

Developing the South African Auto Industry: Lead Firm Sourcing Strategies and Local Productive Capabilities

Lorenza Monaco and Tobias Wuttke

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Abstract

The South African automotive industry has become integrated with the global value chains of the locally active foreign vehicle assemblers over the last 30 years. Exports, production volumes and absolute levels of domestic value added have gone up, but relative levels of local content have declined. This working paper takes a deeper empirical look at the sourcing strategies of the assemblers governing the global value chains on the one hand, and at the domestic component manufacturing base on the other hand. The empirical data stems from more than 50 semi-structured interviews conducted throughout 2021 with assemblers, large multinational component firms with subsidiaries in South Africa, local component manufacturers, policy makers and industry experts. The paper provides a thorough understanding of the sourcing strategies of automotive lead firms, and how they enable and constrain the extent of local value addition in component and materials production, and thereby the multiplier of having the industry in the country. Through a mapping of locally owned component manufacturers, it provides novel data that can complement quantitative indicators like absolute and relative local content data. The paper then discusses the set of structural, policy-related, market-dependent and capability-related issues that local component suppliers face with regard to deepening local value addition. Eventually, we argue that only by combining an understanding of lead firms' sourcing strategies and local component suppliers' perspectives is a proper assessment of obstacles and opportunities for localisation possible.

Keywords: assemblers, component suppliers, South Africa, industrialisation

JEL codes: L62, O14, O25

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1 Introduction

Despite the uncertain future of the global automotive industry, which is challenged by constraints and evolving regulations imposed by the accelerating environmental crisis, and by the interconnected processes of electrification and digitalisation, the sector remains an important driver of industrial development and a significant source of employment. In older sites of auto industrialisation – mostly in Europe and the Global North – the industry has often seen increasing financialisation at the expenses of manufacturing production, or a reducing size because of progressive delocalisations, yet it still plays a dominating role in many industrialising economies in the Global South.

In South Africa (SA), even with substantial limitations and structural weaknesses, the automotive industry continues to play a central role. The industry holds a marginal share of the global automotive space, but it is still affected by severe limitations caused by global lead firm strategies that hamper the possibility of expanding the local manufacturing base, and it will endure the effects of the global electrical transition. The South African auto industry also remains a reference on the African continent and in the Sub-Saharan region in terms of specialisation, state support, policy frameworks, and strong labour organisation. It remains a crucial employer, an investment target, and a potentially leading actor in channelling the integration of a regional value chain (Black et al. 2021). It could be a testing ground for new technologies linked to emerging battery industries and new energy sources. Overall, it remains an important player in and industry for the country, and potentially the continent.

This paper takes stock of the way foreign automotive lead firms have integrated South Africa into their global value chains (GVCs), and what this integration has meant for the development of the domestic component-manufacturing industry. Overall, it provides a nuanced picture of South Africa's participation in the automotive GVC, which can be deemed neither a fully-fledged success, nor a failure. Building on empirical material collected throughout 2020 and 2021, and on previous rounds of research conducted by one of the authors separately, the paper seeks to detail the specific corporate strategies and interests that determine lead firms' decisions in terms of component sourcing, and the actual obstacles that prevent local component suppliers from further developing their local manufacturing operations.

The empirical material that this paper rests on comprises semi-structured interviews, partly online and partly in person, and factory visits. Interviews involved six out of the seven passenger and light commercial vehicle assemblers, 12 multinational tier 1 suppliers operating in South Africa, 25 local component manufacturers, business associations and government agencies. OEMs/assemblers were interviewed with regard to their global production strategies and how their South African operations feature in their global strategies. Here, the interview data is supplemented with publicly available information. Local component suppliers were questioned in relation to their overall market strategies,

production capacity, technological capability and, more broadly, on obstacles to further localisation. Discussions with business associations and government institutions helped to complement the insights from the firm interviews, understand the policy discourse and to outline the current profile of the industry.

The paper is structured as follows. Section 2 briefly outlines the profile of the industry, its current trends and latest developments, as well as its historical and policy trajectory. Section 3 focuses on the dynamics of the automotive GVC, and specifically on the sourcing strategies of lead firms and how they have conditioned localisation outcomes in South Africa. Section 4 then focuses on the local South African component suppliers and their perspective on localisation. It provides new and previously unavailable data on the base of domestic component-manufacturing firms in the country, as well as a qualitative assessment of the obstacles to further localisation. Combining the two perspectives, we obtain a comprehensive picture of governance and bargaining dynamics, and of the way these affect both local development and global integration. Ultimately, the paper aims to clearly highlight South Africa's policy imperatives, present the challenges and material constraints experienced by the local automotive industry, and reflect on its chances for higher, and better, global integration.

2 The South African Automotive Industry: Development and Policy Trajectory

The South African auto industry – a competitive player on the African continent, but still small internationally and remotely connected to more advanced markets, has gone through different phases. Overall, the industry started developing relatively early, with Ford and Chevrolet already operating in the 1920s. The American multinational corporations (MNCs) dominated the market until the late 1950s, when they were joined by British and German companies, and by Toyota by the end of the decade. The industry was flourishing, expanding both in terms of models produced and with regard to employment levels. Until the late 1980s, the industry remained protected by strict local content requirements (up to 66% in the 1960s) and extremely high tariffs on built-up units (still 115% in the Phase IV Local Content Programme, introduced in 1989). This first expansionary phase was unfortunately halted by the economic sanctions imposed during the apartheid era, which caused an inevitable slow-down and induced some foreign companies, including Ford and GM, to leave the country. By the end of the 1980s, thanks to protective measures and local content requirements, the industry had managed to develop a local supplier base, but remained very inward oriented and anchored to globally insignificant volumes, which made it overall uncompetitive (Black 1994, 2001; 2009; Black and Mitchell 2002).

An initial sign of opening was the attempt included in the Phase IV Local Content Programme to make exports count as local content. This also represented a first boost towards local producers becoming internationally competitive. However, a proper shift in policies and trade

regime affecting the automotive industry occurred only in the early 1990s, and marked the actual liberalisation of the sector. With the end of apartheid, the new, democratic South Africa tried to re-open to the world and to catch up against the accumulated delay. The focus on the automotive sector as a driver of industrialisation thus was intertwined with the wish to integrate into global markets, to attract foreign investors, to increase competitiveness and efficiency and to modernise domestic assets. With such purposes, the Motor Industry Development Programme (MIDP, in 1995) and the subsequent Automotive Production and Development Programme (APDP, in 2013) were designed and implemented to expressly foster modernisation, rationalisation and structural transformation in the sector.

