

The rail rolling stock manufacturing sector in South Africa

OVERVIEW

This brief is based on the findings of a Transnet Rail Rolling Stock Localisation Study that had the following goals: To undertake an applied, independent, quantitative and qualitative research exercise to describe the prevailing economic and rail sector context; to map and analyse the existing domestic rail supply chain; to identify those issues that constrain Transnet's localisation programme; and to make recommendations to support a more robust Transnet localisation effort in its rail rolling stock maintenance programme.

The brief highlights the key research findings and recommendations of the study, and should not be considered exhaustive. It contains non-confidential information based on the full report that was commissioned by Transnet.

RESEARCH FINDINGS

Policy and institutional coherence

The research found that critical issues of intragovernmental and inter-institutional coherence and collaboration to develop a common strategy and programme for the rail manufacturing sector were absent. This is with respect to such issues as: the aggregation of demand, a collaborative supplier development programme, and the deployment of strategic supply-side instruments. For example, the policy instruments applied to the rail rolling stock sector were changed several times or ran in parallel.

From 2009 to the present, the National Industrial Participation Programme (NIPP) was supplanted by the Competitive Supplier Development Programme (CSDP), which was rendered defunct in or around 2016. In parallel, the localisation requirements of the amended Regulations of the Preferential Public Procurement Finance Act (PPPFA) and the Designation for local procurement, which is enabled in these Regulations, overlapped with the CSDP, and remain applicable at the time of writing (subject to a legal interpretation of a recent finding by the High Court). NIPP was reintroduced with a lower threshold in 2019. The 2017 Competition, Regulation and Economic Development (CCRED) report states that over 80 legal instruments govern public procurement, and sets

out a table of the multiple policy prescripts that apply.

In certain respects, the developmental mandate of state-owned enterprises (SOEs) is contested. Government officials that interviewed during the research suggest that localisation by rail SOEs is obligatory, regardless of localisation's cost implications and operational considerations. There appeared to be little appreciation of the fact that localisation carries cost implications, which must be quantified and should circumscribe, in the absence of fiscal transfers and supply-side support measures, what competitive localisation is feasible and prudent for a SOE. The research suggests that the "mechanical" enforcement of localisation provisions for maintenance, repair and overhaul (MRO) functions of the Transnet fleet directly and negatively impacted Transnet's ability to maintain a fully operational fleet, with deleterious effects on its ability to provide network services for the broader economy.

Contracting, procurement and institutional capability

The contract design for fleet procurement is critical. Based on available research and documents, it was significantly sub-optimal. Strategic and pragmatic localisation objectives should optimally be built into contracts in the build-programme and with respect to obligations during the entire MRO fleet life cycle.

TIPS supports policy development through research and dialogue. Its areas of focus are industrial policy, trade and regional integration, sustainable growth, and a just transition to a sustainable inclusive economy.

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domestic companies' procurement-sourcing support depends on technology and intellectual property considerations, quality and conformity assessment, and price competitiveness. Research suggested that a "backdated" localisation requirement (beyond the contractual obligations) is highly deleterious to any collaborative relationship with a global original equipment manufacturer (OEM), not implementable, and even counter-productive when MRO functions cannot be undertaken and a fleet is grounded.

It is evident from research that both the Public Finance Management Act (PFMA) and the PPPFA are regarded as binding constraints with respect to local procurement and supplier development by SOEs operating in a commercial environment. Cumbersome procurement processes – long lead times and inordinate delays for exemptions – are considered anathema to the need for operational efficiencies in a technical environment. In addition, global supply chains are agnostic to domestic socioeconomic imperatives, such as transformation, and the pursuit of these important objectives should not – as is the case with the use of intermediaries in procurement processes – undermine the sustainability of domestic manufacturing capability. For various reasons, a "feast or famine" approach to procurement, such as the use of intermediaries who add little value, yet add a premium to prices (and costs); and a lack of demand planning (demand smoothing), certainty, and the requirement for short delivery timelines, has been a consistent problem.

It was evident in the research that inadequate attention was paid to the necessity for institutional capacity. For example, process and systems integration across the business units of an SOE should be optimally secured. A supplier development function requires advanced engineering, technical and industrial capability, and capacity, and is manifestly different to the capacity needs of a procurement function.

