Industry Nodes and Cluster Development in the City of Joburg

BACKGROUND REPORT ON THE PLASTICS CLUSTER

Prepared for the City of Johannesburg

Prepared by the Centre for Competition, Regulation and Economic Development

July 2016

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1. Introduction

The City of Johannesburg appointed the Centre for Competition, Regulation and Economic Development (CCRED) to conduct research to provide a deeper understanding of the economy of Johannesburg and the way in which the city can best use the tools at its disposal to facilitate a more inclusive, job intensive, resilient and competitive city in economy. The research was conducted in 2014 and made two sets of recommendations. The first set of made recommendations were to assist the city to remove bottlenecks which are affecting the competiveness of firms and to create enabling conditions for firm growth. The second set of recommendations, highlighted how the City could assist firms to take advantage of new opportunities. The research found that there are a few sectors that have a strong presence in Johannesburg, which are in demand in the SADC region. This creates an opportunity for the City to coordinate export promotion, skills development and access to investment incentives, research and development to assist firms to take up these opportunities. The report further emphasised that these activities could be better facilitated through clusters.

In middle income countries manufacturing growth has led GDP growth, however in South Africa it has lagged and the non-resource based industries have performed particularly poorly. This is concerning considering the important linkages between industry growth and services. A large proportion of the services growth recorded in South Africa has been found to be a result of outsourcing of services such as security by the manufacturing sector (Tregenna, 2009). Thus the government has placed an emphasis on re-industrialisation, as the strategy to grow the economy. This is consistent with the experiences of countries that have successfully transitioned from developing economies to developed economies. Countries have developed by building industry. But how do countries build industries? This requires bringing together production capabilities, conducive environment such as competitively priced inputs, access to finance, investment in appropriate technology, and working public infrastructure. However, the nature of building production capabilities is that it takes time and effort to learn to use technologies, build skills such that private firms will inherently under-invest in activities required to build these capabilities. Here lies the role for local government.

The challenge for local economic development is ensuring the collective development of capabilities at a local level in order to realise collective learning through informal networks, common understanding and trust. Cluster development has been a channel for initiatives to encourage and support interfirm collaboration. Clusters can result in institutions which provide services and training, so enabling positive externality effects (or ‘spill-overs’) to be built on.

The objective of the report is to identify the potential for cluster development opportunities. One of the sectors that were identified as having a strong presence in Johannesburg was the broader chemicals sector, which encompasses petroleum products, basic chemicals, other chemicals, plastics products and rubber products. Of these industries, plastics and other chemicals have the largest employment potential.

Section 2 provides a background of the plastics sector at a national level. Section 3 focuses on the performance of industry, while section 4 reviews plastic fabrication in the City of Johannesburg. Section 6 looks at the challenges of the sector and opportunities for growth. Section seven reviews the policy frameworks to identify the opportunities for intervention and possible collaborations with other government departments.

2. Background to the Plastics Sector

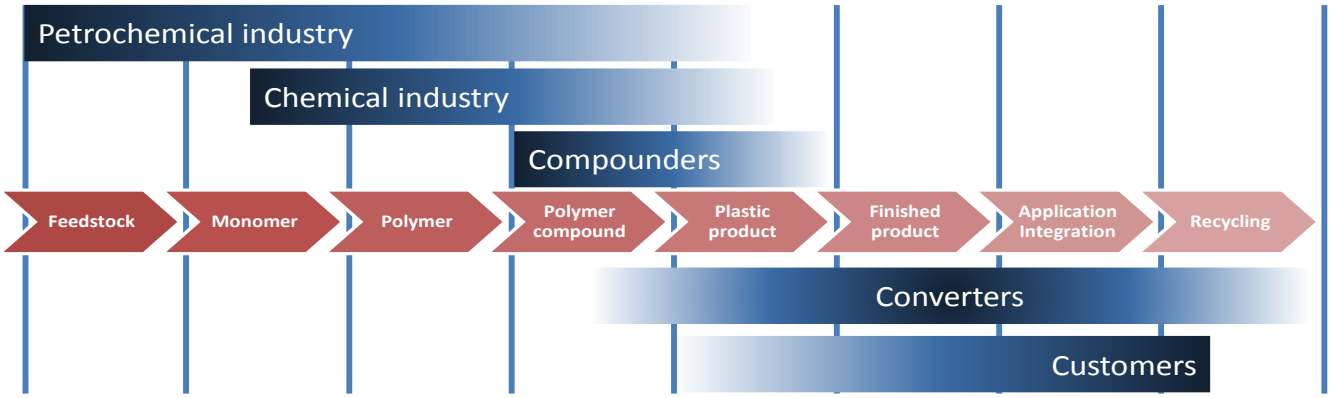
The plastics sector in South Africa is characterised by highly concentrated upstream manufacture of polymer chemicals, which is closely linked with the processing of fossil fuels, and lower levels of concentration in the downstream manufacture of plastic products. Large-scale production of polymer chemicals arises as a result of technical requirements with the minimum efficient scale of present investments exceeding the size of the South African domestic market in some of the polymers, for example polypropylene. This also implies relatively capital-intensive production and significant barriers to entry. In contrast, the manufacture of plastic products is characterised by relatively low scale economies. These products are differentiated by product qualities and the sectors into which they form inputs, such as motor vehicles, building materials, electrical products, and packaging. Cost competitiveness is very important to the sector and this is particularly the case for your commodity goods that can easily be imported.

As reflected in the industrial policy action plan (IPAP), the plastics industry forms an important part of the South African economy. The IPAP recognises major opportunities to improve local beneficiation of polymers - the most important inputs into the manufacture of plastics. The plastics industry has made contributions to output growth and employment, and a competitive plastics industry is a crucial component of sustainable manufacturing growth given the wide range of applications of plastics materials including in the packaging, automotive and domestic sectors.

The plastics sector is in many ways representative of the diversified manufacturing industry in which growth is necessary as part of broader-based economic development. The manufacture of plastic products is not ultra-labour intensive, but it is labour absorbing. It is not ultra-capital-intensive but requires investment in the appropriate, relatively sophisticated, machinery and moulds if world-class products are to be made with the design and characteristics consumers expect. As such, it requires bringing together a set of production capabilities, along with ensuring the basic conditions are in place such as competitively priced inputs, access to finance and the ability to source appropriate machinery and moulds.

The plastics value chains starts with the petrochemical industry which produces the feedstocks used to produce the raw material. The feedstocks are sold to the chemicals industry which purifies them to produces monomers and then polymers. These polymers are either sold directly to the downstream plastic product manufacturers or to compounders who mix the polymers with additives in order to achieve certain, characteristics. For example, the automotive industry generally requires polymers with additives such as talc. Application and integration represents the use of plastic products in the manufacture of other products. Used plastic products are also recovered for recycling.

