

**Industrial Development Research Programme (IDRP)**

**Research Project on Public Procurement**

**Railway Locomotives and Transnet: A Case Study**



GE Evolution Series ES40ACi locomotive

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## Acronyms, abbreviations and terms used

<b>AC</b>	Alternating current
<b>CNR</b>	China North Locomotive and Rolling Stock Corporation Limited
<b>COSATU</b>	Congress of South African Trade Unions
<b>CRRC</b>	China Railway Rolling Stock Corporation
<b>CSDP</b>	Competitive Supplier Development Programme
<b>CSR</b>	China South Locomotive & Rolling Stock Corporation Limited
<b>DC</b>	Direct current
<b>DOT</b>	Department of Transport
<b>DPE</b>	Department of Public Enterprises
<b>DPME</b>	Department of Planning, Monitoring and Evaluation
<b>DTI</b>	Department of Trade and Industry
<b>GE</b>	General Electric South Africa
<b>GDP</b>	Gross domestic product
<b>GPA</b>	Government Procurement Agreement
<b>IPAP</b>	Industrial Policy Action Plan
<b>kph</b>	Kilometres per hour
<b>kV</b>	Kilo volts
<b>NIPP</b>	National Industrial Participation Programme
<b>NDP</b>	National Development Plan
<b>NUMSA</b>	National Union of Metal Workers South Africa
<b>OEM</b>	Original Equipment Manufacturer
<b>PAJA</b>	Promotion of Administrative Justice Act, 2000 (Act No. 3 of 2000)
<b>PPPFA</b>	Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000)
<b>PRASA</b>	Passenger Rail Association of South Africa
<b>R&amp;D</b>	Research and development
<b>Rolling stock</b>	Refers to locomotives, carriages, wagons, or other vehicles used on a railway
<b>RRA</b>	Rail Road Association
<b>SABS</b>	South African Bureau of Standards
<b>SARB</b>	South African Reserve Bank
<b>SACEEC</b>	South Africa Capital Equipment Export Council
<b>SADC</b>	Southern African Development Community
<b>SEIAS</b>	Socio Economic Impact Assessment System
<b>SOC</b>	State Owned Company
<b>SOE</b>	State Owned Enterprise
<b>TE</b>	Transnet Engineering
<b>TFR</b>	Transnet Freight Rail

## **Executive summary**

### **Introduction**

This study evaluates the impact of public procurement policy on Transnet's procurement of 1064 railway locomotives as an instrument to develop local rail rolling stock manufacturing capacity in South Africa. It is a part of Research Stream 1 of a Multi-year Industrial Development Research Programme commissioned by the South African Department of Trade and Industry to review South Africa's industrial strategies. This case study examines the largest ever (in Rand value terms) locomotive procurement in South Africa by assessing its impact on building local industrial capabilities in the rail rolling stock sector, and the institutional arrangements seeking to develop it.

South Africa faces the triple challenges of poverty, inequality and unemployment, in the context of low economic growth. In the current fiscal and macroeconomic context government's capacity to address the various pressing needs is constrained by limited fiscal resources. This means that all expenditure needs to be effective when measured against outputs and outcomes, and justifiable in relation to the opportunity cost of spending it elsewhere. This understanding underscores the need for rigorous monitoring and evaluation of all government expenditure.

Public procurement can be an important lever in developing local manufacturing capabilities because of the scale at which it is conducted. In 2016, the DTI estimated that government purchasing power through public procurement contributed between 15% and 25% to GDP (Makube, 2016). Public infrastructure investment in healthcare facilities, schools, water, sanitation, housing and electrification was estimated at R827 billion between 2013 and 2016. The value of the Transnet locomotive tender under consideration here is R50 billion.

The tender was awarded to four foreign companies. Chinese state owned companies won 56% of the tender (591 units). Of the 1 064 locomotives, 998 are scheduled to be assembled in South Africa at Transnet Engineering's facilities in Pretoria and Durban. In order to meet local content obligations the OEMs have subcontracted much of their component supply to local suppliers.

### **Purpose**

The primary purpose of this research, using the procurement of 1 064 locomotives as a case study, is to assess the impact of public procurement on industrial development where public procurement is a major source of demand, and where localisation occurred as a direct result

of public procurement policies. The impact on supplier competitiveness was measured by firm-level investment in product, process and functional upgrading.

Drawing on previous research on the South African capital equipment sector and the analytical concepts of value chain analysis, the research wished to reveal how relationships impact on firm competitiveness. To do this the key role played by OEMs in driving the different value chains is analysed, in particular with regard to: a) decisions around the localisation of manufacturing operations, product design, R&D, and aftermarket services; b) strategies to access international technologies; c) contractual and operational relationships with Transnet; and, d) the OEMs' role in integrating and supporting South African suppliers, possibly also integrating them into their global value chains (that is, supporting their export orientation).

In order to investigate new entry and growth, in particular by black industrialists, we analysed the extent and modes of entry of black industrialists, key barriers to entry faced in terms of skills, regulations, capital and/or technology requirements, and Transnet procurement practices. Lastly, the research reviews the design, implementation and monitoring aspects of the Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000) Regulations and Instruction Notes regarding the designation of sectors, as well as the coherence among multiple industrial policies.

## **Methodology**

The study used quantitative and qualitative methods. The qualitative element encompassed desk top reviews of key policies, industry reports and academic research. The desk top review included a literature review of public procurement, within the broader literature on industrial development and structural transformation, and more specifically in the South African context. The literature included journal articles, previous CCRED working papers, South Africa's policy documents, technical reports prepared for government, Transnet documents, industry publications and news articles.

For the quantitative data analysis researchers collected and analysed data related to domestic production, employment, capital formation, exports and import penetration. The main databases consulted were Quantec, COMTRADE, and industry data.

Interviews were conducted with key stakeholders in government and the private sector, Transnet, OEMs, and selected Tier 1 suppliers. Despite protracted efforts researchers were only able to gain access to a fraction of the targeted interviewees. Only 2 of the six government departments targeted (based on their interaction with Transnet, industry expertise, policy influence and regulatory conditions) were able to be interviewed. Only one of the four OEMs

could be conducted due to non-disclosure agreements between Transnet Freight Rail and the OEMs. Only ten of the planned 19 interviews with suppliers agreed to be interviewed. Interviews with an industry expert and an industry association were also carried out to ensure a rounded appreciation of the landscape.

### **Research limitations**

These research findings should be evaluated critically in the light of the two significant limitations. Limited access to industry stakeholder (referred to above) was compensated for by engagements with industry experts, suppliers and readily available public information in an endeavour to ensure that the findings are well-grounded.

Secondly the manufacture of the 1064 locomotives was at a very early stage when this research was conducted in September and October 2016 and therefore the learnings are more limited than they might have been had the research been conducted at a later stage in the programme. In addition the delivery of locomotives was running significantly behind schedule, with the manufacturing process running approximately one year behind schedule due to manufacturing problems, especially with regard to the first few locally produced locomotives

### **Overview of the public procurement policy**

South Africa has leveraged public procurement through the designation of sectors and products for local content under the Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000), the National Industrial Participation Programme and the Competitive Supplier Development Programme. A key challenge has been weak application of these requirements among municipalities and large state-owned companies (SOCs) such as the Passenger Rail Agency of South Africa (PRASA), Eskom and Transnet. For this reason, the DTI's Industrial Policy Action Plans (IPAP) focused on improving institutional coordination, enforcement and verification but have met with only modest success.

Verification of local content is the first step towards enforcement. This requires a competent and well-resourced verification agent to conduct verification checks at various points in the process: in the assessment of bids; in dealing with exemption applications and in the assessment of goods delivered. Finally, if non-compliance is uncovered there needs to be an enforcement agency with the necessary policies and procedures to address non-compliance.

Local content policy objectives are undermined by the lack of an operating verification agent for goods supplied, and the lack of penalties.



## **Research findings**

### *Procurement and localisation*

Transnet's 'feast and famine' procurement over time, short notice periods and short delivery deadlines all militate against the sustained development of a local rolling stock manufacturing industry. Although the designation of locomotive fleets was intended to achieve smoother and more predictable demand, the 1064 locomotive procurement programme has not met this objective. These challenges are intimately bound up with the economies of scale that apply in the various locomotive component market segments suggesting that a more detailed and nuanced approach may yield better results. Transnet planning and scheduling is identified by suppliers as sub-optimal with consequential increased costs for suppliers and knock-on effects through the value chain.

Transnet's contracts did not match the DTI's local content expectations and the results thus far have not met the expectations of stakeholders like the Rail Road Association. Transnet Engineering's attempts to assemble locomotives in its own factories and Bombardier's localisation plans have run into difficulties leading to delays with negative consequences for suppliers that are facing throughput and working capital challenges.

In its endeavour to become an OEM, Transnet's chosen programme design involves complicated shop floor manufacturing arrangements in which it is both a customer of the OEMs and a competitor. This, taken together with the emerging delays and the lack of an operational verification agency, puts local content objectives at considerable risk.

Selection and auditing of prospective suppliers by OEMs appears to be thorough and demanding. Nonetheless there seems to be a considerable mismatch of perceptions between suppliers and OEMs. Product quality is a key concern for both OEMs and suppliers. Some suppliers are struggling to meet OEM quality requirements. It appears that GE and Bombardier are more demanding customers for suppliers than the Chinese companies, particularly in the areas of price competitiveness and product quality. Notwithstanding their being tougher task masters, GE and Bombardier seem to enjoy higher levels of trust from local suppliers than the Chinese firms do.

The Department of Transport's National Rail Policy Green Paper makes a strong case for moving South Africa from the narrow (Cape) gauge railways in South Africa to the standard gauge despite the very substantial investments required (Department of Transport, August 2015).

Although Transnet believes that much of its rolling stock has reached the end of its life, the R50 billion investment being made in 1064 narrow gauge locomotives does not maximise the value of the intervention if there is to be a medium term move to standard gauge and further ties South Africa to uncompetitive rail infrastructure. The Green Paper points out that railway development needs to exploit heavy haul, double stacking, and high-speed potentials (which would come with standard gauge) if rail is reverse the growing trend of moving goods by road.

#### *Localisation by suppliers and OEMs*

This study found that the benefits of localisation are becoming apparent among some suppliers. There are indications that some suppliers are engaging in product innovation rather than R&D. There will need to be closer coordination between the DTI and the DST's technology transfer unit, as well as with OEMs, as local suppliers tackle export markets.

OEMs seem to have different strategies towards localisation. On the one hand, investments are being made to equip South Africa as a future platform and innovation hub for expansion into African and other markets. On the other hand, the commitment by the Chinese firms to localisation is questionable. Chinese firms have secured permission to build the largest number of locomotives outside of South Africa and with limited evidence thus far of investments being made in South Africa.

There is some evidence among suppliers that market diversification into both local markets and export markets is beginning to occur but it is too early in the programme for this to be known conclusively. The main target markets are African countries but there are barriers to entry such as state dominance of the rail sector in many countries.

#### *Manufacturing capabilities*

The OEMs have brought with them important foreign direct investment by substantial global firms in higher value adding activities such as propulsion equipment and engines. In addition to the accompanying employment and skills benefits, this holds the prospect of increased localisation in non-rail sectors of the economy, reduced imports and increased exports.

In general, OEM cooperation and assistance has resulted in improved manufacturing capabilities among suppliers. The major thrust of the OEMs in so far as technology transfer is concerned has focused on factory floor issues related to lean manufacturing and consistently meeting quality standards with some firms making significant progress in these areas. Even after these efforts one OEM forecast is that only 5% to 7% of prospective suppliers will succeed in becoming exporters. As may be expected there are varying levels of cooperation between suppliers and OEMs. All suppliers and 'their' OEMs continuously exchange

information. More substantive cooperation is focused on product quality and health, safety and environmental issues whilst there are only weak levels of cooperation in technology transfer and skills.

Many firms, large and small, are focused on the domestic market largely due to the fact that complying with the several different sets of international standards is a major challenge. Focusing on the domestic market reduces the incentive and capabilities to meet international standards. Most suppliers interviewed have upgraded their manufacturing processes, chiefly through investment in machinery, skills, quality controls and new products. Although progress is being made in organisation and management techniques and higher skills, advances in R&D, product innovation and new patents are scarce.

### *Policy and incentives*

Public procurement interventions require cost-benefit analyses to be undertaken prior to implementation, but in this case, none were carried out. Thus far, a critical analysis of the Instruction Notes<sup>1</sup> has not been carried out. It is anomalous that considerable effort is concentrated on putting in place a verification agent and funding it, aimed at dealing with just the measurement of local content and yet the much bigger and more important issue of the costs of local content prescripts is overlooked.

The findings of the Public Sector Supply Chain Management Review (2015) by the National Treasury are confirmed and remain valid. Demand-side incentives such as local content prescripts need to be accompanied by corresponding supply-side interventions if optimal benefit is to be obtained, which is currently not the case.

Transnet's primary role is to provide rail infrastructure and thereafter to operate rail services (trains). Transnet's decision to become an OEM appears to have been made in the absence of policy guidance. This move poses significant challenges for the rail rolling stock industry. Transnet is crowding out the private sector, which is inconsistent with the objectives of developing a rolling stock manufacturing sector and black industrialists, notwithstanding the fact that Transnet's own capacity is being developed. Transnet's actions raise policy questions. Should SOC infrastructure companies go beyond the provision of infrastructure and its repair and maintenance into the ownership and operation of rolling stock on that infrastructure and into the manufacture of that rolling stock, particularly when they are already dominant in their respective markets? By comparison: should Transnet Pipelines be involved

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<sup>1</sup> Issued under the Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000).

the manufacture of piping with a view to exports? Should Eskom be involved in the manufacture of steam boilers or turbines with a view to exports?

Furthermore, Transnet's ambition to become an OEM, complicates relationships between Transnet, OEMs and suppliers. For example, it places Transnet in a position where it is conflicted as it is both a customer and a competitor. When Transnet evaluates bids from suppliers, it gains valuable insights into the cost structures of those firms. That knowledge can then be useful when Transnet is competing for bids with those same firms in the export markets.

Transnet's OEM ambition also has implications for foreign OEMs, such as dissuading them from investing in the local market, and thereby inhibiting the prospects of South African suppliers becoming part of the supply chain for those OEMs in international markets. Its aspiration to become an OEM in a policy vacuum takes on added significance in the light of Cabinet's decision to have the Department of Public Enterprises and National Treasury consolidate procurement for locomotives into a single institution, under Transnet.

The scale of Transnet's procurement exercises together with its market dominance shape the rolling stock manufacturing landscape. This distorts the distinction between policy maker and policy implementer. Without clear policy guidance, SOC procurement officers determine important aspects of industrial policy for competing firms.

Since the 1990s, the design of public procurement policies, laws and regulations has been informed by principles of transparency, non-discrimination and maximum competition. South Africa is falling short of this international standard and its own Constitutional and PAJA standards (code of good administrative conduct), in particular regarding clarity of policy objectives for particular interventions and the written reasons for such decisions being available in the public domain.

#### *Designation and verification*

In general there is recognition among suppliers and OEMs that the DTI staff determining designation thresholds have a difficult task and, despite doing well, there have been unintended consequences.

Local content verification in bids has, in a sense, replaced the role that price plays in a deregulated market and so takes on added importance. This is more so in circumstances where there are pressures on procurement officers to speed up bid evaluations and where product verification has not yet commenced.

Verification and reporting burdens are similar across firms, regardless of size, resulting in a disproportionately large burden on small firms. There is no single document describing how to calculate local content. Instead there are several, which compromises efficiency. The exchange rate to be used in local content value calculations is specified differently in three different documents which creates confusion.

A very low proportion of suppliers interviewed utilised government support instruments. Calls were made for simpler and clearer documentation as well as faster processing times.

The findings of this research confirm those set out in the Black Industrialists Policy, except for a greater emphasis on the need for manufacturing experience.

### *Exemption*

Decisions on applications for exemption from local content requirements are made without the benefit of a fully-fledged delegation of authority matrix and appeal procedure. This is a serious administrative matter given the magnitude of possible decisions. Coordination with Transnet in such decision making is at less than a desirable level.

### *Moving forward*

Readers should bear in mind the caveat given in the introduction concerning the limitations of this research having been conducted so early in the life of the 1064 locomotive procurement programme. The main findings are:

1. The funding of a verification agency should be addressed as a matter of urgency because the space created by the lack of an operational verification agency raises the risk that local content objectives will be compromised and a golden opportunity to advance local manufacturing may be lost.
2. The three different exchange rate requirements used in the local content documentation should be harmonised into a single prescription as a matter of urgency.
3. It is recommended that steps are taken to disentangle the various incentive measures and to streamline the administration thereof.
4. A comprehensive cost/benefit analysis of local content requirements is recommended. At the very least, Instruction Notes made by National Treasury designating local content requirements should be subject to a comprehensive SEIAS review.
5. Transnet's decision to try and become an OEM should be subject to a policy review and clear policy published clarifying the dividing line between matters of public policy or industrial policy and the scope for SOCs to make decisions that impinge on those areas.

Such a policy should also clarify the kind of relationship South Africa wishes to have with foreign OEMs.

6. In the interests of transparency and accountability to the public, the DTI and National Treasury should jointly and formally publish the policy objectives specific to each local content market intervention and provide written reasons for their decisions.
7. Local content prescripts should be accompanied by corresponding supply-side measures dealing with skills development, lean manufacturing, meeting international standards and technology advancement.
8. The design of locomotive local content instruments requires more detailed consideration with a view to more nuanced instruments. More consideration should be given to the role of economies of scale in setting local content thresholds for the various locomotive component market segments and the distinction between procurement for homologated new equipment and procurement for maintenance and refurbishment. In market segments with high levels of concentration Government should provide Transnet with policy direction in regard to achieving transformation objectives without the possible irredeemable loss of certain manufacturing and skill sets.
9. The DTI should require smoother and more predictable demand with longer delivery times in strategic fleet procurement. In doing so it should, *inter alia*, seek involvement in the work of the Department of Public Enterprises and National Treasury intended to consolidate procurement of rolling stock into a single institution, under Transnet.
10. The DTI should investigate the possibility of improving Transnet's planning and ordering with a view to incentivising Transnet to improve it.
11. If Transnet continues to work towards becoming an OEM, its bid evaluations (for rolling stock) should be shifted to an independent organisation in a process designed to optimise efficiency and avoid delays. Alternatively other means should be found to remove Transnet from its current conflicted status.
12. With regard to the administration of the local content Instruction Notes there are several recommendations:
  - a. A more fully developed procedure for processing applications for exemptions with appropriate delegations of authority should be adopted (for details please see page 106).
  - b. Reporting requirements for suppliers should be revised to take account of proportionality that is, making the burden commensurate with financial contribution to a project instead of a one-size-fits-all.
  - c. The SABS should be encouraged to use industry experts in the early stages of verification to identify areas requiring more thorough going investigation.

- d. Decisions on exemption applications should apply not just to the applicant but rather to the product concerned, regardless of manufacturer.
  - e. Consultation between the DTI and Transnet on applications for exemption should be improved.
  - f. SOCs, OEMs and their suppliers bound by local content obligations should be obligated to provide information to the DTI, or its agents, on matters relating to the policy objectives being pursued because improving the design and efficacy of local content instruments requires information about previous successes and failures.
13. The DTI should consider subsidising or otherwise assisting prospective exporters of rolling stock or components thereof in acquiring certification from the Association of American Railroads (AAR) and/or the International Railway Industry Standard (IRIS).
14. A further investigation similar to this one should be carried out at the end of the 1064 locomotive procurement programme.

## **1 Introduction and background**

### **1.1 Introduction**

This report concerns a case study of Transnet's procurement of 1064 railway locomotives as an instrument to develop local rail rolling stock manufacturing capacity. It is a part of Research Stream 1 of a Multi-year Industrial Development Research Programme commissioned by the South African Department of Trade and Industry to review South Africa's industrial strategies. This case study examines the largest ever (in rand value terms) locomotive procurement in South Africa.

South Africa faces the problem of addressing the triple challenges of poverty, inequality and unemployment, in the context of low economic growth. In the current fiscal and macroeconomic context, in particular, government's capacity to address the various pressing needs is constrained by limited fiscal resources. This means that all expenditure needs to be effective when measured against outputs and outcomes, and justifiable in relation to the opportunity cost of spending it elsewhere. This understanding underscores the need for rigorous monitoring and evaluation of all expenditure.

Public procurement can be an important lever in developing local manufacturing capabilities because of the scale at which it is conducted. Public procurement in South Africa amounted to R236 billion and contributed 7.4% to GDP in 2012 (DTI, 2013). Public infrastructure investment in healthcare facilities, schools, water, sanitation, housing and electrification is estimated at R827 billion between 2013 and 2016. In 2016, the DTI stated that government purchasing power through public procurement contributes between 15% and 25% towards GDP (Makube, 2016). The value of the Transnet locomotive tender under consideration here is R50bn.

South Africa has leveraged public procurement through the designation of sectors and products for local content under the Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000), the National Industrial Participation Programme and the Competitive Supplier Development Programme. A key challenge has been weak application of these requirements among municipalities and large state-owned companies (SOCs) such as the Passenger Rail Agency of South Africa (PRASA), Eskom and Transnet. For this reason, the DTI's Industrial Policy Action Plans (IPAP) focuses on improving institutional coordination, enforcement and verification.

This report deals with the impact of public procurement on building local industrial capabilities in the rail rolling stock sector, and the institutional arrangements seeking to develop it.



The benefits of this research should be evaluated critically in the light of two significant drawbacks. Firstly, three of the four original equipment manufacturers (OEMs) supplying locomotives to Transnet were not able to be interviewed. They cited non-disclosure provisions in their contracts with Transnet and required Transnet's authorisation before granting interviews. Such authorisation was not forthcoming. Due to time pressures and lack of cooperation from firms, only 10 of the intended sample of 19 firms were able to be interviewed.

Secondly the manufacture of the 1064 locomotives was at a very early stage when this research was conducted in September and October 2016. It had not yet gained momentum with the result that the learnings available are more limited than they might have been had the research been conducted at a later stage in the programme. In addition the delivery of locomotives was running significantly behind schedule.

### ***Purpose***

This research set out to assess, through interviews with Transnet, its OEMs and their suppliers the following:

- The extent of import replacement at national level for products where public procurement is a major source of demand, and where localisation occurred as a direct result of public procurement policies;
- The extent and modes of entry of black industrialists;
- The impact on firm competitiveness: firm competitiveness *vis a vis* domestic and global competitors, firm sales to other domestic customers, exports;
- The impact on firm upgrading: firm-level investment in production upgrading, technology upgrading, skills development, management and organisational changes, marketing capabilities, R&D and innovation;
- The impact on employment, value addition, and flow through to Tier 2 suppliers;
- The institutional framework: coherence of multiple industrial policy instruments (trade barriers, skills development, competition, etc.) with the localisation programme. It also seeks to identify strengths and weaknesses in the design and implementation of the localisation programme with a view to improvements in subsequent versions.

## 1.2 Background

Transnet is a large South African state owned rail, port and pipeline company with a revenue of R61 billion in 2015. It has refurbished rolling stock (wagons) for many years but has recently embarked on a new venture, locomotive manufacturing in which it is still building capabilities to become competitive. Transnet SOC Ltd. has five operating divisions each of which tends to have its own corporate culture and ways of doing business.

In May 2009 the then Minister of Public Enterprises Minister Malusi Gigaba announced an "ambitious fleet renewal strategy" was being designed to reduce the average fleet age of 33 years (Sapa, 2011). This followed an abortive attempt in 2008 by Transnet Engineering (TE), a division of Transnet, to build 100 class 34-600 and 34-800 locomotives. Although technically successful the plan was abandoned after 5 units were built due to higher than anticipated costs (Railways Africa, 2008). The outstanding units were imported. In 2014 Transnet appears to have enjoyed more success in its manufacturing efforts: 86 of the 95 3kV DC and 25 kV AC dual voltage Class 20E electric locomotives were built at TE's Pretoria facility Transnet, 2014a:63).

*During the year, we took delivery of 95 electric locomotives built with China South Rail. The production programme was completed in a record 12 months, and exceeded all agreed technology and skills transfer targets (Transnet, 2015:33).*

It is not clear what "built" means in this context but it probably means assembled rather than manufactured. The DTI had hoped that the purchases of these two batches of locomotives would have developed local capacity in line with the objectives of the CSDP. In the DTI's view, the results TE achieved were positive but were below expectations regarding suppliers.

In July 2012, the designations under the PPPFA section 9.1 were revised to include designation of local content for locomotives. This was intended to deal with a number of policy grey areas in the NIPP, PPPFA and CSDP. At that time it was reported that a 'follow-on' agreement with General Electric had been reached for 43 diesel-electric locomotives which were being successfully assembled by Transnet Engineering (TE) at its workshops in Pretoria (Creamer, 2012). Up to this point TE had been achieving localisation levels of around 52%, which were then raised to 67% by the order for 43 diesel-electric locomotives given to General Electric (Creamer, 2012).

Also in July 2012 Transnet issued a tender for a much larger order of 1 064 locomotives for its general freight business division: 599 dual-voltage electric powered locomotives and 465 diesel powered locomotives. The local content requirements in the tender were in compliance with the Government's instructions which set the following thresholds (see Table 1):

**Table 1: Rolling Stock Local Content Requirements**

<b>Classes of rail rolling stock</b>	<b>Local content requirement</b>
Diesel locomotives	55%
Electric locomotives	60%
Electric Multiple Units (EMUs)	65%
Wagons	80%

*Source: National Treasury, 2012:2.*

It is noteworthy that the local content required by the new designations for locomotives was significantly lower than Transnet claimed it had already achieved with the GE order for 43 diesel-electric locomotives. At the time (2012) Transnet Chief Executive Brian Molefe said that Transnet would insist on even higher levels of local content than the 67% it had achieved with GE when it came to its much larger order for 1064 locomotives worth R50 billion. This did not happen.

The tenders for these locomotives were scheduled to close in October 2012, but were extended to 28 February 2013. The reason for this may have been that National Treasury and Transnet were still in the process of finalising the terms of the country's Competitive Supplier Development Programme (CSDP) (Transport World, 2012).

However a more plausible explanation is that Transnet was waiting to be bound by the Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000) (PPPFA) and Regulations, from which it was previously exempted. This only came into operation with effect from 7 December 2012 (Transnet, 2013c:46).

Just over a year later the bids were awarded on 17 March 2014 (Barrow, 2014, Transport World, 2015) to four OEMs as follows:

- i. Bombardier Transportation South Africa: 240 Traxx Africa dual-voltage (3kV DC and 25kV AC) electric locomotives with a maximum speed of 100 kph;
- ii. China South Rail Zhuzhou Electric Locomotive Company (CSR): 359 Class 22E dual voltage 3 kV DC and 25 kV AC Co-Co<sup>2</sup> locomotive dual-voltage six-axle electric locomotives, which will have a continuous output of 4.6MW and a maximum speed of 100 kph;
- iii. General Electric South Africa Technologies: 233 ES40ACi Evolution Series diesel locomotives;

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<sup>2</sup> Co-Co is a code for a locomotive wheel arrangement with two six-wheeled bogies with all axles powered, with a separate motor per axle. Co-Cos are most suited to freight work as the extra wheels give them good traction. They are also popular because the greater number of axles results in a lower axle load to the track.

- iv. China North Rail Rolling Stock South Africa (Pty) Ltd (CNR): 232 units of 3.3MW six-axle diesel locomotives using Rolls-Royce Series 4000 engines supplied by MTU South Africa (Pty) Ltd.<sup>3</sup>

CSR and CNR, which won 56% of the tender (591 units), have since merged into the China Railway Rolling Stock Corporation (CRRSC). As of October 2016, only GE and Bombardier had made progress on their localisation plans (Maqutu, 2016).

All of the four OEMs were required to have Black Economic Empowerment partners. Transnet has reported these partners as follows:

- Bombardier Transportation South Africa will include current and future employees; and has the following South African suppliers: Sadiphiri Transport Services; Jabatha Stationers (which according to press reports was surprised to discover that it was a part of the consortium); and Masana Hygiene Services.
- CNR Rolling Stock South Africa (Pty) Ltd has as its partners Kopano Ke Matla Investment company (COSATU's investment company); Linontando Investments; Azon Rail to champion; Lineta Investments and Makana investments.
- CSR Zhuzhou Electric Locomotive has as its partners Matsete Basadi Consortium (MBC) which has four (4) shareholders: Basadi Dirang Systems Development; Matsete Industrial Services; Matla a Sechaba Community Trust; and Adoword Motivational & Life Coaching.
- GE is partnered with the Mineworkers Investment Company.

