equipment that is more than 20 years old are in the fabricated metals and non-ferrous metal products subsector. These are sectors that were previously found to not be performing well. This suggests a vicious circle where firms which face weak demand and record lower capacity utilisation are also unable to reinvest to improve their efficiency and lower production costs.

4.5.2 Technology and investment by manufacturing firms

Investment

A majority of firms [53%] have made investments in the past two years. An evaluation of investment behaviour by sector indicates that the sectors in which a higher proportion of firms invest compared to those that are not investing are (in descending order): computer, electronic and optical products; food products; furniture; electrical equipment and apparatus; and plastic products (Table 12).

Table 12: Top 10 manufacturing subsectors: indication of investment in past two years

Subsector	Yes	No
Computer, electronic and optical products	71%	29%
Food products	67%	33%
Furniture and jewellery	63%	37%
Electrical equipment and apparatus	62%	38%
Plastic products	58%	42%
Textiles, clothing and leather goods	50%	50%
Fabricated metal products	48%	52%
Machinery and equipment	44%	56%
Wood and wood products	43%	57%
Chemicals and chemical products	38%	63%

Source: Survey data, own calculations

There is a link between firm performance and having made an investment, which is in line with the result on the average age of equipment reported above. Firms that invest more are likely to have recorded growth (Table 13). 71% of firms that recorded growth have made an investment, compared with 42% of firms that have not recorded growth. Again, this suggests a role to support investments by firms. Though investment may have a short-term negative impact on profitability, it has a positive influence on sales and employment levels (Grazzi, Jacoby, and Treibich, 2013).

Table 13: Relationship between growth and investment for manufacturing firms

Investing	Frequency type	Growing	Not growing	Total
Yes	Actual	83	65	148
	Estimate	63.8	84.2	148
No	Actual	33	88	121
	Estimate	52.2	68.8	121
Total	Actual	116	153	269
	Estimate	116	153	269
		Pearson chi2(1) = 22.5261		Pr = 0.000

Source: survey data, own calculations

The survey results also indicate that it is important to support the ability of smaller firms to make investments. Large firms are statistically more likely to have made investments (Table 14), even though large firms are not more likely to be growing overall.

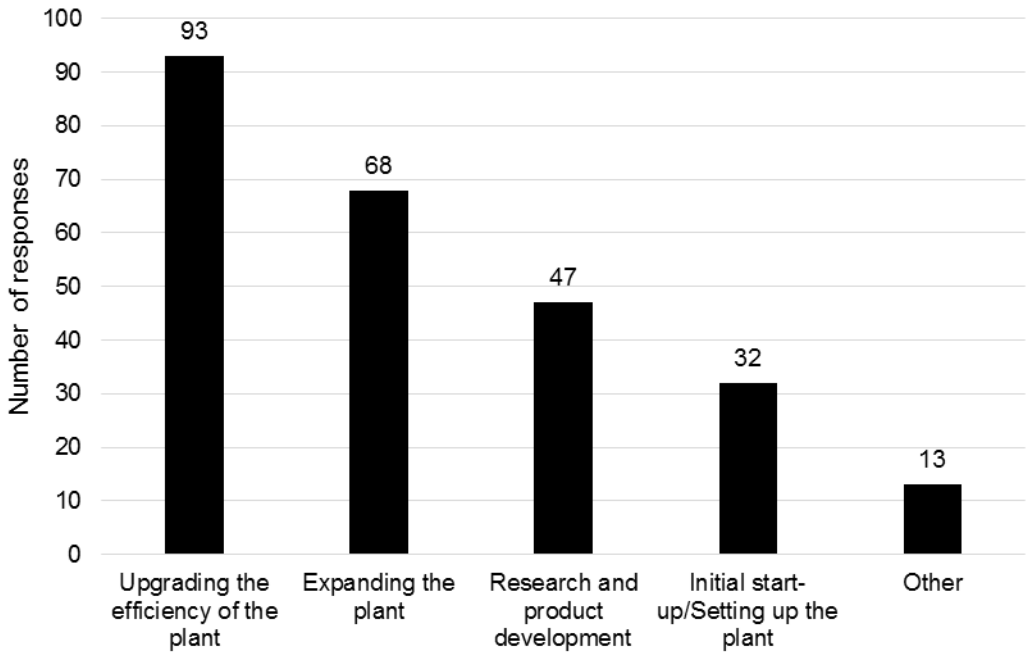
Table 14: Relationship between firm size and investment for manufacturing firms

Investing	Frequency type	Large[18]	Small	Total
Yes	Actual	56	91	147
	Estimate	38.9	108.1	147
No	Actual	15	106	121
	Estimate	32.1	88.9	121
Total	Actual	71	197	268
	Estimate	71	197	268
		Pearson chi2(1) = 22.5076		Pr = 0.000

Source: Survey data, own calculations

The reasons for investment were mainly to replace old machinery. The interviews did not identify large scale investments in new technology. This finding was confirmed by the survey where 37% of those firms who had made investments in the past 2 years did so mainly to upgrade the efficiency of their plants (Figure 29). Twenty-six percent (26%) of those who invested did so to expand the capacity of their plants while 19% did so to improve their R&D capacity. Some firms indicated that they are investing in new machinery and equipment to reduce their reliance on labour.

Figure 29: Reasons for substantial investments in the past two years by manufacturing firms, n=142



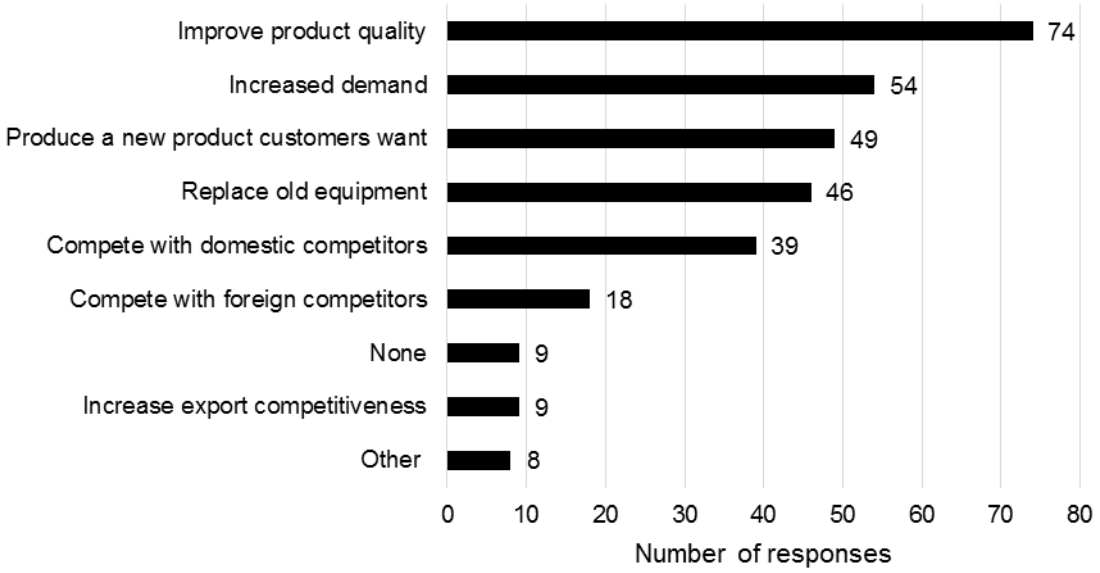
Source: Survey data

Firms were also asked to identify the drivers for investing in plant and equipment over the last two years. Improved product quality (24%), increased demand (17%), producing new products in response to

[18] Small firms are defined here as having fewer than 50 employees and large firms have more than 50 employees

customers' needs (16%), replacing old equipment (15%) and competing with domestic competitors (13%) were cited as the main drivers of investment (Figure 30).

Figure 30: Reasons for investing in plant and equipment in the past two years by manufacturing firms, n=144



Source: Survey data

Innovation among manufacturing firms

Firms were asked whether they hold a patent and/or license technology. Holding a patent indicates that firms are developing new products or processes whereas licensing indicates that a firm has been given adopting proprietary technology. We found that firms are more likely to hold a patent than a license. Only a small proportion (18%) of respondents hold a patent. This is not correlated with better performance (Table 15)

Table 15: The relationship between holding a patent and/or licensing technology and change in growth

Patent holder	Frequency type	Growing	Not growing	Total
Yes	Actual	20	22	42
	Expected	17.2	24.8	42
No	Actual	86	131	217
	Expected	88.8	128.2	217
Total	Actual	106	153	259
	Expected	106	153	259
		Pearson chi2(1) = 0.9287		Pr = 0.335

Source: Survey data, own calculations

4.5.3 Skills and training

This section explores workers' education levels and firms' ability to hire appropriately qualified and experienced staff. It also evaluates the methods firms use to train employees and recruit new workers.

Education (Manufacturing firms)

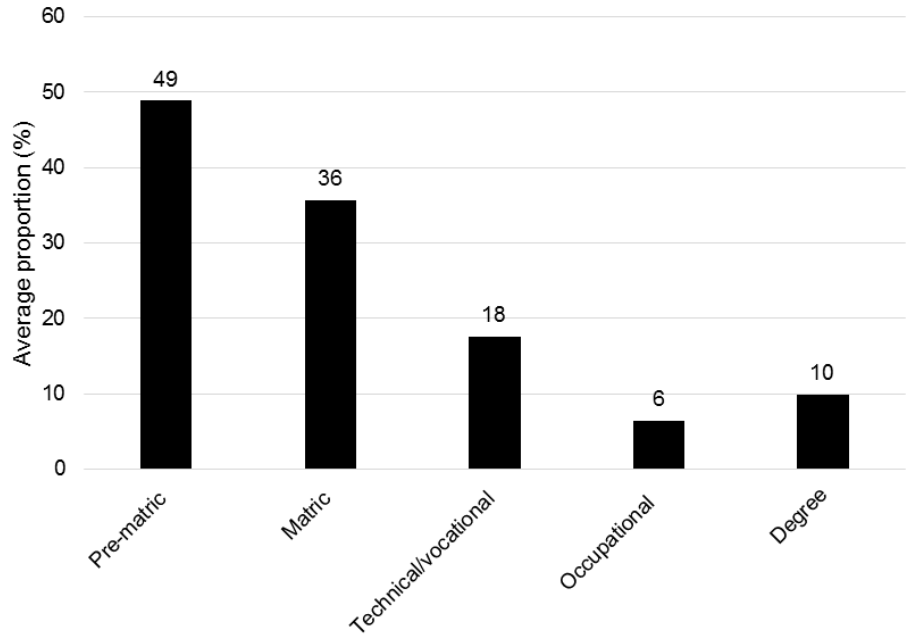
Firms categorised their employees according to the following levels of education: pre-matric, matric, technical/vocational, occupational and university degree. The data reveals that the largest proportion

of employees have a pre-matric (49%) or matric qualification (35%). Only 10% of respondents' workforce have a degree and 6% have an occupational qualification (Figure 31).

Recruitment methods (Manufacturing firms)

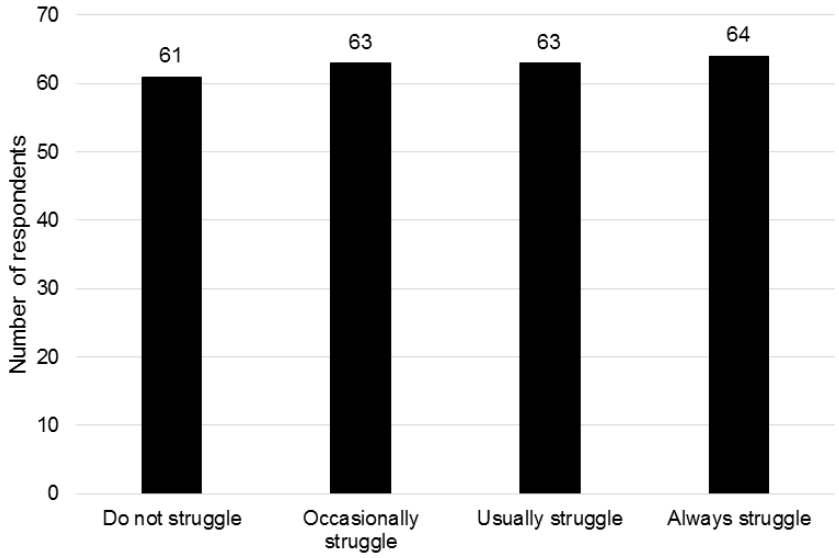
Hiring employees with matric and pre-matric presents some challenges. Despite having these qualifications, workers lack basic arithmetic and literacy skills and require intensive on-the-job training. Only 26% of respondents found it easy to hire appropriately qualified and experienced staff while the majority of firms (74%) experienced some difficulty (Figure 32).

Figure 31: Average level of education per manufacturing firm, n=229



Source: Survey data

Figure 32: Manufacturing firm's experience of attracting employees with relevant skills and experience, n=248



Source: Survey data

The most sought-after skills in the manufacturing sector are engineers, production managers and artisans. Firms are struggling particularly to find and recruit artisans. Many firms feel that there is a 'disconnect' between skills required in the manufacturing sector and the skills obtained through FET colleges and SETA-accredited courses. This is further worsened by a lack of work placements during the training process which produces graduates with little practical work experience.

A cross tabulation of firms' experiences with recruitment and firm size (judged by number of employees) reveals that large firms are statistically more likely to struggle to hire additional staff (**Error! Reference source not found.**).