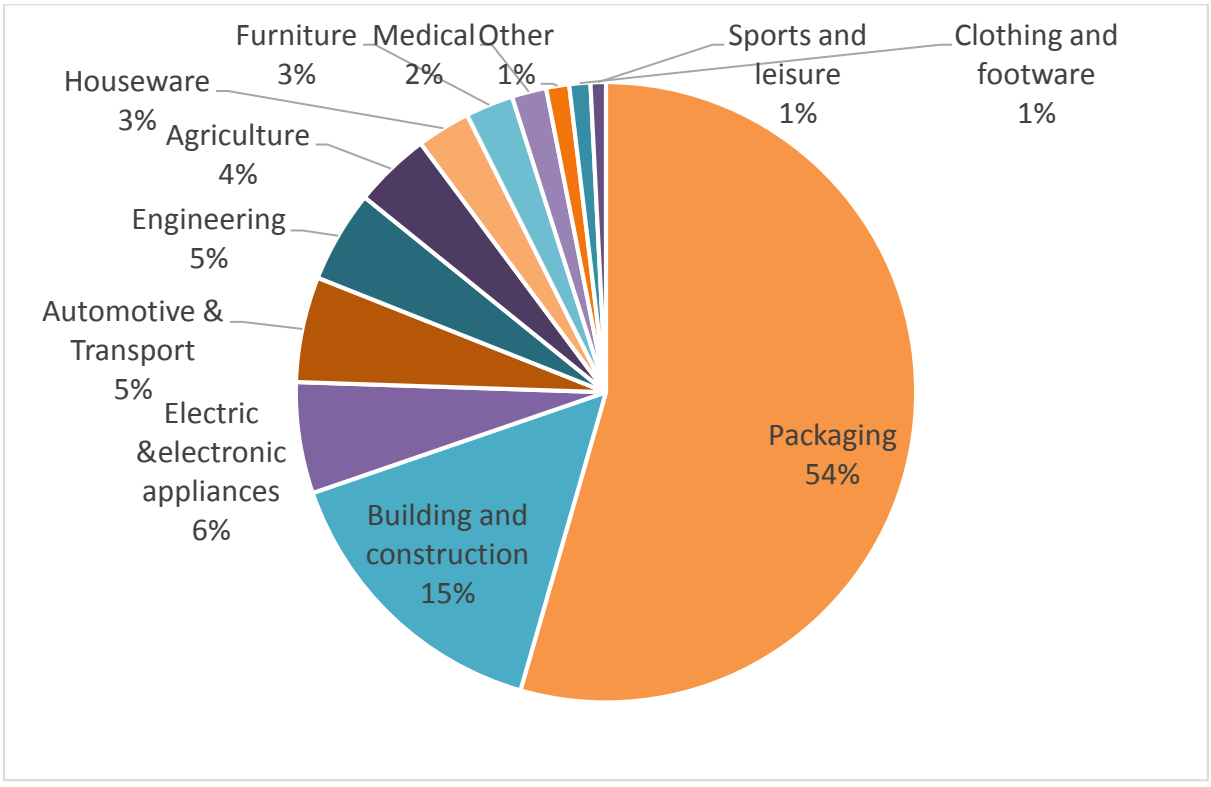
Figure 1: Plastics Value Chain



Source: Merseta Plastics Charter

The petrochemical and chemical industries are capital intensive, with opportunities for labour absorption lying in the downstream levels of the value chain and particularly plastics product manufacturing. As an intermediate product, plastics have forward linkages to a wide range of industries but the biggest subsector, in terms of polymer consumption is packaging (figure 2).

Figure 2: South Africa Plastic Industry market sectors by polymer volumes consumed



Source: Plastic Federation South Africa annual Report, 2014

Factors that influence the location of plastics firms include proximity to raw materials, final markets, reliability and cost of electricity, access to high voltage

Recycling

The local plastic recycling industry has also been growing slowly over time. In 2014, Plastic Federation South Africa reported that 280 000 tonnes were recycled that year, representing 20% of the virgin material consumed by the industry. Recycled plastic is an alternative raw material to high priced virgin polymers for a number of applications. The South African recycle rates are increasing slowly but are still far lower than other countries.

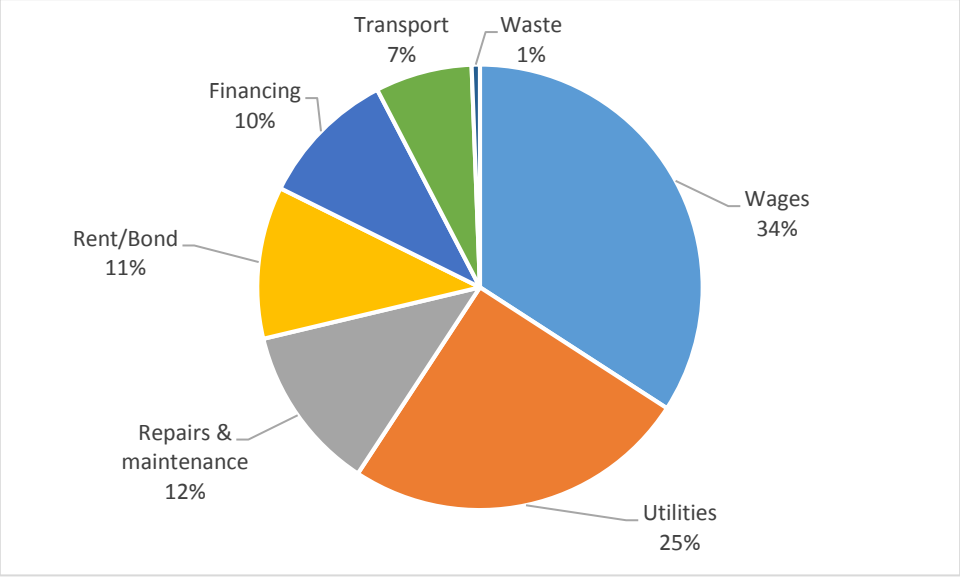
Figure 3: Plastic recycling rates

	2009	2010	2011	2012
Tonnes converted	1 280 000	1 312 700	1 300 000	1 370 000
Tonnes recycled (recovery rate)	228057 (17.8%)	241853 (18.4%)	245 696 (18.9%)	272691 (19.9%)
Total employees	4841	4812	5062	5047

Source: Plastics SA, plastics recycling survey

There are 230 recycling firms in the country, which employ about 5047 people collectively. Informal employment is estimated at 44 000 collection jobs. The recycling firms sort, wash, granulate and pelletise for on-sell to the plastics fabricators. Recycling is labour absorbing with wages making up 34% of operating costs (figure 4).

Figure 4: Average operating costs of recyclers that granulate, wash and pelletise.