The contracts with the four OEMs provide for different numbers of locomotives to be built outside of South Africa as follows (see

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<sup>3</sup> MTU South Africa (Pty) Ltd. is a wholly owned subsidiary of MTU Friedrichshafen which is in turn a subsidiary of Rolls Royce.

**Table 2** and Table 3):

**Table 2: Locomotives**

<b>Electric</b>					
<b>Class</b>	<b>Imperial Classification</b>	<b>Type and Voltage</b>	<b>Number to be built outside South Africa</b>	<b>Number to be built in South Africa</b>	<b>Total</b>
TFR Class 22E <sup>a</sup>	Co-Co	CSR ZELC 3kV DC/25 kV AC	40	319	359
TFR Class 23 <sup>b</sup>			0	240	240
		<b>Sub total</b>	<b>40</b>	<b>559</b>	<b>599</b>
<b>Diesel</b>					
TFR Class 44-000 <sup>c</sup>	Co-Co	GE ES40ACi	6	227	233
TFR Class 45-000 <sup>d</sup>			20	212	232
		<b>Sub total</b>	<b>26</b>	<b>439</b>	<b>465</b>
<b>Total</b>			<b>66</b>	<b>998</b>	<b>1064</b>

Source: Transnet Annual Report 2016, DTI (2016) Notes: <sup>a</sup> The contract was awarded to CSR. <sup>b</sup> The contract was awarded to Bombardier. <sup>c</sup> The contract was awarded to GE. <sup>d</sup> The contract was awarded to CNR.

**Table 3: Base costs of Locomotives**

<b>Firm</b>	<b>No. of locomotives</b>	<b>Cost R bn</b>	<b>Type</b>	<b>Unit cost R million</b>
GE	233	7.1	diesel	30.47
CNR	232	7.8	diesel	33.62
CSR	359	14.6	electric	40.67
Bombardier	240	10.4	electric	43.33
<b>TOTAL</b>	<b>1064</b>	<b>39.9</b>		
<b>Average</b>				<b>37.50</b>

Source: Odendaal, 2015

CSR and CNR, won 56% of the tender (591 units). Of the 1 064 locomotives, 998 are scheduled to be assembled in South Africa at Transnet Engineering's newly upgraded facilities in Pretoria and Durban. CNR and Bombardier will assemble their locomotives at Transnet's Durban workshops and CSR and GE at the Pretoria workshops.

Transnet Engineering will share approximately 16% of the total build programme – about a third of which will be outsourced to local emerging engineering and manufacturing firms. Transnet expects the localisation elements to contribute over R90 billion to the economy (Transnet, 2014a:51).

*The award for the 1 064 locomotives fulfilled the requirements for stringent local content, skills development and training commitments, as stipulated by the Supplier Development Programme. The OEMs exceeded the minimum local content compliance criteria for rolling stock of 60% for electric locomotives and 55% for diesel locomotives (Transnet, 2014a:53).*

Transnet Freight Rail is the division that issued the tender and that will own the 1064 locomotives. The assembly of the locomotives, required by the contracts with the OEMs, will be done in Transnet Engineering's factories, partly by TE and partly by the OEMs.

### **1.3 Methodology**

This research is based on a desk top review of key policies, industry reports and academic research; quantitative data from national and international databases, and qualitative data collected through interviews.

The desk top review included a literature review of public procurement, within the broader literature on industrial development and structural transformation, and more specifically in the South African context. The literature included previous CCRED working papers, journal articles, South Africa's policy documents, technical reports prepared for government, Transnet documents, industry publications and news articles.

For the quantitative data analysis researchers collected and analysed data related to domestic production, employment, capital formation, export, import penetration, etc. The main databases consulted were Quantec, COMTRADE, and industry data. The objective of this exercise was to complete a situational analysis.

Interviews were conducted with key stakeholders in government and the private sector, Transnet, OEMs, and selected Tier 1 suppliers. Six government departments were targeted based on their interaction with Transnet, industry expertise, policy influence and regulatory conditions. These included Department of Trade and Industry, Department of Public Enterprises, National Treasury and the South African Bureau of Standards. For various reasons, researchers were only able to secure interviews with the Department of Trade and Industry and the South African Bureau of Standards. Interviews with an industry expert and an industry association were also carried out to ensure a rounded appreciation of the landscape.

Various challenges were also faced with securing interviews with the OEMs and suppliers. Non-disclosure agreements, refusals and other reasons were cited in response to denied interview requests. As a result, only ten of a planned 19 interviews with suppliers could be carried out, while only one out of four interviews with OEMs was able to be conducted.<sup>4</sup> The interviews were conducted with personnel at management level who had an understanding of the company's operations as well as the policy framework relating to local content policies and

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<sup>4</sup> Even though only one OEM was interviewed, the engagements with industry experts, suppliers and readily available public information ensured that the findings are well-founded.

designation. The questionnaire was sent prior the interviews in order to facilitate more fruitful conversations.

One of the limitations of this methodology, imposed by cost and time constraints, is the exclusion from the sample of the firms that did not wish to or failed to become suppliers to OEMs. Such firms are more numerous than those that succeeded in becoming suppliers to OEMs.

The interviews were based on semi-structured questionnaires which explored the key research questions, namely:

- The impact of Transnet procurement on supplier competitiveness;
- New entry and growth of local business, in particular, by black industrialists; and
- Institutional and incentive framework.

In terms of the impact on supplier competitiveness, the research investigated firm-level investment in product, process and functional upgrading. In order to do this, we adopt the definition proposed by Humphrey and Schmitz (2002). Upgrading is broken down into improvements in the production process, for example through re-organisation of the production systems or new technologies (process upgrading); moving into higher more sophisticated product lines (product upgrading); and moving into higher-skills content functions (functional upgrading).

Moreover, drawing on previous research on the South African capital equipment sector and the analytical concepts of value chain analysis, the research uncovers how firm relationships impact on firm competitiveness. The key role played by OEMs in driving the different value chains is analysed, in particular with regard to the following: a) decisions around the localisation of manufacturing operations, product design, R&D, and aftermarket services; b) strategies to access international technologies; c) contractual and operational relationship with Transnet; and d) the OEMs' role in integrating and supporting South African suppliers, possibly also integrating them into their global value chains (i.e. supporting their export orientation).

In order to assess the effectiveness of such firm-level investment, we consider outcomes in terms of: extent of import replacement, sales to other domestic consumers, patent registration and exports. Broader impact on employment, value addition, and market for Tier 2 suppliers is also investigated.

In order to investigate new entry and growth, in particular by black industrialists, we look at the extent and modes of entry of black industrialists, key barriers to entry faced in terms of



skills, regulations, capital and/or technology requirements, and Transnet procurement practices.

Lastly, the research focuses on the design, implementation and monitoring aspects of the CSDP and designated sectors programme, and its coherence with multiple industrial policy instruments (trade regime, skills development, competition, etc.).

The rest of the paper is structured as follows. Chapter 2 discusses the literature on public procurement and its impact on industrial development. Chapter 3 examines the localisation policy and institutional framework before turning to the costs and benefits of local content interventions. Chapter 4 provides an outline of South Africa's railway industry and its impact on trade.

Chapter 5 presents the research findings on the extent of localisation in the project thus far, exploring the differences between targets and achievements. It notes the importance of foreign direct investment made thus far and the different localisation strategies followed by the OEMs. Some of the implications of the complex web of contracting between Transnet and the OEMs are explored as well as the relationships between the OEMs and their suppliers and the resulting improvements in supplier competitiveness. It also considers the challenges facing transformation and black industrialists in manufacturing. The importance of economies of scale and the nature of procurement is examined in shaping the industrial landscape. Finally the serious implications of Transnet's ambitions to become an OEM are considered.

Chapter 6 deals with the challenges and failures in coordinating and implementing and administering local content policy and prescripts. Administrative processes are examined in some detail and suggestions for improvements are made. The report concludes with a summary of the main findings and recommendations in Chapter 7.

## **2 Public procurement and industrialisation**

### **2.1 Industrial policy**

Sustained economic growth and development are intrinsically linked to changes in the structure of the economy (MacMillan *et al.*, 2013; Rodrik, 2014). For developing countries, these changes relate to processes of industrialisation and structural transformation. The role of the manufacturing sector is crucial because, unlike other sectors, it is associated with particular benefits: dynamic economies of scale, learning by doing and positive externalities (Matsuyama, 1992; Sachs and Warner, 1995), greater scope for productivity growth (Prebisch, 1950), strong backward and forward linkages to other sectors (Hirschman, 1958). Moreover, manufacturing growth leads to changes in the composition of domestic demand, generating a continuous rise in the levels of skills, productivity and wages, and supports the rise of manufacturing-related services, such as design, Research and Development (R&D) and logistics (Alcorta, 2012).

The micro-foundation of the industrialisation process rests on firm-level technological capabilities. These capabilities will determine the pace and extent of the expansion of industrial activity, the rise of new firms, and the deepening of the industrial structure in terms of technological intensity and inter-sectoral linkages. These in turn influence a country's economic competitiveness in domestic and global markets. However, building technological capabilities is a resource-intensive and risky process. Firms operate with imperfect and variable information as to which technologies are available and face risks and unpredictability in adopting new technologies (Lall, 1996; Pack and Westphal, 1986). Technology is not perfectly codified and transferable, hence firms have to invest time and efforts to adopt new technologies (new to them) (Khan, 2013; Ohno, 2013). Technology is not limited to machinery, but includes new production processes, managerial techniques, and so forth. Learning by doing requires 'effort': effort in using technological information, accumulating the knowledge required to evaluate and choose technologies, acquiring and operating processes, managing change, and creating new knowledge (Pack and Westphal, 1986).

In this context, industrial policy is necessary to require an understanding of the constraints affecting industry technological possibilities, create and strengthen private sector actors, and support the accumulation of capacities and knowledge, based on an appreciation of the differences between production sectors (Peres and Primi, 2009). Industrial policy can be defined as "any type of selective intervention or government policy that attempts to alter the sectoral structure of production toward sectors that are expected to offer better prospects for economic growth than would occur in the absence of such intervention, i.e., in the market equilibrium" (Pack and Saggi, 2006).

## **2.2 Public procurement as an industrial policy tool**

Public procurement accounts for a large share of national economies. In industrialised countries, on average, it accounts for 10-12% of GDP, but in the EU it is up to 16% of combined GDP (Brühlhart and Trionfetti, 2001; Aschoff and Sofka, 2009; Rolfstam, 2009; Uyarra and Flanagan, 2010). The state is a major buyer in defence, health, education, construction and transport (Aschoff and Sofka, 2009; Georghiou, Edler, Uyarra, and Yeow, 2014). In South Africa, public procurement ranges between 15% and 25% (Makube, 2016).

Public procurement is an important industrial policy instrument that supports local development, technological upgrading, SME development and strategic sector development, among other policy objectives (Tiryakioğlu and Yülek, 2015). In the longer term, development of a competitive domestic supply base can be strategically important for governments to secure lower cost of services and goods, security of supply, hedge against exchange rate fluctuations and to foster employment and domestic innovation (Watermeyer, 2012).

Efficient acquisition of goods and services is the primary objective of public procurement (Telgen, Harland and Knight, 2007). This is largely associated with increasing transparency, supplier competition and good governance. However government spending has historically been conducted to also pursue secondary policy goals such promoting job creation, innovation, industrial development, regional development, SMEs promotion, diversity (favouring various groups of suppliers), sustainability and the environment (access to health and education).

Since the 1990s, the design of public procurement policies, laws and regulations has been informed by principles of transparency, non-discrimination and maximum competition (Lember, Kattel, and Kalvet, 2014). These principles have been espoused by the WTO Government Procurement Agreement (GPA) and mainstreamed by neo-classical economists. The GPA dismisses the role of public procurement as a tool for secondary policy goals. The GPA requires voluntary participation, and is not part of the binding agreements of the WTO; hence developing countries have largely eschewed it (Kattel and Lember, 2010). Policy space is however is restricted by the WTO Agreements and bilateral investment agreements (Lember et al., 2014; Kattel and Lember, 2010).

### ***Adding value***

Local content requirements are typically focussed on the value added in the domestic economy rather than just local procurement, importing or assembly. Local procurement by one firm from another could be recorded as local content and overlook the fact that the supplying

firm had imported the goods supplied. Similarly mere assembly of completely knocked down kits adds less value than actual manufacture of the kit components.

The DTI has grappled with these issues over a number of years in its Motor Industry Development Plans and Automotive Production and Development Programme. However the learning from these programmes does not seem to have been carried forward into the local content prescripts used in the rolling stock sector where localisation is calculated on the value of the item rather than the extent of value added in the domestic economy.

### ***Innovation and upgrading processes***

Historically, the highest profile developmental impact of public procurement has been linked to defence spending (Lember *et al.*, 2014). After World War-two (WWII), innovation spurred from government spending in the defence industry spread to commercial markets. Examples include semi-conductors, the internet, mobile technologies and jets. In following decades, governments used public procurement to support industrial development and innovation in other sectors, such as infrastructure and environment.

Public procurement can be used to affect the technology life cycle, promote clusters and innovation systems, and increase urban, regional and national competitiveness (Kattel and Lember, 2010). In some developing countries, smaller domestic markets raise production costs for local firms (Kattel and Lember, 2010). In a global economic environment dominated by industries characterised by increasing returns and industry concentration, economic activities tend to locate in larger, developed economies. Public procurement can counter-balance this by providing relatively larger markets for domestic producers. By doing so, governments can promote industries that would have otherwise struggled to emerge. For example, looking at 'procurement-sensitive' sectors, public procurement in the EU has been found to be a better explanatory variable of patterns of industrial specialisation, than other variables such as factor endowments and market access (Brühlhart and Trionfetti, 2001).

Recent research on public procurement has focused on public procurement for innovation. This is commonly understood as public procurement that occurs when a public agency purchases, or places an order for, a product – services, good, or system – that does not yet exist, but which could probably be developed by suppliers within a reasonable period of time (Edquist and Hommen, 2000). Public procurement for innovation is conceptually distinct from discriminatory "off the shelf" procurement, which focuses on existing products.

Since the 2000s, innovation-oriented public procurement is receiving considerable attention in the EU and other OECD countries (Edler and Georghiou, 2007; Kattel and Lember, 2010).

EU governments are concerned about falling behind in the global innovation race, and wish to replicate the experience of the US and Japan, which historically have used public procurement very effectively to promote innovative industries. In the 1960s and 1970s, for example, Japan used public procurement to upgrade industries using technologies that are related such as electric-switchboard, microwave, cables, computers, and large integrated circuits (Lember *et al.*, 2014). More recently, Brazil's Petrobras has been successful in promoting innovating technologies related to oil and gas (see Box 1). Public procurement tools were used differently based on specific industry and market needs: competitive and negotiated tenders, dual sourcing, coordinated procurement with consortiums, and measures to upgrade firm's skills and competitiveness.

**Box 1: Brazil's Petrobras' P-51 platform case study**

Petróleo Brasileiro S.A. (Petrobras) is a Brazilian partially state owned, multinational enterprise in the petroleum industry. Following inception in 1953, it relied heavily on imports of materials, equipment and technical services. Companies which supplied equipment, technology and specialised services to the oil and gas industry, the Brazil Oil Supply Industry (BOSI), was ill-equipped and could not meet the requirements of Petrobras. As a response, Petrobras adopted the Local Content Policy (LCP) to reduce reliance on imports, and develop local capabilities. By the mid-1980s, early 1990s Petrobras had undertaken technology adaptation and was able to master design and scientific knowledge (Dantas and Bell, 2011). An investment of US\$70 million was made in the Technological Capability Development Programme of Deep Water Production Systems (PROCAP) between 1986 and 1991 (Dantas and Bell, 2011). This involved 109 projects in diverse technological areas, 400 internal staff, and the participation of 132 other organisations and 1,000 technical personnel. This was followed by other R&D programmes.

In the early 2000s, Petrobras intensified its R&D efforts and reverted back to local procurement strategies adopted before the 1990s (Martins, 2012; Ribeiro and Furtado, 2014), even though the legal procurement law (Decree, 2745/98) did not oblige them to do so (Jacobsen, 2014). The company's expenditure on R&D and basic engineering already totalled US\$224 million in the late 1990s, and it continued to develop several large technological programs in offshore technologies: in 2000, a third version of PROCAP, renamed Technological Capability Development Program on Ultra-Deep Water Production Systems 3000 (PROCAP 3000), PRAVAP, PROFEX, and the Program for Offshore Technologies (for shallow waters) (PROMAR) (Dantas and Bell, 2011). As a result, Petrobras developed advanced R&D in eight out of 11 of their existing technologies including semi-submersible platforms which reduced reliance on international technologies. These steps resulted in the P-51 project, an oil and gas production and processing platform, in 2005.

The P-51 is among the largest semi-submersible platforms that have been constructed in the world and was the first one to be entirely built in Brazil. It was constructed in 2005 and became operational in 2009 with over 75% local content (Rigzone, 2008). The procurement process of P-51 involved engineering-intensive exercises with custom built-in components and complex interfaces (Ribeiro and Furtado, 2014). Following competitive bidding, Rolls-Royce, Nouovo Pignone and the FSTP consortium were awarded the contract. As local content requirements were not clearly defined, Rolls-Royce and Nouovo Pignone manufactured the turbo-generators and components of the power generation modules; and the reciprocating compressors in their home countries respectively with assembly taking place in Brazil – where until then they only had sales offices. The FSTP consortium comprised of Keppel FELS and Technip, outsourced production of equipment and supply to local firms (hull blocks).

Public procurement played a key role in the development of the P-51 platform and BOSI capabilities. Intensive investment in R&D capabilities built Petrobras innovative capabilities and Brazil's National System of Innovation in oil and gas. However, local procurement policies need to set clear goals and rules as foreign EPC firms may only localise low value added activities. The out-of-country manufacturing of Rolls-Royce and Nouovo Pignone limited the impact on local manufacturing learning processes. The FSTP consortium, which fabricated in Brazil, had elementary and intermediate technology transfer effects on BOSI. Firms benefited from learning by doing and technology adaptation (Ribeiro and Furtado, 2014).

Demand-side instruments to promote innovation become very important once one moves from the assumption that technological innovation is linear and technology is freely available. Linear models assume that government interventions need to address only market failures, such as the poor appropriation of research efforts through supply-side measures, of which R&D subsidies and public funding for basic research institutions are the most popular. These models fall short of reality, where innovation takes various forms, such as adaptive and incremental innovation; basic research and R&D seldom result in commercially valuable innovation; and innovation is often spurred at the product design and testing phase (Edquist and Hommen, 1999). Moreover, innovation has a systemic nature, which requires the interaction of different stakeholders: firms, suppliers, users, research institutes, universities, and so forth. Learning should be seen as 'collective, cumulative and path-dependent' (Lall and Teubal, 1998, p. 1372).<sup>5</sup>

The use of public procurement as a demand-side intervention takes into account these complex dynamics of innovation as path dependent, ridden with linkages, spill overs, externalities, and contextualised in a winner-takes-all, imperfect and dynamic markets (Kattel

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<sup>5</sup> These elements are the core of the National System of Innovation research, in particular researchers from Aalborg University (Lundvall and Lema, 2014; Freeman, 1995).

and Lember, 2010). Demand-side interventions have two objectives: raising incentives for firms to innovate by increasing returns or decreasing risks, and making buyers more willing and able to absorb innovative products (Georghiou *et al.*, 2014). Public procurement goes beyond market mechanism of price and quantities, and establishes interactive and learning mechanisms between buyers (government agencies) and firms supplying goods, services and systems (Edquist and Hommen, 1999). By doing so, what matters is not only the level of demand, but also the *quality of demand*, especially in markets where technological capabilities are highly concentrated, entry is difficult and technologies change quickly. The public sector can absorb risks for socially or environmentally important goods (financial risks involved in the initial phase of technology development) and promote learning and upgrading (when this is embedded in the procurement process) (Kattel and Lember, 2010).

Public procurement can support innovation by influencing the level and the sophistication of domestic demand (Edler and Georghiou, 2007). This includes creating new markets, 'lead markets' or testing grounds for innovative products (Kattel and Lember, 2010; Lember *et al.*, 2014). In some markets, new entry is constrained by networks formed around emergent technologies (Edquist and Hommen, 1999). Here, public procurement creates a core demand of innovative users to provide a critical mass for domestic suppliers. Catalytic procurement initiates procurement with the objective of supporting the new product penetration in the private sector (Edler and Georghiou, 2007). Moreover, public procurement can overcome market and system failures, for example when potential buyers and suppliers fail to signal to the market their needs and potential technological solutions. When the buyer has in-house technological competencies, procurement can also engage suppliers directly in technology development, sometimes co-invention (Uyarra and Flanagan, 2010).

Indeed, public procurement has been found to have a significant positive impact on firm innovation, more so than other supply side measures such as R&D funding and public universities (Aschhoff and Sofka, 2009; Georghiou *et al.*, 2014). This effect was found to be heterogeneous, with smaller firms with fewer internal resources and in more disadvantaged locations benefiting more.

### **2.3 Public procurement in the context of developing countries**

Whilst the innovation-driven public procurement research and policy agenda focuses on radical innovation, most public procurement at national and regional level does not deal with radical innovation (Uyarra and Flanagan, 2010). Instead of triggering radical innovation, public procurement can respond to innovation by favouring goods and services with innovative features (Georghiou *et al.*, 2014). This is particularly important because of the significant post-innovation improvements that take place in the life cycle of a product. Most procurement deals

with products in this phase, when product designs are standardised and adapted to user needs, and technical regulations (Uyarra and Flanagan, 2010). Moreover, public procurement can influence innovation indirectly (Uyarra and Flanagan, 2010). This happens when public purchases create larger markets for new goods, help create standards or convergence towards one standards, which encourages diffusion, and by influencing market structure, for example by influencing the number of suppliers in the market creating or reducing incumbency advantages, or buying bundles of products thus supporting vertically integrated suppliers.

Public procurement plays a big role in promoting incremental innovations: products are produced in improved ways; they are adapted to the domestic context, hence they are new to the country or region, not to the world; goods and services are re-combined in new ways; or delivered in innovative ways (Uyarra and Flanagan, 2010). This holds particularly true in the context of developing countries, where governments are interested in supporting technological upgrading of the domestic industrial structure, mostly in the form of product and process innovation to deliver competitively, goods and services which are already produced somewhere else.

For the scope of this research, we will adopt a comprehensive definition of procurement targeted at its primary goals and pursuing also innovation as a by-product (Uyarra and Flanagan, 2010). We will refer to 'development-oriented procurement'. Innovation is here referred to that which encompasses the technological innovations required from suppliers of various products, including technologically mature ones, to be competitive and efficient suppliers.

The innovation-driven procurement research agenda provides important insights for broader development-oriented procurement. Firstly, the same assumptions hold: suppliers mainly engage in incremental and adaptive innovation, and innovation has a systemic nature. The limited ability of developing countries to spur innovation through public R&D funding and subsidies makes it even more important to design effective demand-side policy tools. Secondly, public procurement interventions aim to reduce risks and increase profits of supplying goods, to enable firms to undertake the investment required to achieve economies of scale, and upgrade technological capabilities. This is particularly important for capital intensive manufacturing, which requires large upfront investment, large markets and security of demand. Thirdly, public procurement affects not only the level, but also the quality of demand, as public agencies interact with potential suppliers to develop the capabilities required. The nature and extent of this interaction will be critical to determine the success of suppliers in developing countries' context.



Even if most procurement processes are not targeting wider economic and social goals and are limited to their specific needs, there can be economy-wide spill overs if new capabilities spread to other public spheres or private markets (Lember et al., 2014). This outcome will be strongly context-specific. A case study on the UK shows evidence that when procurement supports firm upgrading processes, these firms are successful in winning tenders with more public agencies, serve the private market, and, to a lesser extent, move to exports (Georghiou *et al.*, 2014). Conversely, in Turkey, procurement in the defence industry has contributed to technology transfer and domestic design capabilities, but spill over to the civilian sector has been insignificant (Tiryakioğlu and Yülek, 2015). From a developing countries' perspective this aspect is important as it serves to promote broader and more sustainable industrial capabilities.

Uyarra and Flanagan (2010) propose a broad taxonomy of public procurement (Table 4). This taxonomy is based on the assumption that public procurement is characterised by considerable variability in sourcing strategies, and policy objectives. Firstly, procured products differ along key dimensions: strategic importance, supply risk, standardisation, and whether they are generic or dedicated (asset specificity). Public buyers have different needs: small niche applications, innovative solutions, procurement of regular technologically mature goods. These will shape the procurement strategies adopted by public buyers, which have differential impact on supplier industries and potential for innovation.

**Table 4: Taxonomy of Public Procurement Policies**

<b>Procurement type</b>	<b>Adapted procurement</b>	<b>Technological procurement</b>	<b>Experimental procurement</b>	<b>Efficient procurement</b>
<i>Role of the public sector</i>	Niche user	Large/Sophisticated customer	Experimental/lead user	Cost-driven customer
<i>Dominant motivation of procurement/award criteria</i>	Adaptions/customisation to specific needs <i>The best/better seller adapted solution</i>	Fitness for use, value for money <i>The best available/most efficient solution</i>	Functional products performance <i>The most innovative solution</i>	Price, volume <i>The cheapest solution</i>
<i>Product</i>	Diverse designs, customized	At least one product design	Emerging design, prototype, pilot	Mostly undifferentiated standard products
<i>Innovation type</i>	Market niche	Architectural	Radical	Regular
<i>User-producer interaction</i>	Recurrent	Supervisory	Partnership	Arm's length
<i>Procurement practices potentially driving innovation</i>	Competition Outcome specifications Aggregation of supply (consortia)	Dialogue with suppliers/capacity planning/aggregation of demand	Outcome specifications Dialogue with suppliers Prestige, transfer effects to other markets	Price/output specification Aggregation of demand
<i>Innovation related risks on the supply side</i>	Market uncertainty Fragmented supply	Insufficient/unreliable demand to justify investment	Market uncertainty Poor user-producer communication Insufficient incentives (e.g. IP protection)	Obsolescence Overdependence on public markets
<i>Procurement practices posing barriers to innovation</i>	Emphasis on cost Restricting competition	Dependency on a reduced number of powerful suppliers Incumbent advantage	Narrow specifications	Over dependency of suppliers in stagnant markets/lack of competition
<i>Geography of procurement</i>	Regional specifications, regional procurement	Centralised specifications, national procurement	Regional specifications, national procurement	Centralised specifications (standard)

Source: Uyarra and Flanagan (2010, p.139)

For example, procurement of standardised products serving a generic market will be associated by *efficient procurement*, which is mostly at arm's-length and price-based. If public buyers require the application of known technologies to their specific needs, *adapted procurement* would enable the public agency to source from a restricted number of suppliers. There will be recurrent interactions, often with a consortia of suppliers. The requirement of new technologies to meet a generic need (*technological procurement*) or specific needs (*experimental procurement*) both involve higher market uncertainty, more restrictive bidding procedures, and information and cooperation-intensive relationships with suppliers. These strategies have varying geographical dimensions, with some more apt for national specifications than others.

The implications of this taxonomy are two-fold: firstly, innovation opportunities vary by procurement strategy and markets; and secondly, it is unrealistic to pursue a multiplicity of policy goals at the same time with the same type of procurement.

## **2.4 Insights on best practices**

Compared to private procurement, public procurement is subject to demands *sui generis*: external demands such as transparency, accountability, and integrity, and internal demands related to a multiplicity of policy goals and stakeholders, various political prerogatives, and contextual frameworks (budgetary, governance, cultural, legal) (Telgen *et al.*, 2007). These contextual frameworks include the laws and governance determining the level of centralisation, autonomy and devolution applicable to different spheres and size of public spending (Georghiou *et al.*, 2014). This will determine the degree of freedom of public bodies in designing and implementing public procurement. Policies on industrial development or innovation rest with ministries or agencies, but implementation depends on budget holders in other department, agencies, or sub-national governments (Georghiou *et al.*, 2014). These do not necessarily have the same commitment or understanding of these policy goals. The overall implication is that designing and enforcing development-oriented procurement policies requires significant efforts in coordinating institutions, but also that sometimes not all policy goals can be pursued at once.