Table 16: The relationship between number of employees and ease of hiring

Size of firm	Frequency type	Easy	Struggle	Total
Large[19]	Actual	9	59	68
	Estimate	16.4	51.6	68
Small	Actual	51	130	181
	Estimate	43.6	137.4	181
Total	Actual	60	189	249
	Estimate	60	189	249
	Fisher's exact = 0.013		1 sided Fisher's exact = 0.009	

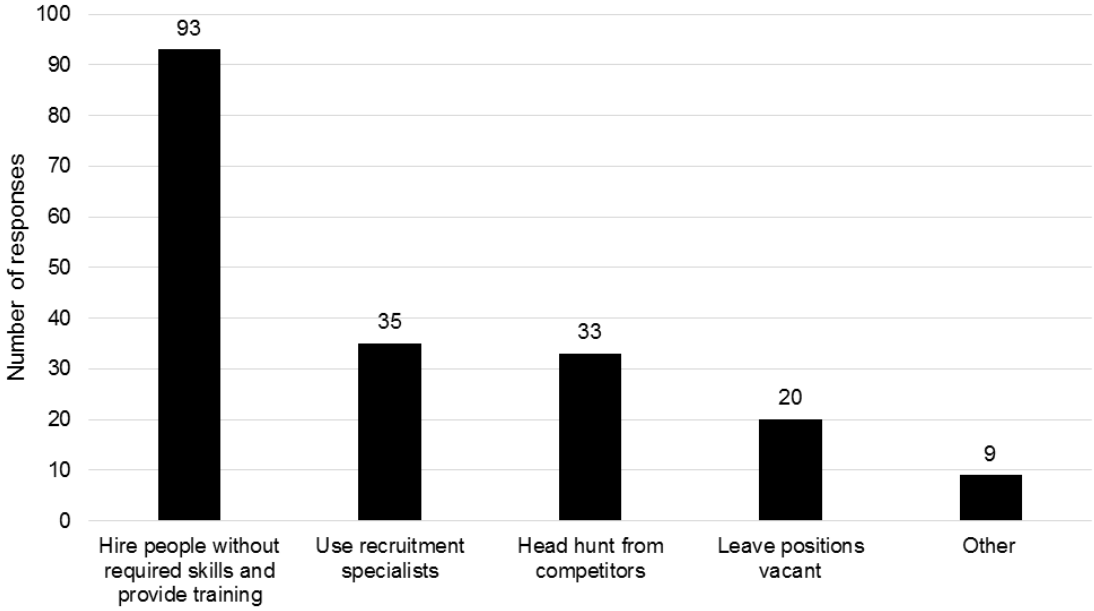
Source: Survey data, own calculations

In light of the challenges associated with hiring appropriately trained staff, the majority (70%) of firms indicated that they hire people without the required skills and provide training. This is indicative of a basic market failure which is inhibiting employment creation. Firms are likely to under-invest in training as there is always the risk that trained employees will move. This is why there is a very important role for the state in supporting education and training. The survey is reinforced by the interviews in finding that the state is not properly playing this role.

With respect to recruitment, 15% of respondents leave positions vacant. This is very concerning given our high unemployment rate. Only 6% of firms use the internet, networking and referrals as a means of hiring staff. Some firms use recruitment specialists and head-hunt from competitors to find appropriately skilled staff (Figure 33). Even though interviewed firms indicated that they are not concerned about former employees working for their competitors, there is some sentiment that head-hunting reduces the incentive of firms to provide training. This is particularly the case for the smaller firms, who have fewer resources to invest in training and recruitment.

[19] Small firms are defined here as having fewer than 50 employees and large firms have more than 50 employees

Figure 33: Manufacturing firms' methods of recruitment, n=191



Source: survey

Training methods: manufacturing firms

To address the weak general skills base and lack of job specific skills, most firms (80%) offer in-house training (**Error! Reference source not found.**). This includes training on health and safety, machine operation and manufacturing processes. More advanced forms of training are usually outsourced. Only 5% of the firms make use of vocational schools or technikons for job-specific training. This is a major gap and indicates that there is disconnect between firms' training needs and the training offered at these institutions.

Table 17: Forms of training firms used by manufacturing firms, n=244

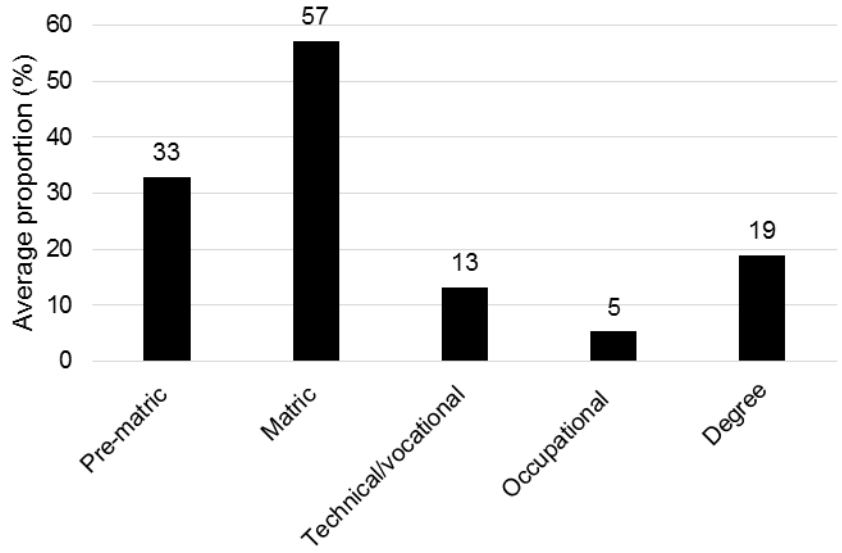
Forms of training	Number of firms	Percentage of firms
In-house training facility	196	80%
Private training schools	15	6%
Vocational/technikons	12	5%
Business partners (other firms)	9	4%
University	4	2%
Other (please specify)	12	5%
Grand Total	**242**	**100%**

Source: survey data

The skills profile of services firms

Unlike manufacturing firms, most employees in service firms hold a matric or post-matric qualification as illustrated in Figure 34. Transport and logistics firms require staff that have a driving license, are able to complete travel documents etc. All of these tasks require competence in literacy and basic arithmetic. The firms interviewed did not face much difficulty in finding and hiring appropriately trained workers. Labour turnover is also much lower which means that they have greater incentives to invest in training.

Figure 34: Average level of education per manufacturing related service firm, n=33

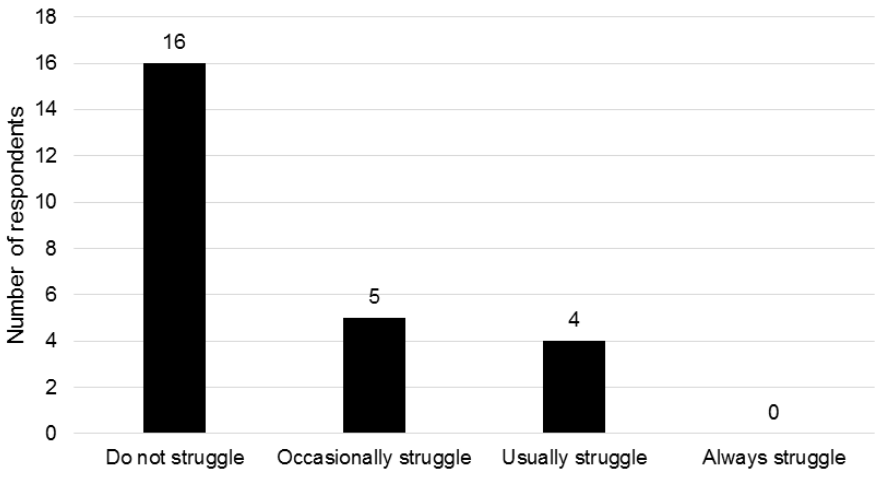


Source: Survey data

Hiring and recruitment in manufacturing-related services firms

Most services firms indicated that they do not struggle to hire appropriately trained staff (Figure 35). The majority (64%) of service firms said that they find it easy to recruit experienced labour. In line with the findings for manufacturing firms, the majority of services firms (70%) rely on in-house training.

Figure 35: Company's experience of attracting employees with relevant skills and experience, n=25



Source: Survey data

Even though the hiring and recruiting experience of manufacturing firms and services firms differ, in-house training is a common thread that signals failure with public provision of training.

4.5.4 Public services for manufacturing firms

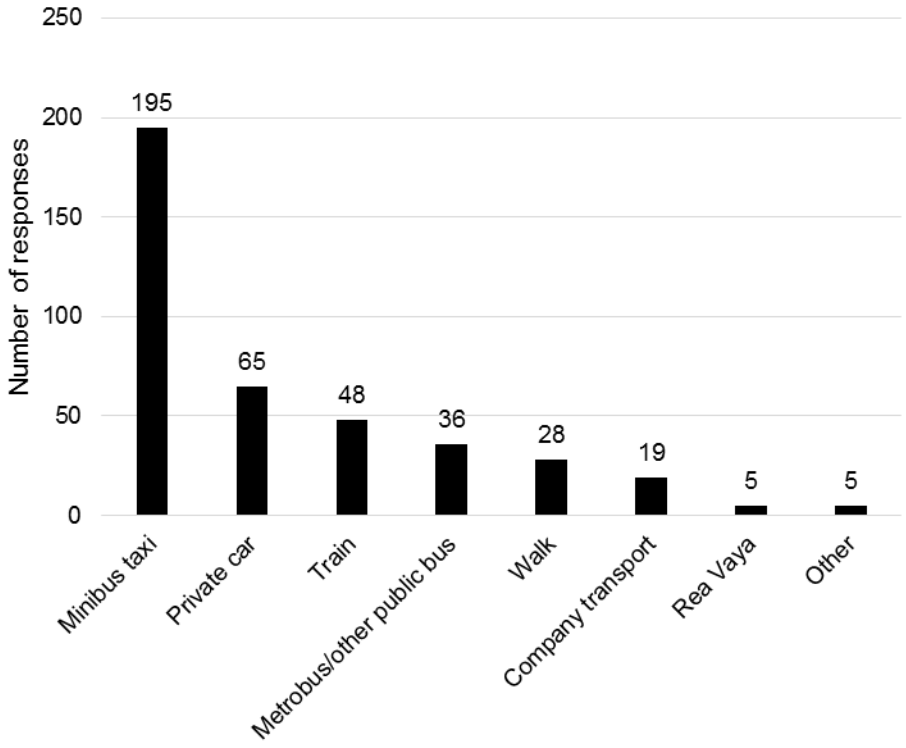
Transport and shift patterns

The majority of employees (70%) use minibus taxis to commute to and from work. The second most frequently-used mode of transport is a private car. Companies generally do not provide transport to

employees but some firms do offer subsidised transport for employees on night shift or in the event of transport strikes and other public transport interruptions.

An interesting insight from these responses is how few people actually use publically-funded transport (Figure 36). Seventy-five percent (75%) of employees use taxis while only 34% use trains, the Rea Vaya buses and other public buses. Despite considerable investment in public transport within the City, the in-depth interviews indicate that many industrial nodes are still not adequately covered by publicly-provided public transport systems.

Figure 36: Modes of transport used, n=260



Source: Survey data, own calculations

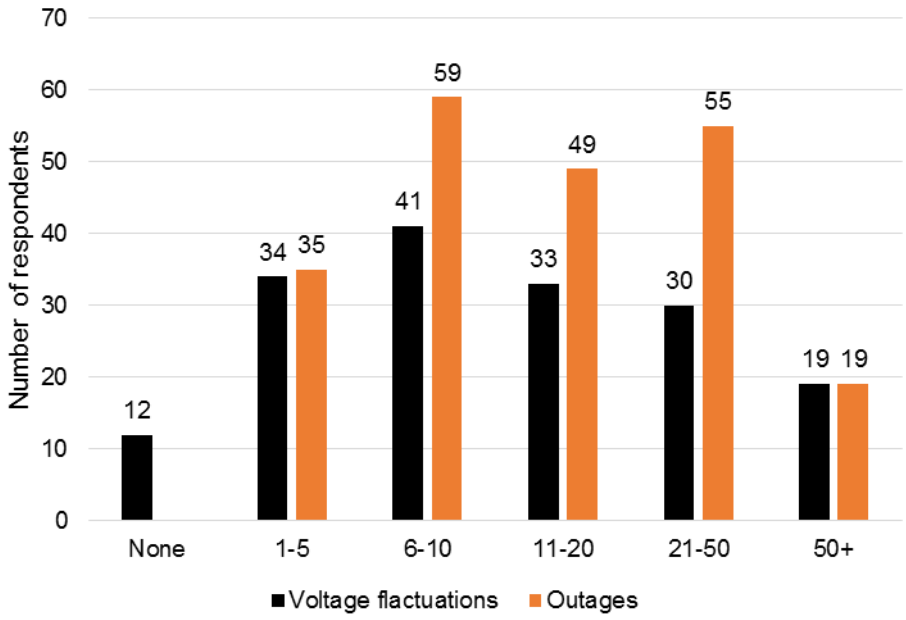
When asked about their current shift pattern, 49% (122) of firms indicated that the availability of transport affects their ability to operate optimally. It limits the range of possible shift patterns and introduces a level of inflexibility that distorts productivity and efficiency. Improvements in the reliability and flexibility of public transport would lower these costs and allow firms to increase production and performance. The lack of a reliable transport also places a cost on employees. This has the unintended consequence of informal settlements being established in and around industrial areas (this is discussed further in the node report in section 5.

Electricity

In the past year power outages have been of major concern with 96% of manufacturing and 92% of services firms having experienced power outages. However, the in-depth interviews show that power outages have become less frequent. On average firms experienced power outages and/or voltage fluctuations on 6-10 days in the past year (Figure 37). At the higher end of the range though there are 19 firms who experienced voltage fluctuations or power outages more than 3 times per week. This damages their equipment and interrupts the production process.

In order to curb the loss of sales and production due to power outages, firms have resorted to purchasing generators. Most firms interviewed also indicated that the impact of power outages could be mitigated effectively with sufficient advance warning.

Figure 37: Number of days in a year with power outages and voltage fluctuations, n=246



Source: Survey

Water supply

Firms are generally satisfied with water supply and water quality. Only 12% of firms indicated that they do not have adequate water supply (Table 18).

Table 18: Satisfaction with water supply

Satisfied	Number of firms	Percentage of firms
Yes	227	88%
No	32	12%
Total	259	100%

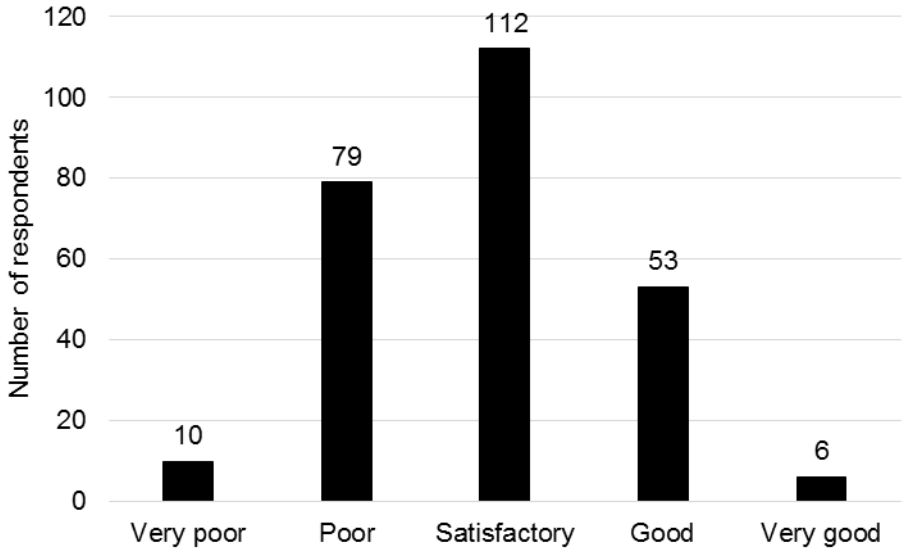
Source: Survey data

Those who reported some level of dissatisfaction with their water supply mostly experienced unscheduled water interruptions and low water pressure while three firms in Randburg and Robertsham complained of contaminated water. Some firms in the chemicals industry indicated that they have purchased tanks to store water in the event of unscheduled water disruptions.