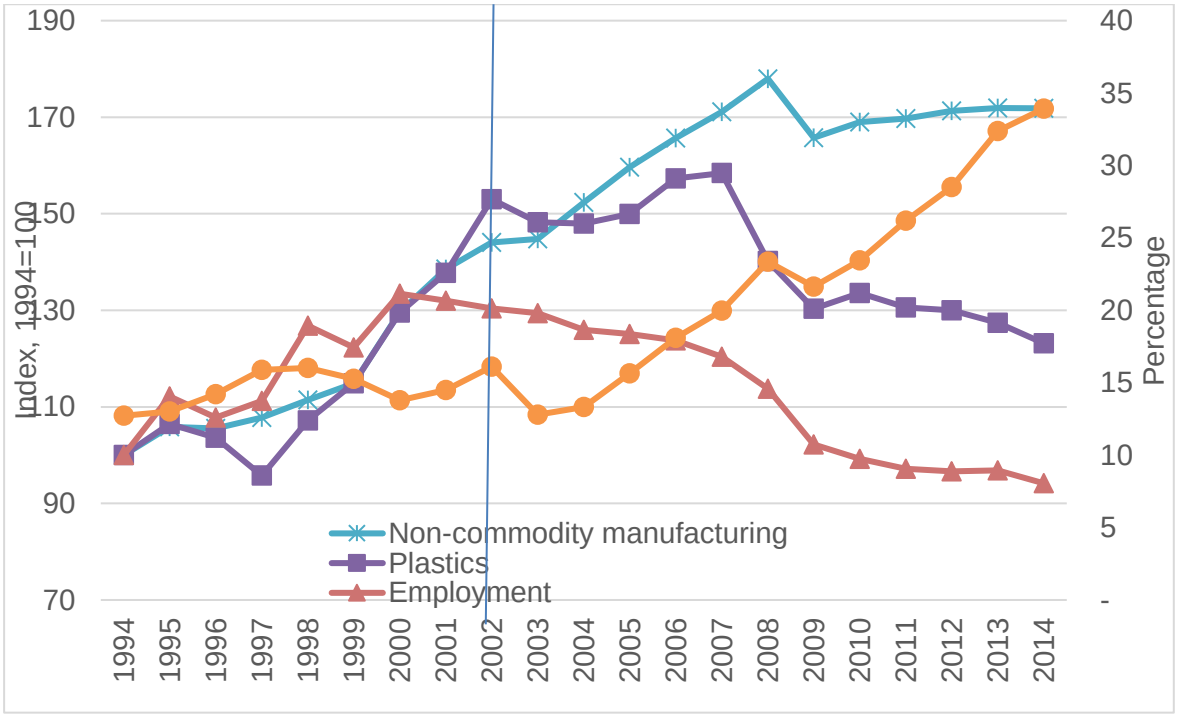


Source: Plastics SA Recycling Survey

3. Performance of the South African Plastics Sector

What is most striking about the performance of the plastics sector is that real output broadly followed non-commodity manufacturing until 2002, with relatively good performance form the mid-1990s (Figure 5). There was particularly strong growth up to 2002 after the depreciation of the Rand. Since 2002 performance has been poor, in particular, when assessed relative to non-commodity manufacturing (Manufacturing less; Basic chemicals, Coke and refined petroleum products, other chemicals and manmade fibres, basic iron and steel, basic non-ferrous metals) and sector output has declined from 2007. While manufacturing recorded a slight recovery from 2009 the same cannot be said for plastics. The poorer performance of plastics from 2002 is associated with rapidly rising import penetration from 2003, having been fairly stable up to then.

Figure 5: Performance of the plastics sector



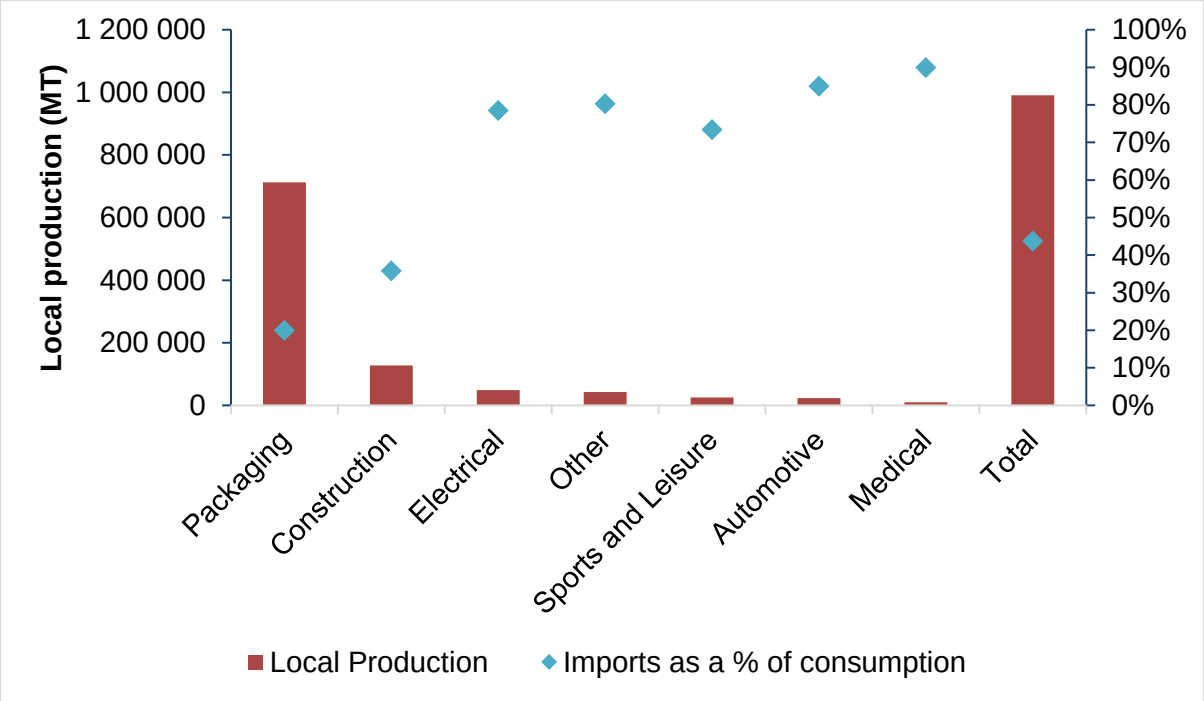
Source: Own Calculations using Quantec Data

Figure 5 also shows that employment has been decreasing for most of the period. The employment data shows that employment shrunk by more than 15 000 jobs from 2002 until 2014. If one considers the counterfactual to be the growth rate in employment experienced in the earlier period, this suggests a net loss in jobs of 20 000. In actual fact, plastic products would be expected to grow more rapidly than GDP and more than upstream sectors in a diversified industrialising economy.

Three industries in particular – construction, packaging, and automotive – drive growth of the plastics sector as economies grow, but in South Africa's case, though the industries have been growing, this has not translated into growth for the plastics sector. While the production of

packaging has grown, the decline in the plastics sector as a whole indicates the shrinking of other segments. In other words, the performance of the non-packaging segments is even worse than for the sector overall (figure 6).