Specific tools of innovation-driven public procurement includes using innovation-related functional specifications in the procurement criteria, which allows suppliers to find innovative solutions to the problem tackled by the public agency, and using R&D procurement, which facilitates learning and knowledge creation in the pre-commercial phase of product

development (Lember et al., 2014).<sup>6</sup> Foresight activities can also be effective and involve early discussion between suppliers and buyers on forecasted needs and potential solutions (Georghiou *et al.*, 2014; Edler and Georghiou, 2007).

However, also within regular procurement, there are practices which can promote supplier innovation capabilities: purchasing based on life-cycle costing (rather than the cheapest bid), procurement which consolidates and standardises markets for existing products, performance specifications, competitive dialogue, variant bids (allowing variations to the specifications to be considered) and idea competition (Georghiou *et al.*, 2014; Lember et al., 2014; Edler and Georghiou, 2007). Early interactions with suppliers and good communication are also important. These help create innovation-conducive environments where firms are incentivised to improve products and invest in organisational capabilities.

Public procurement can link innovation to production (Geroski, 1990). Successful case studies of public procurement- induced innovation and industry development are underpinned by high standards, clear goals in respect of capabilities targeted, provision of a market from the early stage of product development, and some competition. East Asia has been particularly effective in using public procurement, by being very clear about what kinds of products were wanted and what kind of capabilities and technological know-how was needed, setting deadlines and quality standards to ensure continued productivity improvements (Kattel and Lember, 2010). This has led some to conclude that the 'East Asian industrial policy can be seen as a prolonged process of public procurement activity' (Ibid. p.371).

Until recently, China used a formal and very proactive system to signal to the market what the public demand for innovation was (Georghiou *et al.*, 2014). Government published 'catalogues' of innovation products and equipment which listed priorities for public agencies. The equipment catalogues listed products which would receive R&D and other support. If successful, these products would then be included in a catalogue of "accredited" innovative products and equipment to be procured directly by various public agencies.

A selective and focused approach would overcome the bottlenecks of general discriminatory public procurement, which often promotes hidden political or personal agendas (Kattel and Lember, 2010). General preferences are not aligned to the industrial or innovation strategy of the country, and only restrict competition and discourage upgrading.

Overall, public procurement should ensure some level of competition. The lack of competition in some European countries (France, Italy, Austria) made firms uncompetitive in foreign

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<sup>6</sup> R&D procurement can be done horizontally (through a small business innovation programme for example) or by field (health, defence, environment, etc) (Lember *et al.*, 2014).

markets, compared to East Asia which set targets in terms of technology upgrading or export (Lember *et al.*, 2014). There is a risk that firms may decide to specialise in public procurement because they acquire experience or because they receive long term contracts, and are disincentivised from participating in the private market or to innovate and develop new applications (Uyarra and Flanagan, 2010).

Most government spending is still done without taking into account developmental paradigms, but just based on routine practices that target price, off-the-shelf solutions (Lember *et al.*, 2014). This may be the result of an intentional government policy not to use public spending to promote secondary policy goals, or it may be because, notwithstanding development-oriented policies and laws in place, administrative capabilities are low.

Indeed, low administrative capabilities are a key constraint across both developing and developed economies, although at different levels. Various factors can be identified: firstly, administrations are asked to pursue too many policy goals – cost savings, value for money, transparency, sectoral policies (environmental, energy, industrial) - which can contradict each other (Kattel and Lember, 2010). Development-oriented procurement is costly and time-consuming, requires strong stakeholder coordination, and improves only if there is constant evaluation and learning. These transaction costs have to be weighed against short-term cost savings, and often the latter prevail.

Innovation-driven public procurement is particularly challenging because public buyers need the capabilities to acquire market intelligence, transform needs into functional specifications, develop public technology platforms, and move from a risk-aversion culture to a risk-management one (Kattel and Lember, 2010; Edler and Georghiou, 2007). The process of transforming needs into functional specifications can often result in too narrowly defined specifications in order to facilitate measurement and monitoring, but this tends to favour price-based decision making rather than other criteria (Georghiou *et al.*, 2014).

Moreover, there are financial risks and uncertainty involved in procuring new products. Whilst probability of success is higher in markets where governments have dominant market positions (monopsony), there are only few markets where this is the case (Lember *et al.*, 2014). Some governments found solutions to address the higher risk involved in innovative products, such as France's price premium for SMEs procurement and Korea insurance for purchasers of new technologies (Georghiou *et al.*, 2014).

### **3 Localisation policy framework**

Development-oriented public procurement can be articulated in different ways. Public procurement for SMEs or targeted groups often uses price preferences or set asides (Tiryakioğlu and Yülek, 2015). These are common in the US, South Africa, Brazil, the UK and India. Offsets include licensing of technology, investment requirements and counter-trade requirements (Watermeyer, 2012). These are usually delivered during a longer timeframe than the duration of the contract and most often are unrelated to the contract. For these reasons, their evaluation and enforcement is difficult. In the South African context, the National Industrial Participation Programme (NIPP) fits this typology (Haines, 2011). On the other hand, linking deliverables to the supply chain has proven more effective in leveraging technology, skills transfer and investment (Watermeyer, 2012). The Local Designation programme and the Competitive Supplier Development Programme (CSDP) have been developed on this understanding and are the focus on this paper.

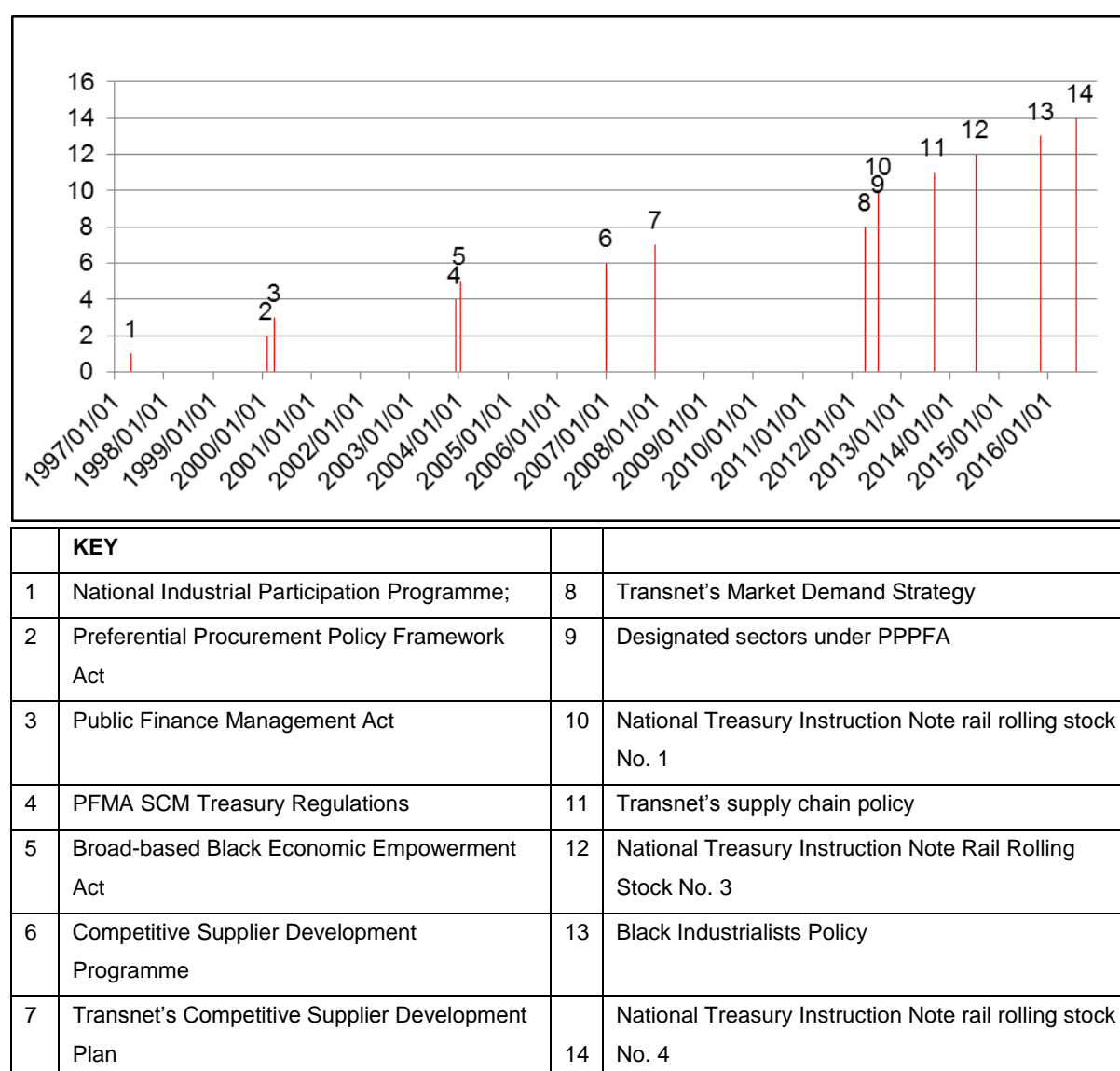
#### **3.1 South Africa's development-oriented public procurement**

##### **Historical outline**

Most of the public procurement policy interventions have occurred in the 16 years since 2000. The frequency of the interventions has been increasing (see

**Figure 1)** as has the detail and specificity. These are described in more detail below.

**Figure 1: Local content policy interventions**



*Source: author's own compilation from government reports and policy documents*

## The key instruments

South Africa's public procurement policy pursues multiple secondary policy objectives: industrialisation, localisation, transformation, skills development, job creation and enterprise and supplier development (Makube, 2016).



There are over 80 legal instruments which govern public sector supply chain management that may be divided into three categories: the Constitution<sup>7</sup>, Acts<sup>8</sup> and Regulations<sup>9</sup> (National Treasury, 2015). Within these, organs of state are implementing these laws and regulations which in some circumstances apply across industries and sectors; while others are more specific. This creates a problematic environment from an implementation and regulation perspective. The Public Sector Supply Chain Management Review (2015) by the National Treasury identified a number of challenges arising from this regulatory dispensation:

- Overlap and duplication in instruments particularly infrastructure, construction, public-private partnerships and supply chain management policy standards.
- Unclear legal status which results in difficulty in interpreting which regulatory instrument takes legal precedence.
- Variation in the scope of the legal instruments and the policy stakeholders' control which results in poor coordination. Furthermore, this makes it difficult to determine the applicable regulatory regime as there is no principal regulatory tool.
- Different supply chain management policies are carried out by different stakeholders such that capacity development programmes and standards are challenging to implement.
- There are a number of standard bidding documents that require the same information and this creates duplication of work and is expensive and time-consuming for bidders.
- Difficulty in achieving developmental and empowerment objectives since the procurement system is not flexible enough to adapt to the changing social and political space.

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<sup>7</sup> The Constitution: Section 217 deals with the basic constitutional requirements of public procurement. Section 33 sets out the requirements for constitutionally valid administrative action and therefore the grounds on which administrative action may be reviewed by the courts. Section 195 lays down the constitutional values for the country's public administration.

<sup>8</sup> Public Finance Management Act 1 of 1999 (PFMA); Local Government: Municipal Finance Management Act 56 of 2003 (MFMA); Preferential Procurement Policy Framework Act 5 of 2000 (PPPFA); State Tender Board Act 86 of 1968 (STBA); Broad-based Black Economic Empowerment Act 53 of 2003 (BBBEEA); Prevention and Combating of Corrupt Activities Act 12 of 2004 (Corruption Act); Construction Industry Development Board Act 38 of 2000 (CIDBA); National Land Transport Act 5 of 2009; National Supplies Procurement Act 89 of 1970; State Information Technology Agency Act 88 of 1998; Financial Management of Parliament Act 10 of 2009; Road Traffic Management Corporation Act 20 of 1999; Armaments Corporation of South Africa, Limited Act 51 of 2003; Administrative Adjudication of Road Traffic Offences Act 46 of 1998; Nursing Act 33 of 2005; Public Audit Act 25 of 2004; Health Professions Act 56 of 1974; Housing Act 107 of 1997; Disaster Management Act 57 of 2002; Promotion of Access to Information Act 2 of 2000 (PAIA); Promotion of Administrative Justice Act 3 of 2000 (PAJA); Local Government: Municipal Systems Act 32 of 2000 (Systems Act).

<sup>9</sup> PFMA SCM Treasury Regulations; MFMA SCM Regulations; Preferential Procurement Regulations and DTI provisions for local procurement designations.

The principal piece of legislation that addresses public procurement in South Africa is the Public Finance Management, 1999 (Act No. 1 of 1999) which states that the procurement and provisioning system ought to be fair, equitable, transparent, competitive and cost effective.<sup>10</sup> This largely informs the approach of South Africa's National Treasury in public procurement. For this reason, National Treasury plays a strong role in public finance management but that does not extend to secondary policy goals such as supplier development (Cawe, 2014).

South Africa's development-oriented public procurement is articulated across a number of policy instruments:

1. National Industrial Participation Programme;
2. Competitive Supplier Development Programme; and
3. Designated sectors under the Preferential Procurement Policy Framework Act.

### **The National Industrial Participation Programme (NIPP)<sup>11</sup>**

The NIPP is an offset scheme aimed at fostering economic growth, establishing new markets and trading partners, attracting FDI, ensuring technology transfer, encouraging R&D collaboration, supporting domestic OEMs and supporting transformation (B-BBEE).

The revised guidelines of the NIPP released in 2013 stipulate suppliers of goods and services to the government, with an imported content of at least USD10 million, are obligated to participate in domestic economic activity through investment equivalent to 30% of the imported portion of the purchase contract. This 30% NIPP obligation is fulfilled through local economic activities that have the potential to impact positively on the objectives of NIPP. Companies are required to sign an obligation agreement which is submitted to the DTI for monitoring with fulfilment expected within seven years. Investment in manufacturing-related activities is not compulsory, implying that firms can invest 30% in any area.

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<sup>10</sup> Other acts regulating public procurement are the Promotion of Administrative Justice Act 3 of 2000; The Promotion of Equality and the Prevention of Unfair Discrimination Act 4 of 2000; Construction Industry Development Board Act 38 of 2000; Local government: Municipal Finance Management Act 56 of 2003; and the Prevention and Combating of Corrupt Activities Act 12 of 2004 (Ambe and Badenhorst-Weiss, 2012).

<sup>11</sup> Section based on the Department of Trade and Industry. (2013). The National Industrial Participation Programme. Available at [https://www.thedti.gov.za/industrial\\_development/docs/nipp/Nip\\_Guidelines2013.pdf](https://www.thedti.gov.za/industrial_development/docs/nipp/Nip_Guidelines2013.pdf) (accessed on 29 June 2016).

## **Competitive Supplier Development Programme (CSDP)<sup>12</sup>**

Capital and operational expenditures by SOEs are expected to increase given the projection of investment in infrastructure, bulk freight transportation and electricity generation and distribution. In the past, low investment by SOEs have undermined the sustainability and eroded the capability of the domestic industry. To seize the opportunity of increased infrastructure spend, the government has devised the Competitive Supplier Development Programme (CSPD). The CSDP provides for supply and demand side measures. Industry and government manage the supply-side measures while the SOC is responsible for the demand side measures. The SOC has to design supplier development programmes which leverage on the OEMs to develop localised Tier 1 and 2 suppliers. This will strengthen the relationship between SOEs, OEMs and the domestic supply chain, which in the past was marred by a number of problems, such as low investment, asymmetric information regarding capital expenditures, hesitation in undertaking firm-level investment and weak linkages to OEMs winning tenders. On the supply side, the CSDP entails supporting local industries targeted in the supplier development plans to meet the OEMs' international standards, by supporting for example technological upgrading.

The CSDP is meant to benefit both the domestic supplier industry and the SOEs. For the SOEs, the CSDP should reduce costs via efficient suppliers, lower dependency on imports and hedge against foreign exchange risk. The CSDP supersedes the NIPP for SOEs, i.e. SOEs that adhere to the CSDP will not need to comply with the NIPP. Suppliers are supported in developing niche export areas by improving industry competitiveness, capacity and capability. Ultimately this is expected to lead to improved performance by SOEs, as well as overall employment, poverty reduction, economic growth and transformation.

## **The Preferential Procurement Policy Framework Act (PPPFA)<sup>13</sup>**

The Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000) (PPPFA) is applicable to any organ of the state i.e. national and provincial departments, municipalities, constitutional entities and public entities. The revised PPPFA empowers the DTI to designate certain sectors where tenders will only be awarded to locally manufactured products with a prescribed minimum threshold of local content. Designated sectors are selected on the basis

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<sup>12</sup> Section based on the Department of Public Enterprises. Competitive Supplier Development Programme. Available at [http://www.gov.za/sites/www.gov.za/files/Introduction%20to%20competitive%20supplier%20dev%20prog\\_0.pdf](http://www.gov.za/sites/www.gov.za/files/Introduction%20to%20competitive%20supplier%20dev%20prog_0.pdf) (accessed on 30 June 2016).

<sup>13</sup> Section based on the National Treasury. (2000). The Preferential Procurement Policy Framework Act (PPPFA). Available at <http://www.treasury.gov.za/legislation/pfma/supplychain/PPPFA.pdf> (accessed on 29 June 2016).

of the following criteria: available local capacity, adequate local skills and capacity development, existing strategic partnerships with local firms and opportunity to develop local supply capabilities. The Implementation Guide for the PPPFA outlines the processes and procedures to be followed. These are supplemented by “Instruction Notes” issued by the Chief Procurement Officer at National Treasury in terms of section 9(2) of the Regulations.

Accounting officers or accounting authorities in the organs of state are required to estimate the cost of the services, works or goods by engaging with the industry and undertaking product analysis. If the products are designated, the first selection criteria is to ensure that the local content thresholds are fulfilled. Bids not meeting this threshold will not be considered. If a bid is for an undesignated product, the procuring entity is able to stipulate its own local content threshold following consultation with the National Treasury. Once the local content threshold has been met, the preference point system is then employed along with price and B-BBEE criteria to determine the winning bid.

**Table 5** below gives the designated split between those that are designated and others still under consideration along with the minimum proportion that is required to be procured locally.

**Table 5: List of DTI's designated sectors**

Description	Minimum local content thresholds	Date of approval
<b>Designated sectors</b>		
1. Rail rolling stock	65%	16-07-12
2. Bus bodies	80%	16-07-12
3. Canned/Processed vegetables	80%	16-07-12
4. Textile, Clothing, Leather and Footwear Sector	100%	16-07-12
5. Solar Water heaters (collectors and storage tanks/geysers)	70%	19-07-12
6. Set-top boxes	30%	29-09-12
7. Certain Pharmaceutical products	Per Tender	07-11-12
8. Furniture products	85%	15-11-12
9. Electrical and Telecom Cables	90%	08-05-13
10. Valves products and actuators	70%	06-02-14
11. Working vessels	10-100%	01-08-14
12. Residential Electricity Meters	50-70%	01-08-14
13. Steel Conveyance Pipes	80-100%	28-09-15
14. Powerline Hardware and Structures	100%	28-09-15
15. Transformers	10-100%	28-09-15
<b>Sectors forwarded to National Treasury for designation</b>		
1. Building and construction material	TBC	14/15 Q1
2. Yellow metals	TBC	14/15 Q1
3. Two Way Radios	TBC	14/15 Q1
4. Solar PV Components	TBC	14/15 Q2
5. Rail Signalling System	TBC	14/15 Q2
6. Wheelie bins	TBC	14/15 Q4
7. Fire trucks/engines	TBC	14/15 Q4
8. Water meters	TBC	14/15 Q4
9. Poultry products	TBC	14/15 Q4

Source: Makube, 2016

At municipal level and with large SOEs (PRASA, Transnet) one of the key challenges of the localisation programme is enforcement (DTI, 2013). To address enforcement, the IPAP 2014 interventions are focused on improving institutional coordination, enforcement and monitoring and evaluation of these instruments (DTI, 2014).

## Verification

Verification of local content is the first step towards enforcement. This requires a competent and suitably resourced verification agent to conduct verification checks at various points in the process: in the assessment of bids; in dealing with exemption applications and in the

assessment of goods delivered. Finally, if non-compliance is uncovered there needs to be an enforcement agency with the necessary policies and procedures to address to non-compliance.

Unfortunately this type of verification measure and instrument is the weakest link in the local content prescripts because of all the different parties involved (see Table 6), the lack of clear procedures, the lack of an operating verification agent for goods supplied, and the lack of penalties. All of these matters are dealt with in further detail below.

**Table 6: Verification and enforcement agencies**

<b>Task</b>	<b>Agent responsible</b>
Verification of bids	Transnet Supply Chain or Transnet Engineering depending on nature of the bid
Decisions on applications for exemption from local content requirements	Department of Trade and Industry
Verification of goods delivered	SABS
Enforcement of commercial penalties	Transnet Freight Rail
Enforcement of criminal penalties	Do not exist

*Source: author's own compilation*

### **Incentive coordination**

South Africa's package of incentives and institutions responsible for implementing them convey the impression of having been conceived in haste and in isolation from one another. The Public Sector Supply Chain Management Review (2015) by the National Treasury came to a similar conclusion and yet nothing is being done to correct the situation.

The Competitive Supplier Development Programme is meant to be coordinated by the Department of Public Enterprises whilst the localisation programme is coordinated by the DTI. And yet both programmes have similar objectives.

This is a recipe for some confusion and misunderstanding particularly since both programmes do not have a proper monitoring and verification agent. Transnet's shareholder responsibilities vest with the Minister of Public Enterprises who approves its Shareholder Compact. The DTI apparently lacks leverage with Transnet as evidenced by the Minister of Trade and Industry's attempts for over a year to have a meeting with Transnet to discuss local procurement. Clearly there is room for improvement in the design of interventions, their coordinated implementation and reporting.

Suppliers were requested to share their opinions on the extent to which the CSDP and localisation programme are supported by other government policies in terms of skills development, import protection, competition policy, etc.

Most suppliers interviewed did not have a good grasp of the array of government interventions available. Those that had some knowledge of them complained about the way in which applications were processed; taking too long, unclear requirements, too bureaucratic, etc. One supplier believed that there was good coordination between the various interventions.

It is recommended that steps are taken to disentangle the various incentive measures and to streamline the administration thereof.

### **Incentives and suppliers**

On the whole, the suppliers interviewed made little use of available Government incentives (See Table 7).

**Table 7: Government support received before or after supplying OEM**

Incentive	Suppliers	
	Before	After
DTI incentives (e.g. MCEP)	14%	14%
DST Technology Localisation Implementation Unit	0%	0%
IDC loans/equity	14%	14%
Others	29%	0%

*Source: author's own compilations based on interviews with suppliers*

One firm complained that DTI's application process for grant assistance is very vague and needs significant improvement. This vagueness results in applicants having to repeatedly submit documents in a time consuming process. Applicants feel like they are facing moving goalposts. Also, the time taken to evaluate and approve applications is too long.

The administration of incentives creates difficulties for small firms. For example the extended time period between approval of a skills development application and the transfer of the funds can cause cash flow difficulties.

## **3.2 Transnet procurement**

### **Market Demand Strategy**

Transnet's Market Demand Strategy (MDS) was launched in 2012. The strategy places the company at the centre of the government's drive to boost economic growth through



infrastructure investments (Transnet, 2012b). MDS is Transnet's seven-year plan for spending R300 billion on infrastructure investments and upgrading between 2012 and 2019. The strategy is for Transnet's five divisions and has four main targets: a) investing R300 billion in infrastructure development, expanding and modernising ports, rail and pipe line infrastructure; b) making Transnet one of the biggest rail freight companies in the world; c) increasing rail volumes from around 200 million tonnes per year to 350 million tonnes a year by 2019; d) creating 288 000 jobs (Transnetb, 2013).

The broader objective of the plan is to position the company to drive the switch from road to rail (Transnetb, 2013). In achieving this target, the MDS identifies the rail division to be crucial in achieving the target; indeed this has received the bulk of funds allocation, 68% of total investment (See Table 8).

**Table 8: Breakdown of investment by division**

<b>Division</b>	<b>Disbursement in R billion</b>
Transnet Freight Rail	201
Transnet Rail Engineering	4
Transnet National Ports Authority	47
Transnet Port Terminals	33
Transnet Pipe Lines	11
Other	4
<b>Total</b>	<b>300</b>

*Source: Transnet (2013b)*

Out of the R205 billion planned investment on rail projects, R151.1 billion has been allocated to the expansion of rail capacity or general freight business. R31.6 billion to the expansion of the coal export line and R18.3 billion to expansion of the iron ore export line. The remaining R4 billion is to be directed towards capex, building, refurbishment and repair of locomotives, wagons, coaches and wagons and manufacture of components such as rolling stock, wheels and rotating machines (Transnet, 2013b).

Whilst achieving these infrastructural development objectives, the MDS seeks to promote localisation, transformation and empowerment (Transnet, 2012b). This is done mainly through the SOE's procurement policy.

### **Transnet's supply chain policy**

Transnet's supply chain policy was developed taking into account national-level procurement policies. The overall aim of the policy is to ensure that Transnet obtains value for money for all goods, services and work procured in order to fulfill its mandate while also playing a part in

redressing the economic imbalances that were created by unfair discrimination of the past (Transnet, 2013c). The procurement policy is guided by the following principles; fairness and transparency, social equity (broad-based black economic empowerment, B-BBEE) and value for money.

Its procurement processes use a two-step procedure where the first step involves assessing the technical aspects and functionality of the bid. The second step encompasses B-BBEE, local supplier development and price. This has been a new process for Transnet, involving considerable changes in processes and attitudes with procurement personnel and institutional learning (Cawe, 2014).

Transnet's tender evaluation is a multi-step process (Transnet, 2013c). Bids are initially assessed on the basis of the minimum local content thresholds for designated products. Only bids meeting this criteria move to the next stage, which takes into account price as well as supplier development/transformation. Functionality and technical aspects are also considered at this stage. For contracts below R 10 million, price considerations weigh 80%, whilst transformation (BBBEE, enterprise development, skills transfer, etc.) weigh 20%. For contracts above R10 million, this ratio shifts to 90/10 (Transnet, 2013c).

In terms of broader developmental objectives, Transnet procurement needs to be aligned to three policies. Firstly, the revised BBBEE has a strong emphasis on supplier development. Secondly, the designated sector programme. When Transnet procures from a designated sector, the bids must meet the minimum local content requirements, as specified in

**Table 9.** Additionally, bidders must source locally a number of specific components identified in a 2014 Instruction Note on the rail rolling stock sector (

**Table 9).** Thirdly, the CSDP, which is elaborated on below.

**Table 9: Designated sectors in the rail rolling stock sector**

<b>Classes of Rail Rolling Stock</b>	<b>% Local content</b>	
Diesel locomotives	55%	
Electric locomotives	60%	
Electric multiple units (EMU)	65%	
Wagons	80%	
<b>Components</b>	<b>% Local content 3-5 yrs</b>	<b>% Local content 6 yrs +</b>
Assembly of locomotives/EMUs	100%	100%
Car body	100%	100%
Bogies	100%	100%
Coupling equipment	100%	100%
Suspension	100%	100%
Heat, ventilation and air conditioning	60%	70%
Braking system	70%	80%
Alternators	90%	100%
Traction motors	65%	80%
Electric systems	80%	90%

*Source: National Treasury (2014). Instruction Note on the rail rolling stock sector.*

### **Transnet's Competitive Supplier Development Plan**

In 2008, Transnet developed a CSDP strategy, moving away from the NIPP. The NIPP bids incorporated price premiums and the offset scheme targeted non-related industries (Cawe, 2014; Haines, 2011; Transnet, 2010). The CSDP is articulated in three phases. The first phase aims at solidifying and forecasting capital expenditure and at the same time developing procurement skills. This phase was planned for 3-5 years and has already lapsed. The second phase's primary focus is to strengthen local manufacturing capability through leveraging OEMs for a period of 5-10 years. The strategic focus at this stage is working with government to understand the country's competitive advantages. The last phase aims to develop, design and build capabilities over a period of over 10 years. The key focus is to identify resources required to succeed and build research and development hubs.

Transnet's CSDP programme also identifies four opportunities arising from implementation of the programme: skills development to improve Transnet's daily operational requirements and support local supplier capabilities; maintenance and repair capabilities; opportunities in component manufacture and upgrading capabilities (either local suppliers or TE working with OEMs); and system/ sub system manufacture.