Road infrastructure

Road infrastructure in industrial areas is generally satisfactory. Forty-three percent of the firms that answered this question consider road infrastructure to be satisfactory, 23% consider the road infrastructure to be more than satisfactory while 34% consider road infrastructure to be poor or very poor (Figure 38).

Figure 38: Quality of road infrastructure, n=260



Source: Survey data

Though many firms seem to be satisfied with the general state of the roads, interviews indicated that there are node-specific problems in road infrastructure that required tailored interventions. These are discussed in the node reports below. Generally, there is a need for continuous maintenance and repair of traffic lights and potholes, for the upkeep of pavements and ensuring that manhole covers are repaired in a timely manner.

5 Industrial Node Review

The node reviews describe industrial activity within seven nodes across the City of Johannesburg and evaluate how firms' physical location either supports or hinders business development. The reviews are based on 45 in-depth interviews conducted across the seven nodes (Table 19).

Table 19: In-depth interviews conducted in seven nodes across the City of Johannesburg

Node	Interviews conducted	Interviews planned	Challenges faced in securing interviews
City Deep	5	10	Refusals, busy and relocations
Devland	6	10	Refusals, busy and not willing to participate
Kya Sand	10	10	N/A
Marlboro/Wynberg	6	10	Refusals, busy and not interested
Nancefield	6	10	Refusals, busy, not willing to participate and unable to reach firms on listed numbers
Robertville	6	10	Refusals, busy and not willing to participate
Strijdom Park	6	10	Refusals, busy and not willing to participate

Robertville is the largest node by surface area and also has the highest proportion of manufacturing firms as a percentage of total business activity but Kya Sand has the largest number of manufacturing firms in absolute terms (Table 20).

Kya Sand is also the most diverse node, with 17 different manufacturing sectors. It is followed by Robertville, which has manufacturing activity across 16 different sectors. Interestingly, furniture is the largest manufacturing sector in both Kya Sand and Nancefield, again indicating that furniture manufacturing seems to be particularly important in the City (Table 20).

Table 20: Characteristics of the 7 nodes

	City Deep	Devland	Kya Sand	Marlboro/ Wynberg	Nancefield	Robertville	Strijdom Park
Area	472.2ha	481,3ha	767.9ha	398,6ha	481.3ha	906,7ha	767.9ha
Total number of firms in node	174	74	616	498	107	374	459
Number of manufacturing/ services firms in node	51	31	211	66	56	203	56
Manufacturing as percentage of total (density)	29%	42%	34%	13%	52%	54%	12%
Number of manufacturing sectors per node (diversity)	9	13	17	12	12	16	14
Main manufacturing sector	Machinery & equipment	Food	Furniture	Textiles, clothing and leather	Furniture	Machinery &equipment and Wood products	Electrical Machinery & equipment

5.1 Classification of industrial nodes

The nodes were classified along a number of dimensions: size, diversity, the proportion of manufacturing activity as a percentage of total business activity, and the types of challenges faced by firms within the node. City Deep was excluded from this analysis at the outset as it has very different characteristics to all other nodes, being the only inland port in the country. The metrics used to assess the other nodes would likely not apply to City Deep.

As a proxy for manufacturing diversity, the number of manufacturing subsectors were identified per node (Table 20). Nodes that have manufacturing activity across a larger number of sectors are considered more diverse than nodes that have manufacturing activity in only a few sectors. Kya Sand is the most diverse node with manufacturing activity covering 17 sectors, followed by Robertville with 16 manufacturing sectors and Strijdom Park with 14 manufacturing sectors.

On the other end of the spectrum, there are three nodes that clearly have one dominant manufacturing sector. In Devland there is a concentration of food processing firms, with 26% of firms in the food, beverages and tobacco sector. In Strijdom Park, 34% of firms are in the electrical equipment and machinery subsector. Nancefield is undoubtedly a hub for furniture manufacture with 45% of firms in the node manufacturing furniture.

Next, we evaluate node size. We considered two metrics per node: the total number of manufacturing businesses and the proportion of manufacturing firms relative to the total number of businesses. Kya Sand has the largest number of manufacturing firms, followed by Robertville and Marlboro/Wynberg. In terms of the relative size of the manufacturing sector, the picture is slightly different: Robertville has the highest proportion of manufacturing firms followed by Nancefield and Devland. (Table 20).

The high proportion of manufacturing activity in Nancefield and Devland is surprising – these nodes are considerably smaller than all other nodes. However, they are clearly manufacturing hubs with fewer services firms than other industrial nodes across the City. This could indicate a lower level of sophistication than other nodes that have attracted more manufacturing-related support services, or it could simply be a function of the fact that these nodes are relatively young and do not have a large enough number of manufacturing firms to attract services firms. Alternatively, it could be that the nodes do not have sufficient infrastructure to support additional businesses.

From this analysis two categories of firms can be identified. The first, a **"sophisticated and diverse"** range of nodes includes Robertville, Strijdom Park, and Kya Sand. The nodes have large and well established manufacturing firms across a wide range of subsectors. They also have a large concentration of manufacturing firms as a proportion of total business activity. Even though businesses in these nodes still have a number of complaints regarding basic services and infrastructure, they would mostly benefit from more tailored interventions (for example, zoning additional land for industrial use) and access to more high-tech services such as fibre-based broadband links to their premises.

The second group includes Strijdom Park, Nancefield and Devland which are classified as "**niche**" nodes because of the high concentration of particular subsectors: furniture in Nancefield; food and beverages in Devland and electrical equipment in Strijdom Park. These niche nodes may all be good candidates for cluster-based initiatives that address the specific needs of the dominant subsectors within the nodes.

Nancefield and Devland can be further categorised as **"niche and neglected"** nodes. These nodes are very small, and are located on the fringes of township areas. The firms in Nancefield and Devland face very basic challenges including a lack of reliable access to electricity, unreliable refuse collection, and poor and deteriorating road infrastructure. The lack of basic services in the informal residential areas surrounding the nodes adds further challenges such as social unrest and violent protests.

The final node, Marlboro/Wynberg, is difficult to place in either category. It is an established node with a central location and the data does not indicate that manufacturing is of much significance. In fact, it has a relatively low number of manufacturing firms, both in absolute terms and as a proportion of total business activity. Marlboro/Wynberg is also not particularly diverse, with manufacturing activity spread over a small range of subsectors. More research is required to establish whether there are opportunities to drive manufacturing in this node or whether it is more apt to consider it a services node.

The next section discusses cross-cutting issues that emerged as challenges across all industrial nodes. Thereafter, we identify common issues for the two categories of nodes identified before presenting the individual node profiles.

5.2 Cross-cutting issues emerging from in-depth interviews

The common issues that emerged from interviews relate to five areas: government incentives, electricity, training, public transport, and the responsiveness of City officials.

5.2.1 Government incentives

Most firms did not have any information about the existence of any provincial or City-led incentive programmes. The only incentives that firms were aware of are national programmes like *the dti's* Manufacturing Competitiveness Enhancement Programme (MCEP). A small proportion of the firms interviewed had tried to access these national programmes.

> ***Action item 1:*** *The City must package, communicate and disseminate information on local, provincial, and national incentives or other support to manufacturing firms within Johannesburg. The dissemination strategy should be simple and succinct. It should suggest a single one point of contact within the City to help firms navigate and access the support available to them. The City could start by making information on incentives available on its website and sending e-mails to the firms on the census database.*
>
> ***Action item 2:*** *The City could set up a walk in centre where firms can collect information about incentives and get assistance on application for national incentives.*

5.2.2 Electricity supply

The most common challenge faced by firms across Johannesburg was power outages and voltage fluctuations. Although some nodes experienced these to a greater degree than others, all firms reported that they regularly lost production due to unreliable electricity supply. Outages were particularly frequent during winter 2015 (a period of intense load-shedding), though some firms still experienced outages two to three times a week around the time they were interviewed (November 2015 – February 2016). More recently, outages appear to be the result of cable theft and poor maintenance of substations rather than load-shedding.

As a result of frequent power interruptions, a number of firms have acquired generators and voltage regulators to protect machinery and hedge against the losses caused by power outages and fluctuations. The maintenance and running of a generator adds substantially to firms' costs.

> ***Action item 3:*** *The City should implement a dedicated line for businesses to lodge complaints about power interruptions and outages. This line should have strict service standards. Complaints from industrial nodes should be prioritised for repair and maintenance, particularly during the week. Assistance should be available 24 hours a day to assist firms that operate more than one shift per day.*
>
> ***Action item 4:*** *The City could pro-actively implement police patrols or other forms of visible policing in industrial nodes to deter cable theft (and simultaneously increase safety of workers).*
>
> ***Action item 5:*** *The City should provide businesses subsidies for off-grid/green back-up power sources for businesses, in partnership with ESKOM. A pilot project could be launched in one of the "sophisticated and diverse" hubs where there are businesses that have the capabilities to assist in the design and manufacture of the equipment required*

5.2.3 Training

Training and skills development is a major challenge to firms and, in some cases, seem to constrain employment creation. At least 15% of firms that responded to the survey indicated that they leave positions vacant because they cannot find suitably qualified employees. Firms also seem to have little faith in the quality of training provided by FET colleges, with only 4% using FET colleges to train their workforce. Almost all firms (90%) provided in-house training instead. This is a significant challenge overall, but particularly for small firms that have fewer resources.

***Action item 6**: Manufacturing firms in Johannesburg need more artisans. The City should consult businesses on the major gaps in artisan training and should work with the Artisan Development Directorate within the NDHET to implement a roadmap for artisan development in the City.*

***Action item 7:** The City should support the provision of basic training in literacy and numeracy (including ABET) in all industrial nodes. In some nodes, training could be provided through existing centres (for example, the Industries Education & Training Institute in Kya Sand). In other nodes, such as City Deep, a training centre and training providers must be established. Business owners in the nodes should participate in the identification of skills gaps and the evaluation/accreditation of training courses offered in the nodes.*

***Action item 8:** The City should develop a strategy to deal with the "fly by night" colleges.*

5.2.4 Public transport

Many firms (47% of those surveyed) indicated that the unavailability of public transport limits the number of shifts they run and introduces a level of inflexibility in their operations. The lack of public transport at the required times affects the productivity and efficiency of manufacturers.

***Action item 9**: Improve the availability, reliability and flexibility of public transport in industrial nodes. The City could consider supporting the development of an uber-like ride sharing application for feature phones that would allow employers or employees to aggregate demand for transport between home and work, particularly for employees working night shift.*

5.2.5 Interaction with the City – billing and response times

Many firms raised concerns about incorrect billing for water and electricity. They report that the City is slow to respond to outages or water supply problems such as burst pipes or low water pressure. Some firms indicated that they only receive services after paying bribes to City officials. The turnaround times of City Power was identified as particularly problematic as they often only attend to electrical faults between 12 to 24 hours after a fault is reported. Firms also complained about a lack of professionalism by City officials who seem either unwilling or unable to resolve their queries and complaints.

***Action item 10:** This challenge could be resolved by implementing a dedicated service line for business, as suggested in action item 2 above.*

5.3 Specific issues in different categories of nodes

5.3.1 Sophisticated and diverse: Kya Sand, Strijdom Park, and Robertville

These nodes are large and well-established. They are generally well-located with good access to major transport routes. Firms within these nodes reported a number of challenges related to the provision of basic services such as interrupted electricity supply and associated production and traffic disruptions, poor road conditions, a lack of reliable public transport, and a lack of skills (particularly technical and artisanal skills). In addition to comments that the City should get the basics right, firms raised a number of more specific interventions.

The specific interventions largely related to zoning and delays in obtaining planning permission. The firms within these nodes are well-established and require space to expand. Their efforts are hampered by slow decisions on zoning of additional land for industrial use and the sometimes illegal use of land adjacent to industrial areas for informal settlements. Firms also reported being frustrated by trying to navigate the processes to obtain planning permission or clarity on land use from the City.

If addressed, these challenges could allow the 'sophisticated and diverse' nodes to consolidate and extend manufacturing activity. The firms seems ready and willing to grow and expand, but lack the land and infrastructure to support this.

The City could should also consider node-based training interventions in partnership with local business owners.

5.3.2 Niche and neglected

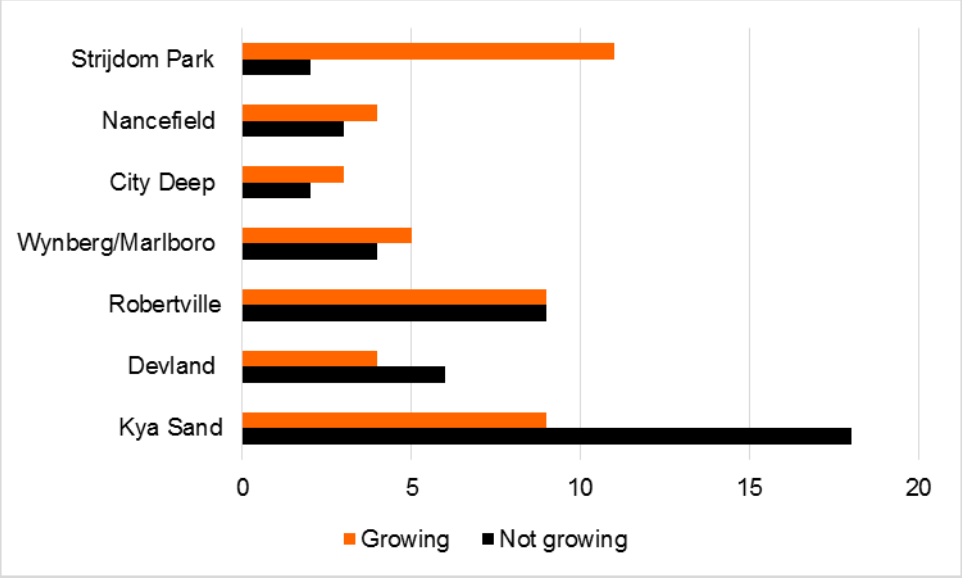
The ‘niche and neglected’ nodes really require intervention at the most basic level. The nodes are in outlying areas and are surrounded by informal settlements. In many cases, these informal settlements also do not have adequate infrastructure, nor adequate basic services. In some cases, this places additional challenges on the industrial nodes as residents connect illegally to electricity supply in the industrial nodes. Despite the challenges, these nodes seem to have well-established manufacturing activity that could grow on the back of specific interventions by the City. Priority interventions in these area include safe and reliable electricity supply (including removing illegal connections), patrols or other forms of visible policing (to address cable theft), and improving the condition of the roads within the areas

5.3.3 Average performance of firms in various nodes[20]

Firms in Strijdom Park, Nancefield, and Marlboro/Wynberg seem to be performing better than firms in other nodes. More firms within these nodes indicated that they have grown their annual turnover over the last three years than those that indicate their turnover was static or declined over the period. Though this is also true for City Deep, the number of responses for City Deep is very low (5 firms in total), making it difficult to draw any conclusions from the data. Firms in Kya Sand seem to be performing poorly compared to respondents in other nodes, with 67% of respondents indicating that they have not grown their turnover over the past 3 years.