Figure 6: Import t penetration by subsector



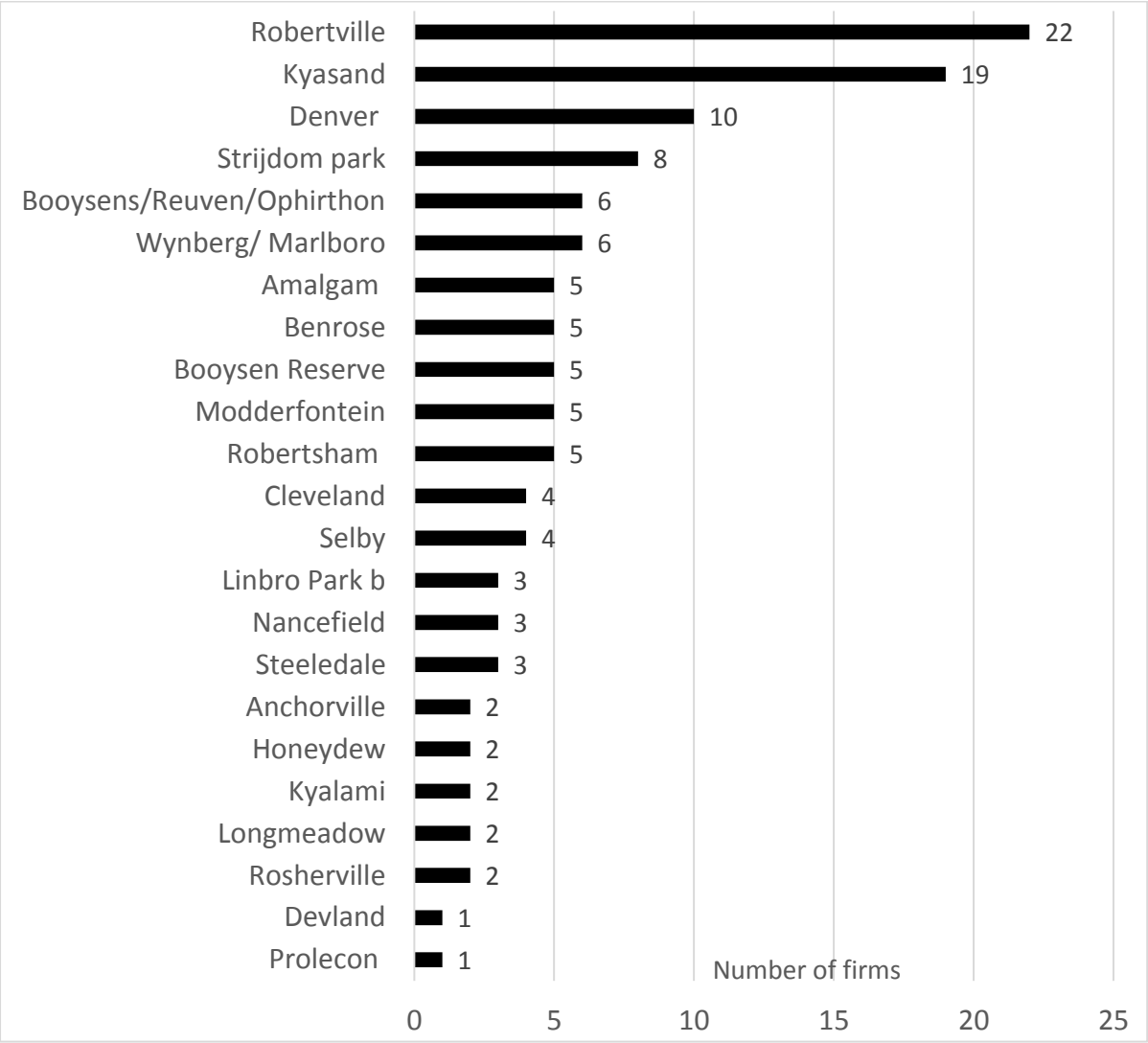
Source: The DTI

Investment levels in the plastics sector showed growth from 1994 consistent with the strong performance over this period, however, investment rates fell again thereafter and, although there has been some recovery, the rates did not exceed the 2001 levels until 2013. Average investment rates in the plastics sector have also been poor relative to other manufacturing sectors. On average over the period 2002-2014, investment rates were only 13% of value add, compared to manufacturing at 26%.

4. Plastic fabrication in the City of Johannesburg

The scoping study found that there are 125 plastic fabrication firms in Johannesburg industrial areas. The industrial nodes that have the highest number of plastic firms are Robertville, Kya Sands and Denver (Figure 7).

Figure 7: Number of plastics firms by industrial node



Source: Scoping data

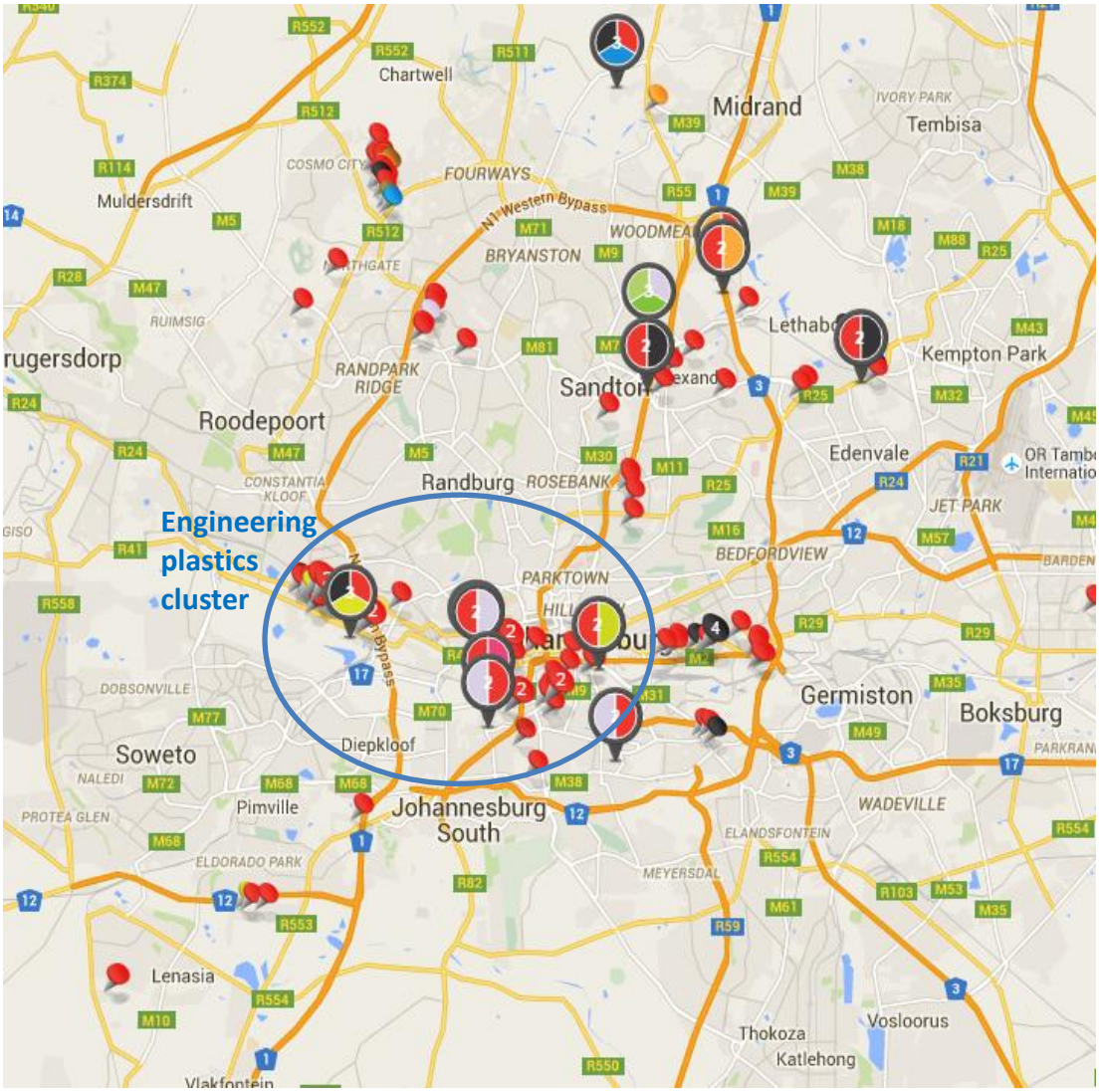
The subsectors that have a presence in Johannesburg are engineering plastics and packaging. We note that the scoping study did not include firms that are located outside of industrial areas and as a result missed the importance of 3D printing in Johannesburg as these firms are located in the suburbs.