Devised as a tool to specifically facilitate trade and to achieve higher volumes, the MIDP abolished local content requirements, introduced a first import-export rebate mechanism,¹ and launched a tariff phase-down, which went even farther than WTO prescriptions (Black 2009; Black et al. 2018; Black and Mitchell 2022).² Overall, the 1995 auto policy framework certainly gave the South African industry a new impetus, pushing for higher international integration and stronger competitiveness, inducing a reorganisation of existing productive structures and leading to reinvestments by MNC firms. In the MIDP years, the industry went through a rationalisation of productive platforms and grew in size and export volumes, thanks to the newly introduced incentive structure. It significantly improved in terms of quality and productivity.

However, the expansion and industrial upgrading that characterised the first MIDP years also led to undesired effects, determining some sort of structural distortions and imbalances that shaped the industry as we see it today. In particular, the rebate mechanism was always accompanied by large inflows of imported parts, which did not help the development of local component manufacturers and actually led to a reduction in tier 2 and 3 component suppliers. The incentives offered to attract foreign investment progressively gave rise to increasing foreign ownership, and to such accommodating conditions that the balance of power was strongly re-shuffled in favour of foreign MNCs, which gained considerable control over the industry and lobbying power in relation to the policy-making process. Overall, international integration and industrial upgrading did occur, but at the expenses of local ownership and capability (Barnes et al. 2021; Bell and Monaco 2021). The incentivised export-led growth was actually concentrated in some specific segments, such as in the production for export of catalytic converters; this was not evenly distributed across different kinds of components and did not generate the hoped backward integration at the local level (Black et al. 2018). Besides the price fluctuations of commodity-type products, the over-dependence on components like

¹ The possibility for companies to obtain import credits by increasing exports.

² The four pillars of the MIDP were: (1) lower tariffs on light vehicles and components, (2) the abolition of local content requirements, (3) duty-free import of components up to 27% of the total value, (4) duty rebate mechanism, allowing for duty-free import of vehicles and components in exchange for increased exports (Black and Mitchell 2002).

catalytic converters may become particularly risky in the coming years due to the progressive shift to electric vehicles and changing emission regulations.

Table 1: Ownership of SA OEMs (1995 to 2000)

South African OEM	Ownership 1995	MNC ownership since the mid-2000s
Toyota SA Motors	100% local (JSE listed, Wesco main shareholder)	Toyota
Volkswagen SA	Volkswagen AG	Volkswagen AG
BMW SA	BMW AG	BMW AG
Mercedes Benz SA	Joint venture: Daimler AG and Volkskas Bank	Mercedes Benz
Ford (Samcor)	100% Anglo American	Ford
Nissan (Automakers)	100% Sankorp	Nissan
General Motors (Delta)	100% local management	General Motors (Isuzu since January 2018)

Source: Barnes et al. (2016) in Black et al. (2018).

Structural imbalances were partly addressed with the introduction of the Automotive Production and Development Programme (APDP) in 2013. The APDP replaced export with a production incentive (PI), and introduced a vehicle assembly allowance (VAA) and a new investment scheme. Whilst expressly trying to correct the ‘export bias’ that had resulted from the MIDP and had created evident distortions in trade and manufacturing patterns, the APDP did not substantially alter the ‘policy paradox’ of compensating local production with import credits. In this regard, OEMs continued to keep high levels of both exports and imports, without benefitting the SA trade balance nor contributing to a satisfactory localisation of manufacturing operations (Black et al. 2018).

The outcome of the two consecutive policy programmes is the SA local industry and value chain that we see today, and which are described below (Section 4). Given the compelling need not only to protect the industry, but to develop its local production and technological capabilities in order to compete internationally and integrate regionally, the 2035 South African Auto Masterplan (SAAM) set localisation, transformation and supply chain development as key policy priorities. The 2035 SAAM also indicates pretty high targets in terms of local content (60% by 2035). In the light of SA’s policy targets, and following extensive discussions with local stakeholders engaged in localisation initiatives, this paper seeks to contribute to a two-fold objective: 1) provide empirical grounds for the theoretical debate on auto industrialisation in emerging economies and localisation in a context of GVC-led industrialisation; and 2) dig into the actual reasons and impediments that prevent SA from achieving higher local content and stronger productive/technological capabilities by focusing

on two interrelated issues – lead firms' component-sourcing strategies and local supplier development. These issues will be explored in the following sections.

3 Lead Firm Sourcing Strategies and Their Influence on Localisation

One main contribution of the analytical and empirical literature on global value chains is that the key to understanding the opportunities and obstacles that firms participating in the lower tiers of the value chain face is identifying the lead firms of the value chain in question and understanding their strategies, i.e. how they govern the chain (Gereffi et al. 2005; Milberg and Winkler 2013). The assemblers and the multinational-tier component suppliers are the major lead firms in the automotive GVC (Sturgeon and Van Biesebroeck 2011). Their sourcing strategies are a key variable determining the extent of localisation that is possible in the countries in which they operate, as well as the technological development opportunities for local supplier firms. We interviewed six of the seven passenger and light commercial vehicle assemblers and 12 multinational tier 1 suppliers in South Africa on their global production strategies and on how their South African operations feature in their global strategies. The interview data was supplemented with publicly available information. In this section, where data is publicly available, the name of the firm is disclosed. Otherwise, we have anonymised the data to protect the firms' confidential data.

3.1 The Automotive GVC

Vehicle assembly tends to happen in proximity to the final market. Automobiles are large products that are difficult and costly to ship. Since demand in advanced countries is saturated and stagnating, assemblers have turned to emerging markets with a large demand for vehicles. Labour costs in these developing and emerging markets are lower than in the assemblers' developed home countries, which makes localising the labour-intensive vehicle assembly process in the final destination market even more attractive. A modern automobile consists of tens of thousands of different parts. Only a small fraction of these parts is fully manufactured in-house by the assemblers. The engine and the transmission are the components that are usually assembled by the vehicle assemblers themselves. They still outsource some of the sub-components, such as the castings for the engine, but tend not to relinquish the design and the assembly of engines and transmissions. In 2016, European vehicle assemblers outsourced only 1% of their engines and 22.6% of transmissions to outside suppliers. For US assemblers, the figures were 4.7% and 11.9% respectively (Klier and Rubenstein 2021).

The rest of the vehicle parts, however, are supplied via a complex tiered supplier network, consisting of hundreds of different suppliers per assembly plant. In contrast to other global value chains (GVCs), for example the electronics GVC, the manufacture of many parts happens in geographic proximity to the final vehicle assembly. Most automotive components have a relatively low value-to-weight ratio, which makes it economically inefficient to ship them

around the world. Frigant and Zumpe (2017: 670), for example, show that more than 90% of German, French and Spanish auto-parts imports come from within the European production network (which includes North Africa and Turkey), instead of from further afield. They argue that the automotive GVC is characterised by regionalisation rather than globalisation (Frigant and Zumpe 2017). The geographical proximity of component manufacturing plants to vehicle assembly plants is an empirical fact observed across many countries (Bennett and Klug 2012).