Again, Nancefield emerges as a particularly interesting node. As discussed above, it is a relatively small node with high manufacturing density and a large presence of furniture manufactures. In line with the earlier finding that furniture is one of the better-performing sectors, Nancefield seems to be a growth point, despite having many basic infrastructure challenges. This confirms the need to look at Nancefield node more closely and to develop targeted plans to facilitate business and support infrastructure development within the node.

Figure 39: Performance of firms across 7 nodes



Source: Survey data

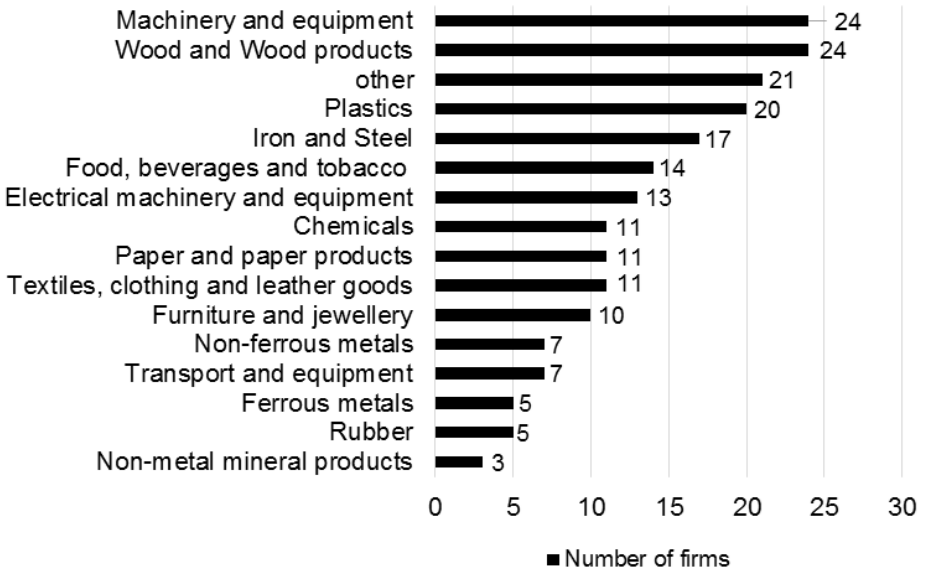
[20] This section provides an overview of performance of firms within the 7 nodes. Due to the low response rate in the individual nodes, the results are purely indicative and are not necessarily representative of performance across all firms in the nodes

5.4 Individual node profiles

5.4.1 Robertville

Robertville is located along Main Reef Road, south of the Florida residential area and north of the Fleurhof residential area. It has easy access to Main Reef Road and is in close proximity to the M1 highway. Robertville has a very diverse range of firms across 16 subsectors (Figure 40).

Figure 40: Firms in Robertville



Source: Scoping data

A total of six interviews were conducted in Robertville, five with manufacturing firms and one with a transport services firm. Two of the manufacturing firms are in the plastics subsector, two in the food sector and one is a mechanical parts manufacturer. The firms range in size from 9 to 116 employees with food processing and food distribution being the largest employers (Table 21).

All the manufacturing firms have been located in Robertville for more than 15 years (one firm has actually been at its current location since 1990). The transport services firm is relatively new and has only been at its current premises for two years (Table 21).

Table 21: Firms interviewed in Robertville

Key activity	Employees	Annual turnover	Firm category
Food products	116	R60-R80m	Medium
Mechanical parts	9		Small
Plastic products	50	R10-R50m	Small
Industrial plastic products	11		Small
Food distribution agent	88	R130-R140m	Medium
Logistics and freight services	15	R10-R15m	Small

Source: In-depth interviews

Key challenges in Robertville

The key challenges in Robertville relate to public infrastructure, specifically unreliable electricity supply, cable theft, public transport and poor road conditions leading to frequent accidents.

Public transport

Firms raised concerns about the high cost of transport for their workers some of whom spend up to a third of their monthly salary on public transport (minibus taxis) and have no reliable alternative means of transport. As a result, the large food processing firm is now resorting to hiring workers who either cycle or walk to work. However, these options are unsafe and the company reported that workers are at risk of being robbed on their way to and from work.

Poor road conditions

Firms complained about frequent accidents along Main Reef Road caused by speeding and malfunctioning traffic lights. This causes severe congestion which affect delivery schedules and operational efficiency.

Security

All firms raised concerns around poor security, lack of street lighting, cable theft and a lack of visible policing in the area. Firms have resorted to hiring private armed response companies to protect their premises and respond to instances of cable theft.

Key Priorities for Robertville:

1. Rapid response and improved turnaround time for electricity and traffic light faults
2. Improved street lighting
3. Institution of regular police patrols or visible policing
4. Traffic calming measures/speed humps along Anvil Road

5.4.2 Kya Sand

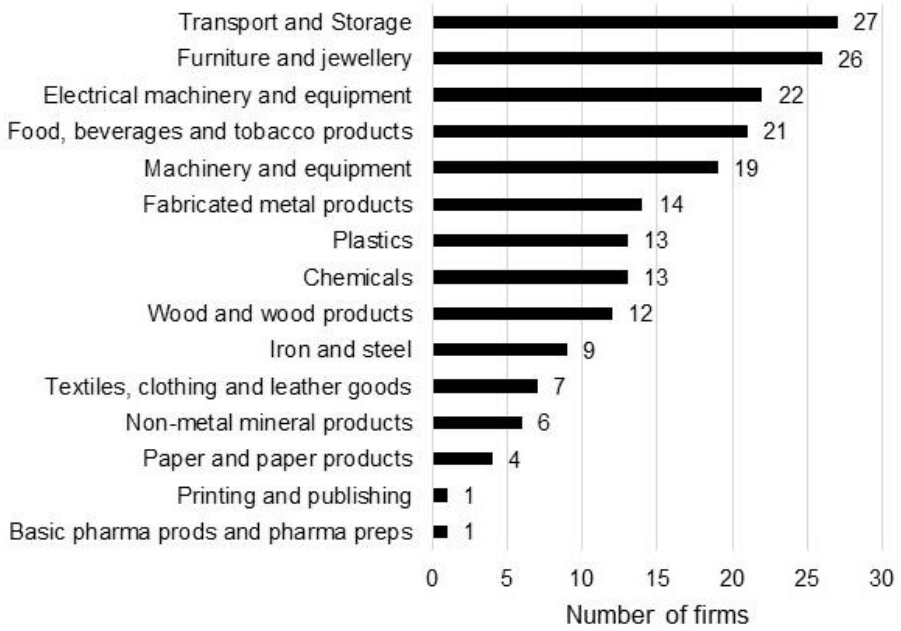
Kya Sand is an industrial suburb north of Johannesburg and has some of the newest industrial building stock in Johannesburg. The suburb is bordered by Kya Sand informal settlement and Cosmo City. The main arterial road in Kya Sand is Malibongwe Drive that connects to Witkoppen Road and the N14. Kya Sand has an existing area association, which firms subscribe to monthly, the Kya Sand Association.

The Kya Sand Association was formed in 2000 and currently has 80 members. Of the 10 firms that were interviewed, 6 firms are part of the association and 1 is in the process of joining. The monthly contribution is R800 per firm.

The Association has managed to build a good relationship with the City and routinely reports issues such as power outages, water interruptions, faulty traffic lights and potholes on behalf of its members. The Association was originally established to deal with the high crime rate in Kya Sand. They contracted a private security company to provide dedicated armed response vehicles to patrol the area and installed an electrical fence. Over time this fence has been removed (allegedly by scrap collectors). The Association plans to install closed-circuit television across Kya Sand.

There are 616 establishments in Kya Sand of which 168 are manufacturing firms and 27 are transport and storage businesses. Kya Sand is the second largest node, among the seven nodes, by number of manufacturing firms and is highly diversified. The main manufacturing sectors are furniture, electrical machinery and equipment, food, beverages and tobacco products and machinery and equipment.

Figure 41: Manufacturing firms in Kya Sand



Source: Scoping data

Table 22: Firms interviewed in Kya Sand

Key activity	Employees	Annual turnover	Firm category
Frozen, chilled and ready-made food	-	R10 million	Small
Fabricated metal products	25	+/- R10 million	Small
Plastic products	16	+/- R6 million	Small
Fabricated metal products	51-200	R10-R51 million	Large
Food products	50	-	Small
Machinery and equipment	100	R200 million	Large
Machinery and equipment	400	-	Large
Electrical machinery distributor	7	R10 million	Medium
Furniture	110	R100 million	Large
Chemical products	80	R25 million	Large

Source: In-depth interview data

In addition to firm interviews, a meeting was also conducted with the Kya Sand Association to understand the challenges firms face and to get any insights from their interactions with the City.

Key challenges in Kya Sand

Electricity

The main issue affecting electricity supply are illegal connections and cable theft. The firms interviewed reported that, on average, they experience a power outage once every two weeks. These outages usually last for several hours, without any clear indication of when the connection will be restored. Such unplanned outages impact the performance and productivity of firms. A furniture manufacturer in the area indicated that they spend an extra 30% - 40% on energy costs due to the use of generators.

The direct and indirect costs of power interruptions reduce the competitiveness and efficiency of firms in Kya Sand. For marginal firms in tough markets (e.g. those supplying to South African mines or those competing with cheap foreign imports), this is a cost that they can ill-afford.

Public transport

Kya Sand is located within close proximity to a PUTCO depot and is easily accessible via public buses. An informal settlement developed on the fringes of the industrial area and most workers who live in the informal settlement walk to work. Minibus taxis are also commonly used, but there is no demarcated taxi rank in the area and these minibus taxis thus cause considerable congestion.

Informal settlement

The informal settlement that developed on the periphery of the industrial area lacks ablution facilities and other basic amenities. There have also been a number of shack fires in recent years. The Kya Sand industrial area cannot be upgraded without addressing the lack of services in the surrounding informal settlement.

Key priorities for Kya Sand

1. Create a designated area for minibus taxis.
2. Remove illegal electricity connections.
3. Extend basic services (electricity and sanitation) to the Kya Sand informal settlement.
4. Improving security and aesthetics of the area to decrease vacancy rate.

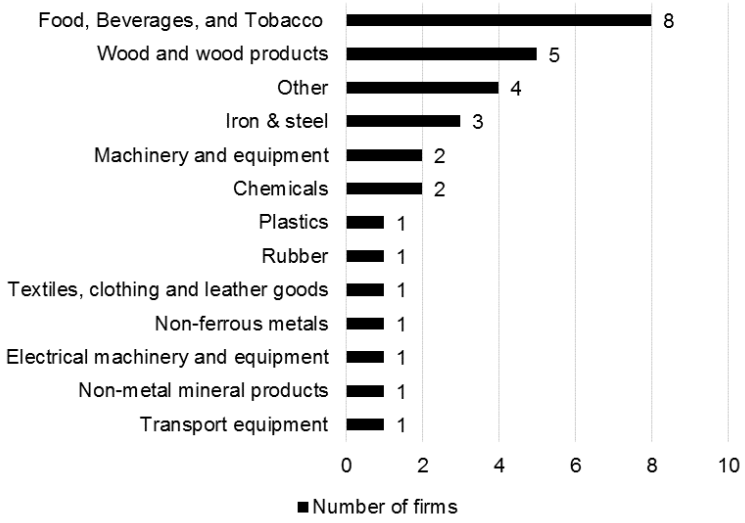
5.4.3 Devland

Devland is located in the south of Johannesburg with easy access to the N1 highway. Neighbouring suburbs include Eldorado Park, Pimville and Diepkloof.

There are 74 firms in the node, 31 of which are manufacturing firms. Most of the remaining firms (28 firms) are wholesale and retail entities. There are 8 manufacturing-related services firms in Devland. Four provide transport and storage services, two provide maintenance and repair services, and two provide other business services.

The largest manufacturing subsectors are food processing (8 firms), wood and wood products (5 firms) and iron and steel (3 firms) (Figure 42).

Figure 42: Manufacturing firms in Devland



Source: Scoping data

Seven firms were interviewed in Devland, covering five subsectors: wood and wood products, personal care products (including baby toiletries), tooling and machinery, waste management equipment and lighting design. The size of these firms in terms of number of employees ranged from 3 to 350 people.

Most of the firms in the area have been located in Devland for a long time (upwards of ten years), making Devland one of the more 'stable' nodes. The primary reason for being located in Devland is proximity to the owners' residence and the importance of having easy access to strategic highways.

Table 23: Firms interviewed in Devland

Key activity	Employees	Annual turnover	Firm category
Waste-management equipment	30	R10-R50m	Small
Ultrasonic welding and tooling machinery	8	Not disclosed	Small
Cosmetics, toiletries and personal care products	31	R10-R15m	Small
Lighting	3	Less than R10m	Micro
Disposable diapers	350	Not disclosed	Large
Coffins	approx. 100	Less than R10m	Small
Disposable diapers and wet wipes	approx. 100	Less than R10m	Small

Source: In-depth Interviews

Key challenges in Devland

Most firms interviewed indicated that they have not been growing over the past three years. The main challenges to growth included poor public infrastructure, corruption in their dealings with public servants, and zoning issues (particularly, the encroachment of informal/unplanned residential and use on the industrial area).

Telecommunications infrastructure and services

The biggest complaint was about poor internet connectivity in the area. Internet access is intermittent and the service is interrupted almost daily for several hours. One firm has acquired internet services from three different service providers to hedge against these frequent losses in connection. When internet services fail, the firm make use of the second and the third provider, if possible. Another firm claimed they have had to work from home a number of times per week as the loss in internet connectivity disrupts their work.

Power supply

Electricity supply problems are mainly due to cable theft, which has become a more frequent occurrence over the past three years. City Power is often slow in addressing these outages and a number of firms reported that they have to pay bribes before their service is restored.

Water supply

Though there are fewer complaints about water supply in the area, two firms have complained about frequent low pressure.