Standards and conformity assessment and verification

There appears to be no evidence that SOEs require a standards and conformity assessment regime for procurement and supplier development. A standards

and conformity assessment regime is, however, considered critical to a supplier development programme in key technical sectors. The International Automotive Task Force provides standards and conformity assessment in the automotive sector, including in South Africa. The International Railway Industry Standard (IRIS) is a global system enabling the rail sector to "secure higher quality in the rail sector through developing and implementing a global system for the evaluation of companies supplying to the railway industry".* "[U]niform language, assessment guidelines and mutual acceptance of audits"* are generally implemented throughout domestic supply chains to enhance competition and increase the quality of rail products. No real-time mechanism for local procurement verification and compliance exists at present. Expensive post-procurement validation is undertaken by the South African Bureau of Standards and involves costly physical inspections and validation by auditors. Clearly, a digitally enhanced system for real-time procurement-demand aggregation, verification and compliance is possible and should be implemented.

SYNTHESISED RECOMMENDATIONS FOR LOCALISATION AND SUPPLY CHAIN MANAGEMENT

The supply chain competitive analysis indicates that, even though the industry is in considerable distress, it retains capacity and capabilities which can be leveraged, provided a more substantial integrated sector development plan (Master Plan) is secured.

In addition to the selected research findings, the recommendations defined a set of principles which, in the view of the authors, should inform and guide a future rail rolling stock localisation effort.

These principles are achievable and should form the basis of the necessary institutional capacity building for a supplier development programme.

Principle One – Localisation as a priority

Principle One applies to the priority accorded to a localisation objective. Transnet's core developmental

* *The International Railway Industry Standard (IRIS): <https://www.iris-rail.org/>*

There appeared to be little appreciation of the fact that localisation carries cost implications, which must be quantified and should circumscribe, in the absence of fiscal transfers and supply-side support measures, what competitive localisation is feasible and prudent for a state-owned enterprise.

In the absence of sufficient conditional supply-side support measures, demand-side support alone may be insufficient to build a globally integrated and competitive domestic supply

mandate is to provide comprehensive, cost-effective, and efficient rail and port freight services to the domestic and regional economies. Given its rail freight and ports monopoly, administered prices apply. Efficient and cost-effective services and prices should provide companies in the domestic minerals, agriculture and manufacturing sectors with cost and efficiency advantages, especially in the case of exports, and particularly with respect to the export of value-added manufactured goods.

Localisation should be a secondary developmental mandate, which must be costed and financed (either leveraging the Transnet balance sheet or fiscal transfers). The economic benefits of a competitive localisation programme are manifold. But localisation carries a cost. "Getting the prices wrong" to support localisation without "reciprocal control mechanisms" and supplier development capacity for local suppliers engenders an uncompetitive supply chain at a prohibitive cost to Transnet. In the absence of sufficient conditional supply-side support measures, demand-side support alone may be insufficient to build a globally integrated and competitive domestic supply chain.

An undefined financial and operational cost to Transnet, passed on to end users as a component of high administered prices combined with inefficiencies, lowers the competitiveness of companies across all the economic sectors and is deleterious to the competitiveness of domestic and regional economies.

Principle Two – Procurement process support and integration

This principle refers to the efficacy of local content verification (LCV). Without an efficacious and cost-efficient verification system, the moral hazard is high, and clear, in the hitherto significant use of intermediate companies that add little value and a high-price premium cost to Transnet. Wilful or expedient localisation non-compliance (combined with the policy misalignment previously described) constitutes a significant risk to the localisation programme.

An integrated digitalised process and system for procurement, localisation, and supplier development – inclusive of real-time LCV, with appropriate capacity in Transnet – is strongly recommended. Such a system should be practical and cost-efficient. An integrated digitalised procurement platform can also be established, aggregating demand over several technical industries, including mining.

Principle three— Long-term strategy

This principle refers to the importance of the centrality of life-cycle contracts. Localisation obligations for capital equipment acquisition must be linked to a systems life-cycle cost and not only the purchase price. It is evident that hitherto statutory localisation requirements have not been or have been sub-optimally included in capital acquisition contracts. Both the system's acquisition cost and total life-cycle support cost must be used to calculate and enshrine carefully planned and optimal competitive localisation requirements across the life cycle.

This implies and should ensure that the relevant OEM must provide Life Cycle Cost Models as a condition precedent to the acquisition contract, and that the SOE and the obligor must agree upon the detail of the localisation requirements, including how domestic manufacturers can gain access to global value chains.

Principal Four – Economic sensibility

This principle refers to matters of economic sensibility. Optimal supply chain management (SCM) requires a detailed technical and commercial evaluation of each subsystem and component within the system's hardware breakdown structure. This necessitates evaluation before acquisition (and as an ongoing function).

This evaluation must define capability (skills, facility, process); quality; performance; and conformance specification – i.e. price and lead time. As a minimum, the SOE's "steady state" demand (baseload) must be at the economic breakeven point.