In 2014, Transnet awarded the R50 billion order for 1 064 locomotives to four companies. The value of local sub-contracting to domestic manufactures has been estimated at R14 billion in 2013 (Chokoe pita 2013). As of 2016, there are around 50 domestic companies sub-

contracted by the OEMs, but some suppliers are struggling to meet OEMs' price, quality and schedule requirements (Engineering News, 2016). There is also concern with the localisation performance associated with the purchase of 95 electric locomotives from the Chinese OEMs – an urgent contract that preceded the 1 064 programme. However, the problem lay with Transnet Railway Engineering that failed to gear up in time to supply the car body shells locally, as originally planned.

### 3.3 Costs and benefits

Do obligatory local content requirements raise costs and do the benefits outweigh the costs? A convincing answer in the affirmative is required especially when it is being conducted at the scale at which South Africa is doing so – if the Transnet and PRASA rolling stock procurements are taken together they are worth approximately R100 billion.

At face value market interventions intended to increase local content seem to be a good idea. However for interventions of this magnitude, prudence requires that some form of cost/benefit analysis be performed before implementation. In the case of railway rolling stock it appears that no such analysis was done despite the fact that learning is available from similar interventions such as the DTI's long running Motor Industry Development Plan (now renamed Automotive Production and Development Plan).

Both Transnet procurement and OEMs denied that the local content requirements raised costs. Transnet cited the fact that it had more than four bids to process and was therefore able to conclude that the bids were competitive. However, this argument overlooks the point that all of the bids had to make allowances for the prescribed local content.

National Treasury's Instruction Notes contain the following provision:

5.2.1 AOs/AAs are required to ensure that reasonable or market related prices are secured for the Rail Rolling Stock / components being procured, taking into account factors such as benchmark prices, value for money and economies of scale. \*\*

*Note: \*\* AO is Accounting Officer and AA is Accounting Authority.*

Presumably "market related prices" may be interpreted to mean market prices without any incentive or intervention influencing them, that is, excluding local content requirements. It is the "reasonable or" phrase preceding "market related" which provides an escape route for all manner of sins. How is "reasonable" to be understood? A further escape route is provided by the ambiguous use of "economies of scale". How is this to be understood? Does it mean that if the item being manufactured locally is done at a scale well below "economies of scale" that

prices should be adjusted upwards by a corresponding amount? Or does it mean that the correct comparator is the market price where it is produced at optimum economies of scale? Benchmarking may bring some objectivity to the question but it too is fraught with difficulties when examined in detail.

Consequently the onus on SOCs to ensure that they and the country are getting a good deal is weak. In addition the policing of such provisions is left in the hands of the SOCs which have their own agendas and ambitions such as to become an OEM. There appears to be no checking or policing of this provision by an external agency. It is anomalous that such a lot of effort is concentrated on putting in place a verification agent and funding it (the SABS) to deal with just the measurement of local content and yet the much bigger and more important issue of the costs of the procurement seems to be completely overlooked.

A number of suppliers interviewed believe that local content requirements do raise prices. One multinational supplier estimated that GE's prices were about 20% higher as a result of local content requirements. If that is correct then in a R50bn deal that represents about R10bn and if one includes the PRASA deal for railway equipment that is about a R20bn price premium in the rail sector alone. This is a considerable burden to place on railroad customers even if it is ameliorated over the period of an SOC's long term debt. It is interesting to note that in the USA, the Buy America regulation allows the Secretary of Transportation to grant a waiver if procuring the product or component locally would increase the project cost by more than 25%. This provision clearly anticipates a cost raising effect of localization. South Africa has not attempted to measure this burden nor to place a limit on it.

The list of possible benefits from South Africa's local content programme is a long and impressive one: local value added, employment, taxes collected, skills gained, import savings and balance of payments, transformation, export capacity, future exports and so on. However without some quantification and some kind of cost/benefit analysis it will remain just that, an impressive list. This research suggests that a good case can be made for a review of the local content instrument by way of some form of cost/benefit analysis and for some form of independent policing of the prudence of the deals SOCs are making.

From 1 October 2015 Cabinet Memoranda seeking approval of draft policies, Bills or regulations must include a Socio Economic Impact Assessment System (SEIAS) assessment that has been signed off by the SEIAS Unit in the Department of Planning Monitoring and Evaluation (DPME). A SEIAS can be regarded as a form of cost benefit analysis although it is unclear how rigorous an analysis is required (DPME, 2015). The earlier Instruction Notes issued by National Treasury on rail local content pre-dated this requirement. To date Instruction Notes have not required a SEIAS assessment. However the economic impact of

these kinds of interventions is much larger than some of the other matters that have been subject to a SEIAS assessment.

It is recommended that henceforth Instruction Notes designating local content requirements should, at the very least, be subject to a SEIAS review.



#### 4 South Africa's railway industry

Rail rolling stock is among the top sectors receiving support through preferential public procurement (see Brühlhart and Trionfetti, 2001 for the EU, Tiryakioğlu and Yülek, 2015 for Turkey, and Box 2 for the US). Most products fall within the transitional phase of the life-cycle product, where incremental product and process innovation is predominant. Some cases of radical innovation however can be found along the supply chain for components.

##### **Box 2: Buy America in the railway stock industry**

The US railway stock industry was a global leader in the early 20<sup>th</sup> century, but this position was lost from the mid-1950s as a result of government's shift in infrastructure spend away from rail towards highways and airports (Pollin et al, 2015). US rail equipment manufacturers progressively fell behind in equipment innovations. To date, none of the world's largest rail equipment manufacturers are US-based and are located in countries such as France, China, Canada and Germany (Pollin et al, 2015). More recently, however, the US railway industry has seen a resurgence. Rail services utilisation grew by 72% from 1995 to 2008, from 2.6 billion to 4.5 billion trips per year (Pages et al, 2013). The USA government is now aiming to utilise the Buy America regulation to resuscitate this once vibrant industry.

The Buy America regulation was introduced in 1982 (Pollin et al, 2015). Buy America provisions apply to procurement in the transport sector funded by grants provided to state, municipal or other organizations, including transit authorities. Provisions that are specific to rail projects are administered under Federal Railroad Administration (FRA), Federal Transit Agency (FTA) and National Railroad Passenger Corporation (AMTRAK). For projects funded by FRA and FTA, rolling stock and rail equipment that exceed a purchase price of US\$100 000 must be from companies using 100% locally produced steel and components. AMTRAK purchases of passenger rail equipment costing over \$1 million must be 100% locally assembled and have 50% local content (Platzer and Mallett, 2015). Waivers approved by the Secretary of Transportation are allowed on four grounds: meeting the Buy America requirements is 'inconsistent with the public interest'; the product is not available either in quantity or quality; rolling stock or power train equipment cannot be delivered within a reasonable time; and if procuring the product or component locally would increase the project cost by more than 25%.

In light of the active enforcement of Buy America, foreign companies, which are responsible for all the railway equipment produced in the US, are establishing assembly plants in the US rather than importing finished rail vehicles. In 2015, China Rolling Rail Stock Corporation invested in a US\$95 million assembly plant in Springfield, Massachusetts after receiving a contract to supply 284 subway cars for Massachusetts Bay Transportation Authority (Platzer and Mallet, 2015).

Railways infrastructure projects are characterised by very complex value chains (Gann and Salter, 2000 in Baloyi and Zengeni, 2015). These involve a combination of service providers (financial institutions, engineering companies and contractors), Original Equipment Manufacturers (OEMs) and Tier 1 and Tier 2 component suppliers.

Railway infrastructure development requires railways construction machines, and tracks. The largest component of rail infrastructure by value is generally the civil engineering work (earthworks, bridges and drainage). The railway track is comprised of the sub-grade, sub-ballast, ballast, sleepers or crossties, rail and track fastening. The superstructure of the railway line includes signalling, specialised equipment and railway depot equipment (equipment to lift trains for undertaking the maintenance work such as wheel drop set, coach and locomotives synchronised jacks, chassis rotators, railway inflow lifting systems, turntables). Finally, the railway line requires locomotives, passenger rail vehicles and freight wagons to become operational.

The South African railway industry has developed different levels of capabilities. On railway infrastructure development, there are strong capabilities in civil engineering services and inputs such as sleepers and culverts for rail track construction (Baloyi and Zengeni, 2015). The industry has also developed capabilities in manufacturing capital equipment used in construction of railway lines - currently there are two companies that manufacture rail construction machinery. Rail signalling equipment is assembled locally using locally manufactured and imported specialised components. Local capabilities also exist in manufacturing of locomotives, passenger rail vehicles and freight wagons equipment (Kneale, 2014).

An important factor to be considered in building capabilities in rolling stock manufacturing is the rail gauge: broad, standard or narrow. The different gauges have different pros and cons, however, the standard gauge of 1435mm is the predominant rail gauge in the world, while South Africa uses the narrow (Cape) gauge. Most other African countries use the standard gauge. The standard gauge has advantages in terms of speed, economic scale, quality and size of rolling stock, that is, for heavy haul, double stacking, and high-speed rolling stock. In simple terms, Transnet's narrow gauge freight (not urban commuter) lines are hampered in their ability to compete with road freight. Moreover, African countries (which are the more likely export market for rolling stock) use the standard gauge. Developing local capabilities without taking into account the different gauges will affect the growth of the industry in the future.

Shifting towards standard gauge will involve very significant investment but the Department of Transport has undertaken a cost benefit pre-feasibility analysis, and prima facie a positive cost benefit ratio was found (Department of Transport, National Rail Policy Green Paper August 2015). Although rolling stock in South Africa has reached the end of its life, the R50 billion investment in 1064 narrow gauge locomotives does not maximise the value of the intervention. The Green Paper also alludes to the fact that railway development that does not exploit heavy haul, double stacking, and high-speed potential is not competitive and cannot compete with the movement of goods by road. Government's oft repeated policy slogan of moving "from road to rail" seems even less likely to be achieved. This investment in 1064 locomotives strengthens South Africa's ties to narrow gauge railways.

Participants in the railway locomotives and rolling stock industry in South Africa include the following:

- Transport consortia and joint ventures comprising global companies and local empowerment partners (Gibela Rail Consortium and Electro-Motive Diesel Africa (Pty) Ltd).
- Manufacturers of locomotives: global companies (General Electric, China North Railways, China South Railways<sup>14</sup>, Caterpillar's EMD and Bombardier Transportation) and local manufacturers (Transnet Railway Engineering, Union Carriage and Wagon, Grindrod Locomotives and DCD Rolling Stock).
- Manufacturers of passenger coaches: global companies (Alstom, Siemens and Bombardier) and local (Wictra Holdings, Commuter Transport & Engineering and Transnet Railway Engineering).
- Local manufacturers of freight wagons, including specialised wagons such as ore cars/hoppers, cabooses, car carriers and tank wagons (Transnet Railway Engineering, Grindrod Locomotives and Galison Manufacturing).
- Global and local suppliers of specialised systems, components and parts for railway locomotives and rolling stock, including signalling systems, windows, interior fittings, bogies, axles and wheels, brakes and parts of brakes, hooks and coupling devices, buffers and buffer parts, shock absorbers, wagon and locomotive frames, bodies and cables and connectors.

#### **4.1 The role of state owned enterprises in shaping the landscape**

The railway locomotive and rolling stock industry in South Africa is highly dependent on contracts awarded by SOEs and the Gauteng Management Agency. The major contracts are

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<sup>14</sup> CNR and CSR merged in 2015 to become China Rail Rolling Corporation. Available at <http://www.railjournal.com/index.php/financial/cnr-and-csr-finalise-merger-to-become-crrc.html> (accessed on 29 August 2016).

driven by Transnet's Market Demand Strategy (MDS) investment of R300 billion in capital projects over a seven-year period and the PRASA's R123.5 billion Rolling Stock Renewal Programme over a twenty-year period supported by projects to increase capacity and upgrade national signalling and stations.

PRASA's Rolling Stock Renewal programmes and the Transnet Market Demand Strategy are expected to revitalise the rail manufacturing industry, with a focus on localisation, supplier development, and empowerment partnerships. Government's R845 billion Strategic Integrated Projects (SIPS) to develop, strengthen and optimise freight corridors is expected to increase demand for locomotives and rolling stock. Also, the long promised move from road to rail will, if it materialises, increase volumes transported, thereby further increasing demand for locomotives and rolling stock.

Large scale investment in rail network and infrastructure projects on the African continent will increase demand for locomotives and rolling stock (Kneale, 2014). African rail networks are predicted to grow by 3.3% annually over the next five years. Major and current envisioned corridor development or upgrading projects total some 27,000km most of them featuring a solid financial basis. The rolling stock infrastructure and railway systems market currently amounts to €3.6 billion and will increase by 8.7% per year on average to €5.4 billion by 2017.

## **4.2 Industry data trends**

Manufacturing data on the transport equipment sector is at a relatively high level of aggregation (Quantec database). Data for railway stock is aggregated with ships, aircrafts, motorcycles, bicycles, among others. Output data show that the sector has not grown significantly in the past decade. Real output from the transport equipment sub-sector (excluding auto) trebled between 2000 and 2005, from R5.01 billion to R15.8 billion. Since 2005 however, output has stagnated to R15.4 billion in 2014. In terms of real value added, South Africa has underperformed: as a ratio of total output, value added produced by the industry has declined significantly. Gross Domestic Fixed Investment (GDFI) has been low, but and the industry failed to invest to keep up with capital depreciation. The trends reflect the diversity of activity in the sector, including areas such as the boat-building industry (including yachts) in which there was substantial growth in the early 2000s. Hence this data needs to be interpreted with caution.

Trade data allows a higher degree of disaggregation than production data.

Figure 2 displays South Africa's trade balance in the following inputs into railway infrastructure construction: iron/steel railway track construction material, signalling equipment and track fixtures and fittings.<sup>15</sup> Currently South Africa has a trade deficit across the first two products.

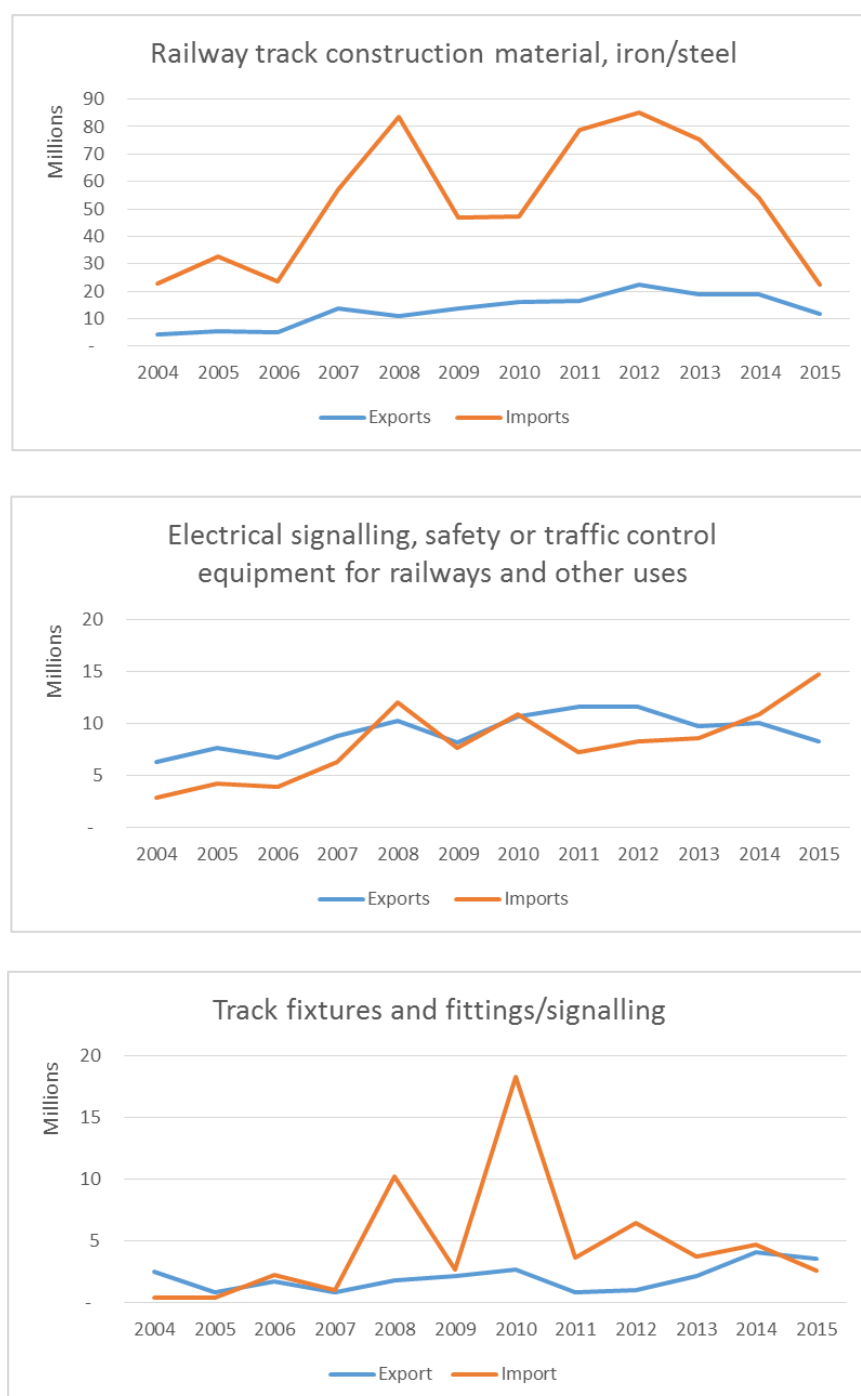
Trade in railway construction material has been generally more significant, peaking to US\$85 million imports and US\$ 22.4 million exports in 2012. Exports have increased since 2007, driven by the regional market, but consistently outpaced by imports. The trade deficit has narrowed in the past two years due to a decline in imports. The main source of imports has been Austria.

While trade values for signalling equipment are generally low, South Africa has been a net exporter for most of the last decade. Export destinations include Australia, China, USA, New Zealand and the UK. Since 2012, however, the trade surplus has declined and turned into a deficit in 2014. Imports are sourced mostly from Germany (more than 50%) and other EU countries. On the contrary by comparison, an overall trade deficit in track fixtures and fittings and some types of signalling equipment turned into a trade surplus in 2015.

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<sup>15</sup> Railway track construction material includes the following: rails, check-rails and rack rails, switch blades, crossing frogs, point rods and other crossing pieces, sleepers (cross-ties), fish-plates, chairs, chair wedges, sole plates (base plates), rail clips, bedplates, ties and other material specialized for jointing or fixing rails. Signalling equipment includes the following: Electrical signalling, safety or traffic control equipment for railways, tramways, roads, inland waterways, parking facilities, port installations or airfields (other than those of heading 86.08).

**Figure 2: Trade balance in selected inputs into railway infrastructure**



Source: Comtrade database

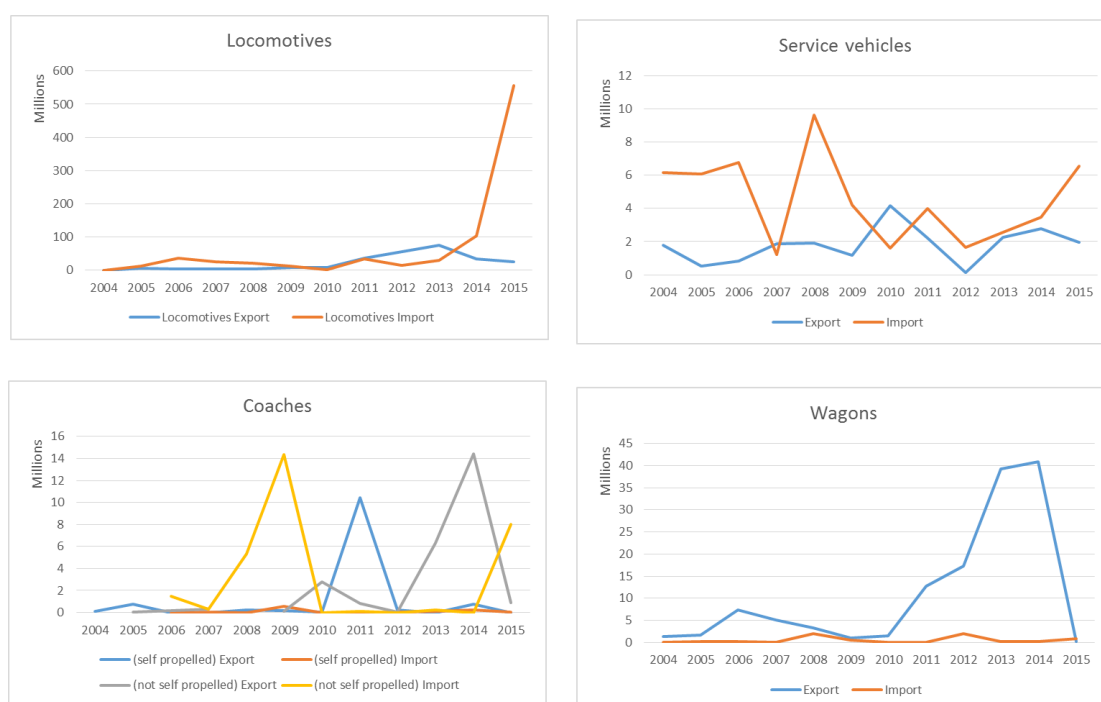
South Africa's trade balance in rail stock is displayed in Figure 2. With regard to locomotives, exports have grown since 2010, but from a low basis. Imports, mostly from China, rose substantially in the past two years, to US\$100 million in 2014 and US\$550 million in 2015. This trend needs to be understood within the structure of contracts recently finalised by

Transnet and PRASA, where OEMs have been allowed to fulfil the initial part of the procurement through imports.

The trade balance in coaches varies significantly year on year. Over the 2004-2015 period, South Africa experienced a trade surplus in self-propelled coaches, US\$11.6 million cumulatively, and a trade deficit in not self-propelled coaches, US\$3.9 million. Exports have been mainly regional (Angola, DRC, and Zambia). The main source of imports in 2015 was Brazil, as the main contractor of PRASA restocking programme.

For service and maintenance vehicles, trade values have been generally low and in deficit, with imports sourced from the EU and marginal regional exports. With the exception of 2015, South Africa has been a significant net exporter of wagons, US\$40.7 million in 2014. The region has been the main export destination market (Botswana and DRC).

**Figure 3: Trade balance in railway transport equipment**

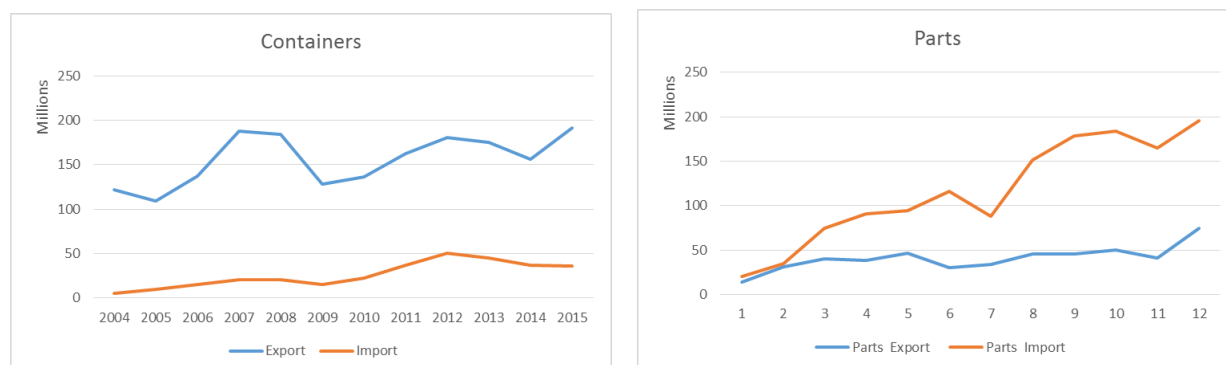


Source: Comtrade database

South Africa's exports of parts of railway, locomotives and rolling stock have grown consistently in the past decade, from US\$13.8 million in 2004 to US\$74.8 million in 2015 (Figure 3). The region is an important destination market, but also the US and UK have absorbed large exports from South Africa. Imports have however outpaced exports, mostly sourced from China.

South Africa enjoys a significant trade surplus on containers, US\$155 million in 2015, mostly exported to EU markets.

**Figure 4: Trade balance in containers and parts**



Source: Comtrade database

Aggregate domestic manufacturing data suggests that there are key challenges for the transport equipment sub-sector (excl. autos) in terms of stagnant value addition and investment, poor export competitiveness (especially in light of the growth in infrastructure spend across the continent), import penetration in the Tier 2 supply chain and stiff competition from China.

The trade data are more disaggregated and show that South Africa suffers a significant trade deficit in important categories such as locomotives, railway construction material, and parts. However, there is also evidence of export dynamism in signalling equipment, containers and self-propelled coaches. The regional market is critical in this regard, especially for higher value added exports, while containers are mostly directed at EU markets. Trade data however does not provide a comprehensive picture of the performance of local manufacturers in meeting domestic demand.



## 5 Progress in localisation

This research was undertaken at a very early stage in the life of the 1064 locomotive procurement project, even more so with regards to locomotives manufactured in South Africa. Only a limited number have been produced and are undergoing trials. There have been manufacturing problems with the first few locally produced locomotives. When this research was commissioned it was not foreseen that the project would be running approximately one year behind schedule by the time the fieldwork for this research was carried out. Consequently this report can only deal with the initial impacts of the project on suppliers and the early stages of the relationships between suppliers and the OEMs. The domestic supply chain has not yet got into full swing and so the hoped for learnings and improvements that are expected to flow from the OEMs to suppliers are at a very early stage. What may be evident by the middle or the end of the project may be significantly different from what is visible at October 2016.

Thus far in the project it appears that the overall impact on suppliers has been positive across a range of measures.

### 5.1 Targets and achievements

Transnet Engineering has reported good progress in localisation.

*Local spend for the year amounted to 89% of total procurement spend against a target of 85%. Transnet Engineering has localised the majority of its purchases (Transnet, 2015:144).*

Transnet's schedule for delivery of the 1064 locomotives is as follows.

	2016	2017	2018	Total
Number of locomotives to be delivered	148	492	424	1064

*Source: Transnet Presentation Annual Results, 2015:14.*

Transnet did not respond to requests for an update on the actual delivery of locomotives to date. One firm that was supposed to deliver locomotives in 2016 had its requirement reduced from 90 to 12 lending credence to the view that the programme is running well behind schedule. According to some suppliers Bombardier over-estimated the capacity of the local suppliers and has consequently fallen behind schedule.

As at October 2016 local assembly of locomotives had not achieved optimum production rates other than some locomotives which were undergoing trials. According to one supplier, between January and October 2016 only five locomotives were produced and the entire programme is approximately one year behind schedule. It is anticipated that this schedule

slippage will increase as the project continues. If so, it will defeat the object of one of the most important selection criteria which was the ability to deliver in a short period of time.

The reason for the schedule slippage has to do with the difficulty in manufacturing long carriage transport equipment or long metal assemblies; the underframe and bogeys rather than the final assembly which Transnet has done for several years. The process requires considerable welding which generates heat in the metal being welded which can lead to deformation in long metal structures. To weld the underframe and bogies is difficult and requires very skilled welders. It appears that the Transnet Engineering workshops do not have sufficient staff with the requisite skills with the result that many of these products are out of true, do not meet the desired quality standards and are being rejected by the OEMs. The responsible engineers from Transnet and the OEMs have been grappling with this problem for some months and appear not to have found a solution.

This attempt at localisation is reminiscent of the attempt by Transnet Pipelines to have piping with a larger diameter manufactured locally for its New Multi Products Pipeline project. On the strength of Transnet's order a private sector firm imported special equipment to manufacture the desired piping but unfortunately could not manage to produce adequate quality piping. In that case, after almost a year long delay Transnet had to import the piping by which time the markets had moved adversely and the piping cost considerably more.

Attempting to manufacture traction motors locally has also run into problems. The objective was to send the first locally manufactured traction motor for testing after 19 months. At least nine months after the target dates, the motor had not met the quality requirements, with no solution in sight.

These examples illustrate the fact that attempts at localisation are not certain to succeed and can result in delays or failure and/or considerable additional costs in both time and money. Transnet is confronted by a rapidly aging and reducing locomotive fleet which is why the delivery of the 1064 locomotives was required within such aggressive timelines. As its need for additional locomotives grows and as the delay in delivery of new ones grows, there will be increasing pressure on Transnet to concede that more locomotives are manufactured off-shore than is currently the contracted case.