Engineering demand is often obscured as many apparent engineering uses can also be categorised as construction (bridge bearing and building pads) or automotive (seals, gaskets, gears and sprockets etc.) or electronics uses (gears and sprockets, bushes, fasteners, knobs, handle, wheels etc.). However certain plastics are clearly for engineering uses but are often high specialised or customised for a specific use, such as conveyor components, dairy and meat processing equipment, wharf fenders, pump lining, high-temperature components, low friction and structural bearings to mention a few. In many countries, engineering plastics producers have developed highly specialised manufacturing plants that serve niche markets and consumers where extensive investments are required to acquire skills and equipment that contributes to the high cost of such goods. However, customers for such niche products are more responsive to quality and reliability of supply than simply cost. Many European and US

downstream plastics manufactures have developed in this manner rather than take on the high volume low value imports from China et al.

We have mapped the firms to be able to assist in picking up any clustering of particular applications in the same location (Figure 8).

Figure 8: Map of plastics firms in Johannesburg



Source: Compiled by authors, Click here to view the interactive map.

Colour	Sector	No. of firms	Colour	Sector	No. of firms
Brown	Automotive	3	yellow	medical	2
Orange	Building and construction	5	White	other	8
Purple	Clothing and footwear	2	black	packaging	15
Blue	Electronics	2	Light green	Sports and leisure	1
Red	Engineering plastics	101	Olive green	Houseware	2
Dark Green	Furniture	1			

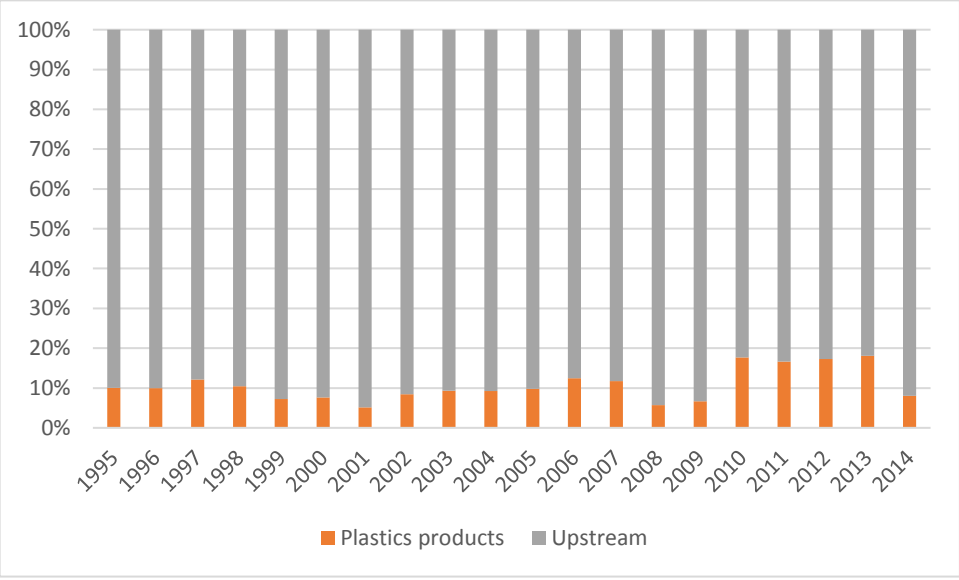
There are 22 firms in Robertville in the West Rand, most of which are engineering plastics firms. Engineering plastics are intermediate inputs into a variety of other industry. Kya Sands has 19 plastics firms which manufacture a variety of products including automotive, electronics, engineering and packaging products. Kya Sands also has three toll manufactures who also do mould design and mould making. Denver, has 10 plastics firms with a focus on packaging. The products manufactured in Denver include closure, containers, tube, and pre-forms. In Denver there is also a presence of large forms e.g. Astrapak and Boxmore, both packaging firms.

There appears to be a clustering of the engineering plastics firms in the South West regions in Johannesburg, around the University of Johannesburg and Witwatersrand University. This certainly would make it easier to facilitate partnerships between these firms and the universities for research and development projects.

Performance

The available industry data on the output, gross value added, employment and investment is only available at the 3 digit sic code for municipalities. As such the data is available for a wider chemicals sector including petroleum products, basic chemicals, other chemicals, plastics and rubber products. From the national data, plastics makes up a small proportion of the wider sector in all the indicators save for employment. Thus we do not assess this data here as the results would not be representative of the performance of the plastics industry. Trade data is available in disaggregated form for municipalities and we assess the data as a proxy for competitiveness of plastics production in the Johannesburg. The assumption is that if products are competitive in international markets, then the firms producing them are competitive. The first striking feature of the plastics export data is that a bulk of the exports are that of the upstream polymers. Over the 20 year period ending 2014, downstream plastics products only made up and average of 14% to the total exports of plastics and articles thereof (Figure 9).

Figure 9: Johannesburg exports of plastics and articles thereof



Source: Quantec

For the purposes of this report the City is not concerned about the performance of the upstream polymers as they are not produced in the Johannesburg. The exports are recorded in Johannesburg because the head offices of the polymer producer firms are based in Johannesburg. This head office effect may also affect other exports as production may take place outside the metro but if the head offices is based in Johannesburg then the origin of exports will also be recorded as such.

A disaggregated analysis of the export volume data, shows that sub-sectors that have recorded growth in the 10 year period 2004 to 2014 are non-reinforced plates and sheets, and bathroomware. The subsectors that have recorded biggest decline are houseware and pipes and parts thereof (Table 1).

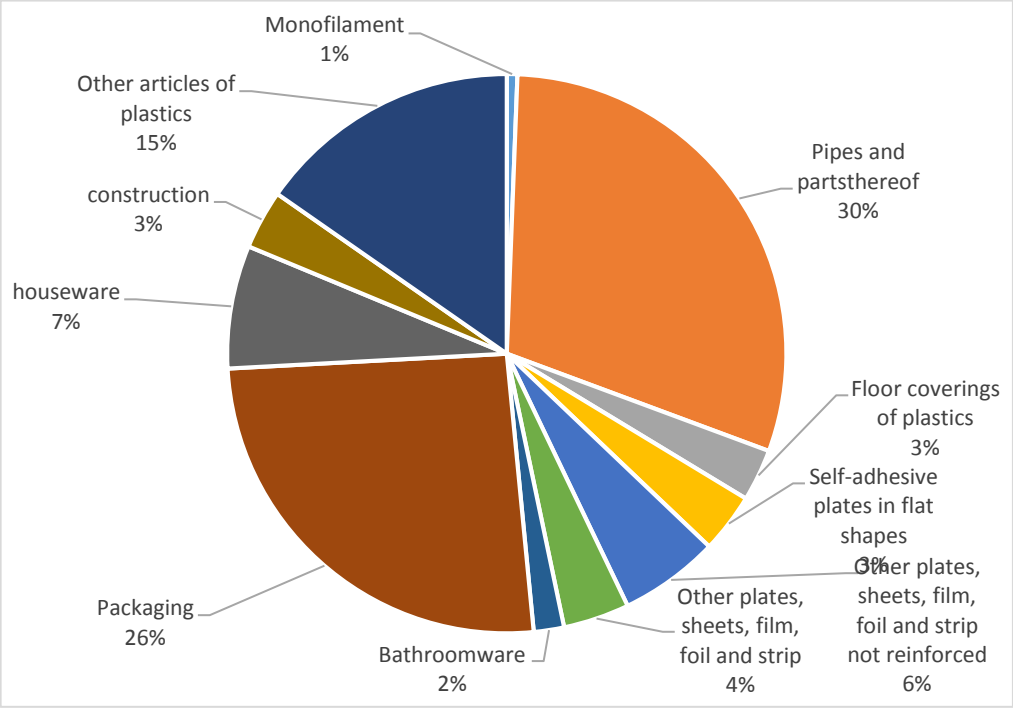
Table 1: Growth/decline of export volumes

Sub-sector	CAGR (2004-14)
Other plates, sheets, film, foil and strip not reinforced	12%
Bathroomware	9%
Floor coverings of plastics	4%
Packaging	4%
Other articles of plastics	3%
Other plates, sheets, film, foil and strip	2%
Monofilament	-2%
construction	-7%
Self-adhesive plates in flat shapes	-9%
Pipes and parts thereof	-10%
houseware	-16%

Source: Authors calculations using Quantec data

However, pipes and parts thereof are a high proportion of the total exports of plastics products in Johannesburg (figure 10).