Transport costs are not the only reason for component manufacturing to be located close to final vehicle assembly. Lead times are another reason, and specifically the demands of the just-in-time (JIT) and just-in-sequence (JIS) production that characterise automotive production (Wagner and Silveira-Camargos 2011). The customers' desire for product distinctness means that the vehicle parts that are most visible to the customer vary a lot from one vehicle to another. Almost no vehicle sold is exactly the same as any other one. Wagner and Silveira-Camargos (2011) document that there are 80 different bumper variants in a modern BMW 3-series, about 24 different paint and interior combinations in a Toyota Corolla, and more than 1 000 seat types in a Vauxhall Astra (5713). JIT and JIS supply were born out of the need to deliver on this demand for variety while not compromising economies of scale. JIT supply means that products of the right quantity and quality are delivered to the final assembly plant at the right time, as specified by the assembler to the suppliers. JIS delivery goes beyond JIT and means that modules and components are not only delivered just in time, but also just in sequence, i.e. sequenced for consumption at the final assembly plant according to the assembler's production schedule. This requires the geographical proximity of the suppliers' manufacturing plants.

Despite all of this, there are still certain components that are globally traded. After all, there are very different sorts of automotive components, ranging from windshields to actuator motors to nuts and bolts. Whether it makes sense to source a component from afar or from very close by depends on the size, the geometric complexity and fragility of the component relative to its value, the raw material content of the component, its local availability and price, the labour intensity of the production process for the component, and the tariffs levied on the importation of that particular component (Schmitt and Van Biesebroeck 2013; Ward 2014). Based on a survey of 42 automotive suppliers from around the world, Spindelndreier et al. (2015) conclude:

Manufacturing next door to a car assembly plant is especially advantageous for products such as interiors, body and structural parts, transmissions, drive shafts, and heating, ventilation, and air-conditioning systems. Proximity is less important for electronics, engine control systems, and audio and telematic systems, which are relatively inexpensive to ship.

Nevertheless, several of the sub-components of the components that are produced locally are often still imported. In that case, it is just the assembly of components and modules from imported sub-components that happens locally (Bennett and Klug 2012: 1287).

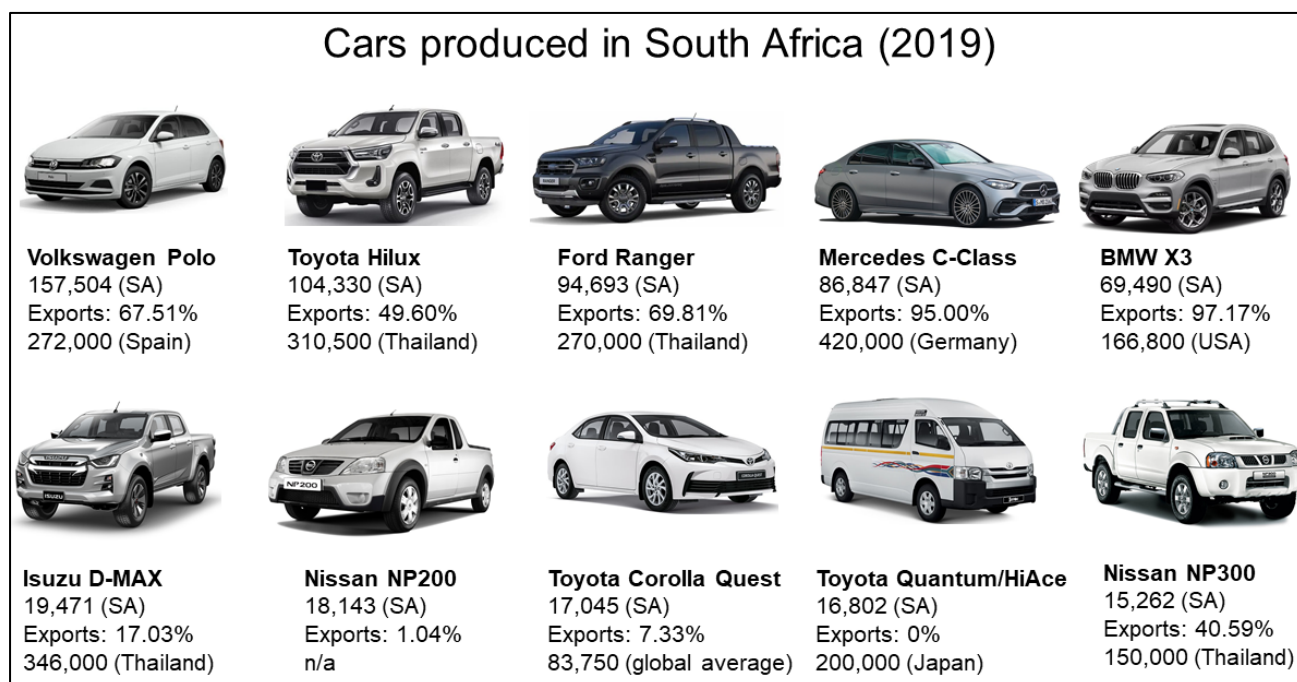
Despite significant pull factors for the localisation of component production once vehicle assembly has been localised in a country, the automotive value chain is still a truly global value chain, not least because vehicles are designed by global vehicle assemblers and rolled out as more or less global cars across the globe. Under the follow sourcing framework, multinational vehicle assemblers and tier 1 suppliers co-locate and create various global production hubs wherever the demand conditions for local vehicle production are most promising (Sturgeon et al. 2008).

3.2 South Africa in Global Context

South Africa has the largest automotive industry on the African continent, with the production of more than 600 000 passenger and light commercial vehicles in 2019, which puts it right between Poland and Malaysia on a list of global vehicle-producing countries (according to OICA, the International Organization of Motor Vehicle Manufacturers). These annual production volumes are large enough to have attracted some investment in local production by multinational tier 1 component suppliers. But the majority of these investments have remained rather shallow and, instead of localising the manufacturing of various types of sub-components, have focused on the assembly of imported sub-components. Vehicle design and, by extension, component design have not been localised in South Africa, which has further blocked the localisation of manufacturing activities. Exports by the component manufacturing sector have been unable to generate further economies of scale for localisation as, except for catalytic converters, they have performed poorly.