Key priorities for Devland

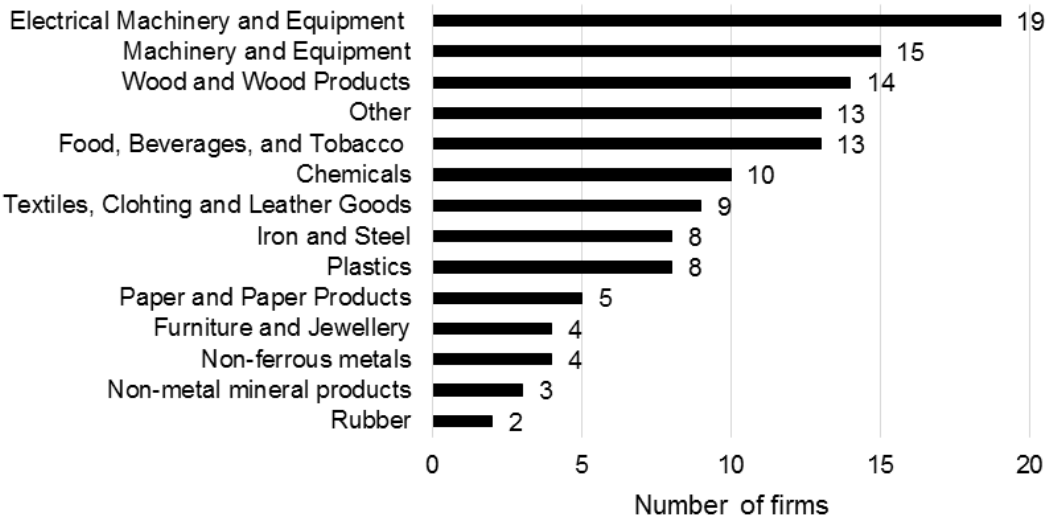
1. Improve internet and telephone access: consider funding the roll-out of broadband internet services in Devland to improve the quality and reliability of internet in the area.
2. Re-assess zoning laws and planning permission in the Devland area: the residential areas bordering the Devland industrial node seems to have been developed without the requisite investment in public services. This has placed a heavy burden on the roads and on electricity supply in the area and has reduced land available for expansion of industrial activity.

5.4.4 Strijdom Park

Strijdom Park is located in Randburg, north-west of Johannesburg. Strijdom Park is within good proximity of the N1 highway and is located on three main routes: Hans Strijdom Drive, CR Swart Drive and Hans Schoeman Street. It is surrounded by the residential areas of Bromhof and Boskruin (west), Malanshof (south), Ferndale (east) and Sharonlea (north).

The main land uses in the area are warehousing, distribution, and high technology manufacturing. The main manufacturing sectors in this area include electrical machinery and equipment (19 firms), machinery and equipment (15 firms), and wood and wood products (14 firms) (Figure 43).

Figure 43: Manufacturing firms in Strijdom Park



Source: Scoping data

Six interviews were conducted in Strijdom Park. Four of the firms interviewed are manufacturing firms (in plastic products, mining equipment and food subsectors) and two provide manufacturing-related services (specifically transport and logistics and electrical engineering services). The majority of firms interviewed are small (Table 24).

Table 24: Firms interviewed in Strijdom Park

Key activity	Employees	Annual turnover	Firm category
Nuts and dried fruits processor	57	R51-R100m	Medium
Machinery and equipment	50	R6-R10m	Small
Meat products processor	44	R15m	Small
Industrial plastic manufacturer	34	R10-R50m	Small
Electrical engineering services	18	R7m	Small
Logistics and freight services	5	R15m	Small

Source: In-depth interview data

Key Challenges in Strijdom Park

1. *Lack of available land for expansion*: some firms reported wanting to expand their current operations, but being constrained by lack of available land. Though there is vacant land in the area, there is no electricity or water infrastructure on these sites, restricting firms' ability to expand.
2. *Lack of public transport facilities*: there is no public transport available for night shift. Workers indicated that they struggle to find public buses in the evening.

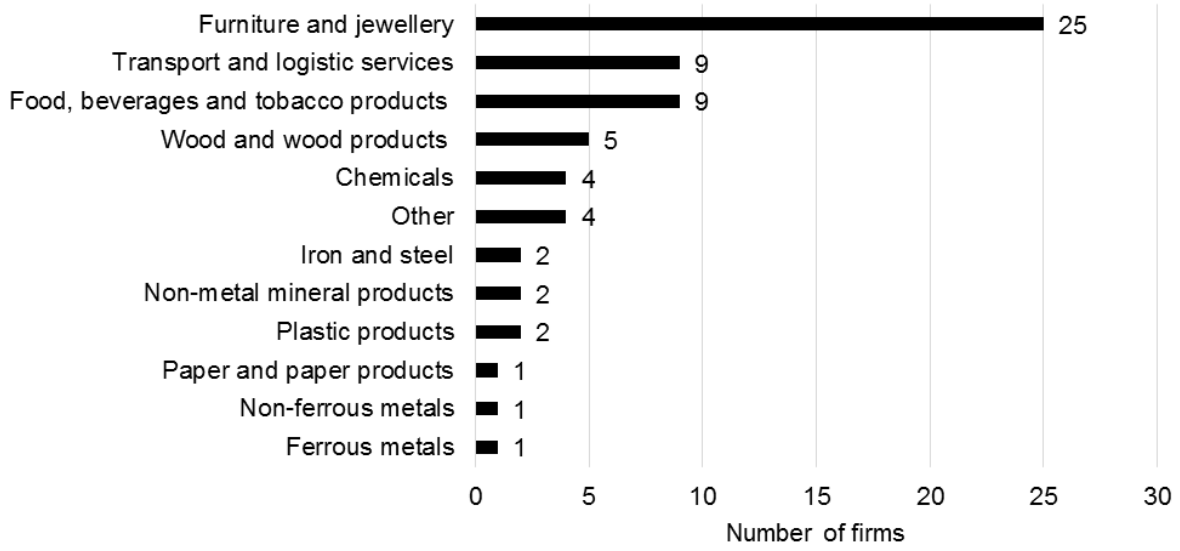
Key Priorities for Strijdom Park

1. A more affordable and accessible public transport system that links Strijdom Park to Soweto and Alexandra.
2. Ensure that vacant land has the requisite public facilities to allow for expansion.

5.4.5 Nancefield

Nancefield is located in the south of Johannesburg, close to Eldorado Park and Lenasia. There are 107 firms within the node. Almost 50% (56) of the firms in the node are manufacturing firms and 9 firms provide transport and logistics services. The main manufacturing subsectors are furniture (25 firms); food, beverages and tobacco products (9 firms) and wood and wood products (9 firms, also mostly furniture manufacturers) as shown in Figure 44.

Figure 44: Manufacturing firms in Nancefield



Source: Scoping data

Six firms were interviewed in Nancefield; five manufacturing firms and one transport services firm. These firms included two furniture companies, one paint manufacturer, a brushware manufacturer, a polish manufacturer and a transport services firm. Four of the five manufacturing firms identified their performance as “growing” with intentions to expand.

Table 25: Firms interviewed in Nancefield

Key activity	Employees	Annual turnover	Firm category
Furniture	30	R6m	Small
Chemicals	81	R120m	Medium
Furniture	32	R9m	Small
Chemicals	12	R15m	Small
Transport services	30	R7m	Small
Plastics	30	R10m	Small

Source: In-depth interview data

Key challenges in Nancefield:

1. *Illegal electricity connections:* there is an informal settlement located within the industrial area that does not have electricity services. Consequently, residents connect illegally to substations within the Nancefield industrial node. These live wires are often uncovered and have resulted

in deaths. Power outages and voltage fluctuations also occur regularly, with one firm mentioning damages of about R30 000 due to power supply problems.

2. *Service delivery protests*: Attempts by City Power to remove the illegal connections result in protests that cause destruction of private property and interfere with firms' operations.
3. *Roads, drainage and bridges:* A part of the Nancefield industrial area lies in a valley. The area often floods making it difficult and dangerous to access some business premises. Several requests have been made for improved drainage and for a bridge to be constructed in the area to control the flooding but this has not been done. There is also poor road maintenance in the area. A bridge linking Lenasia and Kliptown to the Nancefield industrial node developed a crack in 2014. For safety reasons the bridge was closed. No efforts have since been made to repair the bridge. This means that delivery vehicles and workers have to use a much more circuitous route to get to work.

Key priorities

1. *Electricity supply to neighbouring areas*: The City should extend formal electricity connections to the informal settlement and eliminate illegal electricity connections.
2. *Improvement and maintenance of roads*: The bridge linking Nancefield to Lenasia and Kliptown should be repaired. Poor drainage/flooding in the Nancefield area should be permanently resolved.

5.4.6 Marlboro/Wynberg

The Marlboro node is located in the northern parts of Johannesburg between the Sandton Central Business District and the Alexandra Township. The node has easy access to the M1 and N3 highway. The main road running through the industrial node is Louis Botha Avenue. There are 498 firms within the node.

Marlboro is characterised by light industrial manufacturing, warehousing and retail businesses. Out of 498 firms in the node, only 66 are manufacturing firms. The main manufacturing sectors are textiles, clothing and leather goods (13 firms), furniture and jewellery (9 firms), and chemicals (8 firms) (Figure 45).

Figure 45: Manufacturing firms in Marlboro/Wynberg

Source: Scoping data

Six in-depth interviews were conducted in Marlboro with manufacturing firms. Two firms manufacture chemicals for cleaning purposes, one firm manufactures textiles, clothing and leather goods, one produces machinery and equipment, another produces wood and wood products and the last

manufactures plastic products such as bottles and lunchboxes. The table below gives an indication on the size of firms interviewed in terms of number of employees and annual turnover (Table 26).

Table 26: Firms interviewed in Marlboro/Wynberg

Key activity	Employees	Annual turnover	Firm category
Plastic products	150	N/A	Medium
Wood and wood products	31	R18m	Small
Chemicals	28	N/A	Small
Machinery and equipment	26	R20m	Small
Textiles, clothing and leather goods	20	N/A	Small
Chemicals	1	R330 000	Micro

Source: In-depth interview data

Key challenges in Marlboro/Wynberg

Traffic congestion

Traffic congestion is severe in the Marlboro/Wynberg node, mainly caused by traffic in and out of the Sandton CBD. This results in significant loss of productive time for employees traveling to and from work in the node. A lack of pedestrian walkways exacerbates the problem as pedestrians are forced to walk in the roads. Many firms in Marlboro also specifically mentioned increased costs due to e-tolls.

Frequent electricity outages

Power outages occur about two to three times per week. Some firms have resorted to using generators, but this adds significant costs to their business.

Water supply

The water supply in the area mostly meets firms' needs. However, firms have reported extremely high water bills. One firm reported that they appointed lawyers to address their water billing problem and that the use of lawyers cost them more than R100 000.

Crime

Firms in Marlboro have reported a number of robberies, theft and vandalism of business property. As a result, firms have invested significant resources in upgrading security.

Key Priorities

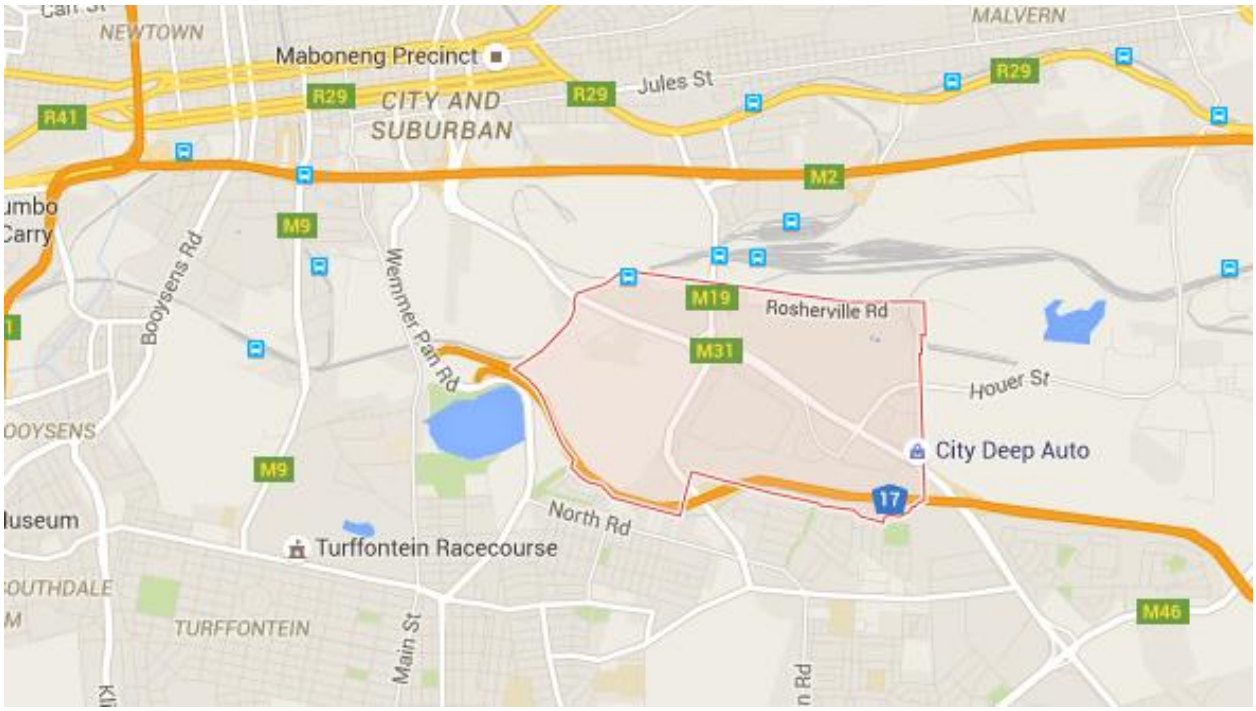
1. *Traffic congestion*: there is a need to review the road infrastructure and capacity within the Marlboro/Wynberg/Sandton area to relieve traffic congestion.
2. *Reliability of electricity supply:* the Marlboro/Wynberg node seems to experience more electricity supply interruptions than any other node. The City may need to appoint a dedicated team to focus on maintenance and repairs within this node.

5.5 City Deep: Africa's largest inland port

City Deep is the largest inland port in Africa and a gateway into the southern African region. It offers specialised logistics facilities such as warehousing, storage, customs clearance and container repair. City Deep is located in region F, at the intersection of Heidelberg Road and the M19, and is bordered by the M2 highway in the north and the N17 highway in the south.

There are 4 railway stations close to or within, the industrial node: Kaserne West, City Deep, Benrose North and Benrose South. The railway network connects City Deep through major cities to the major container ports of Durban, Cape Town and Ngqura.