The Rail Road Association (RRA) is also unhappy with the extent of localisation. Chief Executive Officer of RRA, Bongani Mankewu, has argued that despite railway rolling stock having been specifically designated for local procurement, the results have been mixed and that there is a "misalignment" between policy instruments designed to raise levels of local content in the sector and actual outcomes (Creamer, 2016a). As a consequence the RRA

wanted to establish a new localisation framework by mid-2016 with the support of the operators, the original-equipment manufacturers (OEMs), as well as domestic suppliers.

The DTI and Transnet procurement seem to have different understandings and dissimilar expectations of the ramp-up phase. According to DTI staff interviewed the local content achieved in the contracts Transnet entered into with the four OEMs was lower than that required by National Treasury's Instruction Note. The four OEMs contracted by Transnet have been given differing degrees of leniency by Transnet with regard to local manufacture. The first 6 locomotives supplied by GE were allowed to be built in the USA whilst the China Railway Rolling Stock Corporation has been allowed to manufacture the first 60 of its locomotives in China, 40 from China South Rail and 20 from China North Rail. Thereafter it is scheduled to manufacture the remainder of its order in South Africa. In total only 6.7% of the locomotives will be manufactured outside South Africa.

There is some scepticism among suppliers and other OEMs as to whether the delivery schedules and local content requirements will be met by all the OEMs. Some believe that the current production bottleneck at TE's factories may be employed as a delaying tactic by OEMs that already are planning to delay local content as much as possible and then argue that they cannot meet contractual deadlines if they also have to meet local content obligations. In this view, the fact that there are no statutory penalties for OEMs that do not meet local content obligations and only weaker contractual ones, makes it easier to pursue this strategy.

Even though Transnet's contracts establish penalties for late delivery it may be interesting to see how they are applied if Transnet itself is instrumental in the delays as a result of TE's workshops being unable to accomplish their allotted tasks. This is one of several examples encountered in this research where Transnet's strategy to localise production through becoming an OEM itself has unfortunate unintended consequences.

Bombardier is scheduled to manufacture its entire requirement locally, mostly in Transnet's Durban factory and they too have run into difficulties (RDM News Wire, 2015). Local suppliers are facing challenges in ramping up at the rate prescribed by the DTI and this is starting to be evident.

One supplier claims that it invested heavily in technology, including robots, in preparation for the 1064 locomotive bidding round as it expected to manufacture bogies but it was unsuccessful because they are being built in-house by Transnet Engineering instead. However, according to this supplier, of the eight locomotives built thus far none have bogies as Transnet Engineering cannot manufacture them. Consequently the OEM concerned has decided to have the bogies manufactured in Europe, which the supplier concerned found

particularly annoying as it has the capacity locally to do the job. Presumably the OEM required an exemption from the DTI for this non-local manufacture. It is beyond the scope of this research to investigate such claims. This is a further example of unfortunate unintended consequences flowing from Transnet's ambition to become an OEM.

The division of labour and the accompanying responsibilities, between Transnet Engineering and the OEMs for the work to be carried out at Transnet Engineering's workshops is complex and varies from one OEM to another. When production difficulties arise, such as have just been described, it presents an opportunity for the OEMs to reopen negotiations on the extent of local content, possibly in a trade-off with delivery schedules. Most of the OEMs are continuously seeking to reduce their local content obligations and any opportunity that presents itself may be used in pursuit of that objective. Notwithstanding the contracts entered into, day to day manufacturing problems are an opportunity to renegotiate parts of these contracts, emboldened by the knowledge that the SABS has not commenced its verification tasks (see page 103).

As at October 2016 only locomotives manufactured by GE have been approved to have met the required standard. The first 20 locomotives manufactured by China South Rail (in China) are still being tested in South Africa and none have yet been approved. It is thus premature to try and determine the extent to which local content objectives for locomotives are being achieved.

However some supplier firms report considerable progress in localisation. One importer of components claimed an increase from 0% to 85% in local content since 2007 for certain components. Another importer of components has moved from 0% to 28% and is targeting 60%. Most suppliers claim that the lack of economies of scale in the local market is the chief obstacle.

GE has invested R500 million in its GE Africa Innovation Centre in Johannesburg, its 10th global innovation hub, but a first for GE in Africa (South Africa Info, 2016). It talks of constructing a new manufacturing and operational 'platform' in South Africa as part of the 1064 locomotive programme to meet the localisation requirements. President of GE Africa, Jay Ireland, is quoted as saying "We are looking to impact and enhance the career aspirations of over 100 engineers from previously disadvantaged backgrounds"(South Africa Info, 2016).

Bombardier opened a factory in Isando in August 2016 which is intended to produce the electric propulsion motors for the 240 Traxx Africa electric locomotives it is contracted to supply. This factory will create almost 100 jobs a number that is expected to grow to 200 by the end of the Transnet contract (Van Wyngaardt, 2016).

IEC Holden has invested over R250 million in a factory to manufacture alternating current electric traction motors for locomotives (Engineering News, 2015). IEC Holden is one of the largest manufacturers of traction motors in North America. Both GE and Bombardier will be supplied with locomotive motors from this factory. It claims to have invested heavily in local supplier and skills development and employs 105 employees which is expected to increase to 300 by November 2016. The company believes it has the potential to grow its manufacturing scope to include motors and generators for the industrial, mining and wind energy sectors and expects to develop its Johannesburg operation into a regional and potentially global exporter of advanced manufactured electric motors and generators (Engineering News, 2015).

The localisation initiatives driven by the China Railway Rolling Stock Corporation (CRRC) appear to be slower in getting off the mark but are starting to materialise. Rolls-Royce has inaugurated MTU South Africa's<sup>16</sup> redesigned and upgraded facility in Cape Town on 27 October 2016 with an investment of about R50 million. This factory will assemble, test, paint and commission 212 of the 232 diesel engines for CRRC locomotives to be assembled in Transnet's Durban factory and create an additional 20 jobs (Cloete, 2016). This order is valued at €100 million (Odendaal, 2015). It has also established a new training centre for MTU South Africa staff.

In summary, the 1064 locomotive programme has made an important contribution in attracting foreign direct investment in South Africa just referred to. In addition to the foreign direct investment, employment and skills benefits there are also other wider benefits; these are all new types of manufacturing activity not previously taking place in South Africa. They also represent another step further along the value adding road because they involve more complex manufactures which otherwise would probably not happen. There is a benefit even if some are only doing assembly rather than manufacturing. Large international firms like IEC Holden and Rolls Royce which now have a presence in South Africa say they will also look to service other industries requiring propulsion equipment. They will also look to export to regional markets. As a result South Africa stands to gain from increased localisation in non-rail sectors in meeting domestic demand, reduced imports and increased exports.

## **5.2 Variances in OEMs' localisation strategies**

The three OEMs are adopting different strategies towards localisation. GE and Bombardier are showing a level of commitment to South Africa backed by investment decisions. GE has

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<sup>16</sup> MTU Friedrichshafen is the core business of Rolls-Royce Power Systems, a division of Rolls-Royce plc

established a new manufacturing and operational 'platform' in South Africa. It has opted to view its contract as an opportunity to take a longer term, strategic view towards its suppliers and partners with an eye to building capabilities for the future. It envisages a strategic supply base to be used in future as a launch pad to supply rail equipment to other African countries.

Bombardier has also made investments in manufacturing activities and is developing skills and capabilities in higher value added manufacturing activities. Together GE and Bombardier have "brought" a major propulsion manufacturer, IEC Holden, to South Africa as a part of their supply chain.

The Chinese firms are following a strategy that does not yet appear to involve similar investments in South Africa. Despite China South Rail and China North Rail being awarded the biggest share of the R50 billion contract to produce 1064 locomotives, they have done less than GE and Bombardier to demonstrate their commitment to South Africa. This is despite the fact that Transnet signed a memorandum of understanding with locomotives manufacturer CSR Zhuzhou Electric Locomotive in December 2015 with areas of possible cooperation including setting up of manufacturing plants in South Africa, establishment of a research and development facility, establishment of a training centre in South Africa, setting up a refurbishment and manufacturing plant. None of these has materialised thus far.

According to some suppliers there is a marked difference in the approaches to localisation by the Western and Chinese OEMs. The Western firms having contracted to a certain standard will tend to stick to that standard in the products they supply for the duration of the contract.

In contrast, the Chinese firms have a different approach. One supplier described this approach as follows. The ability of Chinese firms to bid lower prices is partly linked to their more flexible approach to product quality. They are continuously on the lookout for opportunities to optimise costs and product quality. They will monitor the reporting, testing and verification of products and where they see that this is not done in a certain area they will find ways to reduce costs in that area. They adapt to their customer's habits and manner of operating. If local content and specification are not continuously checked the Chinese will adapt to those conditions. Consequently they are less reliable in delivering similar product quality over the duration of the contract.

If this supplier assessment is correct, and taking into account the fact that local content verification by the SABS has not yet commenced there may be a poorer local content result than the DTI was hoping for.

One supplier that had previously contracted with a Chinese OEM reported that the contracting process was not cumbersome as the company provided the deliverables and timelines. Certain contractual obligations were not met. For example, the contract required that there be some supplier/enterprise development for the supplier at beginning of the contract but this was only implemented towards the end of the contract instead. The enterprise development involved training for small business enterprises. Another supplier reported that for Western OEMs it had to provide proof of every material used when manufacturing a component but that this was not required by the Chinese OEMs.

Some OEMs make it easier for their suppliers to integrate into their systems. One has an internal portal for tracking orders which all suppliers can access and see exactly what is required when. This makes the process very efficient. On the other hand suppliers found dealing with the Chinese OEMs more challenging. Language differences with the Chinese firms also made communications more difficult.

### **5.3 Contractual and operational relationships with Transnet**

#### ***Contracting strategy***

Transnet's procurement strategy in opting for four OEMs was driven by risk mitigation; in the event one of the OEM businesses fails it would be able to continue to be served by the remaining three. The post contract merger of CNR and CSR is a diminution of Transnet's risk mitigation strategy particularly since the two Chinese companies were contracted to supply the majority of the locomotives. Transnet believes that its separate contracts with four (now 3) OEMs will provide sufficient risk mitigation and that further risk mitigation is not required.

There is a trade-off to be made between the risk mitigation flowing from contracting more than one supplier and the greater economies of scale that may be achieved by a single supplier. PRASA in a similar sized procurement has opted for a single supplier. The large value of these kinds of contracts raises a possible policy issue for Government. Should decisions on this kind of risk mitigation versus economies of scale trade-off be left to the SOC's concerned or should such decisions rest with the policy maker, Government? The close linkages between the sovereign rating and the ratings of the large SOC's and the fact that the ratings agencies tend to 'look through' the SOC's to the sovereign in their assessments, provides Government with a strong argument that it should make these policy decisions. A counter argument points to the high level of risk associated with a single decision making point in the state and the lower level of risk achieved if such decisions are dispersed among the SOC's.

In the current environment where references to 'state capture' are found in the media on a daily basis this may be a more prudent option. On the other hand, scandals and governance failures on the boards of SOCs are almost as common.<sup>17</sup> In such compromised circumstances it is difficult to mount a compelling argument one way or the other.

Other trade-offs also need to be considered. A supplier that is contracted to all four of the OEMs reported that each OEM has somewhat different approval standards for similar products. This requires more resources and effort to meet these different standards. If the ramifications of quadrupling the work involved in meeting standards is considered across a R50bn procurement exercise, it may result in significantly higher costs. Presumably PRASA's single OEM procurement strategy does not result in these kinds of higher costs even if it does raise other kinds of risks. But as one respondent argued the exporting requires meeting different buyers' standards hence local firms hoping to export may be better off being able to do that from the start.

### ***Corruption***

Industrial policy interventions such as localisation are unfortunately prone to corruption. Local content can become a substitute for price in clearing markets as is discussed elsewhere in this report (please refer to page 105) and this increases the risk of corruption.

Determining an optimal contracting strategy is made even more difficult if allegations of corruption at Transnet, made by several respondents, are to be believed. The allegations range from Government sanctioning of corruption, to board level corruption, to corruption at lower levels in Transnet such as procurement staff which ensure that their cronies obtain contracts. Particular allegations were made about TE (where all the locomotives are to be assembled) and Transnet's lack of clear oversight of TE's activities. This research did not attempt to investigate or verify any of these allegations.

In such circumstance of widespread allegations of corruption policy makers need to pay particular attention to risk mitigation in the design of local content instruments. Corruption can be reduced by increased transparency. Such a policy approach, at all levels of procurement, can act as a disincentive for corruption. It is noted that the Gauteng province has introduced

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<sup>17</sup> PRASA incurred almost R14bn in irregular expenditure during the tenure of CEO Lucky Montana. On 27th September 2016 the Minister of Transport, in reply to a Parliamentary question, said that she was not sure when PRASA's cash flow problems would allow it to begin paying creditors R796 million which was due.



a more transparent procurement process called 'open tender'.<sup>18</sup> There may be useful lessons to be drawn from that experience that could be applied to local content requirements.

The risk of corruption is also increased by Transnet's conflicted role as both procurer and supplier. In such cases removing procurement from Transnet to an independent agency outside of Transnet may mitigate some of the risk.

## **5.4 Original equipment manufacturers and suppliers**

### ***Selection and auditing***

According to suppliers, OEMs conducted thorough investigations into potential suppliers to identify and assess local firms. Once an OEM had identified a supplier, rigorous approval processes are undertaken to ensure that the supplier is able to meet quality and quantity requirements, occupational health and safety standards, pricing, capacity to produce and so on. OEMs have different approval procedures, with some being stricter than others. For example, while two OEMs were said to undertake many approval processes (in one instance 34 stages) other OEMs did not. Even if a supplier did well in these assessments it did not automatically guarantee business for that supplier.

An example of how demanding OEM requirements can be occurred with a local supplier of fibre glass components that was selected to supply Alstom for the PRASA project. It took the firm 18 months to meet Alstom's requirements. Later, when it was selected to supply GE (for the Transnet project) it had to overcome even stricter requirements. GE wanted the resin used in fibre glass manufacture to be localised because it has a short shelf life and needs to be readily available. This is also an example of a knock-on benefit from localisation, in this case, for the chemical industry. Ultimately this arduous process has proved worthwhile as GE now thinks that the fibre glass supplier has export potential.

Before the bids for the 1064 locomotive project were awarded some suppliers did extensive marketing, travelling both locally and abroad to visit the likely bid winners to learn about their individual requirements in the hope of improving their prospects of selection.

Compliance with standards like ISO 9001:2008 is not sufficient for OEMs, which undertake their own audits to determine quality standards and consistency. Initially some OEMs required suppliers to have International Railway Industry Standard (IRIS) certification. Acquiring this is costly, about R250 000 per firm. In addition South Africa does not have the local capabilities

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<sup>18</sup> Gauteng Province open tender available on <http://www.treasury.gpg.gov.za/pages/open-tender.aspx>. Accessed 28 October 2016.

to grant such certification. After realising these constraints the OEMs had to abandon this requirement.

Relationship management with OEMs is a challenge for suppliers because each of the OEMs has a different way of operating. This is evident in decision making and in the initial contract negotiations, where one supplier complained of time wasting and non-value adding negotiations with one Chinese firm.

One OEM commenced its preparations some two years before Transnet awarded its contracts. It began to develop suppliers to meet its exacting standards. It assessed 140 potential suppliers and narrowed this down to just 20 suppliers. Subsequently this number was increased to 27. It conducted exhaustive audits of its potential suppliers and used the results to whittle down the numbers. It selected suppliers with a view to not only meeting its Transnet contract obligations but also their ability to supply possible future contracts in other countries.

In some cases, potential suppliers identified by the OEMs, removed themselves from the approval process; some were not interested in participating in the contract; some were not able to or were unwilling to make the investments and other changes required; some did not want to add complexity to their manufacturing process and were content with the status of their companies. Others were deterred by their perceptions of general investor sentiment and the country's future prospects.

Some suppliers were comfortable with their current position in the South African market and did not aspire to grow their businesses nor export. One respondent said that even some of the best local businesses are struggling to meet the accreditation requirements of international OEMs. The main problems OEMs are encountering among suppliers are: attitude (50%), relationship management (30%) and technical issues (20%). Even if the supplier's plant does not meet the required standards OEMs can assist those that are willing to learn and improve. However, in most instances, this kind of willing and learning attitude is not evident. Instead there is a common culture described as 'grab while you can'.

This lack of entrepreneurial aspiration is anecdotally reported across a wide range of South African businesses. Further research is required in order to identify the causes of this and the possible remedies.

Whilst some OEMs follow exhaustive vetting procedures, one supplier reported that a Chinese OEM carried out no vetting. Another firm reported that the vetting process had helped it to set up proper facilities that are world class.

## Cooperation between suppliers and OEMs

The level of engagement between OEMs and suppliers was found to vary (see Table 10). All respondents were involved in continuous information exchanges with OEMs. The next most consistent areas of cooperation related to cost control and product quality. A majority of suppliers 'sometimes' cooperated with OEMs in joint product development. Areas of weak cooperation between OEMs and suppliers appear to be favourable payment conditions, technology transfer and staff training.

**Table 10 Suppliers views of Cooperation with OEMs**

Cooperation with OEMs on:	% of respondents		
	Never	Sometimes	Consistently
Continuous information exchange	0	29	71
Favourable payment conditions (e.g. advanced payments)	43	43	14
Joint product development	29	71	0
Cost control (sourcing practices, inventory management, etc.)	29	14	57
Product quality improvement (customer return rate, internal reject rate, etc.)	29	14	57
Improving lead times	14	43	43
Technology transfer	43	43	14
Staff training	43	29	29
Compliance with standards (occupational health, safety, etc.)	29	29	43

Source: interviews with suppliers

There is some resonance between the supplier's views of cooperation with (four) OEMs and the OEM's views of its cooperation with its suppliers (see Table 11).

**Table 11: OEM's view of Cooperation with suppliers**

	Never	Sometimes	Consistently
Continuous information exchange			X
Favourable payment conditions (e.g. advanced payments)		X	
Joint product development	X		
Cost control (sourcing practices, inventory management, etc.)		X	
Product quality improvement (customer return rate, internal reject rate, etc.)			X
Improving lead times		X	
Technology transfer			X
Staff training		X	
Compliance with standards (occupational health, safety, etc.)			X

Source: Interviews with OEM

In general OEM cooperation and assistance has resulted in improved manufacturing capabilities among suppliers although one firm reported decreased efficiencies as a result of the increased checks and quality controls. This positive assessment accords with the findings on market diversification by suppliers. Cooperation in technology transfer appears to be concentrated in improved manufacturing practice rather than in product innovation.

### Market requirements

In an endeavour to find out what manufacturing factors OEMs considered important, suppliers were asked to rate on a Likert scale the OEMs' market requirements (1 being not important, 10 being very important), and then to rate their own performance on the same scale. The averages were then ranked and compared with an OEM ranking (see Table 12).

The only factor which enjoyed complete alignment was trust. Suppliers perceive it to be less important in the eyes of OEMs, and in rating their own performance. The OEM also agreed. One supplier rated its trust in a Chinese OEM very low because it alleged that the OEM concerned had reverse engineered its product and stolen the intellectual property.

**Table 12: Importance of manufacturing factors**

	Supplier's perceptions of OEMs level of importance	Supplier own performance rating	OEM rating of suppliers <sup>19</sup>
	Rank order of average	Rank order of average	Rank order
Product quality	1	5	2
Price competitiveness	2	2	5
Capacity to produce volumes requested	3	1	6
Trust	4	4	4
Lead times	5	6	3
Occupational health, safety, environmental standards	6	3	1

*Source: Interviews with suppliers*

Suppliers perceive OEMs to be most concerned about product quality which is almost correct – the OEM ranked it 2<sup>nd</sup> – and ranked their own performance poorly (5th). This confirms the general impression gained from fieldwork that suppliers are struggling to meet demanding quality standards set by OEMs. This may be interpreted as a positive development for the future of exports as product quality is an important element in being internationally competitive.

<sup>19</sup> Note this reflects the views of the only OEM that granted an interview.

The most misaligned perceptions concern health, safety and environmental standards which suppliers perceive to be the least important of the OEMs concerns whereas for the OEM it is the most important. Health and safety standards among suppliers is an important issue for OEMs because a safety incident can result in production stoppages which can delay project completion resulting in OEMs being fined.

Misaligned perceptions also appear to exist around price competitiveness where suppliers perceive it to be among the most important factors for OEMs whereas the OEM ranked it much lower.

Suppliers tend to believe that GE and Bombardier are more demanding customers than the Chinese companies, particularly in the areas of price competitiveness and product quality. Notwithstanding their being tougher task masters, GE and Bombardier seem to enjoy higher levels of trust from local suppliers than the Chinese firms do.

## 5.5 Impact on supplier competitiveness

The impact on suppliers will be assessed by using certain metrics: sales and profits; employee numbers; research and development; ability to enter other markets and impact on economic transformation. These will be discussed in turn below, after the firm's activities have been described.

### ***Firm activities***

All of the firms interviewed carried out manufacturing, assembly, marketing and aftermarket services (see Table 13). Foreign owned firms tended to carry out their research and development and product development at their corporate headquarters outside of South Africa. Consequently Table 13 understates a surprisingly high proportion of firms engaged in this type of activity.

**Table 13 Supplier activities carried out locally**

Activity	Average
Aftermarket services	100%
Assembly	100%
Manufacturing	100%
Marketing	100%
Product development	86%
Distribution	71%
Research and Development	71%

*Source: Interviews with suppliers*

### ***Sales and profits***

Most respondents said that annual sales and net profits had increased as a result of their involvement with the 1064 locomotive project as has employment. The results for unit pricing are more mixed with about half of the suppliers reporting an increase in unit prices and half a decrease.

### ***Employment***

Most suppliers reported an increase in employment as a result of their involvement in the 1064 locomotive project; on average by 84%. However this result should be treated with caution in view of the small sample size.

### ***Research, development and innovation***

Research and development (R&D) and innovation capabilities are a part of the package of attributes required by national value chains to compete internationally. Transnet's R&D capability, within TE, is respected among local suppliers and is presumably one of the strengths it considered when it decided to try and become an OEM. As is discussed elsewhere, this national resource requires TE to engage more with local suppliers, all of whom appear to carry out R&D of some form or other but none of whom have registered any patents.

Although most suppliers claim to be engaged in R&D the impression gained during fieldwork is that it is more incremental innovation rather than formal R&D. Nevertheless this is an important area of cooperation with OEMs where knowledge can be shared and developed. Shifting R&D from OEM corporate headquarters outside of South Africa to South Africa is an altogether much larger challenge.

An opportunity to work with the Department of Science and Technology's (DST) technology transfer unit with Tier 1 suppliers was identified as an opportunity that Tier 1 suppliers could use. As these suppliers start to enter the export market, the technology transfer unit has the capability to provide support. Currently, one of the OEMs is in discussions with DST's technology transfer unit as it believes that once some of the suppliers start gearing themselves up to export there will be a need to increase R&D and innovation.

### ***Manufacturing practice***

For some suppliers, dealing with international OEMs such as GE, Alstom and Bombardier was a shock; it was a new way of doing business. By comparison, TE is not a demanding customer. Despite grumbling about the investments that have had to be made and the high standards

set, most firms admit that the technology transfer has been substantial and that it has brought them closer to world class manufacturing.

Most suppliers interviewed had upgraded their manufacturing processes following their contract with an OEM (see Table 14). A high percentage of firms have invested in new machinery, improved skills and quality management, and introduced new products. Some instructive examples emerged (See Box 3). However a significantly lower percentage of firms have started new functions.

**Table 14 Supplier's manufacturing upgrades**

<b>Upgrade</b>	<b>Average</b>
Invested in new machinery	86%
Improved workers' skills	86%
Introduced/improved a TQM system	86%
Introduced new products	86%
Improving quality of existing products/services	71%
Reduced the time of product delivery	71%
More sophisticated products	71%
Higher skills content functions	67%
Introduced new organisational/management techniques	57%
Undertaking new functions (product design / production/ design/ servicing)	43%
Registered new patents?	0%

*Source: Interviews with suppliers*

### **Box 3: Improving Skills**

Eight years ago, the company started recruiting technicians to build the mid-level skills base by working with Tshwane University of Technology, Vaal University of Technology and the University of Johannesburg. In the beginning, the firm would recruit two students per annum, and this has increased gradually over time. The firm has also learnt how to select promising individuals. Using this method the mid-level skills base has developed over ten years and helped the firm grow from 20 to 68 employees. All were grown and trained in-house in accordance with the firm's strong internal training culture.

This expansion has been facilitated by the substantial supply of students that need to complete practical work requirements before qualifying during which time promising individuals are identified. They are later employed and can become valuable assets to the organisation.

Most of the firms interviewed had invested in upgrading plant and equipment in response to OEM contracts. Most also believe that the South African market has considerable limitations for them and so they are attempting various strategies such as product innovation and market

diversification to escape the limitations of the local market. However several are struggling, particularly with exports.

### ***Market diversification***

Some suppliers that had previously supplied OEMs and/or export markets did not have to make many changes to meet OEM requirements. Some that did have to make changes complained about the amount of effort, funding and paper work required.

One OEM estimates that by the end of its contract with Transnet about 7 to 10 South African suppliers will be incorporated into its global supplier database: a mere 5% to 7% of the 140 firms it first assessed. If new supply contracts are in future offered to these firms, price competitiveness will be key, which may be a challenge for some firms. Exporting adds transport and storage costs, adding additional pricing pressure for suppliers. Furthermore, in the domestic market local content requirements add a form of subsidy to supplier's prices which will not apply in export markets.

Once supplier capability has been developed there are concerns in some quarters that those suppliers will be limited to and beholden to 'their' OEM. Some OEMs do not seek to restrict their suppliers to only supplying it. On the contrary, they see benefit in suppliers also supplying their competitors as this diversifies the supplier's customer base risk and improves the supplier's prospects of sustainability. Supplier sustainability is a concern for OEMs that hope to be contracted to provide maintenance and refurbishment services to Transnet.

Some firms have increased exports as a result of the relationship that they have built with OEMs and believe that this holds promise in future. They seek to develop a good reputation with the OEMs and to be included in the OEM's supply chain to provide products in other countries. One firm reported decreased exports whilst others saw no change.

Suppliers' share of revenue from exports has increased in roughly half of the respondents and for most of those firms the number of countries to which they export has increased. One firm reported a reduction in the number of countries to which it exports.

One firm complained that their endeavours to export were unsuccessful because of the 'bureaucracy' surrounding the rail industry in SADC countries. They point out that potential customers tend to be state-owned enterprises and that, in their view, this implies that during bids, political influence can be employed. Consequently it has given up attempting to export to SADC countries but will try other African countries. Others point out that the African markets are small. South Africa has the largest African market for rail goods and services followed by



Egypt. The remaining countries have comparatively small markets which are not that attractive given the barriers to entry.

Another pointed out that exports have declined due the slump in global commodity prices – commodities are often transported by rail.

A further challenge for prospective exporters is the different standards applicable in different regions and the need to comply with these standards before market entry can be obtained. The USA market is governed by the Association of American Railroads (AAR) certification requirements and the EU market by the International Railway Industry Standard (IRIS) certification requirements. Meeting international standards is a major constraint for both small and larger suppliers and appears to be a consequence of many firms in the industry being focussed on the domestic market for a long time which has reduced the incentive and capabilities to meet international standards.

We argue elsewhere in this report that supply side incentives are needed to accompany demand side incentives such as localisation and this is a case in point. Acquiring such certifications is a costly and time consuming business without any promise of immediate reward. Consequently the DTI may consider some form of subsidy or incentive to assist firms in acquiring such certification.

Some firms complain that their competitors in international markets receive government assistance and funding, but that the South African government does not assist them in the same way.

In the local market none of the respondents reported new contracts with other public sector institutions. This may be because not much time has elapsed since the close of the 1064 locomotive procurement and the close of PRASA's big procurement exercise. And because there have been no significant bidding rounds since those two. Two firms had found new customers in the private sector.

In summary it appears that Government's local content intervention in the rail rolling stock sector is beginning to have a positive impact on suppliers in so far as market diversification is concerned.

### ***Black economic empowerment and black industrialists***

Transnet's supply chain development policy aims to support local manufacturers and local upgrading processes to meet OEMs' requirements (Cawe, 2014). This objective is not easily aligned to the objective of creating a class of black industrialists. Transformation has been

remarkably low in the capital equipment sector. It is not clear whether black industrialists can be supported quickly enough for them to benefit from the opportunities created by Transnet's recapitalisation strategy. If progress on the black industrialists' front is not sufficient, the risk is that the two categories that will benefit most from the MDS will be untransformed businesses and TE.