Figure 10: Plastics subsectors in Johannesburg



Source: Quantec

The other articles of plastics makes up 15% of Johannesburg exports, where the category includes office or schools supplies; articles of apparel and clothing accessories; fittings for furniture, coachwork; statuettes and other ornamental articles and uncategorised products. The biggest subcategory is the uncategorised products followed by office or school supplies.

Survey Responses

29 plastics firms responded to the survey, representing 23% of the plastics firms identified by the scoping study as operating in industrial nodes in Johannesburg. The survey respondents are involved the packaging, houseware, engineering plastics and other subsectors. 59% of the respondents are older than 10 years, while 17% had entered in the last 5 years. The survey responses suggest that the Johannesburg plastic industry has linkages to other sectors, 59% of the respondents supply industry.

The majority of the respondents are small firms, with only14% of the respondents meeting the criteria for medium sized classification based on turnover. 44% of the respondents realised a below R10 million in the last financial year. All the respondents were small firm when assessed based on the employee numbers. 28% of the firms have between 51 and 200 employees, while the rest have less.

The performance of the firms is in line with the performance of the national industry. The majority of the firms are either static or declining, 45% of the respondents are static, 31% are declining and only 14% are growing. Of the 4 firms that are growing, 2 entered the market in the last 5 years and are both based in Hariotdale. What also comes out clearly in the survey data is that the firms are operating below capacity with only 5% of the respondents operating at more than 75% capacity. However, we caution that given that the firms are small they may be running multiple product lines on the same machinery which would increase downtime for cleaning the machines and exchanging moulds.

The firms that are declining have cited a fall in customer demand and lost sales to domestic competitors, lost sales to foreign competitors and the decline in the economy, in order of prominence. The loss in customer demand does not seem to be linked to a particular subsector. However, it does emphasise the importance of assisting firms to unlock the regional demand which is growing in most subsectors.41% of the firms export primarily to other African countries.

Though the average life of the machinery is not old. Only 4 had equipment life longer than 20 years, 3 of which were growing. Surprisingly 8 of the 10 firms that have equipment less than 10 years are static. Even firms that have invested in the last two years are static, 7 of the 12 firm that invested are static

Two firms hold patents and both are have been static. 16 of the 29 firms indicated that they struggle to find people with the required skills, albeit to different degrees. The solution that most of the firms that indicated that they struggle to find qualified people has been to hire people without skills and train them. 22 of the 29 plastics firms provide training to their employees and 19 of the 22 provide the training in-house. We note that Plastics SA has

reported that 1 321 learners attended their courses from Gauteng in 2014.[1] 2522 of the 60 000 plastics industry employees attended training with Plastics SA in 2014.

Figure 11: Top 10 learning programmes in Gauteng

Number	Programme Name	
1	Thermoplastic Welding	520
2	Applied Workplace Mathematics	45
3	Understand and deal with HIV/AIDS	37
4	Basic Injection Moulding	35
5	Develop your Portfolio of Evidence	35
6	Financial Principles	34
7	Apply SHEQ Procedures and Systems	32
8	Apply Study and Learning Techniques	32
9	Resolving Conflict in a Diverse Environment	30
10	Develop Learning Strategies	29

Source: PlasticsSA

In terms of infrastructure, 23 of the 29 firms are supplied electricity by City Power, 1 is supplied by Eskom and the other were not aware of the electricity provider. 15 firms indicated that they have had problems with voltage fluctuations. This is a concern for plastic fabrication as most of the conversion methods are electricity intensive. The firms also indicated that they were affected by load shedding in the past year. However, it is difficult to discern which of the power outages were due to load shedding by Eskom or due to poorly maintained electricity infrastructure. The voltage fluctuations are likely related to power provision by City Power. In the study conducted in Aeroton and Industria West, firms indicated that they suffered great loss from voltage fluctuation.

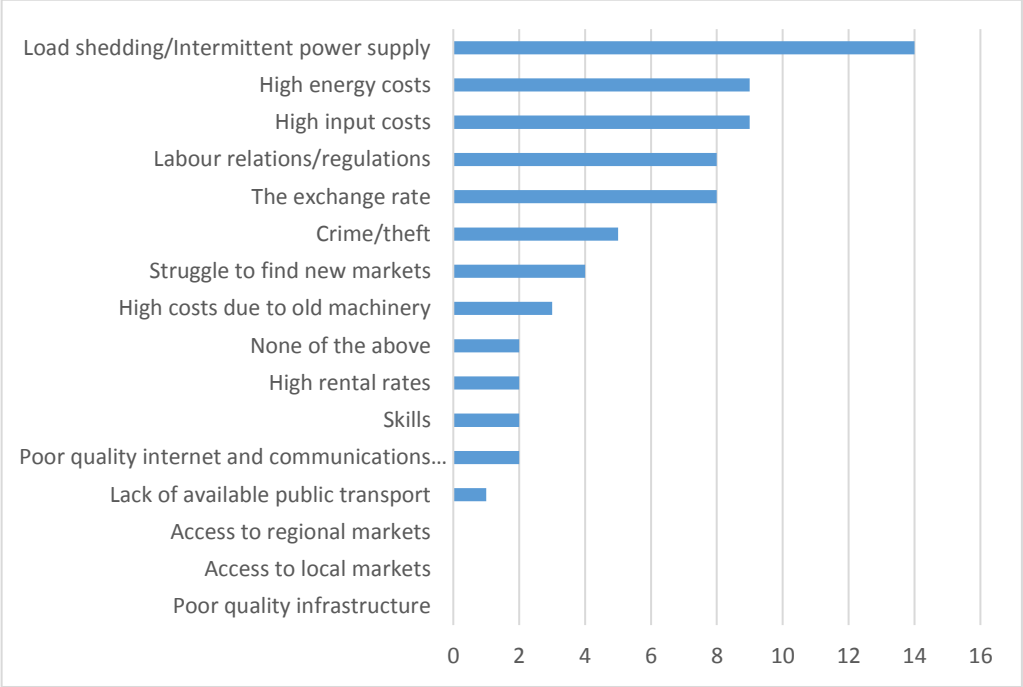
4 of 26 firms indicated that they run 3 shifts a day and 10 indicated that the availability of transport affects the firm's ability to run optimal shifts. 2 of the firms that operate 3 shifts indicated the employees walk to and from work. The firms are in Lenasia and Kya Sands, which have residential areas adjacent to the industrial nodes. Two firms have opted to provide transport for employees, but the main mode of transportation is minibus taxi, which do not operate later than 21:00 in most areas.

Firms have based location decisions on the proximity to markets and suppliers, these are the top reasons for location. While the most commonly cited location decision is maintenance of infrastructure. 6 firms also indicated the lack of availability of infrastructure to expand as a disadvantage.