Figure 46: Map of City Deep



Source: Google maps, 2016

Connectivity and infrastructure investment

The City Deep Freight Hub handles approximately 60% of all container traffic in and out of Gauteng from the coastal ports of Durban, Cape Town and Ngqura. It also handles a significant volume of container traffic destined for other inland provinces and neighbouring countries. At peak times, the terminal handles approximately 300 trucks and 10 trains a day between Durban and Johannesburg (Nevin, 2016).

To relieve congestion and encourage migration from road to rail, Transnet invested R900 million by end November 2015 to modernise the inland container terminal. The investment is also in line with the government's second strategic integrated project (SIP) under the Presidential Infrastructure Coordinating Commission which aimed to improve the transport links between KwaZulu-Natal, the Free

State and Gauteng. Following the R900 million investment, the container handling capacity increased from 280 000 twenty-foot equivalent units (TEUs) to 400 000 TEUs (City of Johannesburg, 2015).[21]

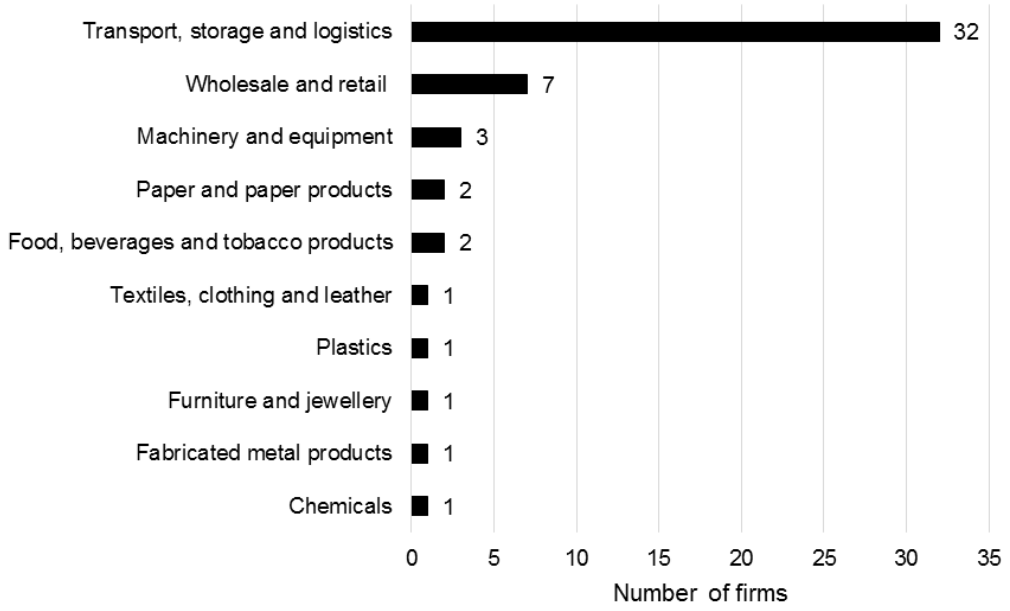
In January 2015, the Johannesburg Roads Agency (JRA) and the Gauteng Department of Roads and Transport announced an investment of R122 million for infrastructure upgrades, new developments and road expansion, particularly developing ramps to the N17 (JRA, 2015). The investment will further increase capacity and connectivity of City Deep with South Africa's coastal ports and with the rest of the region.

Recent newspaper reports indicate that City Deep's future as a vibrant inland port may be under threat. Changes in customs legislation require that all sea freight be cleared at coastal ports. This essentially downgrades City Deep's status from a full customs clearing and forwarding facility to having inspection status only. There is concern that this will lead to increased congestion at coastal ports and reduce the flexibility firms had to move goods destined for inland provinces and other countries directly to inland ports for clearance (Nevin, 2016).

Business activity in City Deep

Though City Deep is a well-established transport and logistics hub, there is a notable presence of manufacturing and wholesale and retail firms. Of the 51 firms identified in the scoping study, 12 are manufacturing and 7 are wholesale and retail firms (Figure 47).

Figure 47: Manufacturing and transport and logistics firms in City Deep



Source: Scoping data

City Deep is also home to the Joburg Market (previously known as the Johannesburg Fresh Produce Market), the largest fresh produce market in the world, and MultiFlora, a specialised flower auction. On a daily basis, there is high traffic volume between these two markets and the rest of South Africa and

[21] A Twenty-Foot Equivalent Unit can be used to measure a ship's cargo carrying capacity. The dimensions of one TEU are equal to that of a standard 20 inch shipping container: 6m long, 2.4m tall.

the region. The Joburg Market, for example, handles on average 2 900 trucks, 5 000 light motor vehicles and 35 000 people on any particular day.

Insights from in-depth interviews

In-depth interviews were conducted with five firms in City Deep (Table 27). Four of these firms are in distribution, transport and storage and one firm is a manufacturer of fabricated metal and plastic products. Of the four firms that are involved in distribution, one provides ambient distribution services to third parties, the second handles fruit and vegetables, the third distributes dairy and beverage products, and the fourth distributes electrical products and accessories. The manufacturing firm produces cable pipe fastening and cable gland systems in plastic and brass.

Table 27: Firms interviewed in City Deep

Key activity	Employees	Annual turnover	Firm category
Electrical products storage and distribution	33	R42 million	Large
Fruits and vegetables storage and distribution	120	R500 million	Large
Dairy and beverage products distribution	1 200	R1.9 billion	Very large
Fabricated metal products	140	R12 million	Medium
Transport and logistics	10	+/-R35 million	Medium/Large

Source: In-depth interview data

The firms interviewed ranged in size from 10 employees to 1 200 employees. Annual turnover ranges from approximately R35 million to R1.9 billion per annum. Two firms noted that in the past 3 years, they have been growing, as evidenced by the increase in their staff complement and increased annual turnover. On the other hand, 2 firms had actively retrenched employees due to the economic downturn. Performance is thus uneven.

The main market for the firms interviewed is local (South Africa), especially Gauteng but all firms identified the export market as vital for future growth. One transport and logistics provider noted that South African market is highly competitive and saturated, and this has led it to focus on the export market. Exports now contribute 95% to their annual turnover.[22] Similarly, the fruit and vegetable distributor also focuses on exports to drive sales. It sells approximately 35% of its produce to other SADC countries and Angola. Namibia accounts for the largest proportion of exports (29%). The distributor of electrical products currently selling 5% of its products in Namibia and is considering entering the Nigerian market.[23]

All the firms noted that transportation is undertaken via the road network, with no firm using air or rail as an alternative.

Key challenges in City Deep

1. *Skills and training:* The firms reported a challenge with unregistered training providers who issue certificates to individuals who are not properly qualified. In response, most firms provide in-house training. There appears to be significant market failure in terms of providing the right level of training in technical vocations, particularly skills like forklift/reach-truck driving that needs to be addressed holistically.
2. *Public transport and security:* There is no bus service early in the morning and late at night in City Deep. Two of the firms interviewed run multiple shifts and have to provide transport to their workers at an additional cost to the firm.

[22] The firm distributes chemicals, minerals, machinery and equipment, agro chemicals and other products mainly to Zimbabwe, Botswana, Malawi and Zambia.
[23]Its decision to enter Nigeria was based on the fact that South Africa and Nigeria have similar round pin plugs..

3. *Safety and security*: The area is dangerous and faulty streets lights increases the risk to employees walking to and from the nearest train station. Many robberies have been reported and there are rarely police patrols in the area. Some firms in the area are actually investing in restoring the lights themselves in the absence of intervention by City Power
4. *Parking for trucks*: There is no demarcated space for haulage trucks in the area. As a result, trucks park along the roads and on sidewalk, which causes further congestion.

Key Priorities for City Deep

1. *Technical/Vocational Training Centre:* A central, accredited training centre should be established within City Deep to provide the skills needed by firms within the node.
2. *Overnight parking lot:* A dedicated overnight parking with basic amenities should be laid out.
3. *Police patrols:* Regular patrols should be instituted

6 Conclusion and Recommendations

Our research on the nature of industrial activity in the City of Johannesburg provided some interesting insights on the nature of economic activity in Johannesburg, how firms are performing, what the constraints to growth and competitiveness are and how the City can respond better to these challenges. The research affirmed the importance of focusing on the basics – most firms are simply concerned about more reliable electricity supply, quicker turnaround times from City Power, and instituting police patrols to improve the safety and security of the areas for firms and workers. The main insights from the study are summarised below.

6.1 What is the nature of economic activity across the industrial nodes in the City of Johannesburg?

Manufacturing activity in Johannesburg is diverse, though there are some nodes with a clear sector focus, such as furniture manufacture in Nancefield, food processing in Devland, and manufacture of machinery and equipment (electrical and non-electrical) in Strijdom Park. These nodes could be supported through cluster initiatives.

- Overall, manufacturing activity seems to have shifted towards somewhat more complex, higher technology sectors since the early 1980s. At that time, the largest manufacturing sectors in Johannesburg were clothing manufacture, printing and publishing, food processing, and jewellery and diamond cutting. Now, the City has a greater concentration of manufacturing activity in fabricated metal products, furniture, machinery and equipment and plastic products indicating diversification into sectors that support mining and mining-related firms in the City. As mining activity declines within Johannesburg and before coal mining in the Waterberg comes on-stream fully, it will be important to support these firms in finding new markets in other SADC countries where mining is showing stronger growth.

There are very **large differences in the firm performance across sectors**. The sectors in which the majority of firms recorded growth are food products, furniture, non-metal mineral products and rubber products. The worst performance is in fabricated metals, machinery and equipment and plastics. Intervention strategies must be sector specific as firms in different sectors will require different types of support. Firms are **not investing** because of poor local demand and competition from imports. Firms that do wish to invest and expand are hampered in doing so by **local barriers** such as long delays in planning permission and slow rollout of basic infrastructure to vacant land. The **lack of public transport limits the output of firms**, by constraining their ability to easily run multiple shifts. These local barriers could be mitigated through targeted interventions by the City.

- The formal education and training system is not supplying workers with the types and level of skills that manufacturing firms in the City of Johannesburg need. As many as **70% of firms hire people without the required skills** and **90% of firms provide in-house training** rather than using FET colleges to bridge the skills gap. It is likely that the reliance on private investment in training result in an under-provision of training. Even more worrying is that **15% of firms are not filling vacancies** because they cannot find appropriately qualified workers, despite high and rising unemployment. The City of Johannesburg must prioritise investment in building the skills and capabilities of workers, particularly in technical vocations.

Most of the firms in the City of Johannesburg are small and medium-sized. All of these challenges disproportionately affect smaller firms that have fewer resources to invest in training or to provide additional security, alternative power and public transport in cases where public provision of these services either fail, or is inadequate.

- Unsurprisingly, manufacturing firms in Johannesburg thus require very basic support from the City. Firms indicate that they would benefit from knowing who to call when there are electricity or water interruptions or when they have billing queries, having their calls answered in a timely manner, and having these issues resolved promptly and professionally.
- The size of firms has implications for how the City develops and plans its reindustrialisation agenda. The process of engaging firms may be slower than it would be with larger multinationals, but once consultation mechanisms have been established, decision-making processes will likely be much quicker.

- The gains from assisting smaller firms may also not be substantial in the short-term. The City will have to go through a gradual process of building capabilities and preparing firms for a step-change in operations which may be faced with more resistance than they would if they were dealing with more sophisticated firms with a track record of engaging with various local and national government partners.

An overwhelming conclusion from engagements with firms is that the City must focus on upgrading physical infrastructure in industrial nodes, including extending services to vacant land and making this available for expansion, and must invest in developing human capital. The best way to do this is through clusters driven by business owners committed to the collective resolution of challenges within a sector or geographic area to ensure that the City's interventions respond to firms' needs.

6.2 How are firms performing?

Given the weak economic climate over the past three years, firms in the City of Johannesburg are performing better than expected. Only 24% of firms surveyed indicated that their revenues declined between 2013 and 2015, while the rest reported that their annual turnover was either stable (33%) or growing (43%). Firms that have struggled to grow attribute this to weak domestic consumer demand. Finding new markets or stimulating demand for firms' products through more targeted state spending, for example, could help.

To find sustainable new markets, firms need to look to the region. The City can support exports by developing and implementing trade facilitation programmes designed around the cluster initiatives in machinery and equipment, plastics, and food processing.

Despite better than expected performance, investment in plant and equipment is poor and many firms have old equipment. This poses challenges for the future as older equipment is less energy efficient, and may result in lower and declining output further down the line. There is an opportunity to consider incentives to invest in more efficient and energy-efficient equipment.

6.3 What are the key constraints to firm growth?

Though the weakness of the economy more broadly is negatively affecting firms' growth, there are various local issues that either increase firms' costs or reduce the efficiency of their operations. These include intermittent electricity supply, poor road infrastructure, poor provision of public transport at the time needed to run additional shifts, crime, and lack of technical skills. These challenges were raised by firms across all seven nodes. Specific responses to these issues have been suggested in the node reviews above.

6.4 What should the City do?

There are some "quick wins" that should be addressed across all industrial nodes in the City:

a) Upgrade and maintain substations to improve reliability of electricity supply.
b) Upgrade and maintain road infrastructure, including maintenance of street and traffic lights.
c) Implement traffic calming measures in industrial nodes.
d) Create a dedicated reporting mechanism/create node-specific teams for queries.
e) Improve the professionalism of complaint-handling staff.
f) Implement strict minimum service standards for complaints from businesses.
g) Institute regular police patrols, particularly during shift changes at the end of the day.
h) Support firms' expansion by bringing electricity and other infrastructure on-stream quickly

Then, there are some bigger issues that require longer-term planning:

a) Establish common training centres for skills required by manufacturing firms (basic literacy and numeracy and technical skills)
b) Improve reliability of public transport on under-served routes that connect to industrial nodes
c) Develop a regional trade facilitation strategy, particularly for clusters
d) Investigate the possibility of migrating certain nodes to solar, or other forms of green energy
e) Make vacant land available for expansion and ease process for obtaining planning permission

f) Establish innovation hubs or joint research facilities for product development and testing
g) Facilitate the establishment of business associations in the nodes and establish regular engagements between the City and business owners

References

Breuckner, L. (2011). Why Cities Exist. *Lectures on Urban Economics.* Available at https://mitpress.mit.edu/sites/default/files/titles/content/9780262016360_sch_0001.pdf . Last Accessed June 2016.

City of Johannesburg Economic Strategy Roadmap, 2014

Dasgupta S. and Singh A. (2005). Will Services be the New Engine of Indian Economic Growth? *Development and Change,* 36: 1035–57.

Dias, R. and Dorrit P. (2007). Unemployment, education and skills constraints in post-apartheid South Africa. *Development Policy Research Unit* Working Paper 07/120

Francis, D.C., Saliola, F. and Seker, M., 2013. Measuring Firm Performance in Latin America and the Caribbean. *Latin America and the Caribbean Series Note*, (1).