Figure 1 shows all the vehicle models that are being produced in South Africa, sorted according to their production numbers from 2019. Most of the vehicle models assembled in South Africa, especially those with high production volumes, are exported. Sixty-four per cent of the total 603 115 passenger and light commercial vehicles produced in South Africa in 2019 were exported. The strong export orientation is a major achievement and ensures economies of scale for component manufacturers. The exports go mainly to distant destinations, like Europe, the US and Asia. Only 15.8% of all automotive exports from South Africa, including both vehicles and components, went to the rest of Africa in 2019 (Automotive Industry Export Council [AIEC] 2020).

Figure 1: All locally produced vehicle models with 2019 production numbers and export shares for South Africa, and 2019 production numbers for each model's largest global production location.



Source: Authors' own compilation, based on NAAMSA (for South African production and export numbers) and online research on each vehicle's main global production location and numbers.

Local vehicle assembly volumes are the key variable determining the possible extent of component localisation. The higher the production volumes of vehicles in South Africa, the more interesting it is for tier 1 multinational suppliers to also locate themselves in South Africa and to invest in the widening of local manufacturing processes beyond the assembly of imported components. Once assembler and multinational tier 1 manufacturing processes are localised, that also opens the door for the sourcing of sub-components from local tier 2 and tier 3 suppliers, resulting in an overall deepening of local content. The deepening of local content, and the development of the local component base in South Africa, have been somewhat disappointing, despite the penetration of export markets. One reason for this is that all the major vehicle models produced in South Africa (the upper row in Figure 1) are also produced in other production locations in the world, and in no case is the South African plant the biggest assembly location in terms of production volume (Black et al. 2018). Figure 1 provides the information for the year 2019. Overall, for none of the vehicle models produced in South Africa is the South African plant the global lead firm and/or the largest production location.

Related to this, none of the assemblers have a local R&D or product development/design centre in South Africa. The vehicle models that are produced in the country are designed and developed in the assemblers' design centres, which are often located in their home countries

or, in the case of the pick-ups (Toyota, Ford, Isuzu, Nissan), in Thailand. Of the 12 multinational component suppliers that we interviewed, only one has a South African R&D centre. This local centre, however, is only a satellite facility and is run mostly from the R&D headquarters in Europe. None of the assemblers nor the global suppliers have their overall or even their regional headquarters in South Africa. The main decisions are taken in Europe, North America or Japan. Local design and local content are usually connected. When vehicle design happens in a country, then local component manufacturers in that country are more likely to be involved in the design and product development and have a chance to be selected as a global supplier, or at least as a local or regional partner for an established multinational supplier (Sturgeon and Van Biesebroeck 2011). Renault included a large number of local suppliers in India in the production of the locally designed Kwid model in order to reduce production costs. Local suppliers were actively involved in the development of components for the vehicle to realise maximal cost savings (Midler et al. 2017; Pardi 2019: 18-19). This does not mean that the issue of follow sourcing fully disappears. In countries with local R&D activities, such as Thailand, follow sourcing still dominates. Hence, local component firms struggle to become global suppliers and significantly involved in R&D. Automotive R&D in Thailand is foreign-controlled (Doner et al. 2021: 98-99). But because of the localisation of product development in Thailand, domestic suppliers are more likely to be involved in product development activities than are domestic suppliers in countries without local product development activities, like South Africa.

Given the importance of production volumes and economies of scale for the widening and deepening of local content, it could give a significant boost to localisation if multinational component firms grew beyond the local assemblers' vehicle programmes and made South Africa a base for component exports across the globe. However, while vehicle exports from South Africa have developed well over the last 25 years, automotive component exports have not followed suit. In 2019, automotive components made up 26.6% of total automotive exports from South Africa, with vehicle exports making up the remaining 73.3%. Within component exports, catalytic converters are by far the largest product group, with 37.9%, followed by engine parts, with 8.1% (driven by exports of Ford engine part), and tyres, with 4.9% (AIEC 2020). Of the twelve multinational component manufacturers that we interviewed, only one exports a majority of its production, while four do not export at all and five export less than 10% of their output. The big disadvantage of South Africa, and the main reason why multinational component manufacturers do not undertake more exports from the country, are the logistic costs. This is certainly the case in comparison to comparable automotive sites on the European periphery, like Eastern Europe, Northern Africa or Turkey. For fully assembled vehicles, the automotive policy incentives have been strong enough to offset the logistical disadvantages to some extent. However, the labour costs in South Africa are not low enough to offset them on their own (Barnes et al. 2017).

3.3 The Strategic Considerations of Assemblers and Global Suppliers with Regard to Localising Manufacturing in South Africa

Today, vehicle assemblers have outsourced most of the component production to suppliers. What usually remains with the assembler, in addition to the assembly of the final vehicle, is the production of transmissions/gearboxes and engines. Whether engine and transmission production is localised depends mainly on the volume of local vehicle production. In South Africa, the volumes of production for most models are not high enough to justify local engine or transmission production. None of the seven passenger and light commercial vehicle assemblers in the country produced transmissions/gearboxes locally. However, Ford and Volkswagen make use of two assemblers with local engine plants.

Volkswagen's engine production is small, with less than 50% of its vehicle production in unit terms, but Ford has a large engine plant in Gqeberha with a total capacity of 400 000 engines per year. It assembles the new diesel engine for the Ranger Raptor in that plant. Although this comprises 120 000 units per year, it is assembly only, and all the components are machined in the UK and imported from there. The remaining 280 000-unit capacity is for the Duratorq TDCI diesel engine, which is both machined and assembled in South Africa. There are two other plants for this engine, in Thailand and Argentina, which are assembly only. The machined components and engine sets, which include the cylinder head, the block and the crankshaft, are exported from South Africa to the plants in Thailand and Argentina for assembly there. The castings, however, are not produced locally in South Africa – they are imported from Brazil, Austria and Thailand. The castings are the major content of the engines, but the machining and the assembly also entail high value addition. In addition, the engine oil sump (which is basically just tin pressed into shape), the wiring harnesses and small metal pressed components, are also sourced locally. The valves are imported. Volkswagen, in contrast to Ford, sources the castings for its local engine production locally in South Africa but, as mentioned above, the volumes are much lower than in the case of Ford and are declining every year. The other five assemblers do not produce engines locally at all. One of these assemblers that does not produce engines in South Africa said that tooling costs for engine plants are so high that they have engine production localised in very few locations and ship across the rest of the world. Another assembler said that it would only consider setting up an engine plant in South Africa if local vehicle production reached more than 300 000 units per year.