The firms were asked to pick 3 main challenges from 16 options. 25 firms made selections, however not all the firms made 3 selections. In total, there were 69 selections made. From these selections, the main challenges facing the plastics firms are load shedding at 20% of

the responses, followed by high energy and input costs, both at 13% and labour relations and regulations and the exchange rate, both at 12% (Figure 12).

Figure 12: Survey responses-main challenges faced by firms



Source: Survey data

The responses have to be understood with reference to the cost structures of the plastics firms. The most commonly used conversion methods are injection moulding and extrusion and the biggest proportion of total cost of production are raw materials, labour and electricity (Table 2).

Table 2: Cost build up for typical convertors

	Injection Moulding	**Extrusion**
Raw Materials	56%	83%
Labour	15%	8%
Electricity	14%	3%
other	15%	6%
	100%	100%

Source: Beare et al (2014)

The implication is that the challenges that have the biggest impact on the bottom line will be those linked to those that make a bigger contribution to total cost. This is not to say that the other issues are not important for competitiveness, just that the impact on cost is lower.

The exchange rate is linked to raw material cost as the polymer are priced at import parity and thus subject to exchange rate fluctuations. Load shedding results in losses as when the power goes out the raw material in the machines hardens and it takes approximately 3 hours to clean the machines and re-start them. Depending on the products being produced, the firm may or may not be able to re-use the scrap raw material removed from the machinery. Even if the firm

is able to re-use the scrap it has to be recycled first (pelletise some may require washing as well). So power outages result in downtime (lost production), wastage, recycling cost, and a proportion of the staff complement will be idle (while paid). A plastic firm interviewed, during the 2014 investigation indicated that in that year, it had lost raw materials amounting to R1.7 million due to load shedding. In instances where, the power outage is planned with sufficient notice, it gives firms an opportunity to plan shifts to minimise the wastage and other costs of a shutdown.

5. Policy Framework

The plastics sector was identified as a priority sector in National Industrial Policy Framework (NIPF), as such the DTI's strategies for the sector have been part of the Industrial Policy Action Plan (IPAP) since inception in 2007. IPAP has repeatedly acknowledged high input polymer pricing and the impact on the downstream plastic fabrication industry. In 2007, the DTI requested the Competition Commission to investigate the prices of polymers. We review IPAP plans for the plastics industry for the period 2010 to 2015. It appears that the main targeted outcome has been to increase exports, investments and employment opportunities (Table 3).

Table 3: IPAP

	KAP	**targeted outcomes**
2010	PP beneficiation	Increased export, investment and employment opportunities
2011	PP beneficiation	Increased export, investment and employment opportunities
2012	PP and PVC beneficiation	Achieve local production of at least half the demand.
2013	PP beneficiation	An increase in local production to meet at least half of the total domestic demand.
	Plastics trade policy measures	Eliminate illegal imports and encourage local manufacturing
2014	Development of plastic production and innovation cluster	A Sustainable plastic cluster with access to markets.
	Plastics trade policy measures	A Sustainable plastic cluster with access to markets.
2015	Development of a plastics production and innovation cluster	A sustainable plastic cluster with access to markets.
	Promotion of the integration of plastics products in identified key sectors and cross-cutting area.	Enhanced integration of key intermediate plastic products into other industrial sectors' production and value-adding processes.
2016	Plastics Exporter development programme	Increased exports of value added plastics products supported by an export development programme.
2016	Combating customs fraud	Reduced mis-declaration and under-invoicing of imports
2016	]Innovation and cluster programmes	Establishing a plastics innovation platform. Developing plastics clusters.

Source: IPAP

In IPAP 2015/2016, the DTI's key action plan is to develop a plastics production and innovation cluster and promotion of integration of the plastics products in key sectors e.g. automotives,

construction, footwear and medical devices. Promotion of localisation – designation of plastic products e.g. plastic pipes and other construction material under the PICC localisation programme. The DTI has also committed to support skills development in the plastics sector initiated by Plastics SA. The Gauteng Tooling Initiative also has strategies to upgrade skills in the tool making and maintenance. The Gauteng Tooling Initiative is a subsidiary of the National Tooling Initiative, which has been around for a few years with little or no impact on the industry. Interviewed firms had not come across graduates of this programme.

As one of the key Action Plans for 2016/17 IPAP, the DTI plans to develop a plastics production and innovation cluster. The DTI wants to collaborate with municipalities and is already working with eThekwini and eKurhuleni. There are advanced discussions for spin-off the existing clothing and textiles and automotive clusters. The clothing and textiles spinoff will produce plastic uppers for shoes, while the automotive spinoff will produce plastic automotive products. The initial clusters developed in Ekurhuleni have been successful. The firms in the clusters have improved organizational capabilities, increased expenditure on R&D and have become more competitive. Other examples of clusters in South Africa are Western Cape "special purpose vehicles".

Plastics SA, supported by the DTI, is developing a training, research and development, and testing project. The project will first focus on training and then gradually move to cover research and development and testing. The training programme is designed to follow the apprenticeship model, where the theory will be taught Plastics SA in Midrand and on-the job training will be provided at the different Plastics SA members. The plastics SA members have committed to supporting the initiative by offering opportunities for on the job training. Plastics SA has developed training programmes over the years. On average over 2010 to 2014, Plastics SA provided training to 2708 people a year from their 3 centres in Midrand, Durban and Cape Town.

Plastics SA has not received the final approval for the project, the DTI has not released the funding for the clusters. The DTI and eKurhuleni are also partnering with Plastics SA to attempt to develop a cluster that will fill gaps in plastics manufacturing. This is particular cluster is at the proposal stage.

DTI support of clusters does not replace the role of local government. The support is primarily driven by the clusters programme. Where groups of firms can approach the DTI for cluster funding. The programme has a budget but no funds have been released so far. As part of the programme the DTI provides 80% of the funding and the companies must provide the 20%. The requirement is that the cluster must include 5 or more companies. As plastics products are intermediate products for other production processed there is an opportunity to incorporate strategies to develop the sector into other sector programmes. The DTI has identified key sectors where plastics should be integrated into, these include automotive, medical devices, construction.