Erumban, A.E. (2008). Lifetimes of Machinery and Equipment: Evidence from Dutch Manufacturing. *Review of Income and Wealth,* 54 (2): 237-268.

Grazzi, M., Jacoby, N. and Treibich, T., 2013. Dynamics of Investment and Firm Performance: Comparative evidence from manufacturing industries. GREDEG WP No. 2013-09

Kaziboni, L., Mondliwa, P. and Robb, G. (2014). Towards an understanding of the economy of Johannesburg. *Report compiled for the City of Johannesburg Metropolitan*.

Liargovas, P. and Skandalis, K., 2010. Factors Affecting Firm Competitiveness: The Case of Greek Industry. European institute Journal, 2(2), pp.184-197.

Low, P. and Pasadilla, G.O., 2015. Services in Global Value Chains: Manufacturing-Related Services. *Available at SSRN (2015)*.

Millin M. and Nichola T. (2005). Explaining economic growth in South Africa: a Kaldorian approach. International Journal of Technology Management & Sustainable Development 4: 47–62.

National Small Business Amendment Act of 2003

Nevin, T. (2016). Storm brews up over new customs laws. *Business Day.* Available at http://www.bdlive.co.za/opinion/2016/06/06/storm-brews-up-over-new-customs-law **.** Last Accesses June 2016.

Voulgaris, F., Papadogonas, T. and Lemonakis, C., 2013. Drivers of Competitiveness in the Manufacturing Industry: The Case of Technology Sectors in Greece. Journal of Economics and Development Studies, 1(3), pp.32-40.

Weatherspoon, Dave D., and Thomas Reardon. The rise of supermarkets in Africa: implications for Agrifood Systems and the Rural Poor. *Development Policy Review* 21 (2003): 333-355.

Wells H. and Thirlwall A.P. (2003). Testing Kaldor's Growth Laws across the Countries of Africa. African Development Review 15: 89–105.

Zalk, N. (2014). What is the role of manufacturing in boosting economic growth and employment in South Africa?. Econ 3x3 Article. Accessed from http://www.econ3x3.org/sites/default/files/articles/Zalk%202014%20Industrialisaton%20and%20Employment%20FINAL.pdf. Accessed on 14 December 2015.

Johannesburg Roads Agency (JRA). (2015). On the Road – Mid-term Newsletter 2015. Available from http://www.jra.org.za/documents/publications/On%20the%20road.pdf

City of Johannesburg. (2015). City's freight hub gets a revamp. Available from http://www.joburg.org.za/index.php?option=com_content&view=article&id=9441:citys-freight-hub-gets-a-revamp&catid=88:news-update&Itemid=266

Rogerson, C.M and Rogerson, J.M. (1995). The decline of manufacturing in inner-city Johannesburg 1980–1994. *Urban Forum.* Vol 6 (Issue 1). Pp 17 – 42

Annexure A: List of 26 nodes in which the scoping exercise was conducted

Node	Size	Description
1. Amalgam/ Crown	906,7ha	Located north of the railway line, with Main Reef Road running through the area on an east-west axis, with the residential areas of Mayfair, Mayfair West and Homestead Park to the north of the area. Wholesale, warehousing and distribution uses dominate the area, interspersed with head offices for certain businesses. A growing market is that of Asian imported products.
2. Anchorville	481,3ha	Comprised of vacant land and small concentrated industrial developments. South of Lenasia Extensions 6 and 11, mining activities to the east of the area, with Lenasia Drive (R558) and a railway line running through the area on a north-south line, with Lawley railway station located at the southern edge of the area. A range of smaller industrial uses exists, with properties being developed in an owner-occupant manner for specific uses. Examples include, Timber City, Pump services, Minty's, tracker systems, warehousing and distribution of small goods, including perishables
3. Benrose (within Jhb CBD)	449,8ha	Older urban area, therefore with few new buildings built since the 1950's. Located south of the railway line and north of the M2. South of established residential areas of Jeppestown, Belgravia and Kensington. Industry flight has been experienced in the area, due to the age of the structures not being suitable for more modern businesses, i.e. lack of parking, access points not suitable for current vehicle types, etc. Uses include kitchen and machine parts suppliers (wholesale trade), apparel manufacturing, automotive parts suppliers, and vehicle repair services.
4. Booysens/ Reuven/ ophirton	762,0ha	Located in the East-West Corridor, but sharing few physical features with other areas in the corridor. It is less densely developed, including industrial park developments. Buildings were mainly purpose-built from the 1950's to the 1970's, with some renovation. This area suffers from air, noise, and groundwater pollution. Management of the area is required to upgrade infrastructure and improve safety and security and the general appearance. The area is made up of mainly smaller erven than other industrial areas, many of still retain a residential style of development. Excellent access is available to the area with an on/off-ramp to M1 motorway being located on the area's north-eastern edge. Both heavy and light manufacturing businesses operate in the area, as well as wholesale supply and distribution companies. Products manufactured or distributed from this area include industrial gases, hardware, appliances, transformers, bulk mining supplies, television repair, and freezer / cold rooms, etc. Other service providers and contractors operate out of the area.
5. Booysen Reserve/ Theta	762,0ha	Adjacent to the Ormonde/Gold Reef City regional node. Located in the East-West Corridor, but sharing few physical features with other areas in the corridor. It is less densely developed, including industrial park developments. Buildings were mainly purpose-built from the 1950's to the 1970's, with some renovation. The area is made up of mainly smaller erven than other industrial areas, many of still retain a residential style of development. Excellent access is available to the area being adjacent to both the M1, Soweto Highway and with access to Main Reef Road. The implementation of the BRT is underway along the Soweto Highway and will improve access to this node. Both heavy and light manufacturing businesses operate in the area, as well as wholesale supply and distribution companies. Products manufactured or distributed from this area include industrial gases, hardware, appliances, transformers, bulk mining supplies, television repair, and freezer / cold rooms, etc. Other service providers and contractors operate out of the area.
6. City Deep	472.2ha	City Deep is located along the Heidelberg Road and is regarded as the biggest inland harbour in the world. It is closely associated with airfreight that is found in the Ekurhuleni Municipal jurisdiction of the OR Tambo International Airport and the Rand Airport, which it has good access to with the M2 motorway. The City of Johannesburg's Municipal Market is also located within this industrial node. Well-landscaped industrial parks have been developed within City Deep. The main uses in City Deep are both a heavy industry and bulk transport rail related. The main concentration in City Deep is wholesale food, storage and warehousing, fabricated metal products and machinery. There is a component of light industry, which has newer office/warehousing spaces. City Deep is not

		performing as well as it is expected to in terms of occupancy rates, considering the support it is getting from the City, its occupancy rates are on par with other industrial nodes within the City.
7. Cleveland / Hariotdale	449,8ha	Majority of building stock developed between the 1920's and 1940's, limited new development of industrial space since the 1950's. Therefore, many of the buildings are either unusable or less competitive for current industrial uses. Problem areas include, height of storeys, number of columns, site access, parking availability, truck docking and access. Some "mini" industrial parks exist, whilst the remainder of the sites are security risks. Excellent access exists due to the areas location adjacent to the M2 motorway and the existing railway system with Cleveland Station being in the node. The existing business mix includes kitchen and machine parts suppliers (wholesale trade), apparel manufacturing, automotive parts suppliers, and vehicle repair services.
8. Comercia/ Chloorkop/ Modderfontein	735,2ha	Located around the intersection of Allandale Road and Modderfontein Road, with a dispersed development pattern (at present). The areas are surrounded by vast open tracts of land as well as a number of residential townships of various characteristics, i.e. Phomolong, Birch Acres, Modderfontein proper, Glen Austin A.H., Austin View A.H., Rabie Ridge, Ivory Park, etc. Relatively new industrial space, with tenant mix including specialised manufacturing, research & development, automotive services, and textiles.
9. Denver	449,8ha	Majority of building stock developed between the 1920's and 1940's, limited new development of industrial space since the 1950's. Therefore, many of the buildings are either unusable or less competitive for current industrial uses. Problem areas include, height of storeys, number of columns, site access, parking availability, truck docking and access. Some "mini" industrial parks exist, whilst the remainder of the sites are security risks. Excellent access exists due to the areas location adjacent to the M2 motorway and the existing railway system with Denver Station being in the node. The existing business mix includes kitchen and machine parts suppliers (wholesale trade), apparel manufacturing, automotive parts suppliers, and vehicle repair services
10. Devland	481,3ha	Seen as one of three "formal" industrial parks within the greater Soweto area. The area has generally been built up by the individual property owner-occupants for their specific needs. The area enjoys good road based access from the Golden Highway and hence the N12 motorway. Uses in the industrial parks include motor related industry, small scale manufacturing and distribution centres. The relatively low rentals are resulting in an increased occupancy and create opportunities for smaller/new industries to start off. The area creates employment opportunities to the surrounding population.

11. Frankenwald/ Linbro Park	735,2ha	South of and adjacent to Buccleuch residential area and west of and adjacent to the Modderfontein Conservation Area. It is also east of and adjacent to the N3 motorway and obtains access to such at Marlboro Drive. Across the N3 is a research station and a further protected area including the Jukskei River trail. The tenant mix includes specialised manufacturing, research & development, automotive services, and textiles, logistic companies, etc.
12. Klipriviersoog	481.3ha	Located north of the railway line and Avalon Cemetery, and south of the residential areas of Protea South and Chiawelo, adjacent to Potchestroom Road, one intersection from the N12 on ramp. Mixed industrial uses, small-scale developments, and vacant land. Properties developed in an owner-occupant manner for specific uses.
13. Kya Sands/ Northlands	767.9ha	Kya Sands is located close to residential areas like Cosmo City as well as an informal settlement. The node also has a watercourse running through it. The industrial buildings are independent from one another, and based on individual buildings. This node falls within a sub-market that has some of the newest industrial building stock in Johannesburg with a high mix of offices within its industrial buildings. Kya Sands is within a sub-group that has some of the highest occupancy rates, 98%. Much of the industrial space is for manufacturing and distribution and it is mainly owner-occupied. The other uses are showrooms and office-warehouse.

14. Kayalami/ Barbeque Downs	906,8ha	Characterised by secure and regulated business and industrial park type developments, initiated by Kyalami Park. The area has extended into the Barbeque Downs area. The area is being surrounded by the growing residential component of Midrand. Access is indirectly available to the N1 motorway, but the area is on the mobility routes of Woodmead Road, Main Road and Allandale Road. Higher prices for land and rentals within the city, at R190 to R370 per hectare and rents averaging at R29.28 per square metre. Uses originally focussed on the motor industry due to the location of the racetrack within the area, but have expanded to include light manufacturing and distribution.
15. Lanseria	767.9ha	This node is accessible via Hans Strijdom Drive and is located adjacent to this road. Lanseria Airport is located within this node, handling mostly domestic flights. This sub-market has some of the newest industrial building stock, with a high a high mix of offices within the industrial buildings. The area has a high occupancy rate. The permissible land uses are airport related like warehousing and freight. The North-West sub market also has large manufacturing and distribution is
16. Laser Park/ Honeydew	767.9ha	Located adjacent to the mobility route of Beyers Naude Drive (M5 route), and in close proximity to a number of regional nodes, i.e. Northgate, Constantia/Strubensvalley, Westgate/Princess and Cresta, and between residential areas of vast contrast, i.e. Eagle Canyon Golf Estate, Honeydew, Zandspruit informal settlement. The area has a diverse setting. Characterised by smaller land portions, usually owner occupied, and developed for specific uses, recently developed and still developing, thereby a new industrial area in the city. The uses range from storage facilities to distribution centres and showrooms, and include an industry specific conference and training centre, a motel and retail centre. Due to the recent development of the area, a number of the industries have included factory shop components to their businesses as well as places of refreshment for their staff and customers

17. Longmeadow	735,2ha	Varied property sizes thereby catering for a wide range of industrial uses. Well located between two national roads and to the inland port of City Deep itself. Surrounded by residential properties to the west, including South Hills, Roseacre, etc. Numerous engineering companies, with a focus on metal products and fabrication, chemicals, plastics and machinery. Renewed investment into the area has seen some rejuvenation together with the affordable rental rates allows for the preferable occupancy rate reflected.
18. Nancefield	481.3ha	Located south of the N12 and Slovo Park settlement. East of and adjacent to the wetland area and north of and adjacent to sewerage works. Access is limited to two roads, i.e. Boundary Road and Concorde Road. It is indirectly linked to both the N12 and R554. Mixed industrial uses and small-scale developments. Properties developed in an owner-occupant manner for specific uses.
19. Prolecon	449,8ha	Majority of building stock developed between the 1920's and 1940's, limited new development of industrial space since the 1950's. Therefore, many of the buildings are either unusable or less competitive for current industrial uses. Problem areas include, height of storeys, number of columns, site access, parking availability, truck docking and access. Some "mini" industrial parks exist, whilst the remainder of the sites are security risks. Excellent access exists due to the areas location adjacent to the M2 motorway. The existing business mix includes kitchen and machine parts suppliers (wholesale trade), apparel manufacturing, automotive parts suppliers, and vehicle repair services.
20. Robertsham/ West Turfontein	762.0ha	This industrial node is located within the East West Development Corridor (EWDC) and within a residential area of Robertsham and West Turfontein. It has a slimes dam in the centre (around which the industries have developing thereby creating a protective buffer for the residential areas). It is less densely developed, unlike other industrial nodes within this region. It is bounded by Kliprivier Drive to the east and by Rifle Range Road and the N12 motorway to the south. This node falls within a sub-market that enjoys high occupancy rates, with some of the lowest rentals in the City yet it still suffers from disinvestments.

		The main uses in this node are light and heavy manufacturing with some distribution and wholesale uses taking place.
21. Robertville/ Lea glen/ Stromill	906,7ha	Very diverse selection of uses, including: light manufacturers, printing & publishing concerns, large distribution and small wholesale companies, bakeries and food producers, vehicle repairs, etc. Road network needs to be upgraded. Upgrading of electricity and stormwater systems may be required. There is adequate coverage of bulk sewer but some outfall sewers have insufficient capacity.
22. Rosherville	449,8ha	Majority of building stock developed between the 1920's and 1940's, limited new development of industrial space since the 1950's. Therefore, many of the buildings are either unusable or less competitive for current industrial uses. Problem areas include, height of storeys, number of columns, site access, parking availability, truck docking and access. Some "mini" industrial parks exist, whilst the remainder of the sites are security risks. Excellent access exists due to the areas location adjacent to the M2 motorway and the existing railway system with Cleveland Station being in the node. The existing business mix includes kitchen and machine parts suppliers (wholesale trade), apparel manufacturing, automotive parts suppliers, and vehicle repair services.