Similarly to the decision about localising engine and transmission production, when selecting the global supplier for a component like the instrument panel, the body in white, the seating, the door panel, etc., the assemblers also take the production volumes of their different global plants into consideration. This is of course not the only factor affecting supplier selection. But the largest assembly location has a head start in that a supplier that has a factory close to that location will be chosen, rather than a supplier that does not have a factory there, even if it

has one close to the assembly plant in South Africa. The nomination decision by the assembler regarding the global tier 1 suppliers is usually taken about three years before a vehicle model goes into production so that all the necessary investments can be made, and the assembly lines, machines and tooling can be set up.

The supplier that is chosen as a global supplier is responsible for making sure that it supplies all the assembly plants for that vehicle model. Because of the significant size of the South African automotive industry, with 600 000 vehicles produced annually since the mid-2000s, many multinational suppliers have manufacturing plants in the country. Of the top 30 automotive suppliers by revenue in 2019, 15 have direct subsidiaries in South Africa (Berylls Strategy Advisors 2020). Hence, there is a good chance that a supplier that is chosen as the global supplier for a model will already have a plant in South Africa, and the fact that it has a plant in South Africa might even have tilted the decision in their favour. As established, however, even though the Polo, the Hilux, the Ranger and the C-Class all have significant production volumes in South Africa, none of the South African assembly plants are the largest production locations for that particular model. Therefore, it happens that some global suppliers decide against setting up shop in South Africa because the production volumes are not large enough to provide the scale economies that would justify the investment. Together with the automotive policy of South Africa, which has made importing original equipment components relatively cheap, imports are often the favourable option for lead firms compared to localisation.

In general, the assemblers expect the chosen global suppliers to follow them to their different global assembly locations. They prefer tier 1 supplier localisation because of logistics costs, lead times, currency risks, and the JIT and JIS requirements of contemporary automotive production (Bennett and Klug 2012; Wagner and Silveira-Camargos 2011). This, combined with the hesitancy of multinational suppliers to invest in a low-volume location like South Africa, often leads to a specific sort of compromise. The global supplier invests in setting up a production location in South Africa, or in upgrading an existing one when the model is renewed, but that investment remains limited to the assembly of imported sub-components. In this way, the global supplier can fulfil the assemblers' JIS and JIT requirements by assembling imported components in the required time and sequence. But the investment remains a rather superficial one and does not cost the supplier too much. In the case of suppliers of body parts, this means that they import stamped components from outside of South Africa. The South African plant just welds these imported sub-components together and adds some final touches to the assembled component. A deeper investment would be to localise the manufacture of the sub-components, in this case by investing in stamping presses and the required tooling. Of the multinational body part suppliers that we visited, the majority do not do their stampings in-house.

Figure 2: Exemplary instrument panel and its individual components



Source: Yanfeng Automotive Interiors (YFAI); Volkswagen Oshkosh.

One can imagine localisation as a step-by-step process. Let us illustrate this with the example of an instrument panel (see Figure 2). One option is for the global supplier of the instrument panel not to set up shop in South Africa at all and to simply ship the product to the assembler. The first step of localisation is to set up an instrument panel assembly plant in South Africa, for which all the sub-components that go into the instrument panel are still imported, but are assembled locally to form the instrument panel that is then supplied to the vehicle assembler. This then opens the door for some sub-components to also be localised. Certain bulky injection-moulded parts that go into the instrument panel can be produced locally instead of being imported. But the localisation of this production will only be undertaken by the global supplier or a sub-supplier if the volumes are sufficient to pay back the investment in the machines and the tooling.

What tends to be localised in South Africa are manufacturing processes that give a supplier the flexibility to produce for different vehicle components, as well as for different vehicle models/assemblers. One interview partner called this 'shared technologies'. These technologies include, for example, injection moulding, metal pressing, casting and forging. Injection moulding is a common technology with which one can produce plastic products for different automotive components. Injection-moulded products are used as sub-components in instrument panels, or as sub-components in heating, ventilation and air conditioning (HVAC) systems, or as something like a plastic wheel fender. The technology to produce these different products is the same and it is easier to generate economies of scale in production by producing for different components and vehicle models.

Similarly, metal pressing as a technology can be found across different vehicle body parts, but also in the exhaust system. Casting and forging can produce sub-components for the engine, the suspension system, for the wheel or for the axle. It is not surprising that these shared technologies are the ones most South African component suppliers operate in (see Black et al. 2018, and Section 5 below). Beyond such shared technologies, the local automotive production volumes are often insufficient to justify an investment in South Africa. The

problem is intensified by differences between assemblers and vehicle models. In the case of evaporators for HVACs, one supplier reported that each assembler has a different specification for the material and the technology to be used for the coating. In the case of an instrument panel, one assembler has ten chrome-plated sub-components, while two other assemblers have no chrome-plated components at all. The business case for the localisation of such technologies is much weaker than the business case for the localisation of shared technologies like plastic injection moulding.

A multinational mega-supplier that supplies HVAC systems to six South African vehicle assemblers reports that its local content includes injection-moulded plastic components (from imported plastic resin), foam rubber seals (from imported rubber) and tubes made from local aluminium. The remaining parts, which include fewer shared technologies in production and have higher scale requirements, like heaters, evaporators and blower motors, are imported. The assembly and the brazing of the evaporators happens locally, but the sub-components are produced outside of South Africa. The coating of the evaporators is not undertaken locally either, because the volumes are too small for an investment in a local coating/cladding plant. Overall, the common picture is that global suppliers sometimes refuse to open a plant in South Africa or, if they do so, they set up a final-touches assembly plant without much local manufacturing and sourcing. The assemblers generally do not get involved with telling a tier 1 supplier whether to source sub-components locally or whether to import them. It was reported by the multinational suppliers that the latter approach is more common among the assemblers in South Africa. They sometimes earmark larger components or modules at the tier 1 level for localisation, but do not go down to the level of sub-components. This helps to explain the prevalence of global supplier operations in South Africa with local assembly, but high levels of importation of manufactured sub-components, and thus a weak local lower-tier supplier base.

What was commonly reported across assemblers was that electronics and telematics component manufacturing is totally absent from South Africa, except for the assembly of wiring harnesses. All the vehicle radios, displays, printed circuit boards and other electronic modules are imported. While there are headlights and instrument panel assemblers in South Africa, they import all the electronics, such as the display for the instrument panels. All the local assemblers have in-house paint shops, but three out of the seven assemblers do not have an internal press shop. Another one is currently setting up a press shop in response to a recent expansion of vehicle volume capacity. The assemblers without an internal press shop still source some of their body parts locally from suppliers, but a large chunk is also imported. All of this, in combination with the often assembly-focused operations of the multinational suppliers with plants in South Africa, explains the low levels of true local content observed.