The DTI's Black Industrialists Policy focusses on access to capital and markets.<sup>20</sup> The key message that emerged from the firms interviewed is that in the rail supply industry four key ingredients are necessary; experience in manufacturing, capital, sufficient off-take volumes and customers. Of these, the most crucial is manufacturing experience, which in their view is the most difficult hurdle because there is no easy substitute for years spent working in manufacturing. Successful BEE controlled firms also stressed the importance of leadership experience in making firms successful. The Black Industrialists Policy intends to deal with this need through mentorship support (page 26).

Firms that had dealings with aspirant black industrialists reported that their main handicap related to lack of experience in the industry and manufacturing in particular. Some suggested that hiring experts is a way to address this challenge or partnering with a more experienced firm. Another route suggested was to purchase a white owned firm and leave the management in place whilst getting operationally involved. Examples of such successes exist. However one key stakeholder said that it was aware of some white family-owned firms that want to sell off their business to black industrialists but are unable to find buyers. In order to preserve the business a skills transfer is a necessary component in such transactions. In its view, it is unfortunate that there is no Government programme that facilitates such transactions and so they do not happen.<sup>21</sup>

The challenges faced by small black businesses are expressed mainly in higher prices that are uncompetitive with established businesses, making it difficult for firms higher up the supply chain to switch suppliers.

One firm expressed concern about the direction recent black economic empowerment requirements have taken in regard to points awarded for bringing employees into the business or bringing in new partners. This supplier believes that the previous dispensation which rewarded those that involved employees rather than new partners was much better.

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<sup>20</sup> The Department of Trade and Industry, Black Industrialists Policy (undated, estimated to be 2015).

<sup>21</sup> The respondent may not be aware of the Black Industrialists Policy.

In summary, the findings of this research confirm those set out in the Black Industrialists Policy except for greater emphasis on the need for manufacturing experience.

There are challenging policy trade-offs that have to be made between the pursuits of industrial capabilities on the one hand and small business and black economic empowerment on the other hand. As is shown elsewhere in this report not all elements of the locomotive value chain have economies of scale that are conducive to small business. And there is a dearth of black entrepreneurs with manufacturing experience. Some interviewees with policy oversight experience believe that the DTI and Transnet place too much emphasis on small business and empowerment at the expense of building manufacturing capability. As a result imports may increase, the very opposite of the policy objective. Succeeding as a supplier to OEMs is tough. The prospects of success seem to be better for transforming existing manufacturers rather than for new entry by black industrialists. Unfortunately the broad brush strokes of the current localisation prescripts do not cater for these differences and are not carefully synchronised with the other policy objectives.

## **5.6 Challenges in developing the rolling stock manufacturing capabilities**

The condition of Transnet's aging locomotive fleet was neatly summed up in its 2012 Annual Report.

*The locomotive fleet is now on average 37 years old and no amount of maintenance spend is likely to improve its utilisation (Transnet, 2012a:81).*

This sentiment seems to have also been true, by association, of the rolling stock value chain. Although Transnet has been procuring locomotives for many decades, the procurement of 1064 locomotives in 2014 is its first major procurement exercise since 1985. Government and Transnet wished to seize the opportunity to affect a step-change in local rolling stock manufacturing by having a large number of locomotives assembled in South Africa with a considerable share of local content.

### **Scale economies**

It is also possible that Government and Transnet were rapidly trying to position South Africa with their eye on a bigger prize – to make South Africa the leading supplier of rolling stock for Southern Africa, if not Africa. According to the DTI discussions in SADC structures have been going on for some time about which countries would be responsible for the different parts of the rolling stock value chain. South Africa's plan received a boost when in February 2015 the

African Union designated South Africa as the continent's locomotive manufacturing hub (Creamer, 2016a).

Whilst on the one hand this large order of locomotives created an ideal opportunity to extend localisation, on the other hand it has limitations in developing the locomotive value chain. One of the main impediments is the delivery schedule which requires that the entire order is manufactured and supplied over a short period of time, (three and a half years). Even though the process outlines stages of delivery – from importation, local assembly then local manufacturing – it was to be something of a crash course in locomotive manufacturing for the local industry and this points us in the direction of the first difficulty for the locomotive value chain; the limited ability of local firms to ramp-up capacity in a short period of time.

Secondly, Transnet's pattern of procurement where there are long periods of inactivity followed by short spikes in demand creates challenges for Transnet and both OEMs and suppliers. This has led to a weak response from local private suppliers to the Transnet CSDP (Cawe, 2014). Some industry stakeholders imputed this to the industry's reluctance to undertake significant capital investment in a market historically characterised by uncertain and patchy demand.

However it may be driven to some extent by the 20 to 30 year useful life of locomotives which raises barriers to entry. Erratic demand is not conducive to business continuity, sustainability and low barriers to entry. Big orders typically require significant capital investment not only in plant, machinery and equipment, but also in skills. This means that in order to recover capital over a short period of time the price is usually driven up.

Historically low demand has meant that firm capabilities have shrunk and value addition for higher end capital equipment is very low. The few capable suppliers are becoming increasingly concentrated and specialised in supplying Transnet rather than other domestic and export markets. Transnet's move to programmatic procurement, with predictable, long term and sizeable orders is meant to address market uncertainty.

The designation of locomotive fleets was intended to achieve greater certainty according to the Department of Trade and Industry's Industrial Participation Action Plan at the time (Iteration 2012-13):

***Economic rationale:*** *Inconsistent procurement, often with short delivery times, creates uncertainty in supplier industries because suppliers are not able to adequately plan and phase in investments in preparation for meeting the requirements of these*

*contracts. This KAP aims to facilitate a smoother and more predictable demand in relation to strategic fleets. (DTI, 2011c:83).*

An alternative would be for Transnet to spread out such procurement over longer periods of time. This approach also has challenges. Firstly Transnet may need the locomotives in the short term, given the pressures of its rapidly aging fleet and the anticipated demand arising from Transnet's Market Demand Strategy. Secondly the economies of scale of certain manufacturing processes may require a certain level of output that may not be achievable if an order is spread out over an extended procurement period (see Box 4). And since all of the various manufacturing processes that contribute to locomotive manufacture do not have the same economies of scale, nor the same capital pay back periods, it is difficult to strike the optimum balance.

**Box 4: Economies of scale examples given by suppliers**

The USA's demand for rail wagons is around 100 000 wagons a year and in South Africa it's between 200 and 400 wagons a year. The South African market does not offer comparable economies of scale which makes it difficult for local firms to be competitive.

Another supplier cited the example of braking systems which are designated at 70% local content. This supplier argued that reaching 70% localization is impossible given the small quantities demanded locally do not justify the investment in research and development which is crucial when developing these products.

A third supplier pointed out that the economies of scale in the local market do not justify the approximately R500 million capital investment required to manufacture bearings from raw steel. The decline in demand from Transnet in recent years has caused the owners to try and sell the firm, failing which it will have to close down at a cost of about 90 jobs. Another firm cited that the inability to secure contracts from Transnet has resulted in over half their staff being retrenched (approximately 130 employees).

Suppliers typically try to diversify their income streams in trying to mitigate spikes in demand created by Transnet's procurement. They may, after the initial spike in supply, seek extended maintenance contracts with the OEM or Transnet, which may or may not yield a sufficient throughput to ameliorate the capital costs and economies of scale factors. One firm disclosed that it was making only marginal profits from the sale of its products but hoped to balance this out with returns from a maintenance contract.

Refurbishment typically requires smaller numbers of components than large scale procurement of new equipment. This lack of economies of scale for refurbishment is compounded in the case of older locomotives where several different suppliers supplied different models (GE, Hitachi, and Electro-Motive Diesel) with different components. Consequently it is recommended that local content designation should distinguish between procurement of homologated products such as locomotives and refurbishment of existing rolling stock.

Exporting is another market diversification strategy that some suppliers are engaged in and some are considering either on their own or by means of being included on an OEM's supplier database. OEM supplier support seems to be focussed on providing technical acumen around operational efficiencies to the larger suppliers rather than dealing with the challenge of exporting which requires funding for marketing, additional administration, risk mitigation and sometimes higher transaction costs. It can be something of a quantum leap for small and medium sized enterprises. Where there is the potential for mutual gain for an OEM and a supplier more export assistance may be forthcoming but this is not a consideration in the 1064 locomotive programme which does not have an export component to it.

Some OEMs have systems which maintain records of all of their successful suppliers and their performance. When an OEM secures contracts in another country outside South Africa it is able to select the best of its suppliers, from whichever country, comfortable in the knowledge that it has worked with that supplier before and that it was able to meet the OEM's demanding requirements. This saves the OEM the start-up costs of selection and assistance to bring the supplier up to its required standards. It also offers the local supplier an *entree*' to wider markets.

Has the 1064 locomotive procurement given parts of the South African value chain an *entree*' to wider markets? It is too early in the programme for this research to answer that question conclusively. However there are early indications that some firms are widening their horizons and have ambitions to become suppliers to OEM in foreign markets or otherwise expand exports. One developing new entrant has exported a few products to GE in the USA and Pakistan as a result of the relationship it has established with GE in South Africa where the necessary trust in the supplier's products has been built. It is hoping to establish a similar export orientated relationship with Alstom.<sup>22</sup>

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<sup>22</sup> Alstom is the majority shareholder and major supplier to Gibela which has a contract to supply 600 commuter trains (3,600 cars) over a period of 10 years. Gibela also will provide technical support and supply of spare parts over an 18-year period. The overall value of this contract is worth € 4bn.

But the extent to which these early buds blossom into a full integration into global supply chains will depend in part on the kind of relationship South Africa wishes to foster with multinational OEMs. This will be a product of how Transnet's OEM ambitions turn out and the extent to which it crowds out the private sector. This is discussed below.

OEMs claim to have enhanced manufacturing operations by investing in new machinery, improving workers' skills, reducing product delivery times and improving total quality management systems. Despite these innovations, new products have not been developed as yet.

### ***Transnet and OEMs***

Only the four OEMs (now three) are directly contracted to Transnet Freight Rail (TFR) for the delivery of 1064 locomotives. The OEMs in turn contract suppliers. This may change in future when Transnet enters into service agreements for maintenance and refurbishment of these locomotives at which point it may contract suppliers directly.

The TFR contracts with OEMs are complex in that they involve the OEMs being both a supplier to TFR and a customer of Transnet (Engineering) (TE), at the same time. GE for example is contracted to supply locomotives to Transnet. Transnet is contracted to GE to assemble those locomotives in its factories. This gives rise to some curious developments. For example, Transnet's current manufacturing challenges are resulting in its suppliers (the OEMs) rejecting their customer's (Transnet) work.

To compound matters both TE and OEMs are active on the same workshop floor with the risk that it is not entirely clear who is supposed to do what. Theoretically, TE staff are meant to be manufacturing and assembling the trains with OEMs providing oversight and instruction. According to a supplier, in a previous programme to assemble the class 21E locomotives with Zhuzhou Electric Locomotive Company, (a subsidiary of the China South Locomotive and Rolling Stock Corporation), TE workers were assembling locomotives during the week but over the weekends Chinese workers were assembling the same locomotives. Currently, Transnet is attempting to establish the work allocation more clearly. Nevertheless opportunities for confusion may arise both at shop floor level and at the contractual level. These issues stem from Transnet's ambitions to become an OEM (discussed elsewhere in this report) and the bundling, within one company, of an infrastructure provider, a rolling stock operator and a rolling stock manufacturer.

### ***Transnet planning***

Large scale manufacturing operations require significant materials planning, controls and project management. Several respondents claimed that they experienced difficulties with Transnet's planning and project management which had negative impacts on their manufacturing operations. The main complaint by suppliers is that Transnet deviates from its plans and order schedules, or changes them at short notice. This results in suppliers incurring increased working capital costs which they cannot contractually recover from Transnet. This may be in the form of capital tied up in stock; or hiring of long-duration contractors to meet the contract requirements.

The bottleneck that has emerged in TE locomotive assembly factories has meant reduced orders for suppliers through most of the value chain. Firms that had geared up and employed staff are now considering retrenchment. Presumably if and when the 1064 programme gets into full swing they will have to employ staff again with the possibility of incurring additional training and engagement costs. Some contracts make provision for penalties against Transnet if it reduces or changes orders which then also raise overall project costs.

One supplier reported that on another contract that it had contracted to supply 2000 units but had only been able to supply half of them because Transnet had exhausted its budget. In contrast this firm found PRASA to be a much easier customer to deal with as it sticks to its project plans.

This view of Transnet's difficult relationship with suppliers is supported by other respondents who believe that Transnet's investment of resources, effort and time in supplier development has been limited and that it does not have the capability to support supplier development. It is thus fortunate that it has some OEMs as intermediaries that are much more capable in this area.

### ***Lead times***

The period of notice that Transnet gives to local suppliers was criticised by some respondents who complained that the period was too short to allow local firms to prepare to ramp up production. The DTI believes that the designation of local content acts as a signal to the market allowing it to prepare to supply. Firms interviewed indicated that mere designation is insufficient justification for investment. What is needed are firm orders. The challenge appears to lie in giving suppliers firm off-take commitments with sufficient time for them to ramp-up investment and production.



Transnet and PRASA dominate demand for railway goods and services. Consequently their behaviour has a ripple effect across broad swathes of South African manufacturing. Issues such as poor production planning impacts supplier's cash flows and can be fatal for some small firms. It can thus be argued that Transnet and PRASA have a large responsibility to treat their suppliers fairly in the interests of advancing manufacturing capabilities in South Africa. This argument is strengthened by the fact that they are state owned. This investigation found evidence of the negative effects of Transnet's erratic planning but did not attempt to quantify it.

There is the possibility that Transnet's dominant position in the market has allowed it a level of comfort with different standards. On the one hand Transnet is able to penalise suppliers for inability to deliver on a contract on schedule, however, the same suppliers are not able to impose the same penalty for similar transgressions by Transnet. Could Transnet's systems be moved closer to the kind of Just-In-Time (JIT) manufacturing that prevails in the motor industry? The DTI should consider investigating this possibility with a view to incentivising Transnet to improve its planning and ordering.

### ***Supplier development and technology transfer***

In the course of selecting suppliers OEMs were able to identify that different sized firms had different requirements.<sup>23</sup> For the larger firms the focus has been on technical acumen and technical assistance while for the smaller firms this has had to be extended to business acumen as well. Business assistance includes financial management, marketing/sales strategies, and organisational development.

Technical assistance appears to be the main thrust of supplier development between the OEMs and suppliers. OEMs have been able to source experts from across the world to address some of the challenges local firms face and improve productivity and quality. For example, one supplier reported that an OEM had taught it to transform to industrial production planning and to do lean manufacturing. This process was facilitated by bringing in an expert from the UK to help the supplier improve production and undertake quality assurance checks. These modifications are aimed at ensuring that the firm meets international standards. Even though this requirement increased costs for the supplier, the OEM was willing to revise pricing to cover these additional costs.

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<sup>23</sup> One OEM spent between 18 months to 2 years working with its suppliers to raise them up to the required standards. This involved an investment of some 15 person years provided by local and international staff.

In another case, an OEM has spent R6 million on training local staff in its European factories and has three engineers stationed at the supplier's factory to provide quality assurance and product management. In another case a developing black-owned enterprise received technical assistance which has improved its welding and painting processes.

The ability of local firms to meet desired quality and pricing standards is a contentious issue. On the one hand, a foreign firm reported that the ability of local SMEs to meet their desired quality standards is still very low. It estimated that only about 40% of its suppliers could meet required quality standards. Consequently it employs three quality managers (engineering technicians) to ensure that their suppliers meet the required quality standards at a cost of close to R100 000 per month. When necessary it brings in engineers from its home country to assist suppliers.

In contrast, a local firm that is majority black-owned and is in partnership with a reputable international firm reported that securing subcontractors that produce high quality products is easy. And that with these subcontractors it produces better quality products than those imported from India and China. In the last five years it had developed 5 suppliers as well as small local firms to provide transport, information technology and administrative services and that this had worked well for it.

Despite the opposing views, it appears that there is a dichotomy of firms in South Africa; where some are able to meet international standards, while others need more assistance to meet these.

## **5.7 Transnet's impact on the rolling stock sector**

### ***Procurement shapes the industrial landscape***

The way in which Transnet procures, shapes the industrial landscape. In some segments of the rail market Transnet is the only domestic customer or the dominant customer and therefore through its procurement design, it exercises industrial policy and strategy choices, whether wittingly or unwittingly. It is a 'king maker' and accordingly in line with the PFMA an SOC must take care in exercising its influence over the industry its ambit falls within and act in a responsible, ethical and fair manner that furthers the transformation objectives of the country as a whole

Each sub-sector of the rail market has its own particular character, skill set and economies of scale but they are all influenced by a common set of factors. Transnet procurement is under pressure from a number of Government quarters to reshape the industrial landscape. For example there is law supporting localisation, black economic empowerment, policy supporting

higher valued added manufacturing, black industrialists and so on. There are repeated public statements by the competition authorities expressing its concerns over the degree of market concentration in many South African markets.

The current industrial landscape does not reflect these imperatives. There are some long established firms that received their initial impetus under a market 'protected' by anti-apartheid sanctions that have developed a critical manufacturing mass and the critical skills set necessary to survive. Typically these are firms tagged as untransformed or 'white monopoly capital' and are the legitimate targets<sup>24</sup> of post-apartheid restructuring. Nevertheless, there are certain objective economies of scale which apply to this combination of manufacturing capability and skill set. In South Africa's comparatively small market there may only be sufficient room for one or two such firms in a particular market segment. Consequently Transnet's transformation strategy of promoting new entrants may not be appropriate for that kind of market segment. Before transformation through new entrants became fashionable, empowerment through ownership was Government's preferred strategy and this may be a more appropriate strategy to follow for such market segments.

Procurement efforts by Transnet, driven by the imperatives referred to above, to introduce new entrants may succumb to a lack of economies of scale or may undermine and fragment critical manufacturing competencies and skill sets, inhibiting future efforts to innovate and remain competitive.

Some suppliers expressed concerns that a critical mass of manufacturing capability and skill sets established in such firms over a long time (and possibly only achievable in the pressure cooker conditions of apartheid sanctions) may be lost for ever. Because, in South Africa's currently much more open economy, with its attendant import competition, it may be much more difficult to try and re-establish such a critical mass.

These are difficult considerations and difficult judgement calls to make. However, Transnet procurement is making these decisions through the structure and the specifications in the tenders it issues. Naturally a number of questions flow from this. Are some of these industrial policy decisions? If so, is Transnet procurement the appropriate body to be making such decisions? Does Transnet procurement have the experience, skill, knowledge and understanding of the market segment concerned to competently make such decisions? Are Transnet's capabilities nuanced enough to find an optimal solution? Can it be relied upon to

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<sup>24</sup> For example construction firm Aveng entered into a consent agreement with the Competition Commission regarding collusive tendering for various projects including Transnet railway maintenance tenders. (<http://www.engineeringnews.co.za/article/tribunal-approves-avengs-immunity-from-an-administrative-penalty-2016-10-27> accessed 28-10-16)

select an optimal solution when it has its own commercial interests and aspirations to become a rail products OEM? Will Transnet's tender requirements be driven by European OEM standards that are not appropriate for African operating conditions? If so, will importers be favoured over local manufacturers?

There is a deep concern among some suppliers that Transnet procurement does not have the appropriate capabilities and there are consequently fears that swathes of firms with such critical mass may be wiped out and the capabilities lost, never to recover. Of course such protestations may be disguised attempts to protect illegitimate market power. Careful assessment is needed to establish the facts.

One such supplier explained that it is attempting to adapt so as to try and avoid closing down. The most obvious adaptation is to retreat one step back and allow the new smaller firms to win the tenders and then to lease them a package of equipment and to provide, under contract, the operation and maintenance thereof. This has the hall marks of fronting.

Questions about what role Transnet procurement does or should play in shaping industrial capacity ultimately circle back to what roles Government expects SOCs to play in the economy and how efficient and competent such SOCs are to do so. The National Development Plan (NDP) has made general statements on the roles of SOCs (National Planning Commission, 2012).<sup>25</sup> The question of Transnet's efficiency and competence is a more vexed question. The NDP does say "Plans should be informed by experience and the poor performance of Transnet's capacity expansion programmes" (National Planning Commission, 2012:186). It also says that "Accountability in state-owned enterprises has been blurred through a complex, unclear appointment process and, at times, undue political interference" (National Planning Commission, 2012:55).

In the light of these considerations and in pursuit of greater local content the DTI needs to make a more disaggregated examination of the rolling stock manufacturing sector to determine where more nuanced policy interventions may be required.

The sheer scale of Transnet's locomotive procurement distributed through local content requirements means that it has the potential to have a very significant impact on the rolling stock manufacturing sector. Its requirements, filtered through OEMs down to suppliers, are generating a significant volume of orders and work after a long period of depressed activity.

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<sup>25</sup> "SOEs are central to advancing national objectives through providing economic and social infrastructure. If this is done in an equitable and cost effective way, SOEs can contribute to both economic growth and overcoming spatial inequalities."(NDP:438)

This quantitative boost to manufacturing activity also has a qualitative dimension in the improving manufacturing fabric discussed elsewhere in this report.

### ***Transnet's aspiration to be an OEM***

Transnet Engineering (TE) has decided to try and become a rolling stock OEM with a view to meeting its own needs and supplying export markets. There is a potential inconsistency between Transnet Engineering (TE) and the group's overall supplier development policy (Cawe, 2014). TE was originally created to supply rolling stock and maintenance services to the group, as well as maintenance services to PRASA. Through public investment in TE capacity and its participation in CSDP and OEMs supply chain, TE is competing with private suppliers of locomotives, wagons and components.

The pursuit of an OEM export ambition is relatively new. Transnet's 2012 Market Demand Strategy lists its Rail Engineering Rolling Stock Equipment's activities as "manufacture components", not completed locomotives. But the launch presentation in April 2012 referred to Transnet's "Africa Strategy initiatives.....Export of wagons, locomotives and rail maintenance services" (page 18) although this is not mentioned in its Annual Report of that year (Transnet, 2013b:18-20).

The following year (2013) its Annual Report says that:

*Transnet's Competitive Supplier Development Programme (CSDP) focuses on the localisation of suppliers and Original Equipment Manufacturers through contractually obligated supplier development plans (Transnet, 2013a:45).*

This suggests that the decision had not yet been taken to pursue OEM status. By a year later (2014) the decision appears to have been taken to pursue OEM status.

*Transnet Engineering's role in the agreement (to manufacture 1064 locomotives) has been defined to ensure that it transforms into an OEM over time (Transnet, 2014a:51).*

It appears that the *Africa Strategy*<sup>26</sup> was also approved at about the same time in 2014<sup>27</sup> and is intended to position Transnet as a major OEM for the continent's infrastructure development (Maqutu, 2016).

By 2015 specific projects were underway.

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<sup>26</sup> This seems to copy Eskom Enterprises' business ventures into Africa about a decade previously.

<sup>27</sup> The Transnet Long-term Planning Framework, September 2014 refers to the "recent approval of a Transnet Africa Strategy" (page 1).

*In line with becoming an OEM, Engineering is progressing the design and build of the Trans Africa locomotive, equipped with technical capabilities that will cater for the difficult conditions in the Africa market. The project is underway and the first and second prototype will be completed in the 2016 financial year (Transnet, 2015:144).*

Transnet's locomotive supply contracts have been crafted to ensure that it transforms into an OEM over time and to create export capability for locomotives and related products (Railways Africa, 2014). As of 2016, 20% of its revenues already accrued from African clients. TE has also developed a locomotive for the African market, which is currently under production in joint venture with Grindrod, a private JSE-listed freight and logistics company, for Angolan and Mozambican clients.

The pursuit of this strategy has and continues to, crowd out the private sector. If manufacturing capability is merely shifted from private firms to SOCs there is no net gain for the economy. Indeed there may be net losses. Certainly there have been losses for firms that have traditionally supplied Transnet like DCD<sup>28</sup> and Union Carriage and Wagon<sup>29</sup> (see Box 5) just as there have been gains at TE which has invested in new manufacturing equipment<sup>30</sup> which has had some success in assembling rolling stock and locomotives after initial failures.

#### **Box 5: Declining fortunes**

Union Carriage and Wagon made many of South Africa's current locomotives and wagons including the Class 15E locomotive, the heaviest and most powerful locomotive in the world.

In recent years Union Carriage and Wagon suffered a dip in fortunes as Transnet work dried up and it was sold by Murray and Roberts to local black owners in January 2013 after a period of poor performance. This was too late for it to be one of the successful bidders for the 1064 locomotive project which were announced on 17 March 2014. By that time Union Carriage and Wagon staff complement was below one third of its capacity causing the National Union of Metal Workers of South Africa, on behalf of its members at UCW to complain to the Minister of Transport that foreign firms were being preferred over local firms by Transnet (NUMSA, 2014).

DCD previously manufactured approximately 60% of all locomotives in South Africa and was one of Transnet's biggest suppliers. This changed from the 1990s when Transnet orders shrunk to one or two small contracts and various other changes were made by Transnet to the supply chain that

<sup>28</sup> DCD was originally established in 1946 as DCD Dorbyl (Pty) Ltd, a merger of Dorman Long and Vanderbijl Engineering Corporation.

<sup>29</sup> Union Carriage Works is 51% owned by French multinational Alstom with effect from April 2016 and is now known as CTLE (Commuter Transport & Locomotive Engineering).

<sup>30</sup> The Operating Division invested R115 million in the upgrade of locomotive production lines in preparation for the assembly of the 1 064 locomotives build programme. In the year ahead, a further R470 million will be spent on the locomotive assembly lines. Transnet Annual Report 2015: 144.

adversely affected DCD. Its Transnet orders have fallen to about one two hundredth of their former value as Transnet has increasingly pursued its plan to become an OEM. DCD's orders for both new equipment and spares has declined dramatically. In the last two years it has retrenched 250 skilled employees. DCD responded to these changes by becoming more innovative and diversifying its markets. It started manufacturing specialised rail wagons and improved the design and technology for specialised locomotives which are now running on the iron ore and coal routes.

Has this relocation of capabilities from the private sector to the public sector resulted in a net gain for the country? The answer will depend upon what policy objective is being pursued. Unfortunately there does not appear to be any specific public policy guiding this strategy.

There is no mention of it in the IPAP 2011 (DTI, 2011c). There is no mention of Transnet's aspiration to become an OEM in the National Rail Policy Green Paper (DoT, 2015).<sup>31</sup> The IPAP 2016 only reports on the 1064 locomotive contract and the assembly activities as Transnet's facilities (DTI, 2016).

Transnet's ambition nevertheless appears to enjoy support from some quarters in Government. Recently there have been statements by senior public servants supporting Transnet's aspiration to become an OEM. For example Department of Public Enterprises Director General Richard Seleke has been quoted as saying "I can confirm that Transnet will become the leading original equipment manufacturer of locomotives in South Africa" (Van Wyngaardt, 2016).

This statement stands in stark contrast to the Statement of Strategic Intent (SSI) issued by the Minister of Public Enterprises on 19 November 2012 which defines the overall objectives of the company, including a requirement to leverage the private sector in the provision of both infrastructure and operations where required (Transnet, 2014b).

It may be that Transnet's Shareholder Compacts (required by the Public Finance Management Act) direct it to become a manufacturer of rolling stock but unfortunately these documents are not in the public domain (despite this being explicitly required by the National Development Plan).<sup>32</sup> However a Shareholder Compact is not a statement of Government policy. It is an instrument to give effect to public policy. The question remains, where did Transnet obtain a mandate to become an OEM?

The decline of older more established firms is accompanied by job reductions and the loss of a whole set of manufacturing competencies and skill sets. Some respondents claim that Transnet is training new people to acquire these skills whilst those already trained are often

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<sup>31</sup> Department of Transport, August 2015.

<sup>32</sup> The NDP has a whole raft of recommendations designed to improve the functioning of SoCs.

lost to the industry. This kind of duplication is a net loss. Elsewhere in this report instances are given of Transnet's inability to successfully manufacture certain parts of locomotives with the result that the parts are imported either because the capability in the private sector has been lost or overlooked. This too is a net loss.

State crowding out also impacts negatively on new entrants. Newer black owned firms in the rolling stock refurbishment sector complain that TE has a scale advantage over its private sector competitors and that this allows it to fund a better research and development effort, placing new entrants at a further disadvantage. As a consequence TE wins most of the tenders.