23. Selby/ Village Deep	762.0ha	Selby and Village Deep are located south of the Johannesburg CBD, within the East-West Development Corridor. Access to the area is from Booysens Road and Eloff Extension Road and is visible from the M2 East motorway. The well-known Top Star Drive-in, which is located on a mine dump, is found in this industrial node. The rentals in this area are said to be some of the lowest in the City. The area has a mix of heavy and light industry, with some wholesale supply and distribution component.
24. Steeledale/ Tulisa	472,2ha	Varied property sizes thereby catering for a wide range of industrial uses. Well located between two national roads and to the inland port of City Deep itself. Surrounded by residential properties to the west, including South Hills, Roseacre, etc. Numerous engineering companies, with a focus on metal products and fabrication, chemicals, plastics and machinery. Renewed investment into the area has seen some rejuvenation together with the affordable rental rates allows for the preferable occupancy rate reflected.
25. Strijdom Park	767.9ha	Strijdom Park has good visibility from the N1, and is on three mobility routes, i.e. Hans Strijdom Drive, CR Swart Drive and Hans Schoeman Street. It is surrounded by the residential areas of: Bromhof and Boskruin (west), Malanshof (south), Ferndale (east) and Sharonlea (north). Warehousing, distribution and high technology manufacturing are the main land uses found in this area, as well as motor related industries, sales, repairs, etc. A number of home related uses are now located in the area, i.e. lighting retailers, tile retailers, etc. There is also a good mix of offices within the industrial buildings.
26. Wynberg/ Marlboro/ Kew	398,6ha	It is characterised by high densities of industrial uses in single and multi storey buildings, with a number of "mini" industrial parks. In close proximity to the business centre of Sandton Metropolitan Node and adjacent to the large residential population of Alexandra. Anchored by the Louis Botha Avenue mobility road running through the centre of the node, with ample motorway access by both the Grayston Drive and Marlborough Drive to the M1, and via Marlborough Drive to the N3. The uses include: light manufacturing (include furniture & furnishings, instruments & equipment, pharmaceuticals, electrical products, personal care products, medical equipment, motor vehicle components, food processing, computer components and apparel), industrial services, followed by construction contractors, retail, wholesale suppliers and other distributors and other uses.

Annexure B: Form used for the Scoping Exercise

Questionnaire Number				

City of Johannesburg Industrial Firm DATABASE 2015

1. Fieldworker details

1.1. Name of the Node		1.3. Supervisor (name)	
1.2 Date		.4. Fieldworker (name)	

2. Respondent Details

2.1 Company Name (in full)	
2.2 Company Registration number	
2.3 Name & Surname of MD/CEO/Owner	
2.4. Email address of MD/CEO/Owner	
2.5. Telephone number	
2.6 Address	
2.7. GPS coordinates	

3. Activities of the Company

In which of the following main sectors does the firm operate? (choose more than one answer if appropriate).

a. Agriculture (skip to Q 4)	
b. Mining & quarrying (skip to Q 4)	
c. Manufacturing **(if this ask table A below)**	
d. Construction (skip to Q 4)	
e. Wholesale & retail (skip to Q 4)	
f. Sale, maintenance & repair of motor vehicles (skip to Q 4)	
g. Transport & storage(skip to Q 4)	
h. Financial services (skip to Q 4)	
i. Business services**(if this ask table B below)**	
j. Communication services (skip to Q 4)	
k. Other (please specify) (skip to Q 4)	

(TABLE A MANUFACTURING)
If respondent selected manufacturing, which sub-sector is the company involved in?

a. Manufacture of food, beverages & tobacco products	
b. Manufacture of textiles, clothing & leather goods	
c. Manufacture of wood & wood products	

d. Manufacture of paper & paper products	
e. Manufacture of chemicals	
f. Manufacture of plastics	
g. Manufacture of rubber	
h. Manufacture of non-metal mineral products	
i. Manufacture of iron & steel	
j. Manufacture of non-ferrous metals	
k. Manufacture of ferrous metals	
l. Manufacture of electrical machinery & equipment	
m. Manufacture of machinery & equipment	
n. Manufacture of transport equipment	
o. Manufacture of furniture & jewellery	
p. Other (please specify)	

(TABLE B BUSINESS SERVICES)

If respondent selected business services, which sub-sector is the company involved in?

a. Architectural & engineering activities	
b. Auto Repair / Services / Parking	
c. Labour recruitment & provision of personnel	
d. Cleaning activities/services	
e. Educational & training Services	
f. Engineering & Management Services	
g. Health Services	
h. Legal Services	
i. Accounting, book-keeping, & auditing	
j. Marketing research	
k. Membership Organizations	
l. Packaging activities/services	
m. Security services	
n. Real estate activities	
o. Computer hardware or software consulting	
p. Data processing	
q. Maintenance or repair of office, accounting, & computing machinery	
r. Research & development	
s. Management consultancy activities	
t. Other (please specify)	

4. Please describe the products & services that the company provides.

5. Fieldworker description of the organisation (observations)

REMEMBER TO STAPLE THE CEO'S BUSINESS CARD TO THIS DOCUMENT!!!!!!!!!

Annexure C: Pilot Survey conducted in Aeroton and Industria West (attached as separate pdf)

Annexure D: Description of changes made after the conduct of the pilot survey

A pilot survey was conducted in Aeroton and Industria West between 6 October 2014 and 7 November 2014. The survey was administered to 89 firms (44 from Aeroton and 47 from Industria West). We received responses from 47 firms (20 from Aeroton and 27 from Industria West). Based on the responses, the following changes were made to the pilot survey before administering it to firms across 26 industrial nodes in the City of Johannesburg:

a) Overall, the questions were simplified and the question order was changed to ensure a better flow in the themes.
b) Firm classification: The sector classification were harmonised with SIC codes and non-manufacturing activities were excluded from the selection.
c) Stating growth of firms' numerically (e.g. +5% growth) was ambiguous as it was not clear if this referred to nominal or real growth. Instead of selecting numerical ranges, firms were asked to indicate whether they were (1) growing, (2) static, or (3) declining.
d) Access to markets: The responses to this question were difficult to interpret and analyse. The question was thus simplified by breaking it up into 4 parts so that firms could separately estimate the proportion of goods they sold to Gauteng, to the rest of S. Africa and to the rest of the world.
e) Main customers: We included a question asking firms to identify their primary customers. The options were: (1) final consumers, (2) industry or (3) retailers/wholesalers.
f) Investment: The options for 'reasons of investments' were broadened to include initial start-up.

Annexure E: Survey of Manufacturing Firms (attached as separate pdf)

Annexure F: Survey of Manufacturing-related Services Firms (attached as separate pdf)

Annexure G: Interview Guide for in-depth interviews across 7 nodes

IN-DEPTH INTERVIEWS GUIDELINE

Meeting prep:

1. Research and read on the industry.
2. Read about the company specifically – website, annual reports, which sector they are in and how they fit into the company hierarchy (if there is any)
    a. Note any areas of interest for specific further inquiry. These could include whether the firm exports to other countries in Africa or the world, if it holds any significant patents/IP or if it seems to be active in any business associations
3. Send the firm survey
    a. Enquire if the firms can complete the survey beforehand to facilitate more informed discussion and to answer the mundane questions prior.

The interview responses will be used to manually complete the online responses and it is important that the survey is completed by each company.

Overview of the firm (refer to information from prior research)

1. In which of the following primary main sectors does your firm operate? Which sub-sector(s) are you involved in?
2. Please describe the products and services that the company provides.
3. How many years has your company been in the current premises?

Company size

1. What was the company's turnover from this site in the last financial year?
2. How many employees (part-time and full-time) does the company have at this site currently?

Capacity Utilisation

1. Please select the category which you think best reflects the production level at which the company operated over the past year relative to plant capacity?
2. [For logistics firms, confirm the size of fleet. Probe further on (1) whether they dispatch full loads, (2) who they distribute to and (3) whether they pick up any stock on the return journey. Check whether there are other companies with similar businesses, and whether there are opportunities to deliver mixed loads; i.e. pick up stock from firms in the area & deliver to one customer]

Company performance

1. In your opinion, which of the following best describes the change in average turnover in this company in the past 3 years?
    a. Increasing, stayed the same, declining
2. If you answered "Declining", what was the main reason for this?
3. Please estimate the company's sales (in %) to customers in Gauteng.
4. Please estimate the company's sales (in %) to customers in the rest of South Africa.
5. Do you export any sales from production at this site?
6. If yes, please estimate the proportion of the company's sales (in %) from production at this site that is exported to the following destinations:
7. Who are your customers of the production at this site? Final, input to industry, retailers/wholesalers, other sectors?

Exporting and export conditions

1. How easy/difficult was it to enter the export market?
2. How did you enter the market (agents, requests from customers, follow a SA buyer expanding into the region, etc.)?
3. Do they have subsidiaries/warehouses in other countries?
4. Are you planning to increase exports or even invest in a company abroad?

5. Has the government assisted in any way? If so, how? (if there is a government programme that has assisted get as much information as possible about this and what makes it work for the company)

Import and import conditions

1. Is there adequate supply of raw materials in the local market? If not, how do you make up for this shortfall?
2. Are there any duties or tariffs imposed on raw materials, equipment or finished goods?
3. In the case of equipment, are there after-service facilities or parts manufacturers in South Africa?

Performance, competitiveness and market conditions

1. How do you measure your performance relative to your peers/the rest of the industry?
2. What industry benchmarks exist, if any?
3. How has your competitiveness/performance matched up to the rest of the industry?
4. To what would you attribute that level of performance?
5. What factors have limited your performance? How have they responded to these limitations?
6. Do you take advantage of any government incentives? Are you able to quantify the incentives? How easy/difficult was it to access the incentives? Did you apply for the incentives directly or did you use a consultant/service provider to do so on your behalf?
4. Are the requirements to qualify for incentives communicated effectively?

Research and development, Technology and Investment

1. What is the average age of the company's plant and equipment?
2. [For logistics: What is the average age of the fleet? What is the replacement age?]
3. What has the company invested in?
4. Do you receive any funding from IDC or any government department?
5. Where does product testing occur?
6. Does your company have a research department on site or is it at the head office? How much do you invest in R&D per year?
7. Where do you develop your concepts?
8. Does the company currently hold a patent and/or license any technology from another company?

Skills and training

1. What is the proportion (%) of your workforce with the following levels of education?
    - Pre-matric, matric
    - Technical/vocational qualification
    - Occupational qualification (e.g. health and safety qualification)
    - Degree
2. In your opinion, how is the company's experience of attracting qualified/experienced employees?
3. If you answered that the company struggles to hire appropriately qualified/experienced staff, to your knowledge, how does the company deal with this problem?
    - Use recruitment specialists
    - Head hunt from competitors
    - Hire people without required skills and provide training
    - Leave positions vacant
    - Other (please specify)
4. To your knowledge, does the company provide training to its employees?
5. If yes, what is the company's preferred means of providing training? In-house, University, Technikons, Business partners or other?
6. Are the training institutions that are available offer courses that are relevant for their business?
7. Is there a positive change in performance of the staff after attending courses?
8. If they train in-house, do they have a formal training programme or is it a process of learning on the job?

Labour regulations and cost

1. How would you describe the labour relations environment in your sector, in this area, and in your business?
2. What is the impact of the strikes on your business? Are you affected because it's an input to other product, or you close down because your employees are part of a union?
3. How have the prevailing labour conditions affected your incentive to hire labour?
4. Have you recently made any decisions to mechanize? Are you considering or planning to mechanize?
5. Do you make use of any external companies for cleaning, maintenance etc? To what extent do you outsource?

Power supply

1. Has your company experienced power outages?
2. If yes, during how many days did your company experience power outages and/or voltage fluctuation at this site in the last 12 months?
3. Who is the company's power provider, City Power or Eskom?
4. How has the electricity situation affected your performance and expenses? What is the effect of power outages on your company?
5. If possible, will you quantify the impact of outages on their business? This should be detailed in terms opportunity costs of lost production (this would include the labour cost and must account for the duration of the outage and the time it takes to start up the plant), any wastage in input materials used, initial cost of generator and running it?
6. In the event of a power outage, what is the start-up and the cleaning up process?

Water Supply and Road infrastructure

1. Does the water supply in your area meet the firm's needs? If not, please explain.
2. In your opinion, which of the following best describes the road infrastructure in the area?

Transportation

1. Does the company provide transport to employees? If not, to your knowledge, what modes of transport are most frequently used by the company's employees to get to work?

Shift patterns

1. Does your company run shifts?
2. How many shifts is the company running currently per day at this site?
3. If the firm has a 2 shift system, what would be the optimal number of shifts for the firm?
4. Would the firm shift to the optimal number (if greater than 2) if there was public transport available for a late night shifts?
5. If the company is running 3 or 4 shifts and providing transport for staff, are you able to quantify the cost associated with this?

Location

1. Do you have room for expansion?
2. In your opinion, which of the following best describe the main advantages of the company's current location.
    - Access to markets
    - Quality of infrastructure (electricity, water, public transport etc)
    - Proximity to suppliers
    - Availability of land to expand
    - Inexpensive rental
    - Other (please specify)
3. In your opinion, which of the following best describe the main disadvantages of the company's current location.
    - Lack of access to markets
    - Quality of infrastructure (electricity, water, public transport etc)
    - Lack of availability of infrastructure to expand (i.e. electricity, water etc)
    - Lack of availability of land to expand

- Crime/Theft
- Expensive rental
- Other (please specify)

O. Firm challenges

Which of the following best describe the main challenges facing your business in the past 3 years?

- High input costs
- The exchange rate
- High costs due to old machinery
- High energy costs
- Lack of access to/poor quality internet and communication infrastructure
- Load shedding/intermittent power supply
- Poor quality infrastructure
- Lack of available skills
- Crime/theft
- Labour relations/regulations
- Lack of available public transport
- Struggle to find new markets
- High rental rates
- Access to local markets
- Access to regional markets
- None of the above
- Other (please specify)

Membership of business associations

1. Is the company a member of a business association currently? If yes, please provide the name(s) of the association.
2. Capital equipment firms - Are you part of the SA capital equipment export council (SACEEC)?
3. Plastics - Are you part of the Plastic Federation of SA?
4. Are there any benefits derived from this membership?
5. How has the membership benefited your company? Is it through export information, industry advice?

Relationship with the City

1. Has your company recently interacted with the City? If yes, how has been that experience?
2. What could the city do to help improve the competitiveness of the company?
3. How can the city attract/retain/grow businesses in the area?

Forward looking plans

1. Would they like an export council or any other association to be set up?
2. What solutions do they have for the issues that they have brought up?