4 Local Component-Manufacturing Firms in South Africa

The rationale for increasing local content to develop a domestic manufacturing base and to deepen a local supply chain is linked to multiple objectives. On the one hand, it responds to the attempt to reduce dependence on foreign firms and investors, and to limit the inflow of imported components. On the other hand, it reflects the developmental ambition to trigger local spillovers, build intersectoral linkages and boost demand for local infrastructure, services and workers. At the same time, the development of local firms, of competitive niches and of local productive capabilities, can be an indicator of increasing global competitiveness and be linked to growing participation in international markets. This section focuses on the localisation issue from different viewpoints. First, it outlines the theoretical case for increasing localisation. Second, it frames localisation as a policy imperative within the South African context. Third, it draws on interviews conducted with local auto component manufacturers and business associations in South Africa to highlight actual obstacles to further localisation. In this regard, the analysis of the responses provided by local actors helps to distinguish between different types of constraints: policy-induced, market-related and capability issues. Overall, the paper aims to contribute to an identification of exogenous and endogenous factors that play along the country's declared policy goals, and to a discussion of real opportunities for deeper localisation.

4.1 Developing and Integrating Local Component Suppliers into GVCs

The fragmentation of global manufacturing, with the productive models, the organisational structures and the geography of production determined by increasingly GVC-led industrialisation, pose numerous challenges to industrialising developing economies (UNIDO 2021). The possibility of industrialising via integration into GVCs per se offers a range of opportunities, but also embodies the risk of further economic exclusion and significant barriers to entry. The increasing technical complexity of automobiles and the wider global reach of automotive OEM lead firms has led to a situation in which these OEMs have outsourced more design and production activities to tier 1 suppliers. To fulfil the demands of the OEM lead firms in terms of design and R&D activities, as well as having a global supply footprint for the various production locations of the OEMs, these tier 1 suppliers themselves have had to become much bigger. Through a wave of mergers and acquisitions at the tier 1 supplier level, this has caused a global 'rationalisation' of tier 1 component manufacturers, which have become global mega-suppliers. They have been able to capture more value by reaping economies of scale at the global supply level and getting involved in more high value-added activities in innovation, R&D and product design (Sturgeon et al. 2008).

On the other hand, this has led to a more competitive environment for component manufacturers from developing and emerging economies that struggle to operate at the global supply level against these mega-suppliers. While automotive lead firms used to rely on

local suppliers and local design in their production locations in the past (Humphrey and Salerno 2000), they now tend to source from their global mega-suppliers via follow sourcing and imports. Still, given that over 60% of the value of a vehicle lies in the production of parts, developing a local base of component manufacturers remains a crucial development tool for industrialising countries wishing to maximise local development benefits and to integrate into global production networks. Overall, countries aiming to develop their supplier base (like SA), and firms pursuing upgrading and global integration, face significant challenges. These are not only related to the dominant role of global tier 1 suppliers, but also to the available policy tools in an era ranging from WTO-regulated trade and established free markets, to structural economic issues (e.g. labour market structures and skill availability) and market competition overall. We explore some of these issues with reference to the South African case.

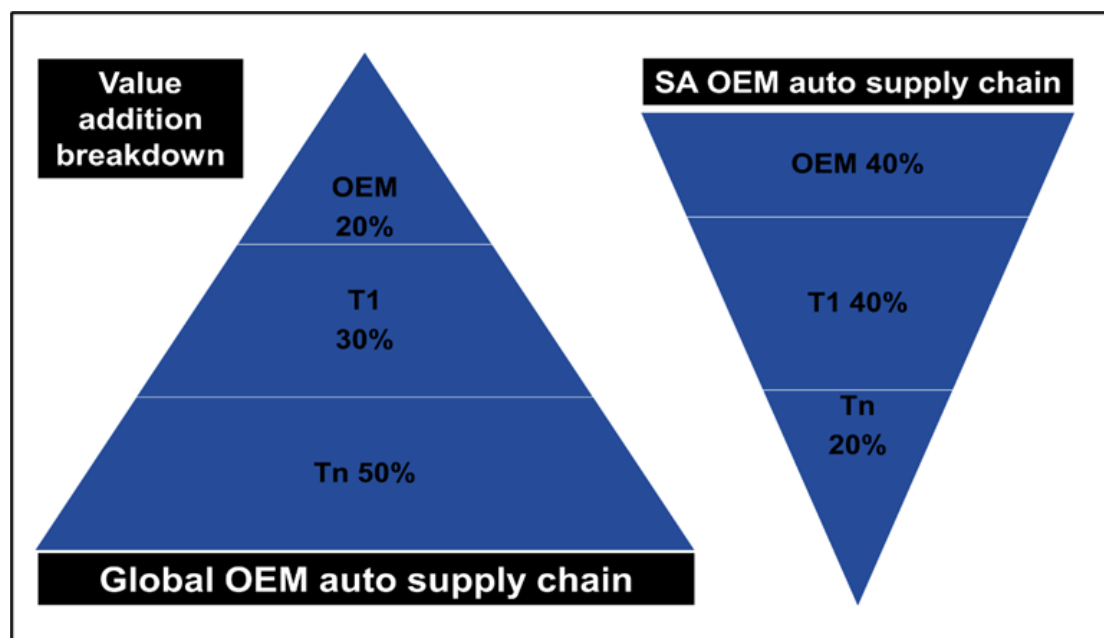
Overall, promoting the development of a local manufacturing base has become increasingly difficult, given the multiplicity of free-trade agreements impeding the use of import-substitution measures, tariff barriers, local content prescriptions and quotas (Doner et al. 2021). Confronting a reduced number of protection tools compared to earlier industrialisers, newly industrialising countries are forced to rely on alternative measures to attract investments, to promote competitive niches and to defend their local producers. Within a globally liberalised trade environment, the competitiveness and bargaining power of small African manufacturers seems rather weak. However, the newly launched African Continental Free Trade Area (AfCFTA) might entail some new opportunities to develop regional value chains and strengthen intra-continental trade routes (Black et al. 2021). From a policy perspective, GVC-led local industrial development, and auto industrialisation in particular, place an ever stronger emphasis on the bargaining relationship with multinational assemblers, whereby securing contracts for a few, competitive local components becomes a more convenient strategy than the costly attempt to establish national champions (Doner et al. 2021). In this regard, efforts to counter global sourcing (see previous section) and to localise previously imported components become crucial, and localisation initiatives become part and parcel of strategies to boost the integration into GVCs.