Transnet's role as an aspirant OEM in export markets has negative consequences for itself and for local suppliers which may lose export orders. In regard to the former, OEMs point out that the export markets that Transnet is targeting are the same ones in which they will also be competing. Consequently whilst they are willing to assist their customer Transnet, they must keep a wary eye on the extent of that assistance because they anticipate that in future they will encounter Transnet as a competitor in other countries. Obviously OEMs do not want to strengthen a future competitor and so they hold back on the kind of cooperation that they are willing to give Transnet.

For South Africa to target African locomotive markets it will need a locomotive OEM which could be either privately or publicly owned. African locomotive markets are probably not big enough to warrant two such OEMs at this time. If so, then a choice must be made between a private or publically owned company. Each option has its own advantages and disadvantages. Both options would presumably seek to draw on globally competitive South African suppliers to some extent.

The disadvantages for the local private sector of having to compete with a large SOC is that not only do they lose local market share but when they try to diversify to other African markets, they may be frustrated by Transnet there too.

It also complicates relationships. For some suppliers TE is not only their biggest customer, but also a significant competitor and this makes for a very tricky relationship for a supplier to manage. Examples are cited where Transnet, whilst competing in a foreign market, approached its competitor/supplier for designs so as to better compete in that export market. Naturally suppliers are reluctant to equip their competitors with intellectual property which will decrease their own prospects of winning a tender. Yet on the other hand they are fearful that if they do not cooperate and provide the designs they may lose out on future business with Transnet.



There are also allegations that Transnet uses its state ownership to crowd out the private sector in other ways. Firstly it is alleged that Transnet benefits from Government to Government relations with other countries in order to win tenders, possibly as a part of some bigger government to government deal in which other non-rolling stock related trade-off may be involved.<sup>33</sup> The private sector cannot compete at this level. Secondly it is alleged that Transnet has a shareholder (the Government) that is far less demanding of financial performance than private sector shareholders are, which enables it to bid lower prices than the private sector can and so compete unfairly.

It is also alleged that Transnet uses its market dominance to try and extract intellectual property out of private sector firms with a once off payment rather than the normal extended royalty type payment. In such cases Transnet can threaten to deny work to firms that do not cooperate.

Shifting locomotive manufacturing capacity from OEMs to Transnet also runs the risk of damaging the supplier base. Selecting, nurturing and developing suppliers is a skill that Transnet does not currently possess, and may never possess. On the other hand some of the OEMs have this as their core competence. Consequently, if Transnet crowds out the OEMs it may have adverse consequences for its own supplier base.

Crowding out can also take more subtle forms affecting such things as collaboration between suppliers and customers, which in highly technical fields is often a key to success. Transnet's Very Important Technology (VIT) division for R&D engineering used to engage closely with suppliers seeking to innovate and better meet their customer's needs. Recently Transnet has blocked access to its engineers and technicians, only allowing suppliers to speak to procurement staff. It may be trying to reduce the risk of competitors gaining access to its thinking or it may be attempting to level the playing fields between older established firms and new entrants. Whatever the reason may be, if the entire industry is denied this kind of interaction with the dominant customer there is reason to believe that the entire industry may be worse off as a result.

Railways in smaller economies are natural monopolies and rail procurement in many countries often has a high degree of government involvement. This is especially the case in Africa which is the target of Transnet's *Africa Strategy*. If South Africa enjoyed cordial relations with other African governments, there is probably a case to be made in which it could be argued that a Government owned company may have better prospects of supplying the African market with

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<sup>33</sup> SADC has commenced a discussion on which parts of the locomotive value chain will be housed in which country. Usually such deals involve trade-off.

rail equipment than privately owned firms. However, there are also drawbacks to this stance as has been referred to above.

In summary, it appears that Transnet has, apparently of its own accord in the absence of any policy guidance, decided to try and become a significant manufacturer and exporter of locomotives, or OEM. In the light of the negative effect Transnet's OEM aspirations are having on the local economy, the cost to the taxpayer of Transnet's investments and the kinds of allegations that are being levelled at Transnet's conduct there are good grounds for the DTI to fill the prevailing policy vacuum.

Such a policy will need to address questions such as: should decisions by SOCs (to become manufacturers and to compete in export markets) be left to the board of a SOC or not? If not, what policy should guide such decisions? What kind of relationships does South Africa wish to have with foreign OEMs in the light of their potential to utilize local suppliers and thus generate exports? What thresholds will apply? How best can South Africa leverage its intergovernmental relationships with other African governments, by assisting the private sector or through a SOC?

## **6 Implementing localisation incentives**

### **6.1 Institutional coordination: coordinated state procurement**

Local content requirements are applicable at a SOC level and accordingly the larger the SOC's market the better the prospects are that local production may achieve economies of scale. But South Africa has some 140 SOCs many of whom utilise similar products. Consider pipeline valves for example. Many SOCs including those involved with electricity, water and petroleum procure large numbers of valves, but the benefits of agglomerated demand and reduced transaction costs have not yet been exploited.

The separate rolling stock procurement exercises carried out by Transnet and PRASA (each worth approximately R50 billion) appears to have caught Government's attention. There was no coordination between these two SOCs in this procurement of rolling stock.

It has been reported in the media that a Cabinet Lekgotla, which took place from August 16 to 19, 2016, decided that the Department of Public Enterprises and National Treasury will consolidate procurement for locomotives into a single institution, under Transnet, to ensure "efficiency and compliance with the localisation requirements" (Creamer, 2016b). It is odd that the DTI appears to be excluded from this consolidation exercise.

TE suggests that Government should go one further and consider the needs of all the large SOCs before designating products for local content, particularly where there is only a limited demand for certain products.

It is recommended that the DTI should try and engage with Government processes seeking to consolidate locomotive procurement.

### **6.2 Designation and verification**

#### ***Administrative actions***

Ideally a careful analysis of the strengths and weaknesses of the Competitive Supplier Development Programme would have revealed its slow uptake and that demand side measures alone are insufficient to engender manufacturing capability. Accompanying supply side measures are just as important. Skills development, lean manufacturing and technology advancement are needed to assist the supply side so that demand can be met.

The PFMA local content prescripts have not been accompanied by corresponding assistance to the supply side. The supply side measures that do exist will need to be strengthened if South Africa is to maximise the benefits that can flow from local content requirements.

Procurement by SOCs is a deployment of taxpayers funds intended to be in the public interest. Best practice demands transparency and accountability. Local content requirements for SOCs direct the way in which procurement is done. Therefore there is a compelling case to be made for wide public consultation and a transparent process in determining designated products and the share of local content therein.

Those responsible for making such decisions are engaging in ‘administrative actions’ as defined in the Promotion of Administrative Justice Act 2000 (Act No. 3 of 2000) (PAJA). This Act sets the minimum standards for public consultation regarding administrative actions and gives effect to Sections 33(1) and (2) of the Constitution which require that everyone whose rights have been adversely affected has the right to be given written reasons (refer to section 5 of PAJA).

How does the DTI’s public consultation process compare with the aforementioned minimum legal requirements? Whilst this question was not exhaustively investigated it appears that the public consultation process did meet the minimum requirements. However this is less clear in so far as the provision of reasons for decisions is concerned. There appear to be no written documents in the public domain providing written reasons for the Instruction Notes issued by National Treasury at the behest of the DTI. Such documents would assist the DTI in clarifying its approach and intentions but also provide the public with a better understanding and possibly avoid accusations by stakeholders, such as the Rail Road Association, of “misalignment” between policy intent and results. As has been argued above, innovation opportunities vary by procurement strategy and markets; and secondly, it is unrealistic to pursue a multiplicity of policy goals at the same time with the same type of procurement. According to Makube (2016) South Africa’s public procurement policy pursues multiple policy objectives: industrialisation, localisation, transformation, skills development, job creation and enterprise and supplier development. It is unclear which of these are prioritised in the designation of locomotives because there are no reasons for decisions published.

More particularly, the public have the right to know what the particular policy intent is. If this is published it is then easier for Government to justify its actions but also for Government and members of the public to evaluate the degree of success, or failure, of the particular market intervention. The policy objectives provide the criteria against which to measure the outcomes.

It is recommended that the DTI and National Treasury should formally publish their local content policy objectives and provide written reasons for their decisions when Instruction Notes are issued.

### ***Designation thresholds***

In general there was recognition among both suppliers and OEMs that the DTI staff responsible for designation thresholds have a difficult task and that it had done well. However there were calls for improvements by way of more in-depth research into value chains so that more detailed and nuanced thresholds could be set. For example, bearings are designated at 100% local content but no suitable steel is manufactured in South Africa with which to manufacture bearings. Consequently the designation target cannot be met and the DTI has had to issue an exemption. A bearing supplier believes that a local content requirement of 25% to 30% would be more realistic.

Suppliers are concerned that unrealistic or inappropriate local content requirements provide an excuse for some OEMs to increase imports. They point out that increasing local content levels does not follow a linear relationship with the degree of difficulty. As the local content level increases, the degree of difficulty increases exponentially, but this does not seem to be fully appreciated by the DTI.

The local content requirements require considerable reporting in anticipation of verification audits. Among suppliers there was general acceptance that this is an unavoidable part of doing business. However smaller firms complained that the tedious administrative burden of reporting, despite their miniscule contribution to the value of a locomotive, was the same as it was for much larger contributors. They argue that the principle of proportionality should apply i.e. that the burden of reporting should be in proportion to the share of value added to a locomotive.

This research has found the designation instrument to be something of broad brush approach in practice which is having some unintended consequences. For example products are designated regardless of whether they are intended as part of a new large scale procurement or a much smaller scale procurement for replacement parts for the refurbishment and repair of existing equipment. There may be financially viable economies of scale in the former but not necessarily in the latter.

In regard to the latter, Transnet maintains a Materials Master which specifies in detail each of the approximately 150 000 components in a locomotive. TE has found that there are mismatches between the descriptions of designated products used by the DTI and its Materials Master. This has confused some suppliers who are familiar with the Materials Master specifications and cannot figure out the requirements in regard to the designated products with the consequence that their usual suppliers believe they now fall outside the requirements and do not bother to bid.

This has had negative impacts on its ability to procure. In some instances when the market was requested to quote on certain designated products, no bids were received. The main concern is that the designation descriptions are too general and not specific enough to match the Material Master. This has delayed procurement.

It is recommended that the DTI should strive towards a more carefully researched and nuanced approach to designated local content thresholds and to reporting requirements.

Some firms criticised the local content rules as unrealistic. For example one firm, although it was consulted by the DTI, complains that its inputs were ignored with the result that all locomotive wheels were designated at 100%. The difficulty with this designation is that certain diameter wheels cannot be forged in South Africa and can only be forged in Italy making it impossible to achieve 100% local content.

Designations that result in such unintended consequences require more nuanced consideration.

Prospective suppliers must navigate several documents:

- Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000);
- The Regulations made under that Act;
- Guidance Document for the Calculation of Local Content (the Guidance Document)<sup>34</sup>
- The Implementation Guide<sup>35</sup>;
- Instruction Notes; and
- Bid documents

Just this task alone suggests a need for considerable legal, business and technical acumen that may be within the grasp of large multinational corporations but may be more challenging for smaller local firms. Several firms interviewed complained about the lack of clarity in Government's requirements and the time involved in trying to clarify these with Government.

The proportionality principle may be a useful guide to follow here with a view to reducing complexity for bids of lower value, thus making it easier for SMMEs to participate in bidding rounds.

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<sup>34</sup> The Department of Trade and Industry. (Date unknown). [Guidance Document for the Calculation of Local Content](#). Accessed in September 2016.

<sup>35</sup> The National Treasury. (2011). [Implementation Guide: Preferential Procurement Regulations](#), 2011 pertaining to the Preferential Procurement Policy Framework Act, Act No 5 of 2000. Available from:..

### **6.3 Administration of local content**

#### ***Verification agent***

The SABS was appointed by the DTI as the official agency responsible for the verification of localisation in 2012. However the decision regarding who will be responsible for paying SABS for this work had not been made by October 2016.

The implementation of designation, for all sectors of the economy, commenced before the funding of verification was finalised. Any instrument of Government intervention, particularly in industrial strategy or policy, is only as good as its policing. Thus to commence with such an intervention without a means of verification is a serious lapse in design or judgement because of its many adverse consequences.

Although several explanations have been received, this research has not been able to uncover precisely what led to this blunder. One option considered is to require the OEMs to pay for verification. They, understandably, reject this idea as the costs were not included in their bids.

Delays in activating a verification agent, with the increasing backlog that accompanies it, creates the space within which suppliers may dispute rule interpretations in future. It also creates space for those that will argue that 'what's done is done and can't be undone'. The guilty may be expected to plead that they were not given adequate guidance at the time and cannot be judged with the benefit of hindsight.

Suppliers will also take into account the time frame within which the funding of verification is likely to be resolved. According to the SABS the earliest that the state could provide funding would be the 2018/19 financial year. This would be after September 2017; Transnet's planned completion date for the 1064 locomotive contracts. After funding is secured, SABS would still have to mobilise its programme adding further time before verification could commence in earnest.

This is a very worrying forecast. However, there may be some perverse relief from the fact that the project is already a year behind schedule and, according to some, will fall even further behind.

Verification is not merely a materials testing exercise but is also partly an accounting exercise. SABS has catered for this in SATS 1286:2011 which allows verification to be conducted by an independent registered auditor.

As the South African standards authority the SABS would appear to be a natural choice. But is it, alone, the most appropriate verification agent? There are concerns among some suppliers

about SABS' abilities to do the materials testing work. Some suppliers point out that whilst the SABS may be good at testing items it is familiar with, it is sorely challenged, from a skills point of view, in dealing with new or unconventional items. In this they see plentiful scope for evasion of localisation requirements.

They also point out that, understandably, the SABS does not have industry experts in every aspect of locomotive manufacture. These suppliers are confident that the SABS will not be able to discover, in a supplier's records, the extent of localisation, unless SABS engages industry experts that are well versed in the particular product requiring verification. They believe that an industry expert would know what to look for and would very quickly be able to direct the verifiers to the areas that need auditing and checking.

A further consideration is the scale of the resources necessary to conduct a credible verification exercise. According to the DTI, the R50 million budget submitted by SABS was for all sectors with designated products. SABS estimates that the cost of verifying the 1064 locomotive project to be R12 million, a mere 0.023% of the costs of the entire project. Given the complexity of this kind of verification and the number of tiers of suppliers involved this seems to be a very modest estimate.

### ***Verification of bids***

The verification of local content in bids is left in the hands of the relevant SOC. It is additional work that has not necessarily been factored into staff complements and it slows down procurement and production. Consequently it is not surprising that there is a view among some persons interviewed that the prospects of bidders exaggerating their local content is high because the risk of being caught and successfully prosecuted is slim. In addition the extent of local content in a bid is becoming increasingly important in determining the outcomes of procurement exercises.

One supplier provided an example which illustrates the insidious nature of developments when suppliers are not very concerned about the consequences of falsifying the extent of local content in their bids. This manufacturing supplier submitted a bid to supply a certain component. A competitor requested a quote to include the same component in its bid and was duly given one, at a price higher than the manufacturer's bid price together with all the documentation proving the proportion of local content. Surprisingly, the competitor won the bid with a higher price than the manufacturer. According to the manufacturer the only way this could have happened was if the competitor had falsely claimed a higher percentage of localisation than the manufacturer had and got away with it.



Local content verification has, in a sense, substituted the role that price plays in a deregulated market. To achieve a fair and proper outcome, local content claims need to be carefully scrutinised. But as Transnet points out, this takes up time and resources and slows down business. One obvious solution is to shift bid verification outside of Transnet to an independent organisation but this may lengthen bid evaluation times. It is recommended that the DTI give further consideration to the manner and extent to which bids are scrutinised for local content.

### ***Verification of products***

Complex manufactures such as railway locomotives require thousands of components which may in turn require several levels or tiers of suppliers. Where this is the case, tracing origin or local content rapidly becomes very complex and difficult to measure. To assist this process SABS has drafted SATS 1286:2011, Technical Specification: Local goods, services and works – measurement and verification of local content (SATS 1286)<sup>36</sup> and the DTI provides the Guidance Document for the Calculation of Local Content<sup>37</sup> (the Guidance Document) and the Implementation Guide.<sup>38</sup> SATS 1286 does not have the higher status of a National Standard, although SABS believes that the current review may lead to that.

The SATS 1286:2011 stipulates that the local content threshold is contingent on designation according to the PPPFA. The procuring authority then stipulates the safety, quality and other specifications of the product. The local content formula is:

$$Local\ Content = \left(1 - \frac{x}{y}\right) \times 100$$

Where:  $x$  = imported content (by value) and  $y$  = tender price.

Imported content refers to any parts or materials which have been purchased outside of South Africa no matter where along the value chain they were inserted, that is, by the supplier, the supplier's subcontractors or a third party. Transportation and duty related costs are also included in the import content calculation. The remaining content is considered to be local content. This encompasses products that were locally manufactured and services provided locally.

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<sup>36</sup> The Department of Trade and Industry. (2011). SATS 1286:2011 on Technical specification: Local goods, services and works – measurement and verification of local content. Available from: [https://www.thedti.gov.za/industrial\\_development/docs/ip/technical.pdf](https://www.thedti.gov.za/industrial_development/docs/ip/technical.pdf).

<sup>37</sup> The Department of Trade and Industry. (2011). Guidance Document for the Calculation of Local Content. Available from: [http://www.dti.gov.za/industrial\\_development/docs/ip/guideline.pdf](http://www.dti.gov.za/industrial_development/docs/ip/guideline.pdf).

<sup>38</sup> The National Treasury. (2011). Implementation Guide: Preferential Procurement Regulations, 2011 pertaining to the Preferential Procurement Policy Framework Act, Act No 5 of 2000. Available from: [https://www.environment.gov.za/sites/default/files/legislations/pppfa\\_guideline.pdf](https://www.environment.gov.za/sites/default/files/legislations/pppfa_guideline.pdf).

Imported content is almost by definition valued in the currency of the country of manufacture. The exchange rate at which this value is converted to Rands is thus crucial, particularly as the Rand is volatile against major trading currencies such as the US dollar and the Euro. Unfortunately there are confusing and contradictory requirements regarding which exchange rate to use.

SATS 1286:2011 is confusing as it requires the use of the exchange rate specified in Annexure A, but there is no exchange rate specified in Annexure A. The exchange rate it is also specified in two other separate documents: the Declaration Certificate for Local Production and Content for Designated Sectors (SBD 6.2) and the Implementation Guide for the PPPFA. The former requires a bidder to use the exchange rate published by the South African Reserve Bank (SARB) at 12h00 on the date of advertisement of the bid. The latter requires a bidder to use the exchange rate published by the South African Reserve Bank (SARB) at 12h00 seven calendar days prior to closing the bid. All bids are considered in Rands and exclude value added tax.

Obviously three different exchange rate requirements is a challenge for both bidders and verification agents alike and is a matter that Government should remedy as a matter of urgency.

The various documents outlining the procedure to be used in establishing local content do not comprehensively describe, in a single document, the approach the bidders should apply. Instead there is cross-referencing to various other documents rendering it somewhat challenging for bidders to accurately assess all the requirements. Expert assistance may be required which increases costs without adding value. A more efficient solution would be to design a single document in a clear and easily understood fashion.

### ***Exemptions from local content requirements***

When bid documents are submitted bidders have to make assumptions about the local availability of certain components. But by the time actual manufacture starts several months later, such components may no longer be available. This can arise from a variety of reasons such as firm closure or the component does not meet quality requirements. Such events were anticipated by Government and provision has been made for the DTI to grant exemptions in such cases.

The DTI is responsible for evaluating all applications for exemptions and may grant an exemption in consideration of the following<sup>39</sup>;

- Required volumes in the particular bid;
- Available collective South African industry manufacturing capacity at the time;
- Delivery times;
- Availability of input materials and components;
- Technical considerations including operating conditions; and
- Materials.

According to the DTI it responds to the applicant within 48 hours either with a response or an acknowledgement that the request is being considered. In cases where an exemption application is received in regard to a product that has previously been exempted it takes 48 hours to process the application.

Where a previous exemption has not been granted it can take up to a week to process an application particularly in instances where consultation with industry players is required or if the exemption is volume-based or based on the particular type of material (DTI, 2016).

In general suppliers reported no difficulties in obtaining exemptions and whilst this is positive feedback it may also disguise a weakness. Despite the existence of a framework for exemption applications, the governance of the process is not adequately designed to deal with the potential magnitude of the decisions – theoretically up to the value of the entire programme, in the case of the 1064 locomotives, R50bn.

Currently there appears to be a one-size-fits-all approach to exemptions. The Chief Director Metal, Fabrication, Capital and Rail Transport Equipment makes all exemption decisions regardless of the size or value of the application.<sup>40</sup> The procedure used to process exemption applications does not seem to be clearly documented and delineated.

There appears to be a lack of coordination between the DTI and Transnet especially in regard to exemption decisions. The DTI does not inform Transnet of the exemptions it is considering. Transnet is concerned that the knowledge and experience it has of the industry is not being brought to bear on exemption decisions. Transnet has recognised this shortcoming in the system and is setting up a Steering Committee with the DTI to consider this and other

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<sup>39</sup> National Treasury (2016), accessed from Interview with the Department of Trade and Industry, 29 August 2016

<sup>40</sup> Interview with the Department of Trade and Industry, 29 August 2016

matters<sup>41</sup>. Because Transnet, as an aspirant OEM is conflicted, this consultation process will need a clear set of rules.

Thus far, the exemption decisions have been comparatively minor. Even so, given that exemption decisions occur within the framework of the PFMA which requires transparency and due diligence type systems, a more highly developed system of checks and balances for exemption decisions is recommended. Such a system would reduce risk in the system and is expected to benefit from higher levels of public trust.

A well-defined exemption system would have governance processes and rules covering the following areas:

- A clearly documented process for receipt, tracking and archiving of exemption applications and the consequent decisions;
- A clearly documented process for analysing and testing the validity of an application;
- Fair and consistent treatment of applicants is important. Even with the best of intentions it is possible that over time inconsistencies in decision making will emerge and be exposed. Precedents will be claimed and leveraged. Such decisions will then be vulnerable to criticism of inconsistency, arbitrariness or subjectivity. To maintain consistency, the integrity of the system and to reduce perceptions of risk, subjective or arbitrary decisions should be minimised as far as possible;
- A clearly documented route of signed-off recommendation and approval up through the layers of authority to the appropriate level;
- A clearly documented delegation of authority allowing decisions involving pre-set amounts to be made at designated authority levels. For example it could begin at Director level for the smallest values, rising to Chief Director to Deputy Director General to Director General and ultimately to Minister of Trade and Industry at the highest level for the largest values;
- A clearly documented procedure for appeals against exemption decisions is required. Normally in the first instance this would be to the next higher level of authority, proceeding upwards step by step (if the matter is not resolved) ultimately reaching a court of law. The Rule of Law and the reputation of the South African courts are important in mitigating risk in the eyes of many investors. The ability to appeal to a court of law in the final instance is perceived by many to reduce the risk of regulatory failure or political interference.

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<sup>41</sup> Interview with Transnet Group, 5 September 2016.

Delays have also arisen from the need for some suppliers to obtain exemptions from the DTI. TE usually employs a three week bidding period for replacement parts but when exemptions are necessary this period has to be extended to accommodate the exemption process, once again causing delays to refurbishment projects.

Exemptions also cause other difficulties. Currently, a firm or an industry association may apply for an exemption. If an industry association receives an exemption it is applicable to the industry. However, if a single firm receives an exemption it is only applicable to that firm and not the product. Other firms that are not familiar with the exemption procedure, either do not apply and are disqualified or do not bid. Either way, the competition concerning that bidding round is reduced and in some instances results in higher prices, estimated by TE at between 5% and 30% higher.

Transnet's proposed solution to this challenge is to change the nature of exemptions. Instead of exemptions being given to firms they should instead be given to products. This would mean that all bidders would be exempted even if only one bidder applied for an exemption for a particular product resulting in more competitive tenders and lower prices for Transnet.

## **7 Summary of main findings**

### **7.1 Procurement and localisation**

Public procurement accounts for a large share of national economies. In industrialised countries, on average, it accounts for 10-12% of GDP, but in the EU it is up to 16% of combined GDP. In South Africa, public procurement ranges between 15% and 25%. There is thus a good case to be made to use local content requirements in public procurement to pursue a number of policy objectives, as South Africa has done.

However such interventions are not without costs but no cost-benefit analysis is conducted when local content requirements are introduced. It is anomalous that considerable effort is concentrated on putting in place a verification agent and funding it, to deal with just the measurement of local content and yet the much bigger and more important issue of the costs involved is overlooked. The SEIAS assessments performed by the Department of Planning Monitoring and Evaluation are akin to a form of cost-benefit analysis but none of the Instruction Notes issued thus far have been subjected to that scrutiny.

Internationally, public procurement has been found to have a significant positive impact on firm innovation, more so than other supply side measures such as R&D funding and public universities. This study found that the benefits of localisation are beginning to become apparent among some suppliers. There are indications that suppliers are engaging in product

innovation rather than R&D. There will need to be closer coordination between the DTI and the DST's technology transfer unit as well as with OEMs as local suppliers tackle export markets.

Transnet's 'feast and famine' procurement over time, short notice periods and short delivery deadlines all militate against the development of a local rolling stock manufacturing industry. Although the designation of locomotive fleets was intended to achieve smoother and more predictable demand, the 1064 locomotive procurement programme has not met this objective. These challenges are intimately bound up with the economies of scale that apply in the various locomotive component market segments suggesting that a more detailed and nuanced approach may yield better results.

Attempts at localisation are not certain to succeed and have resulted in delays and failures and or considerable additional costs in both time and money.

Localisation in the 1064 locomotive programme has got off to an uneven if not rocky start. Transnet's contracts did not match the DTI's local content expectations and the results, thus far, have not met the expectations of stakeholders like the Rail Road Association. TE's attempts to assemble locomotives in its own factories and Bombardier's localisation plans have run into difficulties leading to delays with negative consequences for suppliers that are facing throughput and working capital challenges.

In its endeavour to become an OEM Transnet's chosen programme design involves complicated shop floor manufacturing arrangements in which it is both a customer of the OEMs and a supplier to them. This, taken together with the emerging delays and the lack of an operational verification agency, puts local content objectives at considerable risk.

Notwithstanding these challenges, some suppliers report considerable progress in localisation.

There is some evidence among suppliers that market diversification into both local markets and export markets is beginning to occur but it is too early in the programme for this to be known conclusively. The main target markets are African countries but there are barriers to entry such as state dominance of the rail sector in many countries.

Transnet planning and scheduling is identified by suppliers as sub-optimal with consequential increased costs for suppliers and knock-on effects through the value chain.

Selection and auditing of prospective suppliers by OEMs appears to be thorough and demanding. Nonetheless there seems to be a considerable mismatch of perceptions between

suppliers and OEMs. Product quality is a key concern for both OEMs and suppliers. Some suppliers are struggling to meet OEM quality requirements. It appears that GE and Bombardier are more demanding customers for suppliers than the Chinese companies, particularly in the areas of price competitiveness and product quality. Notwithstanding their being tougher task masters, GE and Bombardier seem to enjoy higher levels of trust from local suppliers than the Chinese firms do.

## **7.2 Manufacturing capabilities**

Findings regarding the impact of localisation on manufacturing capabilities are constrained by the early stage in the life of the 1064 locomotive procurement programme at which this research was conducted as well as the limited sample of firms prepared to be interviewed.

The OEMs have brought with them important foreign direct investment by substantial global firms in higher value adding activities such as propulsion equipment and engines. In addition to the accompanying employment and skills benefits this holds the prospect of increased localisation in non-rail sectors of the economy, reduced imports and increased exports.

In general OEM cooperation and assistance has resulted in improved manufacturing capabilities among suppliers. The major thrust of the OEMs in so far as technology transfer is concerned has focused on factory floor issues related to lean manufacturing and consistently meeting quality standards with some firms making significant progress in these areas. Even after these efforts one forecast is that only 5% to 7% of prospective suppliers will succeed to become exporters, and then only if they have competitive pricing. As may be expected there are varying levels of cooperation between suppliers and OEMs. All suppliers and 'their' OEMs continuously exchange information. More substantive cooperation is focused on product quality and health, safety and environmental issues whilst there are only weak levels of cooperation in technology transfer and skills.

There is a degree of complacency or an attitude among some potential suppliers that does not lend itself to world class manufacturing. Further research into the reasons for this and possible remedies is required.