Principle Five – Structured engagement

This refers to the necessity of adopting a Systems Engineering Approach (SEA) by all the parties. Adopting a qualified SEA is critical and mandatory for those SOEs reliant on technical systems, and research information suggests a currently "naïve" approach to technical systems acquisition. The role, obligation, responsibility, and accountability of an Assigned Professional Systems Engineer (APSE) must be defined within Systems Acquisition, especially for those capital-intensive assets with long life cycles. The duties of a Professional Engineer as an independent and objective technical authority, within the defined parameters of the Engineering Profession Act of South Africa (Act 46 of 2000), must be formalised in the Systems Acquisition process and during the MRO support phase.

All the State's legislative and policy instruments should be aligned to ensure competitiveness, which requires extensive localisation-centric legislative and policy support, and significant intragovernment alignment.

Principle Six – Technical systems authority and responsibility

This is strongly associated with Principle Five, and refers to the additional independent and objective technical oversight required to ensure the technical integrity and cost-effectiveness over the entire system's life cycle. The Engineering Profession Act provides guidelines for obligation, responsibility, and remedies for dereliction of duty in this regard

Principle Seven – Feasibility of localisation objectives

Principle Seven provides the basis for what localisation is technically feasible and economically prudent and viable, and should optimally be determined and agreed upon during the acquisition phase of a system. The defined and agreed localisation parameters and targets should be mandatory, but in the MRO phase, this should not be so immutable as to jeopardise the core operations of Transnet.

Principle Eight – Conformity and compliance to standards

This refers to the need for suppliers and products to conform to regulatory and statutory standards. The adoption of standards and conformity assessment is a widely established best practice that characterises the functioning of domestic and global value chains with significant productivity, safety and SCM gains across all the critical technical value chains.

The introduction of conformity specification and testing ensures inter alia that domestic products conform to international performance, quality, and safety standards. Adherence to international standards functions as a barrier to the entry of substandard and "cheap and substandard" imports, which provide an unfair advantage to producers in other jurisdictions, and provide a mechanism for an "open and transparent" definition to qualify suppliers, their processes and products as fit for purpose.

A standards and conformity assessment regime enables an SOE to approve and contract value adding manufacturers directly in long-term contracts to support accredited and competitive suppliers with

direct sourcing processes, which are compliant with national legislation.

Principle Nine – Rules of engagement

This refers to problems associated with the retrospective application of localisation policy instruments after the conclusion of acquisition agreements. Systems with long life cycles require midlife upgrades to ensure performance, reduce obsolescence, ensure safety, and reduce MRO spending. The retrospective application of the NIPP for MRO is questionable since, amongst other considerations, local content requirements are challenging to apply to systems that are ten years old.

Principle Ten – Competing technical component supply bids

Principle Ten refers to the high capital cost required to establish local industries within the Technical Industry Value Chain (TIVC), which creates a significant barrier to entry, limiting the possibility of establishing "competing" domestic value-adding manufacturing entities. In some instances, only a single value-adding manufacturing entity can be supported on the demand and supply side. Furthermore, if competition is defined as competing against imported systems through intermediaries (who add no value), this undermines the very foundation of localisation and local content designations policy.

The conception and implementation of localisation require a fundamental change in basic assumptions to an entire life-cycle approach, and should be optimally integrated with the OEM's global value chain. In short, localisation will require a coherent long-term strategy with carefully selected OEM partners.

Principle Eleven – Organisational integration

Principle Eleven refers to the best practices of localisation and supplier development, procurement integration, and the requisite technical capacity and capabilities. An Enterprise and Supplier Development (ESD) function may undertake costly SME support functions. But SCM is a separate function which requires specialist capabilities to undertake supplier

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Transnet's role as a market-maker within the ecosystem should be clarified to ensure the domestic rail rolling stock sector's global competitiveness and economic viability.

development, even if it is to a limited number of competitive domestic companies identified as key suppliers in the Transnet MRO process.

In short, ESD should form part of a team responsible for procurement contracting processes, and implement a supplier development or manufacturing extension programme with the requisite skills base to support local manufacturers. This could be undertaken in collaboration with the Department of Trade, Industry and Competition sector desk.

The evidence suggests that higher levels of localisation and supplier development, working directly with domestic manufacturers, have been achieved by OEMs who, amongst other factors, have the capacity and capability to implement and incubate competitive supplier development programmes and enable the entry of domestic manufacturers into their global supply chains.

THE NEED FOR LOCALISATION POLICY AND PROCESS ALIGNMENT

Importance of systems engineering within the Technical Industry

It is apparent from the research that the application of a Systems Engineering Approach (SEA), allied to a standards and conformity assessment framework, may not be promoted in the contracting processes as well as the MRO technical procurement and supplier development processes. This has significant implications for supplier development practice and efficacy, and is dealt with in further detail in the sections below.