4.2 Localisation and Supply Chain Deepening: South Africa's Policy Imperative

As highlighted before, localisation and supply chain deepening are two of the policy priorities South Africa has been pursuing actively as part of the 2035 South Africa Auto Masterplan (SAAM). Such imperatives stem from the need not only to sustain the industry, but to increase local ownership, enhance inter-sectoral linkages and generate higher employment rates. They also depend on the current structure of the South African auto supply chain, and rest upon observed opportunities for further localisation. Indeed, while local content in South Africa barely reaches 40% (against a target of 60% by 2035), the local supply chain is properly

truncated, with a base of tier 2/3 component suppliers that has been shrinking over time (Black et al. 2018).

Figure 3. Breakdown of value addition of global and South African automotive supply chains



Source: Barnes (2014).

The concentration of assets and value produced around foreign OEMs, and mostly multinational tier 1 suppliers, has been linked to several factors. On the one hand, the sector mirrors the rest of the economy, with highly concentrated wealth and an orientation towards foreign capital, still limited (but growing) local/black entrepreneurship, and insufficient transformation. Secondly, the structure of the supply chain has been affected partly by the same system of state incentives, and in particular by the rebate mechanism. Whilst aiming to encourage export, the possibility to offset imports never managed to actually limit the inflow of imported components, still allowing for significant global sourcing (see previous section) and even leading to negative trade balances. For many years after 1995 (MIDP and progressive liberalisation), OEMs and large tier 1 suppliers did not experience extreme pressure to localise and continued relying on foreign suppliers for both components and raw materials. Since the last years of the APDP, and thanks to the 2035 SAAM, objectives related to localisation, supply chain development and transformation/black economic empowerment have become more interconnected, government pressure to achieve them has become more stringent, and initiatives in this regard have multiplied (see Black et al. 2018). In addition, the premium on export and local production – as we will see shortly – mostly went to OEMs, with indirect exporters/suppliers rarely benefitting from the available incentives. Finally, the development of the local supply chain reflected the nature of the components being manufactured locally and exported, largely constituted of catalytic converters and

commodity-type components (e.g. metal pressing and plastic moulds), whose value is diminishing over time (Monaco et al. 2018). The localisation of higher value-added components, like powertrains and electronics, remains particularly difficult for multiple reasons that we will highlight in the next section.

Overall, the South African auto industry has grown, mostly in terms of export (not including the Covid-19 crisis) and domestic productive capabilities, but the growth generated has not translated into sufficient local development, or into the proper integration of local component suppliers into global value chains, maintaining a very outward-oriented character. Ultimately, the further localisation of auto parts and the development of the local supply chain remain an important challenge, fraught with constraints and structural obstacles. We will unpack these by voicing the perspectives of local component manufacturers. Before that, we provide new data on the number and activities of local automotive component manufacturing firms in South Africa based on our fieldwork.

4.3 New Data on Local Component Suppliers in South Africa

While the National Association of Automobile Manufacturers has good data available on multinational automotive component suppliers in South Africa, there is no comprehensive database of local component firms in the country. The extensive fieldwork in 2021, both online and through field interviews and factory visits, allowed us to fill this gap. Based on the interviews with policymakers, industry associations, lead firms and component suppliers, we conducted a mapping of domestic component suppliers in the country. While we cannot be sure that the list is exhaustive, there is little chance that there are significantly more firms than those that we identified. We cross-checked the list of firms with NAACAM and other automotive firms, and eventually did not come across any new names. In addition, the fieldwork data was complemented with and checked against newsletters and articles by NAACAM and its sub-organisation ASCCI (Automotive Supply Chain Competitiveness Initiative), member lists and newsletters of the regional automotive industry associations, namely AIDC (Automotive Industry Development Centre) in Gauteng, DAC (Durban Automotive Cluster) in KwaZulu-Natal, and ECAIF (Eastern Cape Automotive Industry Forum). At the end of this process, we arrived at a list of 84 companies, of which 25 were interviewed and 19 were visited during fieldwork. This allowed us to present a comprehensive overview and understanding of domestic automotive component manufacturing firms and the challenges they are facing.

Table 2: Local automotive component firms in South Africa

Component category	Number of firms	Share of total employment
Metal forming and pressing	29	24.3%
Automotive trim	18	10.4%
Foundry, casting and forging	9	9.8%
Plastic moulding	6	9.7%
Machining	5	2.3%
Cables	4	0.9%
Rubber moulding	3	1.9%
Windshields	2	6.6%
Batteries	2	9.6%
Trading	2	0.2%
Wiring harnesses	1	11.9%
Filters	1	8.3%
Heating, ventilation and air conditioning (HVAC)	1	3.1%
Electronics	1	0.9%
Total	84	100% (21 766)

Source: Authors. Component categorisation and employment figures according to NAACAM, online research and interviews with domestic component firms.

Table 2 displays the 84 identified local component firms according to the component categories in which they are operating. Seventy-four per cent of all firms operate in the areas of metal forming/pressing, automotive trim, casting and forging, and plastic moulding. This is in line with previously presented data on the domestic manufacturing space of automotive components in South Africa (Black et al. 2018: 23). These component categories and associated manufacturing technologies are ‘shared technologies’, as explained above. The domestic component firms focus on the manufacturing of sub-components, examples of which are provided in Figure 4, and rarely engage in assembly and high value-added activities. The only exceptions are a few firms that are mainly part of the automotive component holdings Metair and KAP Automotive, and are based on joint ventures or technology agreements with global tier 1 suppliers. None of the domestic component suppliers operate based on proprietary technology or engage in product design and development.

Figure 4: The dominant components produced by domestic suppliers



Source: Pictures provided by component suppliers in South Africa.

The domestic component firms are more in number than the multinational component firms, but employ fewer people. According to NAACAM, there are 76 multinational component suppliers in South Africa, which together employ more 33 500 people – in comparison to the 84 domestic firms, which employ 21 800 people (see Table 2).

4.4 Obstacles to Localisation: The Perspective of Local Component Suppliers

From our interviews with local component manufacturers, the National Association of Automotive Component and Allied Manufacturers (NAACAM) and different organisations involved in localisation studies,³ we could draw conclusions on the environment in which local

³ Including NAAMSA – the Automotive Business Council of South Africa (National Association of Automobile Manufacturers, i.e. the vehicle assemblers), the Durban Automotive Cluster (DAC), B&M Analysts, and the Automotive Industry Development Centre (AIDC).

component suppliers operate and the challenges they are facing. Overall, we can group what emerges as obstacles for local component manufacturers to expand their productive capacity and to secure more significant global contracts into different sets of issues. In turn, these can be attributed to a) policy issues, b) structural issues, mostly value-chain related, c) market-related impediments, and d) capability issues.