Meeting international standards is a major constraint for both small and larger suppliers and appears to be a consequence of many firms in the industry being focussed on the domestic market for a long time which has reduced the incentive and capabilities to meet international standards.

OEMs seem to have different strategies towards localization. At one extreme investments are being made with a view to using South Africa as a future platform and innovation hub for expansion into African and other markets. At the other extreme the Chinese firms have secured permission to build the largest number of locomotives outside of South Africa and with limited evidence thus far of investments being made in South Africa. There is skepticism among suppliers about the Chinese firm's commitment to localization.

Most suppliers interviewed have upgraded their manufacturing processes, chiefly through investment in machinery, skills, quality controls and new products. Although progress is being made in organisation and management techniques and higher skills, advances in R&D, product innovation and new patents are scarce.

### **7.3 Policy, incentives and institutions**

The findings of the Public Sector Supply Chain Management Review (2015) by the National Treasury are confirmed and remain valid.

Demand side incentives such as local content prescripts need to be accompanied by corresponding supply side interventions if optimal benefit is to be obtained. At this time they are not.

The local content policy as it is being implemented in the 1064 locomotive procurement programme is having a significant impact on the rolling stock manufacturing sector after a long period of depressed activity. A cost/benefit analysis is needed to determine the overall impact. What this research found is that there are positive impacts on local rolling stock manufacturing firms.

Transnet's role is primarily to provide rail infrastructure and thereafter to operate rail services (trains). It is a quantum change for it to become a rolling stock manufacturer with a view to exports. Transnet's decision to try and become an OEM appears to have been made without the benefit of any policy guidance. This is unfortunate as it is a major intervention in the rolling stock industry with several consequences. Although its own capacity is being developed it is crowding out the private sector and is inconsistent with the objective of developing black industrialists. It raises important policy questions. Should SOC infrastructure companies go beyond the provision of infrastructure and its repair and maintenance into the manufacture of equipment, particularly when they are already dominant in their respective markets? By comparison: should Transnet Pipelines be involved the manufacture of piping with a view to exports? Should Eskom be involved in the manufacture of steam boilers or turbines with a view to exports?



Relationships between Transnet, OEMs and suppliers are made more complicated by Transnet's ambition. For example, it places Transnet in a position where it is conflicted as it is both a customer and a competitor. Transnet when it evaluates bids from suppliers gains valuable insights into the cost structures of those firms. That knowledge would be useful when it has to try and out compete that same firm in export markets.

Transnet's decision also has implications for foreign OEMs and therefore the prospects of South African suppliers becoming a part of the supply chain for those OEMs in international markets. Its aspiration to become an OEM in a policy vacuum takes on added significance in the light of Cabinet's decision to have the Department of Public Enterprises and National Treasury consolidate procurement for locomotives into a single institution, under Transnet.

The scale of Transnet's procurement exercises together with its market dominance shape the rolling stock manufacturing landscape and therefore the distinction between policy maker and policy implementer can easily become blurred, as it has in this case. Without clear policy guidance, SOC procurement officers determine important aspects of industrial policy for competing firms.

Since the 1990s, the design of public procurement policies, laws and regulations has been informed by principles of transparency, non-discrimination and maximum competition. South Africa is falling short of this international standard and its own Constitutional and PAJA standards, in particular regarding clarity of policy objectives for particular interventions and the written reasons for such decisions being available in the public domain.

In general there is recognition among both suppliers and OEMs that the DTI staff setting designation thresholds have a difficult task and that they had done well although there have been unintended consequences. There is room for improvement, in particular with regard to a more nuanced approach to economies of scale, refurbishment and market segment.

Local content verification in bids has, in a sense, replaced the role that price plays in a deregulated market and so takes on added importance. This is more so in circumstances where there are pressures on procurement officers to speed up bid evaluations and where product verification has not yet commenced.

Decisions on applications for exemption from local content requirements are made without the benefit of a fully-fledged delegation of authority matrix and appeal procedure. This is a serious administrative matter given the magnitude of possible decisions. Coordination with Transnet in such decision making is at less than a desirable level.

Verification and reporting burdens are similar across firms, regardless of size, resulting in a disproportionately large burden on small firms. There is no single document describing how to calculate local content. Instead there are several which compromises efficiency. The exchange rate to be used in local content value calculations is specified differently in three different documents which creates confusion.

A very low proportion of suppliers interviewed utilized Government support instruments. Calls were made for simpler and clearer documentation as well as faster processing times.

The findings of this research confirm those set out in the Black Industrialists Policy except for a greater emphasis on the need for manufacturing experience.

## **7.4 Recommendations**

Readers should bear in mind the caveat given in the introduction concerning the limitations of this research having been conducted so early in the life of the 1064 locomotive procurement programme. The main findings are:

1. The funding of a verification agency should be addressed as a matter of urgency because the space created by the lack of an operational verification agency raises the risk that local content objectives will be compromised and a golden opportunity to advance local manufacturing may be lost.
2. The three different exchange rate requirements used in the local content documentation should be harmonised into a single prescription as a matter of urgency.
3. It is recommended that steps are taken to disentangle the various incentive measures and to streamline the administration thereof.
4. A comprehensive cost/benefit analysis of local content requirements is recommended. At the very least, Instruction Notes made by National Treasury designating local content requirements should be subject to a comprehensive SEIAS review.
5. Transnet's decision to try and become a rolling stock OEM should be subject to a policy review and clear policy published clarifying the dividing line between matters of public policy or industrial policy and the scope for SOCs to make decisions that impinge on those areas. Such a policy should also clarify the kind of relationship South Africa wishes to have with foreign OEMs.
6. In the interests of transparency and accountability to the public, the DTI and National Treasury should jointly and formally publish the policy objectives specific to each local content market intervention and provide written reasons for their decisions.
7. Local content prescripts should be accompanied by corresponding supply-side measures dealing with skills development, lean manufacturing, meeting international standards and technology advancement.
8. The design of locomotive local content instruments requires more detailed consideration with a view to more nuanced instruments. More consideration should be given to the role of economies of scale in setting local content thresholds for the various locomotive

component market segments and the distinction between procurement for homologated new equipment and procurement for maintenance and refurbishment. In market segments with high levels of concentration Government should provide Transnet with policy direction in regard to achieving transformation objectives without the possible irredeemable loss of certain manufacturing and skill sets.

9. The DTI should require smoother and more predictable demand with longer delivery times in strategic fleet procurement. In doing so it should, *inter alia*, seek involvement in the work of the Department of Public Enterprises and National Treasury intended to consolidate procurement of rolling stock into a single institution, under Transnet.
10. The DTI should investigate the possibility of improving Transnet's planning and ordering with a view to incentivising Transnet to improve it.
11. If Transnet continues to work towards becoming an OEM, its bid evaluations (for rolling stock) should be shifted to an independent organisation in a process designed to optimise efficiency and avoid delays. Alternatively other means should be found to remove Transnet from its current conflicted status.
12. With regard to the administration of the local content Instruction Notes, there are several recommendations:
  - a. A more fully developed procedure for processing applications for exemptions with appropriate delegations of authority should be adopted (for details please see page 106).
  - b. Reporting requirements for suppliers should be revised to take account of proportionality that is, making the burden commensurate with financial contribution to a project instead of a one-size-fits-all.
  - c. The SABS should be encouraged to use industry experts in the early stages of verification to identify areas requiring more thorough going investigation.
  - d. Decisions on exemption applications should apply not just to the applicant but rather to the product concerned, regardless of manufacturer.
  - e. Consultation between the DTI and Transnet on applications for exemption should be improved.
  - f. SOCs, OEMs and their suppliers bound by local content obligations should be obligated to provide information to the DTI, or its agents, on matters relating to the policy objectives being pursued because improving the design and efficacy of local content instruments requires information about previous successes and failures.

13. The DTI should consider subsidising or otherwise assisting prospective exporters of rolling stock or components thereof in acquiring certification from the Association of American Railroads (AAR) and/or the International Railway Industry Standard (IRIS).
14. A further investigation similar to this one should be carried out at the end of the 1064 locomotive procurement programme.

## 8 Bibliography

- Alcorta (2012). Climbing the stairway of development. Structural change as the driver of economic growth. UNIDO Policy Brief
- Aschhoff, B., & Sofka, W. (2009). Innovation on demand—Can public procurement drive market success of innovations?. *Research policy*, 38(8), 1235-1247.
- Baloyi, B. and Zengeni, T. (2015). Regional Industrialisation Research Project: Case study on transport infrastructure value chain in South Africa and Mozambique. Accessed from [http://www.competition.org.za/s/CCRED-Working-Paper-7\\_2015\\_Infrastructure\\_Case-study\\_BaloyiZengeni-1h59.pdf](http://www.competition.org.za/s/CCRED-Working-Paper-7_2015_Infrastructure_Case-study_BaloyiZengeni-1h59.pdf)
- Barrow, K. (2014). Transnet South Africa orders 1064 locomotives. *Rail Journal* (17 March 2014). Accessed from <http://www.railjournal.com/index.php/locomotives/transnet-south-africa-orders-1064-locomotives.html>. Accessed October 2016
- Brühlhart, M., & Trionfetti, F. (2001). Industrial specialisation and public procurement: Theory and empirical evidence. *Journal of Economic Integration*, 106-127.
- Cawe, A. (2014). Programmatic Procurement: A Political Economy Review of the Transnet Freight Rail Competitive Supplier Development Programme. ERSA working paper 447.
- Cloete, K. (2016). Rolls-Royce rolls out MTU South Africa's upgraded facility in Cape Town. *Engineering News* (27 October 2016). Accessed from <http://www.engineeringnews.co.za/article/rolls-royce-rolls-out-mtu-south-africas-upgraded-facility-in-cape-town-2016-10-27>. Accessed on 28 October 2016.
- Cremer, T. (2012). Transnet issues tenders for the acquisition of 1 064 locomotives. *Engineering News* (12 July 2012). Accessed from [http://www.engineeringnews.co.za/article/transnet-issues-tenders-for-the-acquisition-of-1-064-locomotives-2012-07-16/rep\\_id:4136](http://www.engineeringnews.co.za/article/transnet-issues-tenders-for-the-acquisition-of-1-064-locomotives-2012-07-16/rep_id:4136). Accessed September 2016
- Cremer, T. (2016a). Rail sector moves to deal with 'mismatch' between localisation promises and delivery. *Engineering News* (28 April 2016). Accessed from [http://www.engineeringnews.co.za/article/rail-sector-moves-to-deal-with-mismatch-between-localisation-promises-and-delivery-2016-04-28/rep\\_id:4136](http://www.engineeringnews.co.za/article/rail-sector-moves-to-deal-with-mismatch-between-localisation-promises-and-delivery-2016-04-28/rep_id:4136). Accessed 24 October 2016.
- Cremer, T. (2016b). [New unit to be set up to oversee rail local-content push](http://www.engineeringnews.co.za/article/new-unit-to-be-set-up-to-oversee-rail-local-content-push). *Engineering News* (22 August 2016). Accessed from <http://www.engineeringnews.co.za/article/new-unit-to-be-set-up-to-oversee-rail-local-content-push-2016-08-22>. Accessed 24 August 2016

- NUMSA (2014) see National Union of Metal Workers. (2014). Memorandum of Demands. National Union of Metal Workers (NUMSA) (16 October 2014). Available from <http://www.numsa.org.za/wp-content/uploads/2014/10/Memorandum-of-Demands.pdf>. Accessed October 2016
- Dantas, E., & Bell, M. (2011). The co-evolution of firm-centered knowledge networks and capabilities in late industrializing countries: the case of Petrobras in the offshore oil innovation system in Brazil. *World Development*, 39(9), 1570-1591.
- Department of Transport. (August 2015). National Rail Policy Green Paper. Available from <http://www.transport.gov.za/LinkClick.aspx?fileticket=0MTIGeNPZ8s%3D&tabid=334&mid=1800>
- DPE (2015) see Department of Planning Monitoring and Evaluation. (2015). [Socio-Economic Impact Assessment System \(SEIAS\), Final Impact Assessment Template \(Phase 2\)](#). Accessed July 2016.
- DTI (unknown) see Department of Trade and Industry. (Date unknown). [Guidance Document for the Calculation of Local Content](#). Accessed in September 2016.
- DTI (2011a) see Department of Trade and Industry. (2011). Guidance Document for the Calculation of Local Content. Available from: [http://www.dti.gov.za/industrial\\_development/docs/ip/guideline.pdf](http://www.dti.gov.za/industrial_development/docs/ip/guideline.pdf).
- DTI (2011b) see Department of Trade and Industry. (2011). SATS 1286:2011 on Technical specification: Local goods, services and works – measurement and verification of local content. Available from: [https://www.thedti.gov.za/industrial\\_development/docs/ip/technical.pdf](https://www.thedti.gov.za/industrial_development/docs/ip/technical.pdf).
- DTI (2011c) see Department of Trade and Industry. (2011). Industrial Policy Action Plan (IPAP) 2011/2012-2013/2014.
- DTI (2013) see Department of Trade and Industry. (2013). The National Industrial Participation Programme. Available at [https://www.thedti.gov.za/industrial\\_development/docs/nipp/Nip\\_Guidelines2013.pdf](https://www.thedti.gov.za/industrial_development/docs/nipp/Nip_Guidelines2013.pdf) (accessed on 29 June 2016).
- DTI (2014) see Department of Trade and Industry. (2014). Industrial Policy Action Plan (IPAP) 2014/15 – 2018/19.
- DTI (2016) see Department of Trade and Industry. (2011). Industrial Policy Action Plan (IPAP) 2016/17 – 2016/17.

- Edler, J., & Georghiou, L. (2007). Public procurement and innovation—Resurrecting the demand side. *Research policy*, 36(7), 949-963.
- Edquist and Hommen, 2000
- Edquist, C., & Hommen, L. (1999). Systems of innovation: theory and policy for the demand side. *Technology in society*, 21(1), 63-79.
- Engineering News. (2016). DTI moving to iron out local content frustrations around Transnet contracts. *Engineering News* (24 May 2016). [http://www.engineeringnews.co.za/article/dti-moving-to-iron-out-local-content-frustrations-around-transnet-contracts-2016-05-24/rep\\_id:4136](http://www.engineeringnews.co.za/article/dti-moving-to-iron-out-local-content-frustrations-around-transnet-contracts-2016-05-24/rep_id:4136)
- Engineering News. (2015). [IEC Holden](http://www.engineeringnews.co.za/article/iec-holden-2015-11-27). *Engineering News* (27 November 2015). Accessed from <http://www.engineeringnews.co.za/article/iec-holden-2015-11-27>. Accessed 09 September 2016.
- Freeman, C. (1995). 'The "National System of Innovation" in historical perspective'. *Journal of Economics*, 19: 5–24.
- Georghiou, L., Edler, J., Uyarra, E., & Yeow, J. (2014). Policy instruments for public procurement of innovation: Choice, design and assessment. *Technological Forecasting and Social Change*, 86, 1-12.
- Geroski, P.A. (1990). Procurement policy as a tool of industrial policy. *International Review of Applied Economics*, 4(2), 182-198
- Haines, R. (2011). The Complexities of Development: The South African National Industrial Participation Programme in Perspective. In M.A. Yülek and T. K. Taylor (eds). *Designing Public Procurement Policy in Developing Countries*. How to Foster Technology Transfer and Industrialization in the Global Economy (pp. 111-139). New York: Springer
- Hirschman, A. O. (1958). The strategy of economic development. New Haven, CT: Yale University Press.
- Humphrey, J., & Schmitz, H. (2002). How does insertion in global value chains affect upgrading in industrial clusters? *Regional Studies*, 36(9), 1017-1027.
- Jacobsen, J. (2014). Opportunities and Challenges in the Brazilian Shipping & Offshore Industry. Presented on 13 February 2014. *Viera Rezende*
- Kattel, R., & Lember, V. (2010). Public procurement as an industrial policy tool: an option for developing countries?. *Journal of public procurement*, 10(3), 368.



- Khan, M.H. (2013). Technology Policies and Learning with Imperfect Governance. In Stiglitz, J. and J.Y. Lin (Eds). *The Industrial Policy Revolution I. The Role of Government Beyond Ideology*, London: Palgrave 2013. pp. 79-115)
- Kneale, L. (2014). *Manufacture of Railway Locomotives and Rolling Stock*. (Research report 38500). Who Owns Whom. Available at: <http://www.whoownswhom.co.za/web/> (accessed in February 2016).
- Lall, S. (1996). *Learning from the Asian Tigers: Studies in technology and industrial policy*. Macmillan London.
- Lember, V., Kattel, R. and Kalvet, T., 2014. Public Procurement and Innovation: Theory and Practice. *Public Procurement, Innovation and Policy* (pp. 13-34). Springer Berlin Heidelberg.
- Lundvall, B-Å., and R. Lema (2014). 'Growth and structural change in Africa: Development strategies for the learning economy'. *African Journal of Science, Technology, Innovation and Development*, 6(5): 455–66.
- Makube, T. (2016). "Designation of Industries, Sectors and Products for Local Procurement in the Public Sector". Presentation to the DTI: Economic Policy Dialogue on 24 June 2016, Johannesburg.
- Maqutu. 21 April 2016. Transnet to build its first factory outside SA. Business Day Live. Available online at <http://www.bdlive.co.za/business/transport/2016/04/21/transnet-to-build-its-first-factory-outside-sa>
- Maqutu. 29 April 2016. Transnet locomotives lag in local content. Business Day Live. Available online at <http://www.bdlive.co.za/business/transport/2016/04/29/transnet-locomotives-lag-in-local-content>
- Matsuyama, K. (1992). Agricultural productivity, comparative advantage, and economic growth. *Journal of Economic Theory*, 58, 317-334.
- McMillan, M.; Rodrik, D.; and Verduzco-Gallo, I. (2013). Globalisation, structural change, and productivity growth, with an update on Africa, IFPRI
- National Planning Commission. (2012). National Development Plan 2030. Accessed from <http://www.gov.za/issues/national-development-plan-2030>
- National Treasury. (2014). Instruction Note: Rail Rolling Stock Sector. Available online at [http://www.etenders.gov.za/sites/default/files/tenders/Instruction%20Note%20\\_Rail%20Rolling%20Stock%20Sector\\_0.pdf](http://www.etenders.gov.za/sites/default/files/tenders/Instruction%20Note%20_Rail%20Rolling%20Stock%20Sector_0.pdf) (accessed 29 August 2016).

- National Treasury. (2015). 2015 Public Sector Supply chain management review. Available from: <http://www.treasury.gov.za/publications/other/SCMR%20REPORT%202015.pdf>
- National Treasury. (2016a). Instruction Note: Invitation and Evaluation of Bids Based On A Stipulated Minimum Threshold For Local Production And Content For The Rail Rolling Stock Sector, Minister of Finance, 16-7-12 (subsequently repealed). Available from <http://www.treasury.gov.za/divisions/ocpo/sc/PracticeNotes/INote%20on%20a%20stipulated%20minimum%20threshold%20for%20the%20rail%20rolling%20stock%20sector.pdf>. Accessed in September 2016
- National Treasury (2016b), accessed from Interview with the Department of Trade and Industry, 29 August 2016
- Odendaal, N. (2015). Rolls Royce secures €100m order to supply 232 loco engines for TFR. *Engineering News* (26 January 2015). Accessed from <http://www.engineeringnews.co.za/article/rolls-royce-secures-100m-order-to-supply-232-loco-engines-for-tfr-2015-01-26>. Accessed 28-10-16
- Ohno, K. (2013). Learning to industrialize: from given growth to policy-aided value creation. Routledge.
- Pack, H. and Saggi, K. (2006). The case for industrial policy: A critical survey, World Bank Policy Research Working Paper 3839, World Bank.
- Pack, H.; and Westphal, L.E. (1986). Industrial strategy and technological change. Theory versus reality. *Journal of Development Economics* 22, pp. 87-128
- Pages, E., Lombardozzi, B. and Woolsey, L. (2013). The Emerging U.S. Rail Industry: Opportunities to support American manufacturing and spur regional development. Available online at <http://www.nist.gov/mep/upload/Rail-Report.pdf> (accessed 15 August 2016).
- Peres, W. and Primi, A. (2009). Theory and practice of industrial policy: evidence from the Latin American experience Santiago de Chile, Chile: Economic Commission for Latin America and the Caribbean
- Platzer, M.D. and Mallett, J.W. (2015). Effects of Buy America on Transportation Infrastructure and U.S. Manufacturing: Policy Options. Available online at <https://www.fas.org/sqp/crs/misc/R44266.pdf> (accessed 15 August 2016).
- Pollin, R., Heintz, J. and Wicks-Lim, J. (2015). Strengthening U.S. Manufacturing Through Public Procurement Policies How Procurement Policies Can Promote Innovation and Good Jobs. USA: University of Massachusetts-Amherst. Available online at

- [http://www.peri.umass.edu/fileadmin/pdf/published\\_study/PERI\\_Procurement\\_FullStudy\\_web.pdf](http://www.peri.umass.edu/fileadmin/pdf/published_study/PERI_Procurement_FullStudy_web.pdf) (accessed 15 August 2016).
- Prebisch, R. (1950). The economic development of Latin America and its principal problems. (Economic Bulletin for Latin America 7). New York, NY: United Nations Department of Economic Affairs.
- Railways Africa. (2008). The class 39 diesels. *Railways Africa* (12 December 2008). Accessed from <http://www.railwaysafrica.com/news/the-class-39-diesels>. Accessed 29 September 2016
- Railways Africa. (2014). [Huge Transnet loco orders](http://www.railwaysafrica.com/news/huge-transnet-loco-orders). *Railways Africa Railway News* (18 March 2014). Available at <http://www.railwaysafrica.com/news/huge-transnet-loco-orders>. Accessed 12 September 2016
- RDM News Wire. (2015). Transnet signs loan deal for 240 new locomotives. *Times Live* (23 June 2015). Accessed from <http://www.timeslive.co.za/local/2015/06/23/Transnet-signs-loan-deal-for-240-new-locomotives>. Accessed on 28 October 2016.
- Ribeiro, C. G., & Furtado, A. T. (2014). Government procurement policy in developing countries: The case of Petrobras. *Science Technology & Society*, 19(2), 161-197.
- Rigzone. (19 November 2008). Brazil's Platform P51 Gears Up for Marlim Sul Field Operations. Rigzone. Available online at [http://www.rigzone.com/news/oil\\_gas/a/69790/Brazils\\_Platform\\_P51\\_Gears\\_Up\\_for\\_Marlim\\_Sul\\_Field\\_Operations](http://www.rigzone.com/news/oil_gas/a/69790/Brazils_Platform_P51_Gears_Up_for_Marlim_Sul_Field_Operations) (accessed 23 August 2016).
- Rodrik, D. (2014). An African growth miracle? (NBER Working Paper 20188). Washington, MA: National Bureau of Economic Research
- Rolfstam, M. (2009). Public procurement as an innovation policy tool: the role of institutions. *Science and Public Policy*, 36(5), 349-360.
- Sachs, J. D., & Warner, A. M. (1995). Natural resource abundance and economic growth. (Working Paper No. 5398). Cambridge, MA: National Bureau of Economic Research.
- Sapa. (19 May 2011). Transnet locomotive fleet to be renewed. *Fin24*. Accessed from <http://www.fin24.com/Companies/Industrial/Transnet-locomotive-fleet-to-be-renewed-20110519>. Accessed 17 October 2016.
- South Africa Info. (2016). [GE invests half-a-billion rand in South Africa](http://www.southafrica.info/business/investing/ge-africa-innovation-centre-29062016.htm#.WA3TidJ950w). *South Africa Info* (29 June 2016). Accessed from <http://www.southafrica.info/business/investing/ge-africa-innovation-centre-29062016.htm#.WA3TidJ950w>. Accessed 24 October 2016.

Telgen, J., Harland, C., & Knight, L. (2007). 2 Public procurement in perspective. *Public procurement: international cases and commentary*, 16.

The National Treasury. (2000). The Preferential Procurement Policy Framework Act (PPPFA). Available at <http://www.treasury.gov.za/legislation/pfma/supplychain/PPPFA.pdf> (accessed on 29 June 2016).

The National Treasury. (2011). [Implementation Guide: Preferential Procurement Regulations](#), 2011 pertaining to the Preferential Procurement Policy Framework Act, Act No 5 of 2000. Available from:.

The National Treasury. (2011). Implementation Guide: Preferential Procurement Regulations, 2011 pertaining to the Preferential Procurement Policy Framework Act, Act No 5 of 2000. Available from: [https://www.environment.gov.za/sites/default/files/legislations/pppfa\\_guideline.pdf](https://www.environment.gov.za/sites/default/files/legislations/pppfa_guideline.pdf).

The Transnet Long-term Planning Framework, September 2014 refers to the “recent approval of a Transnet Africa Strategy” (page 1).

Tiryakioğlu, M. and Yülek, M. A. (2015) Development-based public procurement policies: a selective survey of literature, cross-country policy experience and the Turkish experience. *The European Journal of Social Science Research*, 28 (3), 344-359

Transnet. (2010). Transnet Supplier Development Plan. Available online at: [http://www.transnet.net/BusinessWithUs/PolicyDocuments/SDP\\_Brochure\\_April\\_2010.pdf](http://www.transnet.net/BusinessWithUs/PolicyDocuments/SDP_Brochure_April_2010.pdf) (Accessed 29 June 2016).

Transnet. (2012a). Transnet Annual Report 2012. Accessed from <http://www.transnet.net/InvestorRelations/TransnetRep.aspx>

Transnet. (2012b). Transnet Issue 1. Available online at: <http://www.transnet.net/BusinessWithUs/MDS/External%20Magazine%20-%20Final.pdf> (Accessed 4 July 2016).

Transnet. (2013a). Transnet Annual Report 2012. Accessed from <http://www.transnet.net/InvestorRelations/TransnetRep.aspx>

Transnet. (2013b). Your guide to the MDS. Available online at: [http://www.transnet.net/PressOffice/Documents/MDS%20BOOKLET\\_2013.pdf](http://www.transnet.net/PressOffice/Documents/MDS%20BOOKLET_2013.pdf) (Accessed 30 June 2016)

Transnet. (2013c). Transnet Supply Chain Policy. Available online at: [http://www.transnet.net/BusinessWithUs/PolicyDocuments/TRANSNET\\_Proc\\_Policy\\_Guide\\_at\\_a\\_glance.pdf](http://www.transnet.net/BusinessWithUs/PolicyDocuments/TRANSNET_Proc_Policy_Guide_at_a_glance.pdf) (Accessed 30 June 2016)

- Transnet. (2014a). Transnet Annual Report 2012. Accessed from <http://www.transnet.net/InvestorRelations/TransnetRep.aspx>
- Transnet. (2014b). Transnet Long-term Planning Framework, September 2014. Accessed from [http://www.transnet.net/BusinessWithUs/LTPF%202012/1.LTPF%202014\\_Chapter%2001\\_Introduction\\_Final%20Proof\\_Sept%202014.pdf](http://www.transnet.net/BusinessWithUs/LTPF%202012/1.LTPF%202014_Chapter%2001_Introduction_Final%20Proof_Sept%202014.pdf). Accessed on 08 November 2016
- Transnet. (2015). Transnet Annual Report 2012. Accessed from <http://www.transnet.net/InvestorRelations/TransnetRep.aspx>
- Transport World. (2012). [Big Transnet loco tender delayed](http://www.transportworldafrica.co.za/2012/11/07/big-transnet-loco-tender-delayed/). *Transport World Africa* . (07 November 2012). Accessed from <http://www.transportworldafrica.co.za/2012/11/07/big-transnet-loco-tender-delayed/>. Accessed in September 2016
- Transport World. (2015). Transnet locomotive funding deal concluded. *Transport World Africa* (03 March 2015). Accessed from <http://www.transportworldafrica.co.za/2015/03/03/transnet-locomotive-funding-deal-concluded/>
- Uyarra, E., & Flanagan, K. (2010). Understanding the innovation impacts of public procurement. *European Planning Studies*, 18(1), 123-143.
- Van Wyngaardt, M. (2016). New locomotive propulsion equipment production plant opens in Gauteng. *Engineering News* (09 September 2016). Accessed <http://www.engineeringnews.co.za/print-version/bombardier-opens-new-propulsion-equipment-production-site-in-isando-2016-09-09>. Accessed 26 August 2016.
- Watermeyer, R. (2012). Linking Developmental Deliverables to Public Sector Contracts. In M.A. Yülek and T. K. Taylor (eds). *Designing Public Procurement Policy in Developing Countries* (pp.35-52). New York: Springer