An SEA provides feasible technical solutions consistent with the business's requirements and funding constraints. System integrity requires that these three aspects be balanced and given equal emphasis at all decision-gate reviews. Specific decision gates should address affordability, business requirements and delivery considerations.

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Council on Systems Engineering. However, the traditional life cycle should be adapted to incorporate domestic localisation objectives. Some of these additional stages include:

- **Policy development stage:** This focuses on developing specific industry sector master plans and industrial policy instruments to enable the successful industrialisation of systems. This stage should have policies and strategies available long before an acquisition programme is initiated.

- **Localisation opportunity development stage:** A continuous process that evaluates specific systems and subsystems used within the Technical Industry and establishes suitable candidates for domestic industrialisation. This opportunity may be driven by the National Strategic Objectives (NSOs) that may supersede the needs of a specific SOE.

- **Localisation viability:** This establishes an economic business case for the opportunity, and quantifies and qualifies investment requirements to support the initiative until breakeven.

- **Localisation support:** This is required to establish a support framework for initiatives and determine how all State instruments will be deployed to ensure its success.

- **The competitiveness phase:** This is necessary to establish a "cut-off point" when most policy instruments will be withdrawn in favour of a global

competition that will endure foreign competitors within the domestic market. It thereby ensures that the cost-to-serve is on par with international markets.

Policy and implementation alignment

It is essential to acknowledge that localisation is a process that optimally commences long before an acquisition decision is made. All the State's legislative and policy instruments should be aligned to ensure competitiveness, which requires extensive localisation centric legislative and policy support, and significant intragovernment alignment.

Thus, a future coherent technical system acquisition process should provide a continuous localisation opportunity development process, which should continuously evaluate the demand for systems and subsystems, and determine localisation opportunities in the domestic industry. In addition, a detailed industrialisation business plan must be developed to guide OEM negotiations during system acquisition. Assessments should be conducted to validate the

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domestic Technical Industry's capability to manufacture systems, subsystems and components. A *pre-acquisition* alignment phase should be undertaken to negotiate future localisation and/or NIPP obligations, with specific needs and capabilities defined in the opportunity master plan, and align demand and supply-side policy instruments to ensure successful industrialisation. A *post-acquisition* localisation phase should focus on monitoring localisation progress, to ensure that the manufacturing processes and systems are delivered according to international standards. This should provide SOEs and the private sector with a competitive cost advantage. During this phase, access to an OEM's global value chain should also be pursued.

The rail rolling stock ecosystem

The domestic rail ecosystem involving industry associations, rail manufacturing companies, OEMs, and SOEs and labour, is in significant distress. This was characterised by respondents to a Voice of the Supplier survey and multiple research interviews as: elevated levels of mistrust, an immature supply chain with poor communication and outreach, and sub-optimal demand management. Serious misgivings concerning the role of Transnet Engineering as an OEM and state-owned procurement entity exist. The absence of a collaborative, competitive ecosystem is a serious impediment to rebuilding the rolling stock sector. It is strongly recommended that Government and Transnet consider rectifying this situation.

Despite increasing convergence and concentration in the global rail rolling stock industry, six global OEMs retain a presence in South Africa in one form or another. Several OEMs have maintained that their investments are driven by the intention to establish a manufacturing base in the country for exports into the rest of Africa, and as an innovation hub.

Research suggests that these ambitions may have been severely dented, and that the relationship between the OEMs and domestic rail SOEs is characterised by mistrust, with manifest corruption a significant factor.

Transnet's role as a market-maker within the ecosystem should be clarified to ensure the domestic rail rolling stock sector's global competitiveness and economic viability.

CONCLUSION

The rail rolling stock supply chain in South Africa is in significant distress. Future locomotive capital expenditure programmes and long-term maintenance and repair of the freight and passenger rail locomotive fleet provide an opportunity to sustain and rebuild capability and capacity that has been lost.

In and of itself, without a range of supply-side instruments, a demand-side programme will unlikely lead to a reindustrialisation process. A sector development plan (Master plan) that develops a suite of industrial policy instruments anchored on the foundations of intragovernmental policy coherence, certainty, and programme alignment is necessary. The relationship between Transnet Engineering and OEMs resident in South Africa should optimally be repaired around a mutual understanding and acceptance that the OEMs are best placed to undertake a programme of competitive localisation and supplier development. The appropriate institutional capacity and capability, and Transnet's integrated systems and process to support a supplier development programme, working closely with OEMs and suppliers, are also critical.

An Engineering Subsystems approach is central to future localisation programmes. Institutional capacity should therefore not be confined to the SOE alone, and should also be built within the appropriate government departments.

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