In the first group we find, for example, the incentive structure of the different auto policies (MIDP, APDP). Specifically, the rebate mechanism allows auto firms to increase their import allowance by augmenting their exports. However, due to the predominantly indirect exporter role of local auto component manufacturers, credits are only accessed by OEMs and large tier 1 multinational suppliers, while smaller suppliers remain cut off. In addition, the same rebate mechanism has been linked to the widespread use of follow sourcing, with foreign OEMs introducing their own suppliers into the country, rather than drawing on local capabilities and skills. The third policy issue raised by the interviewed companies concerns the need to comply with increasingly stringent BBEE (broad-based black economic empowerment) criteria. Although these are meant as an incentive for transformation and increasing local ownership, they are seen as discouraging foreign investors and preventing the optimal utilisation of entrepreneurial capacities.

Partly depending on the structure of the global auto chain, and partly linked to specific business strategies, we found a series of structural impediments that limit the options available to component manufacturers and their opportunities for growth. One of these is the inherent power disparity embedded in the use of the built-to-print model, which concentrates decisions on components and their specifications in the hands of OEMs, largely constraining the leeway of component suppliers in terms of product manufacturing and input sourcing. The concentration of design and R&D capabilities at the top of the value chain also constrains local development. Likewise, and partly related to local productive capabilities, the ownership and control of tools by the OEM reduces local capacity. In a few cases, the firm makes its own tool, but these are rather exceptions. When exploring the feasibility of localising high value-added components, like powertrains, which would allow for a substantial increase in local content levels, the lack of made-in-house tools becomes a particularly costly burden, hampering the financial viability of the project because of import and maintenance costs.

Another issue connected to the structure of the global value chain revolving around international platforms is the requirement that suppliers need to have an 'international presence' to obtain contracts with global vehicle assemblers. South African component manufacturers do not have this international footprint and are unlikely to be able to sustain international competition in this regard, hence missing 'global' opportunities. Overall, such structural issues are just indicators of an overarching power imbalance between GVC lead firms and local component suppliers, whereby the decisions on the sourcing and

manufacturing of components lie disproportionately in the hands of the former, and localisation strategies depend almost fully on lead firms' investments.

As far concerns market opportunities are concerned, South African component manufacturers face a range of barriers. Most importantly, they confront a significant difficulty in developing economies of scale: even in the presence of localisation opportunities and available capabilities, production volumes are not enough. NAACAM calculates that the minimum threshold to make localisation projects viable is 80 000 units, below which competitive prices cannot be offered at all. In this regard, even where local productive capabilities exist, South Africa is not able to win over much cheaper competitors – especially from China – which can produce much higher numbers at much lower unit costs. Low volumes, labour costs and input prices are also the reasons why making tools in-house becomes extremely expensive.⁴ Non-competitive market prices also explain why South African firms continue to import raw materials, despite their local availability.⁵ While the reason for this often lies upstream (e.g. SASOL not selling PVC and PPP at competitive prices; see Bell et al. 2021), another explanation relates to the complex specifications required by the OEMs, which require extensive and expensive testing processes. Unlike plastics, steel products benefit more accessible inputs, and thus tend to have higher local content. Overall, given the actual availability of raw materials in the country, most of the current localisation studies are exploring possibilities for local beneficiation (e.g. plastic resins for bumpers).⁶ Finally, a crucial market-related issue that also hampers the development perspectives of SA component manufacturers is the heavy fluctuation in exchange rates that frequently discourages investments.

At the local level, issues related to both productive capabilities and available infrastructure strongly influence possible localisation plans: while unreliable infrastructure (especially electricity, see Eskom crisis) diverts investors and undermines local productivity, the lack of adequate training and specialised skills (e.g. moulding, tool making, painting) also affects firms' decisions and performance.

5 Conclusion: Sustainable GVC Integration and Local Development – Which Way Forward?

South Africa's integration with the automotive GVC over the last three decades provides a useful case study to understand the challenges and opportunities that come with linking up to the global automotive production system. Lead firm decisions – in this case mostly global

⁴ One firm reported that its subsidiaries in South Korea or India can make tools at one sixth of the factory price in South Africa.

⁵ For more on this, see Wuttke (2022).

⁶ The NAAMSA Localisation Council is currently considering options related to steel, copper, polypropylene and aluminium.

assemblers but also multinational tier 1 suppliers – fundamentally shape the possibilities for localisation. Economies of scale and logistics costs are key drivers of their strategic decisions. In that regard, the successful integration of South Africa’s automotive industry into the global vehicle platforms of several assemblers has been a significant achievement. It ensures that South Africa’s automotive industry continues to exist, and the successful penetration of export markets has provided economies of scale for local component suppliers beyond the constraints of the domestic market. The automotive policies of the South African government, however, have not sufficiently encouraged assemblers and multinational tier suppliers to localise more manufacturing activities in the country. They were allowed to comfortably rely on their global follow-sourcing strategies, which have undermined the lower tiers of South Africa’s component industry. From a governance perspective, the development of the South African auto industry has consolidated the bargaining power of large assemblers and multinational firms, reducing the policy space of the state and making domestic component manufacturers largely dependent on the strategic decisions of the leading firms.

From a market viewpoint, the South African case illustrates the centrality of production volumes and economies of scale. Without attracting automotive investment by providing an attractive proposition to multinational assemblers and tier 1 suppliers, there will be no local production. But once such an investment has been attracted, there is a need for policy to also make it attractive for the multinational firms to source locally manufactured sub-components, and to encourage local development spillovers. The South African government has a tool at its disposal to do so, and it seems that it is now trying to use it. During the last revision of the automotive policy regime, the incentives were made more dependent on local value addition. The changes were only implemented in July 2021, so their effect remains to be seen. Arguably even more important, however, is to acknowledge and understand the challenges that local component manufacturers are facing. This paper has provided an overview of these challenges from the perspective of South African component firms. Government policy should try to alleviate some of these constraints to strengthen the competitiveness of the local component base, which would also make local sourcing more interesting from a lead firm perspective.

Lastly, it is important to acknowledge that relying on foreign lead firms will always have certain limitations. Eventually, they are the ones calling the shots regarding what kind of and what extent of vehicle production is localised. Local policy must adapt to these conditions and always bear in mind that production volumes and economies of scale are the fundamental determinant of localisation possibilities. Such constraints, as well as the reliance on foreign R&D and therefore limited domestic technology development, can only be circumvented if domestic lead firms are nurtured. This, however, is much more difficult to pull off than the road of integration with foreign assembler-led GVCs (Barnes et al. 2021; Doner et al., 2021). The transition to electric vehicles could possibly provide a window of opportunity for

developing countries to leapfrog and to develop domestic lead firms and domestic technology (Alochet and Midler 2019).

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