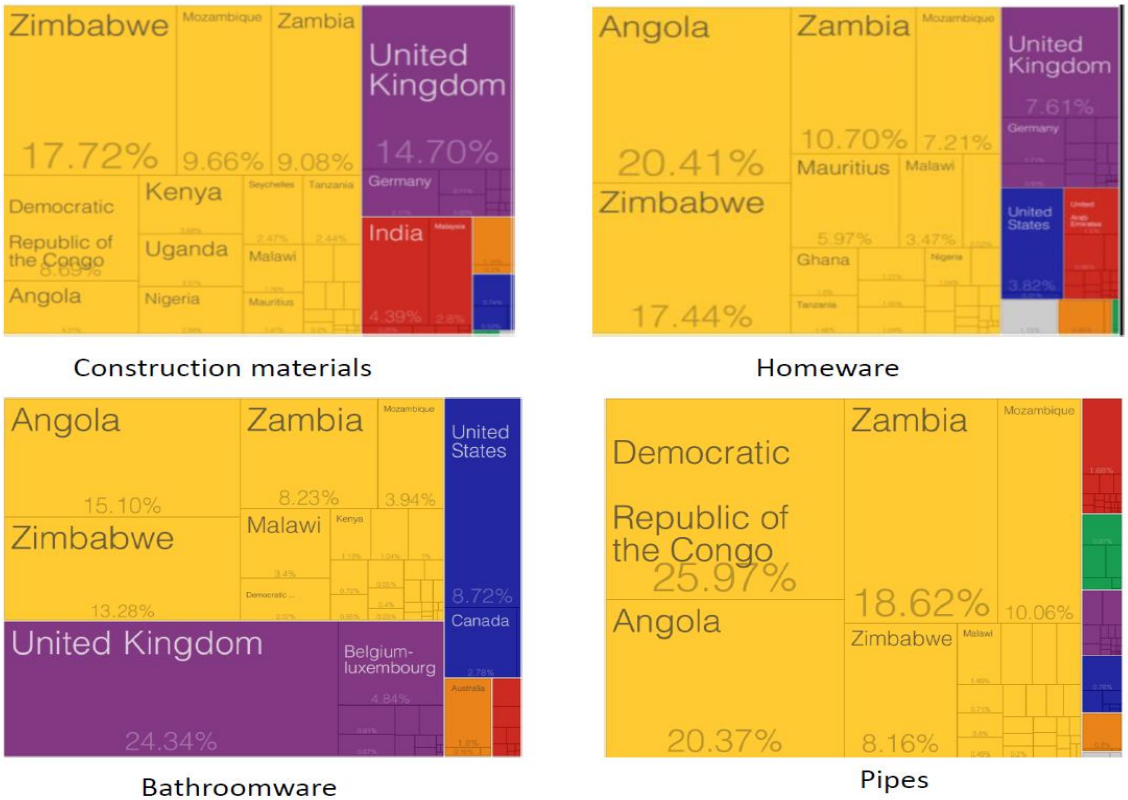
6. Challenges and opportunities

The research has shown that the main challenges that are facing the plastics sector are poor competitiveness as evidenced by the high import penetration at approximately 35%. South Africa is also generally performing poorly relative to industrialising economies like Malaysia, Thailand, Turkey and Brazil. The expectation is that plastics industries in industrialising

economies grow as plastic are intermediate inputs into other manufacturing processes and also as incomes rise the demand for plastics products (e.g. packaging, houseware, bathroomware) increase. In South Africa and this has not been the case and Johannesburg is no different to the rest of the country in this respect. Export volumes have declined over time, indicative of a shrinking industry. The survey responses and in-depth interviews conducted have highlighted the challenges that plastics firms in the Johannesburg industrial nodes. These include polymer pricing, high cost of electricity, the power outages, skills shortage and low investment levels. All these factors contribute to the poor competitiveness of the industry. The firms have also indicated that there is a decline in domestic demand.

To improve the performance of the industry there are two things that need to be achieved. First, the industry needs to win back the imports. Second, the domestic industry needs to take advantage of the growing demand in the regions. The City of Johannesburg is relatively close to the region and best positioned to service the regional market through overland exports. South Africa is viewed as the gateway to the region and should be taking advantage of this position. Incomes in the region are growing thereby creating demand for plastic consumables. As the industries in the region grow so will the demand for intermediate input products. Though South African exports to the region have grown in absolute terms, there has been a loss market share. In 2011, South Africa had a 41% share in the total plastic products imports but by 2013 this had declined to 33%. If South Africa loses competitiveness in the region this affects 83% of the total plastics products exports and would thus have a devastating impact on the industry. An analysis of the four important plastics subsectors shows that the most important export destination for locally manufactured plastics products is the continent and more specifically the SADC region.

Figure 13: Exports of destination for locally manufactured plastic products



Source: Observatory of Economic Complexity

The diagram shows exports categorised by destination and the different colours represent the different continents, where, yellow is Africa, purple is Europe, red is Asia, blue is North America, green is South America and Orange is Australia.

7. Potential clusters for development by the City of Johannesburg

Though the research, identified a number of areas for potential clustering, there has been little interest from firms to cluster. The commitment of firms is critical for the success of clusters. The more successful clusters are led by firms with local government and other stakeholders providing a supporting role. The proposed intervention focuses on one of the issues that has been raised during the firm interviews which is confirmed by the 2015/2016 CoJ survey, the mismatch between the skills that are available and those that are required by industry.

Plastics SA has developed a proposal for what they are calling a Plastics Industry Innovation and Skills Cluster. The initiative has three initiatives, a) skills development, b) research and development and c) testing. The objective of the skills component is to develop artisan level skills. The National Artisan Moderation Body (NAMB) in collaboration with the industry has developed the Plastics Manufacturing Machine Setter Trade qualification (NQF level 4) to develop skills that are relevant to the plastics industry. However, at the moment there is no FET College that has the necessary equipment and trainers to teach this qualification and skills initiative seeks to fill this gap.

The research and development initiative will link current research activities by CSIR and universities with the research requirements of the industry. The testing initiative will build a laboratory for sample testing, trial runs, product development, analysis of products and materials and testing products that are destined for exports where products need to meet certain standards.

The proposed intervention responds to the skills shortage challenge that is faced by the sector. Most of the interviewed firms were aware of the training courses provided by Plastics SA and a number of the firms had sent their employees for training. Though the proposed location for training centre is Midrand, a more suitable location for the firms would be one of the university campuses, the mapping of the plastics firms has shown that there is already clustering of the engineering plastics firms around the universities. It is also likely that the bulk of the workers that are employed in these firms are from the surrounding townships including Soweto.

Engineering plastics production typically require more advanced capabilities and the firms would benefit from the skilling of employees. Over and above the programme suggested by Plastics SA there is an opportunity to explore partnerships with universities for design, prototyping and 3D printing. The University of Johannesburg and Wits already have a 3D printing facilities that could be used by firms for design and prototyping. Three dimensional printing (3D printing) is rapidly expanding. It is used to print a range of products including parts for the military, medical implants, jewellery and football boots designed for individual feet. The 3D printing technology is changing the way that production of high performance plastics products are manufactured, allowing firms to develop and launch a range of products faster,

at lower costs and with fewer risks.[2] The technology was initially used exclusively for prototyping but the technology is evolving and a survey of users in the United States shows that there is a shift to using the technology for production as well.[3] The technology is also becoming available in lower cost over time, making to more affordable for use in production.

Given the delays in release the cluster funds, the City of Johannesburg may step in to support the initiative. Plastics SA has indicated that they would be happy to get assistance from the City and the DTI which is also supporting the project has also indicated that the project could benefit from assistance by local government. Should the project succeed, the Johannesburg would be attractive for firm location due to the skills availability. The high number of engineering plastics firms in Johannesburg may be an indication of advanced capabilities in plastic product manufacturing and these capabilities need to be supported through skills development and research and development interventions to ensure that Johannesburg continues to attract the smart industries. We recommend that when engaging with Plastics SA, the City of Johannesburg should negotiate that the facilities should be housed at one of the universities to be closer to firms and also allow for ease of information flow between firms and universities regarding research and development.

[2] European Plastics Distributors Association. 2015. 3D Printing will transform plastics industry. Available online http://www.epda.com/3d-printing-will-transform-plastics-industry [Accessed 20 June 2016]

[3] Price Waterhouse Coopers, 2014. As 3-D printers become faster, easier to use, handle multiple materials, and print active components or systems, they will find use beyond rapid prototyping. Available online: http://www.pwc.com/us/en/technology-forecast/2014/3d-printing/features/future-3d-printing.html